Profile of a Welsh county coalfield - the Denbighshire coalfield

1850-1914

by

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"Coal in truth, stands not beside, but entirely above all other commodities. It is the material energy of the country.....and commands this age – The Age of Coal."

W.S Jevons
The Coal question (1865)

Summary

During the nineteenth century the British coal industry fuelled industrial growth to such an extent that Great Britain was acknowledged as the most powerful industrial country in the world. Although the coal industry was dominated by the larger regional coalfields, e.g. south Wales, the smaller coalfields also made an important, albeit largely local, contribution. This contribution has, however, often been ignored; most histories either concentrate on the larger coalfields or, if examining small coalfields, they have centred on a particular event or town rather than on examining the contribution of each coalfield as a whole. This thesis will partly redress this imbalance by undertaking a 'case study' of a small, county coalfield, Denbighshire. For official purposes, Denbighshire was never considered a coalfield in its own right, it was merely recognised as part of the north Wales 'coalfield'. It is, however, argued in this thesis that geological factors and its significance within the north Wales coalfield, mean that Denbighshire warrants consideration as a small coalfield in its own right.

This thesis attempts to develop, for the first time, a definitive history of the coal industry in Denbighshire, 1850-1914, through the use of an archival approach. Source material, including company records, newspapers, personal letters and official statistics, was examined. The thesis considers not only the performance of the coalfield in terms of productivity and profitability but also the various stakeholders in the coalfield, i.e. those people who, either directly or indirectly, influenced, or were influenced by, the development of the Denbighshire coal industry.

Apart from establishing that Denbighshire should be treated as a small coalfield in its own right, it is concluded that the performance of Denbighshire was comparable to that of other 'small' coalfields and that, although affected by similar influences to other coalfields, the extent of their impact could be different.

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This thesis is dedicated to my mother, Valmai, who did not live to see its completion.

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Introduction

The purpose of this thesis is to examine the economic history of the Denbighshire coalfield between 1850 and 1914 with a view to providing as comprehensive a picture as possible of the coalfield's development over this period, in particular, establishing how and why the coal industry was able to develop in the county and examining some of the problems that had to be faced along the way. This thesis will establish the economic conditions which prevailed in the region in the period up to 1850 before carrying out a detailed examination of the people and events which allowed the coal industry to become the most important industrial employer in Denbighshire in 1914, employing 12,982 men working in 26 collieries (British Library, hereafter BL, BL/BS/27/1). The vast majority of these collieries were located in Wrexham and its immediate environs, and the growth of the coal industry had an enormous impact on the town. Between 1841 and 1911 the population of Wrexham grew from 5,854 to 18,377, an increase of 214 per cent (WA Williams, 2002) and, according to Dodd (1957: 145), it was the expansion of the coal industry that was chiefly responsible for the growth of the town.

Rationale

When one thinks of the coal industry in the United Kingdom the areas that are automatically associated with this industry are probably south Wales, Yorkshire and the north east of England. Smaller coalmining regions, such as north Wales, are not, generally, considered as being of any significance in the national context, though, within their own own regions/localities, the coal industry could be a major 'player' in the industrialisation process. This was the case in north Wales where the coal reserves are concentrated in the north east of Wales, in Flintshire and in Denbighshire. However, the coal reserves of north Wales are not shared equally by both counties, the 'Bala fault' acting as a major geological barrier

between them and, in effect, creating two coalfields completely independent of each other (see Chapter 1, page 27 for further details).

From 1850, the growth of the coal industry in north Wales is essentially a story of the growth of the Denbighshire coalfield. Hence this thesis focuses on developments in Denbighshire where coalfield activity centred around the towns of Wrexham and Ruabon. It is important, at this point, to recognise that, for official, statistical, purposes the 'Denbighshire coalfield' was never considered a coalfield in its own right, it was simply a region within the north Wales 'coalfield'. It is the contention of this thesis that the term 'the north Wales coalfield' does not reflect the 'reality' of the coal industry in north Wales, it was simply a convenient 'badge' for the region and it is more 'useful' to discuss the individual coalfields, Denbighshire and Flintshire, as distinct entities that come within the 'north Wales' umbrella. As a consequence this thesis will only use the term north Wales 'coalfield' when it is impossible to break down official statistics into their 'component parts' because of the way the statistics were compiled.

In 'coal' terms north Wales has always been a "minor region" (Church, 1986), barely worth a mention in the many books written on the UK coal industry. Indeed, for statistical purposes, compilers often included the north Wales figures with those of 'Lancashire and Cheshire', which illustrates the 'unimportance' of the region on a national level. It therefore follows that, being only part of an already marginal region, Denbighshire has received little or no detailed attention by previous historians. Given the importance of the coalfield to Denbighshire's industrial past, however, it is surprising that very little has been written specifically on the Denbighshire coalfield. Although north Wales-wide studies have been carried out by Rogers (1928) and Gildart (2001), the only major study of the Denbighshire coalfield conducted to date is that carried out by the locally acclaimed historian GG Lerry in the 1950s. However, despite its importance in recording the various mines, their history and chronology, he did not attempt to explain why the Denbighshire coalfield was able to expand as it did, neither does his work consider who invested in the coalfield, who were the other major stakeholders or how the coal companies that were founded actually performed.

This thesis is an attempt to redress this imbalance and seeks to provide the most comprehensive study of the Denbighshire coalfield to date.

As mentioned above, smaller coalfields have tended to be ignored by writers and historians of economic and industrial history. However, it is the contention of this thesis that a detailed study of a small coalfield allows insights to be made into issues that might not be apparent in a broader study. For example, it can illustrate how specific events, such as strikes, or problems with sinking, impact on the profitability of particular companies within the coalfield. In addition, such a focused study will allow comparisons to be made with larger coalfields which will demonstrate whether issues that were important in these regions were of the same significance in smaller coalfields, or whether completely different, localised issues dominated.

Aims

The main questions that this thesis will attempt to throw light upon are:-

- Can Denbighshire be considered a coalfield in its own right?
- What were the obstacles to economic and industrial development that faced the Denbighshire coalfield in the early nineteenth century and how were these overcome?
- Who were the coalowners and shareholders who invested in the coalfield and were they similar in background to shareholders in coal companies elsewhere?
- Who were the other major stakeholders in the coal industry in Denbighshire and what was the nature of the relationships between these stakeholders and the coal companies?
- How did the coal companies of Denbighshire perform? In this context we will look at two measures of performance, productivity and profitability, to determine how Denbighshire 'performed' in comparison with other coalfields.

- Does examining a small coalfield offer insights into issues that might not be revealed by studying a larger coalfield and were these issues different from those being raised in larger coalfields?

Methodology

Approach

Before outlining the methods used to achieve the aims of this thesis, it is necessary to establish what 'type' of research has been undertaken. Research has many connotations, not least the belief that it means that something new will be 'discovered', such as a new planet or a new miracle drug, or that surveys and questionnaires need to be completed to allow new conclusions to be drawn. However as Jordanova (2006: 23) explains, 'research' "is rather loose and under-determined in its meaning". To some, research, even historical research, is not research unless it is 'scientific', or 'positivist', and involves empirical methods which test one hypothesis or another. Essentially it is about facts and figures which should not be 'coloured' by the preconceptions of the author (Tosh, 1991: 131). To others, historical research is equally valid when it is 'idealistic', i.e. 'interpreted' by authors who have an "imaginative identification with the peoples of the past" (Tosh, 1991: 132). However, research methods are not always mutually exclusive and it is often difficult to allocate research simply to one category or another. Consequently, as with this thesis, a 'mixed' approach has to be taken. While a wholly scientific approach has not been possible, due to the limited data available and hence the need to interpret certain data, some quantitiative data has been extracted which has allowed the author to 'measure' Denbighshire's performance against hypotheses produced by other historians, to establish whether Denbighshire accords with 'accepted' views. However, as Jordanova (2006: 51) explains "it is unfortunate to isolate quantitative from qualitative work; they are best seen as complementary". As a result, the author has had to, in some cases, interpret facts or events and make suppositions that

can in no way be seen as definitive conclusions, but are acceptable if using an idealistic approach.

According to Marwick (1989: 199) historical research involves "diligent and systematic investigation .....to address precise problems and extend human knowledge in a particular area". This thesis, by means of such investigation, will attempt to determine the factors that help explain the development of the Denbighshire coalfield which, it is hoped, will add to the body of knowledge of small coalfields by providing a comprehensive study of an, hitherto, un-researched area, namely, Denbighshire.

Having established that the research undertaken to achieve the aims of this thesis falls into the 'mixed' category, we can now turn to the sources and methods used.

Sources

According to Jordanova (2006: 32) "when we talk about sources it is conventional to divide written ones into 'primary' and 'secondary'". Primary sources are usually considered to be sources that "came into existence during the actual period of the past which the historian is studying.....while secondary sources are those accounts written later by historians looking back upon a period in the past" (Marwick, 1989: 199). However this distinction is not always clear cut and "what is a primary source for one project might be a secondary one for another, and vice versa" (Jordanova , 2006: 101). Jordanova (2006: 101) cites journalism as an example; she explains that newspapers can be seen as secondary commentary for historians, but to historians of journalism they would be primary sources. This view, however, does not coincide with that of Tosh (1991: 37) who considers the press to be "the most important published primary source for the historian". According to Tosh (199: 37-38) "newspapers have a threefold value"; they "record the political and social views which made most impact at the time", they "provide a day to day record of events" and they "from time to time present

the results of more thorough enquiries into issues which lie beyond the scope of routine news-reporting".

An additional source that can be disputed as primary or secondary is what Saunders et al. (1997: 160) describe as "documentary secondary data". This includes "notices, correspondence, minutes of meetings [and] reports to shareholders" (Saunders et al., 1997: 160). For a student studying a business issue, for example, human resource practices, such documents might indeed be considered a secondary source, but for the historian studying the business itself, then these documents would be seen as primary sources rather than secondary.

For the purposes of this thesis, newspapers have been treated as a very valuable primary source, as have company archives consisting of minute books, financial statements, official government returns, correspondence etc. Additional archival material treated as primary sources includes the minutes, reports and correspondence of various Denbighshire mining unions, the autobiographical notes of Edward Hughes, union leader, various Acts of Parliament and official returns such as the *List of Mines*. Much of the archival material relating to the coal companies and the unions is available at the Denbighshire and Flintshire County Archives at Ruthin and Hawarden respectively, however some of the archival material relating to the coal companies is also held at the National Library of Wales, Aberystwyth. The official returns to the Board of Trade can be found at the National Archives, Kew, while the *List of Mines* are housed at the British Library.

These sources provide a mixture of qualitative and quantitative data. The quantitative data, for example, such as figures relating to turnover, employment or Output per Man Year (OMY), allows various performance trends to be analysed. These have then been underpinned by the qualitative primary information that was available or by the secondary sources which has included books, journal articles and web-based sources.

Comparators

Throughout this thesis comparisons will be made with other UK coalfields that are considered 'small' which, for the purpose of this thesis, are those that contain fewer than three per cent of the total number of collieries in the UK (see page 51 below). In addition, south Wales will be used as a major comparator throughout the thesis; not only is there an abundance of literature on south Wales but both coalfields began to develop at about the same time, faced many of the same problems throughout the period under review, and were subject to certain, common 'Welsh' influences, such as 'non-conformism'.

Caveats

One of the main 'stumbling blocks' to studying a coalfield such as Denbighshire is that, as outlined above, it was never considered, for official returns purposes, a 'coalfield' in its own right, it was only part of another insignificant coalfield. Output and employment figures were compiled for north Wales, from 1874, in Hunt's *Mineral Statistics,* however, statistics relating simply to Denbighshire are often more difficult to come by. From 1894 employment figures for individual collieries are available from the annual *List of Mines* and from this it has been possible to calculate annual totals for the coalfield itself. Although Hunt presented OMY figures for Denbighshire, these were calculated using the output and employment figures given in his *Mineral Statistics*, and the employment figures sometimes differ from those extracted from data in the *List of Mines.* Consequently, the OMY figures for Denbighshire that are included within this thesis are those calculated by the author from the employment figures given by the *List of Mines.*

Another problem relates to the availability of archival material. As Tosh (1991: 134) explains, "the primary sources available to the historian are an *incomplete* record... [either by]..... accident or design". When the original proposal for this thesis was put forward the intention was to develop 'case studies' of the major coal companies in Denbighshire to illustrate the issues

raised throughout the thesis. It had been hoped that financial and other archival records would provide sufficient evidence to allow 'company histories' covering 20-40 years to be written. However, despite extensive investigation, only one coal company's records survive to this extent (and even then with gaps), while records for other companies are intermittent and limited to say the least. This means that these archival records will be 'pooled' on a company by company basis in order to provide evidence relating to specific issues, and to inform the analysis as and when they are relevant, rather than trying to cover all issues for each company.

An additional consequence of the limited nature of the archival sources is that this thesis cannot cover developments in all the areas that might be expected to be considered in the history of a coalfield. While the thesis attempts to be as comprehensive as possible from an economic perspective, some issues, for example, changes in technology are not considered in detail due to the dearth of relevant material. Furthermore, although social issues are touched upon within this thesis, they are only discussed if they arose as a consequence of an economic issue since this thesis is an attempt to examine the economic, rather than the social history, of the Denbighshire coalfield.

Structure

Chapter 1 begins by providing an insight into the coal industry in Great Britain in the period up to 1850. Attention is then turned to Wales, both north and south, before finally looking at the economic conditions in Denbighshire prior to 1850. This provides the context for Chapter 2 which presents evidence relating to the overall development of the Denbighshire coalfield in the period 1850-1914. In this chapter we examine changes over the period in the number of mines in Denbighshire, their size, output and employment. This allows us to place Denbighshire into its context within north Wales and the UK as whole. Against this background Chapter 3 examines how this expansion was financed, looking in

particular at the capital needs of coal companies and how Denbighshire coal companies raised and spent capital.

Chapters 4 to 7 look in detail at the 'stakeholders' in Denbighshire coal companies; the owners and shareholders, the mineral owners, the employees and finally the customers. In Chapter 4 profiles of the major coalowners and shareholders are provided, as are analyses of shareholder occupations and locations. Chapter 5 then turns its attention to the mineral owners and examines, in detail, relations between the landowners and coal companies in Denbighshire. Possibly the most important stakeholder in any coal company was the miner himself, and Chapter 6 provides a detailed examination of relations between miners and owners, looking especially at the development of trade unions, both national and local. Chapter 7 then looks at the markets available to the coal companies of Denbighshire, the methods they used to sell their coal and the people who bought it.

Finally, Chapter 8 attempts to measure the performance of Denbighshire coal companies. Performance can be measured either in terms of productivity or profitability and therefore this chapter considers both. First the chapter looks at productivity; how it can be measured and the factors affecting it, before examining the productivity of Denbighshire as a whole and that of individual companies in the coalfield. The chapter then turns its attention to profitability; it looks at the income of coal companies and the factors affecting the price of coal before considering the main cost elements and the various methods used by companies to control these costs as a means of improving profitability.

Conclusions

The detailed conclusions to this thesis can be found in the final chapter but a brief summary of the main findings is presented below:

i. We show in Chapter 2 that Denbighshire was a coalfield in its own right;

ii. The history of the north Wales 'coalfield' between 1850 and 1914 is, to all intents and purposes, the history of the Denbighshire coalfield. The Denbighshire coalfield was found to be a distinct geographical 'entity' separated from Flintshire by the 'Bala' fault and between 1875 and 1914 Denbighshire's share of north Wales' output increased from 60 per cent to 80 per cent. More significantly, over this period, while the output of Denbighshire more or less doubled from 1.38 million tons to 2.64 million tons, the output of the rest of north Wales fell from 0.97 to 0.67 million tons.

iii. It would appear, from this study of the Denbighshire coalfield, that the issues that dominated the coalfield, for example, wage rates and royalty rates, were not specific to the region. Indeed, this study has not been able to establish, in any major way, that the Denbighshire coalfield was 'different' to other coalfields. What it has made possible is an in-depth study of how the universal issues affecting the coal industry impacted on a single small coalfield. Treating the Denbighshire coalfield as a 'case study' of a small coalfield, has allowed the national issues to be put into a local context.

Summary

For a thesis to be successful it must add to the body of knowledge currently existing, in other words it must find things out that were not known before. This thesis has brought together archival and other material that has allowed the development of the Denbighshire coalfield to be chronicled in a way that has never before been undertaken; this in itself constitutes an addition to knowledge. While this thesis has not been able to establish that Denbighshire was different to other small coalfields in any significant sense, it has allowed us to gain an insight into how various issues, applicable across the UK coal industry as a whole, affected individual companies on a coalfield level, an approach that has been

applied by historians such as Wale (1990). This approach has allowed us to determine whether issues which were considered important on a national level were given the same emphasis at a local level and vice versa.

If we consider the specific conclusions of this thesis, some of the more interesting findings, which enhance our current knowledge of small coalfields in the nineteenth century include the following:

- Without the railways, Denbighshire would not have developed as it did, but this, given that Denbighshire was not the only 'landlocked' coalfield in the UK, does not make Denbighshire unique.
- 'Immigrant' coalowners were far more important to the development of the coalfield than 'indigenous' coalowners. This, again, is not particularly unusual. For example, in south Wales 'outsiders' were important, though there were some important local 'players'. In Denbighshire, on the other hand, there is no evidence to show that there was any significant local involvement in the coal industry which may have been because the coalfield was never large enough to generate an indigenous pool of entrepreneurial talent.
- While 'gentlemen' made up the majority of shareholders, women constituted a significant proportion of shareholders in some Denbighshire coal companies. This latter fact might, initially, appear to be surprising. However, recent research undertaken by, for example, Freeman et al (2006), suggests that women took a more active role in share-owning in the nineteenth century than has hitherto been thought.
- Performance-wise, OMY in Denbighshire was not out of line with that of other small coalfields and Denbighshire was able to more or less maintain its contribution to the overall UK output. However, profits in Denbighshire were found to be volatile and, even during relatively good times, marginal. The volatility of profits is not unusual, it was a feature of the coal industry as a whole but, it would appear, from the evidence available, that even the large coal companies in Denbighshire never made significant profits, unlike the larger companies in, for example, south Wales.

This research allows us to conclude that a study of a small coalfield, such as Denbighshire can offer an in-depth insight into how a coalfield develops, the obstacles it had to overcome and the stakeholders that combined to 'back' its development. This, when combined with national studies of the coal industry and studies of the larger coalfields, enhances our understanding of the issues that faced those involved in the nineteenth century coal industry.

Chapter 1

THE COAL INDUSTRY IN BRITAIN, WALES AND DENBIGHSHIRE TO 1850

Introduction

The purpose of this chapter is to put into context the subsequent study of the Denbighshire coal industry from 1850. Denbighshire was a small, and insignificant coalfield in the context of late nineteenth century British coal industry but, in the context of north Wales, in the period after 1850, it developed significantly, employing large numbers of men. This chapter will therefore briefly examine developments in the coal industry up to 1850. We examine first the British coal industry as a whole, then Wales, both north and south, before finally looking in detail at developments in Denbighshire.

Britain

In the nineteenth century, "the British coal industry came to be regarded as one of the three or four staple industries of the country" (Mitchell, 1984: 1), but before 1800 it had played only a minor role in the industrial history, to the extent that there was an industrial history, of Britain.

On the whole, until the seventeenth century, any coal that was mined was usually dug from surface deposits (Griffin, 1977: 16), and any 'coal industry' that existed was centred on the north east, where the Tyne Valley had a "virtual monopoly of the coal trade" (Buxton, 1979: 3). The reason for this predominance was the relative ease with which the coal could be transported to its main market, London and the south, by sea. Buxton (1979: 3-4) claims that 40 per cent of the British output in 1700 was carried by water (sea and/or river), and it was not until the means of transportation began to improve in the mid to late eighteenth century, that the "overwhelming dominance" of the north east region began to weaken.

By 1700, "England had almost certainly become the largest coal producing and consuming country in Europe" (Buxton, 1979: 6), Mitchell (1984:1) believing that this had little to do with developments in the coal industry itself, but everything to do with technological changes in other industries, which increasingly needed coal as a source of power. This view is upheld by Buxton (1979: i) who asserts that the coal industry did not suddenly make the Industrial Revolution start, but "facilitated and speeded up the growth process".

A big impetus in the increasing demand for coal came in 1709 when a new method of smelting iron, using coal rather than charcoal, was developed at the Coalbrookdale furnace, Shropshire, by Abraham Darby. However, the use of this method was very slow to spread, and even in the early 1750s "knowledge of his invention was still confined to Shropshire and Denbighshire" (Lewis, 1971: 16). Buxton (1979: 9) believes that this was largely due to the old method of using charcoal in the smelting process being cheaper than Darby's innovation, but ultimately "by the late 1750s the superiority of mineral fuel smelting was established and iron masters rapidly effected the changeover" (Buxton, 1979: 9).

Another technical innovation that not only helped to increase the demand for coal, but also made getting the coal easier, was the development of the first steam engine by Thomas Newcomen in 1705. This was not only powered by coal, but helped overcome one of the main problems of sinking mines to any depth: drainage. Until the introduction of the steam pump, hand pumps and horse-gins were widespread, and although the take-up in the use of engines was slow, due to their cost and relative inefficiency, as other industries developed and needed coal, they became increasingly necessary as pits got deeper (Buxton, 1979: 17).

As the Industrial Revolution progressed, the coal industry was in a position to capitalise on the new opportunities, and was soon to become "the lifeblood of British industry" (Buxton, 1979: 58). Table 1.1 illustrates how the output of coal increased in the period 1750-1850 but the expansion, according to Buxton (1979: 59), was "evolutionary, rather than revolutionary" and it was to be a long time before coal used for domestic purposes stopped being the biggest consumer of

coal; indeed, as can be seen from Table 1.2, domestic coal accounted for the biggest share of UK output until the 1850s.

Table 1.1: Annual average tonnage, by decades, of coal output in Britain

Decade	Average (000 tons)	% increase on previous decade
1750-1760	4,356	
1760-1770	5,235	20
1770-1780	6,435	23
1780-1790	8,059	25
1790-1800	9,980	24
1800-1810	13,927	39
1810-1820	17,563	26
1820-1830	22,659	29
1830-1840	32,379	42
1840-1850	46,337	43

(Source: Pollard, 1964: 229)

Table 1.2: Estimated consumption of the output of the main British coalfields by uses, 1816-1855 (in million tons)

	1816	1830	1840	1855
Exports	0.3	0.3.	1.6	4.4
Coastwise	3.5	4.8	6.7	8.3
Ironworks	2.8	4.8	7.3	15.7
General manufacturing	3.5	5.2	7.9	15.0
Domestic	5.4	7.2	8.2	10.4
Manufacturing & domestic railed south				1.4
Railways			0.1	1.2
Steamships			0.6	1.7
Collieries	0.9	1.3	2.2	3.8

(Source: calculated from figures in Mitchell, 1984: 16)

Table 1.2 also illustrates how the iron industry's consumption of coal increased between 1816 and 1855, a development which Buxton (1979: 63) believes to be "the most important single factor in the expanding demand for coal"; as technological changes occurred in the iron industry, not only did this

mean that the demand for coal increased, but it also meant that the iron industry relocated to areas where coal was plentiful, and the history of the two industries became inextricably 'entwined'. The needs of these two industries also helped to spur on further technological changes; as the demand for coal and iron grew, so did the necessity to transport the commodities further afield. This helped stimulate road development schemes, the development of canals and, ultimately, of railways, as industry demanded an increasingly sophisticated infrastructure to meet its demands.

By the start of the nineteenth century, industrialisation had transformed the structure of the British economy (Buxton, 1979: 69), and the coal industry was an increasingly important foundation block for further developments. However, "when one talks about the British coal industry in the nineteenth century in the singular, it is often straining reality, for there was, in fact, a large number of British coal industries in separate districts, more or less loosely connected" (Mitchell, 1984: 10). The main reason for this is that coal is not a "homogenous product" (Benson, 1980: 7); different regions have different types of coal with different markets and geological conditions etc. According to Benson (1980: 9), Great Britain's coalfields can be split into three main categories:-

i) the major coalfields of the north east, Lancashire, Yorkshire, the Midlands and south Wales;
ii) the smaller fields of the west Midlands and east and west Scotland;
iii) the minor fields of Cumberland, Kent, the south west, north Wales and Northern Ireland.

The coalfields developed at different speeds according to local conditions and especially the ease with which their mineral wealth could be transported around the country. According to Church (1986: 17) the changes in the relative importance of the various coal regions of the UK throughout the nineteenth century was determined not only by the quality of the coal, but by the state of communications. The dominance of the north east coalfield until well into the

nineteenth century was due to the fact that it had three navigable rivers, the Tyne, Wear and Tees, which enabled the coal to be carried by sea to London (Church, 1986: 37). It was only when inland communications improved that the inland coalfields would be able to expand, and only then if communications extended to London and the south east, because this market was "crucial to the expansion of the inland coal fields" (Church, 1986: 38).

Methods of transporting coal

Improvements to road transport brought about by the Turnpike Trusts went some way to enabling coal to be carried further afield, but it was only with the advent of canals that inland coalfields were able to open up to non-local markets. Until the development of canals, the sites of industries had been dictated by nature, especially the presence of raw materials; canals now meant that transport could dictate these sites, because "their [the canals] technology freed them [industries] from the tyranny of natural hydrology." (Turnbull, 1987: 539). Canals meant that resources could be carried further and more cheaply and, according to Griffin (1977: 131), "the central importance of the canal system to the expansion of the mining industry in the period 1770-1830 cannot be overstated".

The coal industry in the late eighteenth/early nineteenth century was still to a large extent dominated by iron-masters who were either simply exploiting coal for use in their own industry, or had recently recognised the merits of developing the industry in its own right; for this reason "colliery and mineral owners were prominent among the canal promoters and investors". Indeed, most of the canal bills between 1770 and 1800 related to mining districts (Griffin, 1977: 132). This benefited areas where the iron and coal industries were working 'hand in hand'. However, those regions that either had no iron industry, or where natural conditions made it impossible for canals to reach the centres of coal production or other industries, remained 'isolated' from potential markets and would remain so until the coming of the railways.

Turnbull (1987: 537-40) recognises this when he says that, although "canals played a central role in Britain's industrialisation, [their] impact was heavily local and regional". The network took a long time to build, there being "100 years between the first and last constructions of the 'canal age' - and there was no country–wide network in any sense until 1810" (Turnbull, 1987: 543). This meant that canal transport was confined to a limited number of areas and routes; these were built and operated primarily by local enterprises, therefore a coherent, national infrastructure was never achieved. Most canal companies remained parochial, the bulk of the traffic was local, and although coal was usually the most important cargo, it was not carried any great distance, perhaps 10-20 miles (Turnbull, 1987: 543). Turnbull (1987: 544), further asserts that being even only a short distance away from a canal prevented an industry or locality from taking advantage of its benefits: "the path of a canal would create a narrow corridor of superior locational space, yet impart little benefit to sites only a short distance away". However, despite these shortcomings transport became cheaper, new sources of raw material became accessible, labour and products could move cheaply and further afield which meant that "the ties of location, which had previously bound the economy [were] broken down" (Turnbull, 1987: 544).

According to Pollard (1964, cited in Turnbull, 1987: 549), the coalfields that were most influenced by the 'canal age' were those of south Wales, the east Midlands and Lancashire. However, although the canals "did materially alter the geography of industrial growth" by helping inland coalfields to be opened up, it was only with the development of the railways that other areas, including north Wales, were able to take advantage of the transport revolution. Griffin (1977: 137) believes that "the railway made it possible for the inland coalfield to challenge the monopoly of the London market previously enjoyed by the sea-borne coal of the North East". However, this development took time; canals were still able to compete successfully until the 1840s (Buxton, 1979: 76), and it was not until 1845 that the first rail-borne coal reached London (Mitchell, 1964: 329). During the 1840s "the railway began to revolutionise the fabric of the coal

industry", and by the 1850s it was dominating the transport industry (Buxton, 1979: 39).

According to Mitchell (1964: 315) the railways made an impact in three significant areas:-

i) they lowered transport costs and brought new areas and products into the market;
ii) they helped develop a new export sector; and
iii) they led to the development of modern coal, iron and engineering industries.

In terms of the coal industry, it was not so much that the rail industry was a big consumer of coal, only a small percentage of production was actually used by trains (see Table 1.2 above), but that they made transporting coal much easier and more efficient. It was in this provision "that railways exerted their most profound influence on the coal industry" (Buxton, 1979: 76). According to Mitchell (1964: 316), the "industry which stood to gain most from the diffusion of cheaper transport services" was the coal industry, and the main beneficiaries within the industry itself were the inland coalfields. Where previously coal pits tended to be sunk in areas of iron production or where access to water transport was easy, they were now sunk to take advantage of proposed new lines which promised to open up markets which would never previously have been available, so making the sinking potentially worthwhile. One of these regions, the growth of which became synonymous with the success of the British coal industry in the second half of the nineteenth century, was south Wales.

Wales

When one talks of the 'Welsh' coal industry, it is automatically assumed that it is south Wales that is being discussed; because of that region's domination of the industrial 'face' of Wales, coal mining and the south Wales 'Valleys' are almost synonymous when discussing the industrialisation of Wales, with north Wales

almost always ignored. Authors tend to dismiss north Wales as a "minor region" (Church, 1986: 11), but this is hardly surprising given that "of all the success stories of nineteenth century Wales, none could compare with the dramatic expansion of coal" in south Wales (Jenkins, 1992: 233). Yet, in the eighteenth century, in coal producing terms, "the North [was] considerably in advance of the South" (Jenkins, 1992: 233), but geography and geology conspired to ensure that the latter region was to achieve unprecedented success and leave its northern neighbour languishing in obscurity throughout the nineteenth century.

In the eighteenth century, Wales, both north and south, "was essentially a peasant economy" (John, 1995: 4); any coal that was worked, because it outcropped, was worked by farmers for their own agricultural and domestic needs, and it was only when the metallurgical industries began to develop that coal began to be worked for 'industrial' use. The fledgling industries that did exist in Wales tended to be localised along the coasts of Carmarthen and Swansea Bay in the south, and Flintshire in the north. It was their very proximity to the sea that allowed the industries to start developing, because any trade that did exist had to be sea-borne owing to the appalling state of internal communications within Wales (John, 1995: 7). This meant not only poor trading links but also that Wales was 'insulated' from the industrial changes taking place in England. As John (1995: 2) observes, to the Englishman of the eighteenth century, Wales "was a remote part of the Kingdom in which he had little interest". However, this situation was to change dramatically over the next century, especially in south Wales.

South Wales

"A country of barren upland and bleak moor, interspersed with deep and narrow valleys", is how Phillips (1925: 112) describes eighteenth century south Wales; an area where "the fingers of industry have as yet touched lightly on the landscape" (Minchinton, 1969: ix), and there was little sign that the region was to develop into a major industrial centre. It was, however, the topography of the

land, and the riches it bore below the surface, that was to make the region its fortune in the nineteenth century. Hull (1897: 62) explains that "the coal basin of south Wales is, with the exception of that of the Clyde valley, the largest in Great Britain"; it stretches for approximately 90 miles and has a width varying from 2 to 20 miles (North, 1931: 159) (See Map 1.1, page 28). Its geology and geography has also been kind; the coal measures are crossed by what Hull (1897: 62) describes as a "remarkable anticlinal axis", the effect of which is to bring much of the lower coals to within an easy working distance of the surface. Coal working was further facilitated by the terrain of the region; the deep, narrow valleys made accessing the coal seams much easier than in other regions, and their proximity to the sea, once decent transport links had been developed, enabled these resources to be exploited quickly and efficiently (John, 1995: 1).

According to Minchinton (1969: xi), and John (1995: 163), the pre-1914 economic history of south Wales can be broadly split into two phases, 1750-1850 and 1850-1914. In the first phase the metal industries dominated the industrial face of the region, but they were overtaken by coal in the second phase and, according to John (1995: 23), "it was not until the remarkable growth of the coal trade that industrialisation embraced the entire [region]". This view is upheld by N Evans (1989: 215), who ascertains that the industrial development of south Wales is "largely the story of the shift from one staple (iron) to another (coal)".

1750-1850

At the start of this period, industry in south Wales was localised into 'pockets' that, due to the paucity of transport facilities, were of necessity located along the coast of the region. The most important industries were copper and iron works, with the former, based mainly in the Swansea-Neath area, initially being the more significant; some works were of a considerable size, and employed between 30 - 70 people (John, 1995: 7). Coal was exploited by these industrialists, and other individuals, but it was only on a very small scale, and any trade that did exist was either land-based or sea-borne via Swansea (John, 1995: 14).

A big impetus to both the iron and coal industries of south Wales was the adoption of Darby's method of smelting, which was increasingly used after 1780 (Jones, 1984: 163). This meant that the iron industry, boosted by the demand generated by an almost continuous thirty year period of war, required increasing amounts of coal. It was thus that the iron masters of south Wales became increasingly involved in the development of the coal industry.

The increase in demand, along with technical changes, starting with the Coalbrookdale method of smelting, and the development of steam engines, provided two of the three factors that Minchinton (1969: xi) asserts were required to effect the transformation of south Wales. The third factor was transport; markets could only be opened up if there were effective means of transport for the products of the iron industry. However, at this time the only method of transport was either via mule or packhorse, or coast-wise; both were very slow and subject to the vagaries of the weather and Welsh geography.

The initial impetus for the development of an effective and efficient transport infrastructure came from those entrepreneurs involved in the copper and, increasingly, the iron industries. But who were these men? A number of authors (Minchinton, 1969: xvii; N Evans, 1989: 201) have theorised that, when looking at the economic development of south Wales, the region should be viewed as 'semi-colonial' because it developed only as a result of outside, English investment. Indeed, N Evans cites Harold Perkin as describing the region as being "handicapped ... by [a] lack of capital, [a] lack of entrepreneurs, and [a] lack of a potential proletariat" to the extent that "industrialism had to be induced from outside" (1989: 201). While to a great extent Minchinton's view (1969: xvii) that "the initial source of finance was largely external", is true of the early beginnings of industry in south Wales, as industrialisation continued apace, more 'indigenous' entrepreneurs became involved, especially in the coal industry. Indeed, Morris & Williams (1958: 138) assert that, after 1840, investors were mainly drawn from within the coalfield itself, partly because local knowledge was very important, and partly because the industrialisation that had already taken place gave newcomers the impetus to 'have a go'.

The early need for 'external' finance had much to do with the 'remoteness' of the region and the fact that, due to poor communications, it was a 'late developer' in industrial terms, compared to some of the English regions. In addition to this, although there were entrepreneurs in south Wales, they were usually 'small-time', their sources of funds restricted to what could be raised either from their own resources, or by approaching their acquaintances among "the only monied classes on the coalfield, the larger yeomen and the landowners" (John, 1995: 7).

However, as opportunities for expansion began to increase, these relatively restricted sources of capital became insufficient, and external sources were required. According to John (1995: 23), this local inability to provide capital "made its immigration into the area a pre-requisite of industrial expansion" and much of the capital required was introduced by "English businessmen ...who saw the possibility of exploiting the natural resources" of the region (Chambers Jones, 1978: 17). Englishmen such as Anthony Bacon and Richard Crawshay, both London merchants, were important in the initial development of the iron industry. In 1765, Bacon and William Brownrigg set up the Cyfarthfa furnace in Merthyr Tydfil, and other furnaces in 1777 and 1780. In 1776, Bacon joined forces with Richard Crawshay, whose family was to play an extremely important role in the future industrialisation of the region (John, 1995: 24).

As the pace of industrialisation increased, local capital became more involved; the costs of developing iron works were considerable, and many of the opportunities available within that industry had already been grasped, so it was to coal that aspiring entrepreneurs turned to make their fortune. Among such men were "mineral agents and mining engineers, who were very prominent amongst the pioneers of the steam coal industry" (Walters, 1977: 51). One such engineer was Thomas William Lewis, engineer at the Plymouth Works, Merthyr Tydfil, whose son, William Thomas Lewis (1837-1914) became the 1st Baron Merthyr of Senghenydd. This development did not, however, mean that south Wales became 'self-sufficient' in producing its own entrepreneurs; it still attracted Englishmen, for example, John Nixon and George Elliot, the latter of whom

formed the Powell Duffryn Steam Coal Company in 1864, from the traditional 'coal' areas of England: Durham and Northumberland. Such men were attracted by the potential riches to be made from the, as yet, unexploited coalfield; a coalfield that could not be fully developed until an effective transport infrastructure was in place.

Methods of transporting coal in south Wales

Throughout Great Britain, as has already been explained, the main means of transportation in the eighteenth century were either coastal waterways or the road network. Discussing the situation in the UK as a whole, Dodd (1925: 121), commented on "the deplorable states of the roads in general" adding that, "those of Wales fell below the in-exacting standards of the time". This, according to Jones (1984: 178), was mainly due to the geography of Wales which meant that the roads that did exist were often simple rights of way and, even if on an important route, were often so churned up by the mules and pack horses as to be virtually impassable.

This situation made coastwise traffic all the more important, but this too was an unreliable method, reliant as it was on the tides and the Welsh weather. "Such primitive communications were an obvious deterrent to industrial expansion" (Jones, 1984: 177), and the industrial 'pioneers' of south Wales became enthusiastic sponsors of a canal network in the region. A group of iron masters including Crawshay and Guest applied, in 1784, to build a canal from Merthyr to Cardiff. An Act of Parliament was secured in 1790, and the Glamorganshire canal was completed in 1798. This canal was very successful and "gave the first great impetus to the rise of Cardiff as a sea port" (Phillips, 1925: 113). Another three major canals, the Monmouthshire, the Swansea and the Neath canals, were built in south Wales, and these enabled areas that had hitherto struggled to open up markets for their industrial output to be exploited. According to DG Evans (1989: 36), "the main contribution of canals to the

economic development of south Wales was that they released the iron-smelting industry from the constraint of its location".

All four canals had been built to connect the northern parts of the coalfield with the coast, "thus enabling the mineral resources of the upland districts to be effectively exploited" (DG Evans, 1989: 37). One of the main results of the development of a canal infrastructure was that the cost of transporting heavy, bulk products was reduced: this acted as an impetus for the local coal trade and, according to DG Evans (1989: 37-8), "initiated a vibrant coal trade" which helped "usher in the Industrial Revolution in south Wales". However, the coal industry was still "the handmaid to iron" (Jones, 1984: 161), in that rather than being an important industry in its own right, the coal industry played 'second fiddle' to the iron industry and was heavily reliant upon it for its own development. This meant that throughout the early decades of the nineteenth century, the coal and iron industries developed 'in tandem', because wherever ironworks had been established, there was a "corresponding stimulus to the development of coal mining" (Morris & Williams, 1958: 10). This was largely due to the fact that "the prosperity of the iron industry was dependent upon an abundant supply of cheap coal" which meant that the iron masters had to open new levels and pits (D Williams, 1977: 215). This trend continued, especially during the 1830s, when it was discovered that anthracite coal could be used in the smelting of iron ore (D Williams, 1977: 214), which led to the development of an iron making industry in west Glamorgan. At the same time there was a rapid expansion in ironworks around Merthyr, for example, at works such as Dowlais and Cyfarthfa, and in Monmouthshire, where there were significant iron works at, for example, Ebbw Vale, Tredegar and Rhymney. However, Merthyr was the leading 'iron town', and was so "phenomenally successful" that, by 1840, Dowlais was the largest iron works in the world (N Evans, 1989: 215).

As the industrial demand for coal in the region increased, so did the demand for 'sale-coal': coal used for other purposes. In 1830 the first Welsh coal (from Merthyr via Cardiff) was sold in London (D Williams, 1977: 216) but still, as Morris & Williams (1958: 2) point out, "in the great market of London, Welsh

supplies played little part....the north of England reign[ed] supreme". However the sale of Welsh coal in London "did mark a crucial expansion in the horizon of the Cardiff coal trade" (Morris & Williams, 1958: 20). Despite this increasing importance, the resources of south Wales could still not be properly exploited until the region had an efficient means of transporting the coal to its potential markets. This arrived in 1839 when the West Bute Dock was opened in Cardiff, and was further boosted by the completion of the Taff Vale railway in 1841 (Morris & Williams, 1958: 20). This railway had been promoted by Merthyr's iron masters, especially John Guest of Dowlais, to reduce congestion on the canals (DG Evans, 1989: 39). The railway gave the coal of the valleys access to the sea and the facilities of the new docks at Cardiff, an event which "many would argue... was the great turning point in Cardiff's modern history" (DG Evans, 1989: 39).

According to Morris & Williams (1958: 1), 1840 was a "definite turning point in the economic development of south Wales". The development of good transport links enabled the region to exploit its natural advantages; it had a large coalfield, with abundant seams, which "made its resources seem almost boundless"; no coal for shipment had to travel more than 30 miles to reach the nearest port and the lie of the land made the sinking of pits and construction of railways easier than in other regions (Morris & Williams, 1958: 15). Once the infrastructure was in place, not only was it easier for the goods to flow out of the region, but it also made the region more attractive to inward investment, and the 1840s saw the pace of the influx of capital start to quicken (John, 1995: 40).

According to Minchinton (1969: xvii), by 1850, the dominance of iron in south Wales was fast coming to an end, and it was soon to be overtaken by coal as the "driving force of industrialisation" in the region (Jones, 1984: 171). Within the south Wales coal industry it was the demand for steam coal that provided the main impetus for this expansion. Morris & Williams (1958: 18) explain that "the outstanding development in the ....decades after 1840 was the growth in the shipments of coal, particularly of steam coal". It was the increased demand for steam coal, and the impact that this had on the whole economy of the region,

that dominated south Wales in the decades after 1850 and, by the end of the nineteenth century, the south Wales coalfield was the most significant coalfield in Britain.

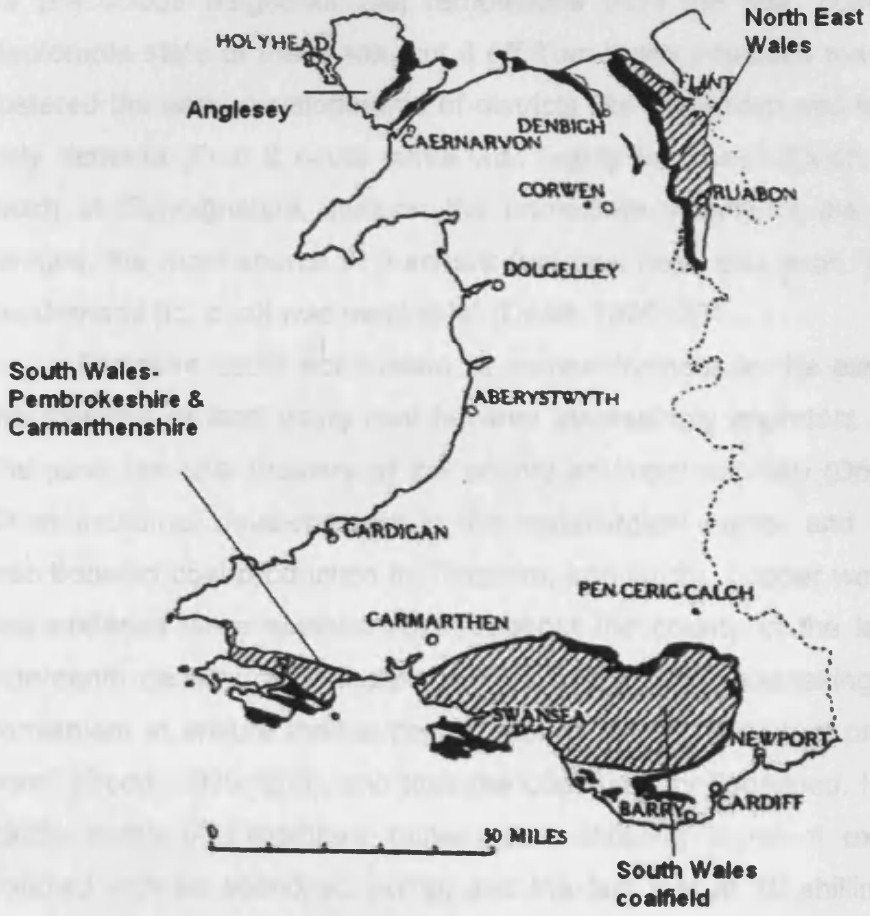
North Wales

Writing in the late nineteenth century, JE Thomas (1889: 11) opined that "the north Wales coalfield is not to be compared with the south Wales field as regards area or capacity. Still, it is an important area, situated as it is so near to the estuaries of the Dee and Mersey". This statement highlights the fact that, when discussing the north Wales coal industry, the region under discussion is actually concentrated in north east Wales. Although there are coal deposits in Anglesey (see Map 1.1) which form a small, separate, coalfield in north west Wales, these had been mined extensively in the fifteenth and sixteenth centuries, and had become of negligible importance by the nineteenth century (North, 1931: 195).

In the north east Wales coalfield, "the coal measures extend in an uninterrupted tract from the slopes of the Severn Valley, south of Oswestry to the Point of Ayr at the mouth of the Dee", a total length of 45 miles (W Gibson, 1927: 240). The coal measures of the region fall into three broad subdivisions: the Lower, Middle and Upper measures. The Lower measures, which attain maximum development in Flintshire, "contain no coal seams of commercial importance" (Flintshire Record Office, hereafter D, D/DM/996/12). The Upper measures, which are "more conspicuously developed in Denbighshire are likewise devoid of commercially important seams" (D/DM/996/12). The chief of the region's seams, which can be found in the Middle measures, is the Main seam, also known as the Five Yard or Six Foot seam (D/DM 996/12). However, the coalfield is not shared by both counties as the 'Great Bala fault', "produces a complete break between the Carboniferous strata of Denbighshire and Flintshire" (Hull,1897: 68), forming two distinct coalfields, those of Denbighshire and Flintshire, each of which has different characteristics, and can be discussed separately. As a result of the faults in the region, the coal deposits "are very

variable [and the faults] completely sever and change the dip and quality of the seams of coal" (Nixon, 1865: 46). The commercially important seams are generally thinner than those in south Wales and not as easily accessible (North, 1931: 193).

Map 1.1: The coalfields of Wales



Source: North, 1931: 12)

Notwithstanding this, the Flintshire coalfield, with its easy access to the sea, was able to exploit its coal resources, and the first evidence of coal working at Ewloe was as early as 1322 (D/DM/996/12). In the seventeenth century much of the production in Flintshire was directed at the export market to Ireland, and especially Dublin. "By 1638-9 [Flintshire] had emerged as the major west coast exporter", with 4,355 chaldrons being shipped across the Irish Sea; an amount that was twice that exported from Liverpool, and four times that from south Wales ports (Lloyd Gruffydd, 1996: 55-59). At this time Denbighshire "lagged far behind its precocious neighbour [its] remoteness from the sea, combined with the deplorable state of the roads, cut it off from those populous markets which had fostered the early developments of districts like Hawarden and Mostyn [and] the only demand [that] it could serve was highly localised" (Dodd, 1929: 200). In much of Denbighshire, outside the immediate vicinity of the coal producing villages, the main source of domestic fuel was peat, and even "in manufactures the demand [for coal] was negligible" (Dodd, 1929: 201).

Flintshire could not sustain its competitiveness in the export market, but the smelting of lead using coal became increasingly important after 1692, and this gave the coal industry of the county an important fillip (Dodd, 1929: 202). Other industrial developments in the metallurgical sector and other industries also boosted coal production in Flintshire; iron works, copper works, brick works and potteries were established throughout the county in the latter half of the eighteenth century, and "the proprietors of the new undertakings soon found it convenient to ensure their supply of fuel by sinking new coal pits or buying old ones" (Dodd, 1929: 205), and thus the coal industry flourished. However, by the 1820s many of Flintshire's mines were showing signs of exhaustion. This, coupled with an economic slump, and the fact that at 10 shillings per ton, the county's coal was "the most expensive fuel in north east Wales" (Pryce, 1971: 49), meant that many concerns 'went to the wall', and the county began to be eclipsed by its neighbour, Denbighshire.

Denbighshire

Background

The original 'industry' in Denbighshire was lead mining and smelting; the Romans had mined for lead in the hills behind Minera and, by the late eighteenth century, a small but fairly vigorous industry existed to the north west of Wrexham. However, "the Denbighshire coal field owes more to iron than lead" (Dodd, 1929: 203) because, as Pryce (1971: 46) explains, "the expansion in coal mining [in the region] was intimately related to and largely dependent on developments in [ferrous] metallurgy". According to Dodd (1971: 24), it was not until "the development... and the reorganisation of the Bersham ironworks [in the mid eighteenth century].... [that] the real Industrial Revolution [began] in the mining and metal industries of North Wales". Until this date industry had been held back by a number of factors, the most important being that the topography of the region meant that transporting goods was extremely difficult and therefore any markets were restricted to the local area. This isolation hindered not only the demand for products that might be manufactured, but more importantly discouraged inward investment; capital was required if industrialisation was to take off, but this commodity was scarce in eighteenth century north east Wales.

To attract industry "it was necessary to have capital, raw materials, [a] means of power, labour and communications" (Chambers Jones, 1978: 17) and although north Wales possessed some of these in plenty, namely raw materials, power and labour, it lacked the means by which to exploit them: capital and communications. According to Dodd (1971: 305), in England, the move toward capitalism and entrepreneurship had started long before the Industrial Revolution began, so the foundations for further development had already been laid. "North Wales had been disqualified by its history from participating in these earlier steps toward capitalism" (Dodd, 1971: 306) and was thus severely disadvantaged. Dodd (1926: 16) argues that one of the reasons for this was that historically, going back to the wars of Independence, the 'Welshry' were excluded from

skilled trades and municipal positions, and even when 'allowed' to become involved, it was to England that any ambitious Welshman turned to make his fortune. It was not that there was no capital in north Wales, there was, but it was in the hands of landowners and agriculturalists who often had little interest in expanding into industry, "largely because of ..... their reluctance to incur risks" (DG Evans, 1989: 32).

The merchants of the region were often unable to exploit any industrial opportunities that they might come across, largely because the lack of an entrepreneurial tradition in Wales meant that the merchants often lacked the requisite skills to pursue potential opportunities, even if they had access to capital. These factors meant that when industrialisation did come to north Wales, "the capitalists who financed the bigger undertakings were almost all Englishmen" (Dodd, 1971: 30).

Lead and Iron

Two Englishmen who recognised the potential in Denbighshire were Isaac Wilkinson, and Richard Kirk (later Kyrke), both from Derbyshire. Wilkinson purchased the Bersham ironworks in 1753, and Kirk moved to Denbighshire in 1775 from Chapel en le Frith (Ellis Hughes, 1946: 85) to "seek his fortune in lead mining at Minera" (Dodd, 1929: 203). Wilkinson purchased an ironworks that, since 1721, had been smelting iron using coal rather than charcoal. The pioneer of the Coalbrookdale method in Wrexham was Charles Lloyd who, AH Dodd asserts (1971: 23), was actually taught the methods by Abraham Darby, "his friend and co-religionist" (Dodd, 1929: 203), "for there were no other works outside Shropshire, where coke-smelting came in until another generation had passed" (Dodd, 1971: 23).

Isaac Wilkinson did not make a success of the ironworks and, in 1761, it was taken over by his sons John and William; John Wilkinson "was to make it one of the most famous [iron works] in the land" (Dodd, 1971: 23). John Wilkinson took over Bersham "just in time for the great Industrial boom of George

III's early years" (Dodd, 1989: 215) and, by 1813, in his Cambrian Travellers Guide, Nicholson (cited by Palmer, 1899: 14) described it as "among the finest in the kingdom". This success was largely down to the opportunities opened up by war; Wilkinson was able to expand the munitions side of his business, and they "were turned out in unheard of quantities" (Dodd, 1971: 135). He took advantage of the seemingly unceasing wars of the late eighteenth century, especially the Napoleonic wars; indeed, he was suspected of supplying ordnance to both the British and French armies! Such was his success that "before long the Wrexham district became known through the land as a centre for the manufacture of ordnance" (Dodd, 1989: 215). In addition to munitions, in 1775, Bersham began to produce cylinders for the steam engines of James Watt and Mathew Boulton, and "for twenty years all but three or four of the engines had their cylinders made at one or other of Wilkinson's works" (Dodd, 1971: 137). This relationship, however, broke down in the mid-1790s due to the fact that Wilkinson was found to be infringing Boulton & Watt's patent by manufacturing his own engines.

By 1795, John Wilkinson had split acrimoniously from his brother and was running the ironworks alone. He died in 1808, having "extended [his] financial activities far beyond the [industry] with which [he] was directly concerned and [had].....amassed [a] great fortune" (Dodd, 1971: 133). He died leaving no direct heir to take over, and "his estates melted away in litigation" until they were eventually sold by the Chancery in 1812. Despite this sale, "sixteen years later [the Bersham ironworks] lay in ruins" and the village of Bersham had reverted to its original rural state (Dodd, 1971: 141). However, despite this ignominious ending to his story, according to Buxton (1979: 68), "Wilkinson was....the pioneer who confirmed the relationship between steam power (and hence coal) ironmaking and engineering". He was the first to blow the blast at Bersham in 1776, the first to use steam to power a forge-hammer in 1776, and the first to use steam in a rolling mill in 1784 (Buxton, 1979: 68).

When Bersham began using coal rather than charcoal to smelt iron in 1721 the production of iron was approximately 5 tons per week or 250 tons per year; by 1806, the combined annual production of the 3 furnaces in Wrexham

was 2,075 tons and there had been little improvement in the figures since 1795/6 (Dodd, 1971: 141-3). The Napoleonic Wars helped maintain the demand for iron but, once it was over, there was a long depression in the industry. This was followed by the "great boom of 1824-5" (Dodd, 1971: 141-3) and "east Denbighshire, with its rich deposits of coal and iron was well blessed" (DG Evans, 1989: 28). However, despite this, in 1826 north Wales produced only 16,000 tons of pig iron per annum from seven furnaces (I Edwards, 1965: 151). Although the number of furnaces had increased to twelve and production to 24,000 tons by 1828, the iron produced by north Wales accounted for only 3.5 per cent of the total output for England and Wales (DG Evans, 1989: 28) and north Wales was far outstripped by other iron producing regions: for example, in 1828 Shropshire produced over 81,000 tons while south Wales produced a phenomenal 280,000 tons (I Edwards, 1965: 151).

An upsurge in the demand for iron was created by the railway boom of the 1840s, but the north Wales iron works were unable to capitalise to any great extent. In 1848 the output from the five furnaces in existence in Denbighshire was less than that of 1827, while in south Wales between 1830 and 1845 production increased by 150 per cent (Dodd, 1971: 152). One of the reasons for this, according to Dodd (1971: 152), was that the region was the least productive of all the iron manufacturing districts, and "the old difficulties - lack of capital and the awkward lie of country prevented North Wales, at the critical moment from devising a railway system suited to her needs". So, by 1850, the iron industry, which had played so important a role in developing industry in the Wrexham area, had dwindled to such an extent that it played only a negligible role in the continuing industrial development of the region. Iron had, however, played an important part in creating a demand for coal in Wrexham, and it was the coal industry, along with, later, the steel industry at Brymbo, which would drive industrialisation in the region throughout the rest of the nineteenth century.

Coal

"The story of coal mining in Denbighshire goes back more than five hundred years" (Lerry, 1958: 41), but "mining in those days meant little more than surface digging for coal" (Lerry, 1968: 9). It was only in the eighteenth century that the Denbighshire coal industry began to develop, and this happened only because the iron industry provided an impetus. Despite this, "the method of raising coal was primitive and the means of communication to centres was so poor that in winter, owing to the bad state of the roads the coal was stacked in the field and carted away in the summer" (Dodd,1971: 42-3).

The county's access to the sea was also restricted which, when combined with the dreadful roads, meant that the market for coal was largely for domestic consumption (Dodd, 1929: 200), and it was only when "immigrant iron masters [were] attracted to the region by its wealth of ironstone and coal" (Dodd, 1971: 190), that the mineral began to be exploited for industrial purposes. This development was initiated by ironmasters such as John Wilkinson; he was unhappy that he had to purchase the coal to smelt his iron from others, "so he gradually acquired various estates in iron and coal" (Palmer, 1899: 18). For example, he purchased Brymbo Hall in 1793; here "he would have coal resources, almost untapped, at his command" (Dodd, 1971: 137), and by 1829 there were 41 pits sunk on the estate (Palmer, 1899: 20). Dodd (1929: 210) explains that it is difficult to actually assess the growth of the coal industry in terms of output in this early period; according to Wilkinson (cited in Palmer, 1899: 32), in 1799 one of his pits was producing 200 tons per week; but truly reliable figures of production for the region are not available until the second half of the nineteenth century.

The 1820s saw coal mining become an increasingly popular venture in north Wales, and speculators began to "brood over the unchartered waters of the Welsh mountains" (Dodd, 1971: 131), but many of these ventures were "too much tainted with the prevailing policy of 'get-rich-quick' with all its recklessness and extravagance" (Dodd, 1929: 216). This meant that "the most accessible

seams were worked at a furious pace and then abandoned" (Dodd, 1929: 216), and many ventures failed, mostly through a lack of expertise and capital. By 1830 there was a general trade depression and, one after another, the industries within the region that required coal, moved to other parts of the country, especially south Wales, "with the result that North Wales fell behind in the race" (Lerry, 1968: 21). This view of there being a race between regions is reinforced by Dodd (1971: ix), who explains that "there were still those who believed on the eve of the repeal of the coal tax in 1831, that with this obstacle removed, the industries of the North Wales coalfield could hold their own" with other regions. However, such hopes were elusive because "the leeway to be made up was abnormally heavy" (Dodd, 1971: vii).

The inherent problems of the region and competition from other areas "seemed to indicate that the coal and iron industry of Denbighshire... might soon be a thing of the past" (Lerry, 1968: 21) but those involved persevered throughout the 1830s, and were reinforced by an influx of 'immigrants' such as Robert Roy (1795-1873) and Henry Robertson (1816-1888) who arrived in the late 1830s and early 1840s. The influence of such men meant that "a new chapter in the history of the Denbighshire coalfield was opened" (Lerry, 1958: 46), but their contribution would have been made a great deal more difficult had not improvements in the methods of communication given the coal industry an additional and extremely significant impetus.

Methods of transporting coal in Denbighshire

Roads

Many areas that possessed plentiful raw materials, such as Denbighshire, were hampered by being landbound; this meant that markets for any industrial output in the region were of necessity local, and reliant on the road network, which was generally in a deplorable state. According to Copeland (1968: 1), "complaints about their [the roads] shocking condition were frequently made, particularly during the winter months when the highways became impassable in a sea of

mud". As Dodd (1925: 122) remarks, "such conditions did not foster traffic", indeed, a comment that was included in an Act for widening and repairing the road from Pool, in Montgomeryshire, to Wrexham (via Chirk and Ruabon) in 1755 states that "by reason of the many heavy carriages passing thereon [the roads] are become too deep and [so] ruinous that travellers cannot pass without great danger" (D/DM/101). Dodd (1925: 124), further observes that the Denbighshire coalfield, because it was dependent on land transport, "was a full century later in developing than its Flintshire neighbour" which had access to the Dee Estuary and, therefore, coastal markets.

Nationally, very little was done to improve roads, and it was left very much to the locality, i.e the parish, to maintain them. This parochial view meant that no thought was given to 'through' routes. Travel was not a necessity or priority for many, and it was only when demands for improvement were made by those who wanted to travel further afield in comfort, and those who wished to exploit the industrial potential of their land, that improvements occurred (Dodd, 1971: 125). However, according to Copeland (1968: 28), the turnpikes occasionally faced opposition in areas where industry had begun to develop "because of fears that better roads would bring increased competition from other areas".

After 1750 new roads were built by both private enterprise and by public subscription, and "finally these methods were merged in the work of the Turnpike Trusts" (Dodd, 1971: 126). It was in this period that Trusts began to appear in north Wales; the first, in 1752, managed the road between Wrexham and Shrewsbury, and communications from Wrexham were further improved by the creation of a Trust to cover the route to Chester in 1756. By 1800, "North Wales could boast a thousand miles of turnpike road" (Dodd, 1971: 133), but this did not effect an "immediate and magical improvement in the state of the roads" (Dodd, 1971: 93). Mismanagement, the cost of tolls and a reluctance to change were some of the main defects, but the main problem was that parochialism continued; this meant that long journeys were difficult to co-ordinate, for example, there were twenty three trusts involved in the journey from London to Holyhead (Dodd,

1971: 94), and in Denbighshire and Flintshire alone, there were eighteen trusts responsible for almost 300 miles of road (Dodd, 1925: 137).

Yet, despite this, communications were much improved and regular coach and postal routes were established; road building in the mining region around Wrexham eased transportation problems, and trade was stimulated. Goods could now be transported further, and more quickly, which helped open up hitherto isolated regions, but journey times were still very slow; and although communications had improved there was still a long way to go before the Denbighshire coalfield could be fully accessible; an important development in this process was the development of a national canal system.

Canals

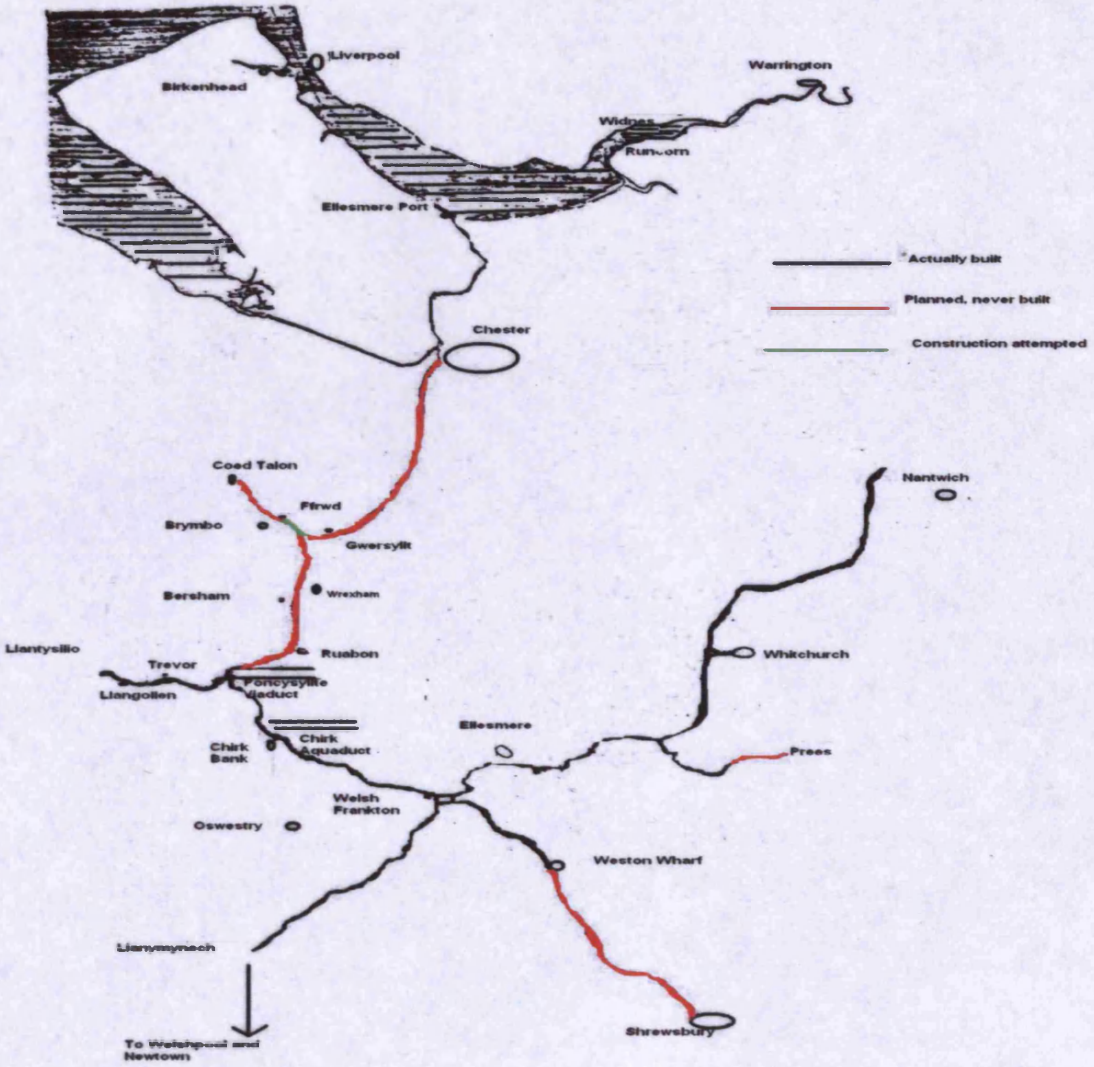
A major reason for the development of the canal system was the need to be able to transport bulky materials, such as coal and iron, further afield; and iron masters and, to a lesser extent, coalowners, were important "pioneers of the canal network" (DG Evans, 1989: 32). In Flintshire, a canal was dug as early as 1768 with the express intention of carrying coal from Hawarden to the Dee but this proved a failure, and no other attempts were made in that county (Dodd, 1971: 101). In Denbighshire, two canals, the Ellesmere and the Montgomery canals, helped link the coalfield to important markets in England and elsewhere in Wales.

When the idea of a canal to link Chester with Liverpool, which would give Chester access to Lancashire coal was first mooted, the pioneer industrialists of North Wales decided to form the Ellesmere Canal Company to promote a route that was more beneficial to their interests. The shareholders included the Earl of Bridgewater, a prominent backer of canals, John Wilkinson and Richard Kirk. Wilkinson and Kirk wanted to open up additional markets for their iron and coal, and were described as "assiduous attendants on our early labours.....who not infrequently gave us their aid and countenance" (Dodd, 1971: 102-3). Indeed, Wilkinson was one of the earliest subscribers in 1792, and was appointed to the Committee of directors of the company in 1805 (D/DM/101).

There was a great deal of debate about the route, (see Map 1.2 for the various alternatives), but they finally settled on "the making and maintaining [of] a navigable canal from the River Severn at Shrewsbury ...to the River Mersey at or near Netherpool ... through, by or near the towns of Ellesmere and Wrexham". The importance of the industrialists to the project is underlined by the Act itself, which states that the canal "will open a communication for the cheap and easy conveyance of goods, wares, provisions and merchandise, and all heavy commodities [which] will greatly promote and facilitate the intercourse of trade and commerce between the several places...[and] will tend very much to reduce the price of coals in the neighbourhood thereof" (Denbighshire Record Office, hereafter DD, DD/PP/600).

The Act was passed in 1793 (33 Geo.3, Cap XCI) and, with a capital of £400,000 raised from 1,238 shareholders, building began. By 1805 most of the work of constructing the canal was complete; it was at that date 83 miles long and linked "Liverpool, Manchester and the whole of the extensive country through which the canal passes" (DD/PP/600). This did not mean that the project had proceeded as planned; as a report to the Ellesmere Directors states in November 1805: "it was originally intended that the main line of [the] canal should be carried from Wrexham to Ruabon and Pontcysyllte, but upon mature consideration, the great quantity of lockage which would have been required upon this part, and the difficulty and expense....made it evident that ...canal navigations through the district would be perfectly unadvisable" (D/DM/101). This was obviously unfortunate for the industrialists around Wrexham, as was the fact that the canal "for some, undetermined, reason, ...was cut short rather less than half way between Ellesmere and Shrewsbury" (Wilson, 1975: 9) and was never extended as far as the latter (See Map 1.2). Given the latter's potential, not only as a market itself, but as a 'gateway' into new markets in mid-Wales and the Midlands, this was a bitter blow to the industrialists of Wrexham.

Map 1.2: Ellesmere Canal showing actual and proposed routes



(Source: Wilson, 1975: 4)

A further blow to the interests of Wrexham occurred when a start was made on a branch of the Ellesmere canal which would connect the collieries and ironworks of Kirk and Wilkinson in Ruabon to the canal; it was found that water would not stay in the canal and, after many failed attempts, "the whole of the Chester-Ruabon section was given up as hopeless" (Dodd, 1971: 104). It was unfortunate that the geography of the region made road building, and later canal and railway building much more difficult than in other regions. The topography of the region is described as "horrendous" by Jones (1984: 178) and, unlike in south Wales, where the topography actually facilitated the construction of an effective communications infrastructure, in north Wales, it was always an obstacle that had to be overcome.

However, despite this, the canal opened up new markets for the Denbighshire coalfield. Coalowners now had access to markets which were much further afield than those previously available and, according to Dodd (1971: 109), "it would be difficult to overestimate the effect on North Wales of the improved communications brought about by canals and turnpike roads". One of the most important effects was to make the area more attractive to outside capital; this helped attract new industrialists, which gave a further boost to the development of the area, which in turn attracted more inward investment.

Railways

Wales, both north and south, was a 'late starter' in terms of building railways, and the rail infrastructure in Denbighshire was still in the developmental stage in the late 1840s. Prior to this, any railways in the county had been simple tram roads that carried goods to the canals to await distribution; for example, since 1757 a three and a half mile 'railway' linked the Ellesmere canal to Trevor, which gave the Ruabon collieries limited access to markets further afield (DD/NTD/144 aa). However, the "failure to construct the Ellesmere canal along its intended line through the coalfield, effectively ruled out that waterway as an outlet for the raw

materials and finished goods of the Bersham, Ffrwd, Ponciau and Ruabon industrial areas" (DD/NTD/142).

There was therefore, in industrial terms, an "urgent need" (DD/NTD/142) for railways if the potential of the region was to be exploited but, according to Lerry, in some unpublished notes, "when railway enterprise was first undertaken in the Wrexham district ... there was considerable opposition to the initial schemes, especially [from] landowners" (DD/NTD/144ab[1]). In 1839, George Stephenson was engaged as the engineer on a proposed line from Wrexham to Chester, a project promoted by "the gentlemen of Chester", who "saw the immense advantages to be derived from opening up the rich coal fields of Wrexham and Ruabon". These initial plans, however, came to nothing due to the "commercial depression which soon commenced". Various attempts were made to revive the scheme; for example, the idea was resurrected in 1842 but, "owing to opposition and apathy, the scheme had to be abandoned". After his arrival in Wrexham, the Scottish railway engineer, Henry Robertson, became involved in the project but, in 1843, he and his colleagues again met failure, "through the opposition of rival mineral proprietors". Finally, in 1844, Robertson and his fellow promoters succeeded in getting the agreement of all parties involved, and the North Wales Mineral Railway Act was passed, which provided for a line from Wrexham to Chester, with a branch from Wrexham to Brymbo, and then an extension south to Ruabon (DD/NTD/142). In 1846 the North Wales Mineral Railway Company amalgamated with the Shrewsbury, Oswestry and Chester Junction Railway to create the Shrewsbury & Chester Railway Company (Boyd, 1991: 218).

When the main London-Holyhead route was being planned, it was decided that the easiest route would be via Chester and along the North Wales coast rather than via Shrewsbury. This latter route had been favoured by the principal owners of mines and ironworks in Wrexham and, from 1836, they had been petitioning strongly for this route, but "the lie of the country prescribed to the main

[1] All further quotes in this paragraph, unless otherwise stated, are taken from DD/NTD/144ab

railway lines a course which precluded them from serving the chief ..... industries" of the region (Dodd, 1971: ix).

By 1848, the line from Chester to Shrewsbury, via Wrexham and Ruabon, was opened and this, especially when branch lines were laid to specific mines, made North Wales coal available to areas which hitherto it had been impossible to supply (Lerry, 1949). The Shrewsbury to Wrexham section of the Shrewsbury and Chester Railway was opened on 12 October 1848, after three years of work, (the Chester, Wrexham, Ruabon section had opened on 4 November 1846). According to an article in the *Wrexham Recorder* (no date), "we are now within easy access of the two largest towns in our neighbourhood... and within a very few months, by the opening up of the Shrewsbury and Birmingham Railway to Stafford, through Shrewsbury will again be our route to London" (quoted in DD/NTD/142). This development of the railway did open up north east Wales to industrial expansion, but it arrived here later than in some other regions, and it thus meant that "while she [north Wales] was still struggling forward, the industrial centres of the North and Midlands were steadily consolidating their position" (Dodd, 1971: 119). However, this is not to say that the coal industry did not make rapid progress once the railways arrived, and the period 1850-1914 was to see coal play an increasingly important role in the industrial expansion of Denbighshire.

Conclusion

The period 1750 to 1850 saw coal becoming increasingly important to the British economy; it helped fuel the technological changes of the Industrial Revolution and, with the coming of the railways, allowed areas that hitherto had had little in the form of industry, due to the lack of natural resources, to take advantage of the new opportunities being opened up. Until the mid-nineteenth century, the demand for coal and, therefore, the price, was closely linked with the demand for iron, and it was not until the second half of the nineteenth century, when domestic and imperial requirements increased significantly, that the coal industry

became the 'dominant' partner; it no longer 'relied' on iron to boost demand and price because there were sufficient other 'customers'.

It was the improvements in the transport infrastructure that allowed coal to become "all-powerful" (Jevons, 1865: viii). As the demand for coal increased, methods had to be found to transport it to the places which needed it; first the roads were improved, then the canals were dug and, finally, the railways were laid. Jevons (1865: 91) explained that "the rapid extension of railways is mainly due to the traffic and wealth occasioned by the use of coal in manufactures" but, once the railways had been laid, the engines themselves needed coal as fuel and so coal and railways became inextricably linked in the second half of the nineteenth century. This close relationship is demonstrated in Denbighshire; without the railways Denbighshire, being a land bound coalfield, was heavily constrained in its development of an 'external' market. All of this changed after 1850, the coming of railways enabling significant developments to take place.

It is these developments that form the focus of the remainder of this thesis. We commence our examination of these developments in the next chapter by providing an overview of the Denbighshire coalfield and its development after 1850, explaining how it fits into the context of, first, north Wales and, secondly, the British coal industry.

Chapter 2

PROFILE OF THE DENBIGHSHIRE COALFIELD

Introduction

The purpose of this chapter is, first, to explain how the Denbighshire coalfield fits into the context of the north Wales coal industry before looking at the coalfield within a UK context. A detailed review of the development of the Denbighshire coalfield over two periods, 1854-1873 and 1874-1914 will then be carried out. This review covers the numbers of mines, their size, their output and the number of men they employed; these statistics will then be used to compare and contrast Denbighshire with other coalfields in the UK and to provide a backcloth against which the developments of the coalfield can be discussed in later chapters.

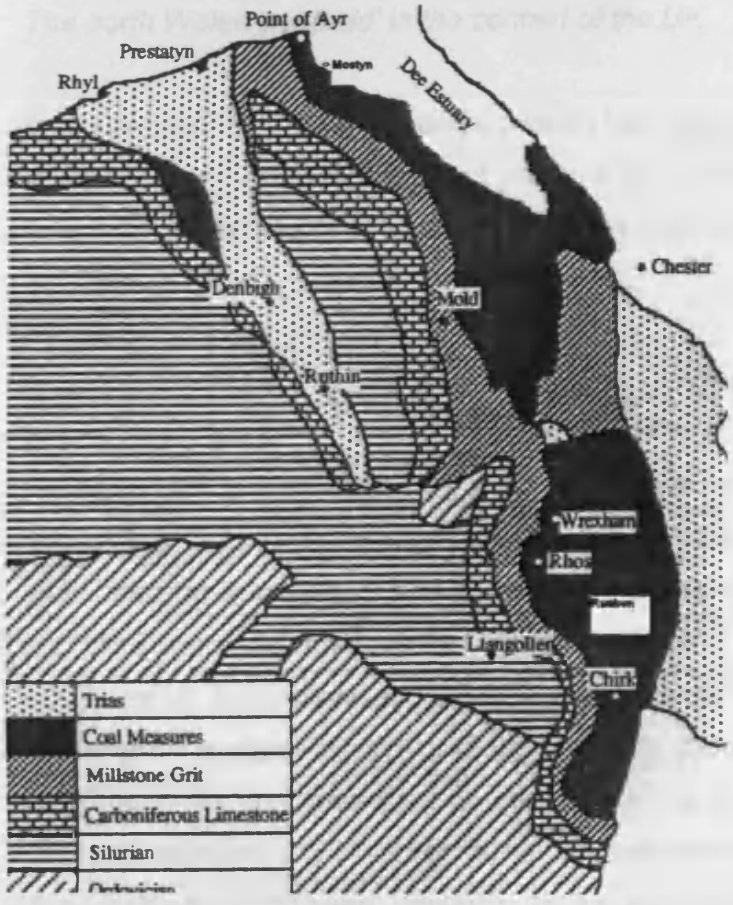
The Denbighshire coalfield was never designated a 'coalfield' in its own right when official statistics were gathered; it was always simply a 'region' within the north Wales 'coalfield'. This means that much of the official data, on which this chapter is based, relates to north Wales, but a number of sources, mainly Hunt's *Mineral Statistics, (Mineral Statistics* from 1884) and the *List of Mines*, (BL/BS/27/1) do provide statistics relating to Denbighshire which has allowed conclusions about this coalfield to be drawn.

The north Wales coal industry

As mentioned in Chapter 1, the north Wales 'coalfield' is split between three counties: Anglesey, Denbighshire and Flintshire. Anglesey comprised a small, geographically isolated field which had been so worked that by the mid-nineteenth century it was of little significance; in 1854, it had only 5 mines (Dickinson, 1854: 72), and its contribution in terms of the output of north Wales was also negligible (approximately 1 per cent). As for Denbighshire and Flintshire, W Gibson (1927: 240) explained that "the Western rim of the crescent

of coalfields surrounding the Cheshire Triassic and Drift filled plain is occupied by [the] coalfields of Denbighshire and Flintshire". Geologically, the coal measures of north east Wales are traversed by the "the great Bala fracture" (FA Gibson, 1922: 241) which runs north east to south west from Caergwrle to Minera (North, 1931: 189), creating two distinct coalfields which can be studied separately (see Map 2.1). The Denbighshire coalfield is centred on the towns of Wrexham and Ruabon and, to a lesser extent, Chirk; whereas the Flintshire coalfield is located mainly around Mold, Hawarden and Buckley, but extending to the coast at Point of Ayr.

Map 2.1: The geology of north east Wales showing the main centres of the Denbighshire and Flintshire coalfields



(Source: Kelly, 1990)

In the eighteenth century, as was noted in Chapter 1, it was the Flintshire coalfield that dominated the output of the north Wales 'coalfield'; the proximity of coastal ports such as Mostyn (see Map 2.1), and therefore the coastal trade to Ireland, meant that coal was exploited for commercial reasons from a much earlier date here than in Denbighshire. Denbighshire was a land-locked county, but "with the aid of the new markets provided by industry and agriculture, and the cheaper and speedier means of reaching them afforded by turnpike roads, canals and mineral railway, coal mining made rapid progress" in the second half of the nineteenth century (Dodd, 1971: 195).

The north Wales 'coalfield' in the context of the UK

In this section, and the subsequent one on Denbighshire, which look at the profile of north Wales and Denbighshire within a UK context, we will split the period between the middle of the nineteenth century and the First World War into two:

i) 1854-1875

ii) 1875-1914.

The reasons for this are twofold. Firstly, the accuracy of the figures in the first period is in doubt; the main source for this period is the statistics compiled by Hunt from the returns voluntarily made by mine owners. However, many of these figures are likely to be estimates and, since the accuracy of figures for individual years can be questioned, any calculations based thereon can only be used to establish trends. According to Taylor (1955: 48) "these statistics [Hunt 1854-1873] are of dubious value" and it is only from 1874 that the official, published statistics for a region's output can be used with confidence. The reason for this is that there was no compulsion on colliery owners to make returns until after the implementation of the 1872 Mines Act and consequently, until this date, the data produced was incomplete. However, for the purpose of this thesis they are useful as a starting point because they are the only figures available for this period. The second reason for the chronological split in our analysis is that the main collieries that were to 'power' the Denbighshire coalfield in the late nineteenth century were

not sunk until the late 1860s/early 1870s and so their impact was only felt in the period 1875 -1914.

1854-1875

In relation to the UK as a whole it is obvious that north Wales was an insignificant region in terms of output and numbers employed (see Table 2.1). In 1854 the output of north Wales was approximately 1.8 per cent of the total for the UK, and the percentage of workers employed in north Wales was 2.1 per cent.

Table 2.1: Statistics re the UK and north Wales 1854-1875

	1854	1860	1865	1870	1875
UK					
Output- '000 tons	64,661	84,042	98,151	110,431	133,306
No. of collieries	2,397	3,009	3,256	2,851(b)	4,445(b)
% increase in output		24.3	16.8	12.5	20.7
Numbers employed	217,356	(a)	(a)	(a)	510,523
North Wales					
Output -'000 tons	1,143	1,750	1,983	2,329	2,349
No. of collieries	60	84	84	53(b)	124(b)
Amount carried by rail - '000 tons		122	930	1,023	1,227
Numbers employed	4,623	(a)	(a)	(a)	13,593
% Increase in output		53.1	13.3	17.4	0.9
NW output as % of UK	1.8	2.1	2.0	2.1	1.8
NW employees as % of UK employees	2.1				2.7

(Sources: 1854-1870: Hunt's *Mineral Statistics*: D/GR/1545-1570; 1875: Gibson (1922): 11 and 29-30)

Notes:
(a) no figures are available for these years;
(b) the fluctuations in the number of collieries between 1870 and 1875 are likely to be due to changes in the way in which collieries were classified. It would appear that, in 1875, collieries which had, for example, No. 1 & No. 2 pits, may have been counted as two separate collieries, whereas they had only been included as one colliery in 1870. If the comprehensive list of collieries for Denbighshire (Appendix A) is studied, this would indeed appear to be the case - only a handful of collieries being opened between 1870 and 1875.

By 1860 the output of north Wales accounted for 2 per cent of the UK total output which was slightly higher than its neighbours, Cheshire and Shropshire

see Table 2.2), two other coalfields that are generally classified as small. However, while the share of UK output produced by both Cheshire and Shropshire fell greatly between 1854 and 1875, that of north Wales remained roughly constant, being 1.8 per cent in both 1854 and 1875. In terms of employment, by 1875, north Wales was employing a higher proportion of the UK's colliers in its collieries, the proportion having increased to 2.7 per cent (see Table 2.1).

Table 2.2: Number of collieries and output, Cheshire & Shropshire 1854-1875

	Cheshire			Shropshire		
Year	No. of collieries	Output- '000 tons	Output as % of UK	No. of collieries	Output- '000 tons	Output as % of UK
1854	30	786	1.2	48	1,080	1.7
1860	35	750	0.9	68	850	1.0
1865	39	850	0.9	69	1,135	1.2
1870	29	929	0.8	59	1,343	1.2
1875	37	659	0.5	64	1,230	0.9

(Sources: Hunt's *Mineral Statistics*: D/GR/1545-1570)

1875-1914

In the years 1875-1914 the coal output of the UK increased from 133.3 million tons to 265.6 million tons, an increase of almost 100 per cent (output had peaked at 287.4 million tons in 1913, see Table 2.3), and there was a corresponding rise in the numbers employed (above and below ground) from 510,523 to 1,124,301, an increase of 120 per cent (see Table 2.3). According to Kirby (1971: 5), much of this increase was due to the expansion of the export market, but Buxton (1979: 7) points out that domestic consumption also increased considerably in this period.

Table 2.3: UK and north Wales (NW) output (to nearest million tons) and employment figures, 1875-1914

	Output		Employment	
Year	UK	NW	UK	NW
	Million tons	Million tons		
1875	133.3	2.3	510,523	13,593
1876	134.1	2.4	489,100	11,981
1877	134.2	2.5	469,954	10,796
1878	132.6	2.2	453,833	9,644
1879	133.7	2.2	455,345	10,142
1880	147.0	2.4	461,774	10,208
1881	154.1	2.7	471,733	10,176
1882	156.5	2.4	481,087	10,098
1883	163.7	2.7	492,422	10,095
1884	160.8	2.6	499,595	10,175
1885	159.3	2.3	500,369	9,314
1886	157.5	2.6	503,868	9,305
1887	162.1	2.7	510,284	9,780
1888	169.9	2.7	518,797	10,151
1889	176.9	2.9	552,855	10,759
1890	181.6	3.0	606,509	12,274
1891	185.5	3.2	642,210	12,789
1892	181.8	3.0	658,676	12,728
1893	164.3	2.2	663,385	12,649
1894	188.3	3.2	693,467	- (a)
1895	189.7	2.8	693,935	- (a)
1896	195.4	2.9	685,881	11,536
1897	202.1	2.9	688,102	11,664
1898	202.0	3.2	699,724	11,533
1899	220.1	3.2	721,624	12,008
1900	225.2	3.1	772,759	12,629
1901	219.0	3.1	800,035	13,377
1902	227.0	3.2	835,743	13,342
1903	230.3	3.2	834,766	13,248
1904	232.4	3.0	839,821	12,949
1905	236.1	2.9	850,390	12,743
1906	251.0	3.2	874,161	12,970
1907	267.8	3.5	932,104	14,370
1908	261.5	3.4	979,026	14,863
1909	363.8	3.3	1,004,945	14,908
1910	264.4	3.4	1,039,986	15,171
1911	271.9	3.4	1,057,699	15,424
1912	260.4	3.3	1,079,926	15,699
1913	287.4	3.5	1,118,453	15,948
1914	265.6	3.3	1,124,301	16,257

(Source: Gibson (1922): 11 and 29-30).

Note

(a) No separate figures given for these years

Buxton (1979: 7), claims that in 1900 consumption per head of population in the UK was 4.05 tons, "higher than in any other country of the world". However, it was the export industry that made the UK coal industry pre-eminent for much of the period under review; in 1870 the UK exported only 14.3 million tons, which constituted 13 per cent of its total output; this had risen to 58.4 million tons or 26 per cent of total output by 1900 (Buxton, 1979: 97), and "by 1910, Britain was still by far the largest coal-exporting nation in the world". Indeed, by 1913, 34 per cent of the total UK output was exported (Asteris, 1986: 38).

During the period 1875-1914, in absolute terms, the output of north Wales increased from 2.349 million tons in 1875 to 3.315 million tons in 1914, an increase of 41 per cent (see Table 2.3); within this period, 1893, a year when a significant strike took place, constituted the 'low' point (2.206 million tons), and 1913 the high point (3.505 million tons). However, with UK output more than doubling between 1875 and 1914, north Wales' output as a proportion of UK output fell from 1.7 per cent in 1875 to 1.2 per cent in 1914, which represented a 30 per cent decline in north Wales' contribution to UK output as a whole. The north Wales coalfield was therefore less significant in UK terms in 1914 than it had been in 1875.

In terms of employment, Table 2.4 below demonstrates that, as for output, north Wales' importance to the UK as a whole, in terms of the proportion of men employed, also declined. By 1885, the proportion of UK colliers employed in north Wales had fallen to 1.9 per cent, and in the years to 1914, after a slight recovery in 1890 (no employment figures are available for north Wales for 1895), the proportion continued to fall, reaching 1.4 per cent in 1914.

Table 2.4: North Wales employment as a proportion of UK total, 1875-1914.

Year	Percentage	Year	Percentage
1880	2.2	1900	1.6
1885	1.9	1905	1.5
1890	2.0	1910	1.5
1895	-	1914	1.4

(Source: calculated from data in Gibson (1922): 11 and 29-30)

Comparisons with other 'small' coalfields

It is clear, when assessing north Wales' contribution to the UK coal industry, that the north Wales 'coalfield' was a small coalfield which, for comparative purposes, should be compared with other 'small' coalfields. For the purpose of this thesis a 'small coalfield' has been defined as one which contained less than 3 per cent of the total number of collieries in the UK in 1913. Using this criterion, it is found that the following coalfields can be categorised as small (see Table 2.5): Nottinghamshire; Leicestershire; Warwickshire; Cumberland; Cheshire, Shropshire; and Gloucestershire; for consistency with recent studies of the British coal industry, Ireland has not been included in our detailed analysis since it does not constitute a part of Great Britain.

Table 2.5: Number of collieries in the coalfields of the UK in 1913

Coalfield	Number of collieries	Proportion of UK total
		%
Scotland	551	16.1
Northumberland	134	3.9
Durham	305	8.9
Yorkshire	444	13.0
Derbyshire	162	4.7
Nottinghamshire	**58**	**1.7**
Leicestershire	**30**	**0.9**
Warwickshire	**29**	**0.8**
South Wales and Monmouthshire	621	18.2
North Wales	**44**	**1.3**
Cumberland	**39**	**1.1**
Staffordshire & Worcestershire	452	13.2
Lancashire	348	10.2
Cheshire	**20**	**0.6**
Shropshire	**67**	**2.0**
Ireland	27	0.8
Gloucestershire, Somerset & Devon	**89**	**2.6**
UK total	3420	100.0

(Source: Boyns, 1982: 135)

In the years 1875-1914, north Wales' contribution to UK output fell from 1.7 to 1.2 per cent but if the coalfield is compared with the new small coalfields

(see Table 2.6), it can be seen that its contribution was more significant than that of Leicestershire and, until the 1890s, it contributed a similar proportion to the UK's output as Warwickshire. Of the older smaller coalfields it maintained a similar share of output as Cumberland and Gloucestershire, while the coalfields of Cheshire and Shropshire became increasingly insignificant. Nottinghamshire, however, another new coalfield, grew very rapidly throughout this period and its contribution towards the UK's output increased from 2.4 per cent in 1875 to 4.3 per cent in 1914.

Table 2.6: Output of 'small' coalfields as % of UK output

	Notts	Leics	Warw	Cumb	Chesh	Shrop	Gloc	North Wales
	%	%	%	%	%	%	%	%
1875	2.4	0.9	0.6	0.8	0.5	0.9	1.4	1.7
1880	3.0	0.7	0.7	1.1	0.5	0.6	1.3	1.6
1885	3.3	0.7	0.8	1.1	0.4	0.5	1.4	1.4
1890	3.8	0.8	1.0	1.0	0.4	0.4	1.3	1.6
1895	3.5	0.8	1.1	1.0	0.4	0.4	1.1	1.4
1900	3.8	0.9	1.3	0.9	0.3	0.3	1.2	1.4
1905	3.9	1.0	1.6	0.9	0.2	0.3	1.0	1.3
1910	4.3	1.0	1.7	0.8	0.1	0.3	1.0	1.3
1914	4.3	1.1	1.9	0.9	0.1	0.3	1.0	1.2

Key: Notts - Nottinghamshire; Leics - Leicestershire; Warw – Warwickshire; Cumb – Cumberland; Chesh – Cheshire; Shrop – Shropshire; Gloc – Gloucestershire

(Source: Gibson, 1922).

If north Wales' employment figures are compared with those for the other small coalfields (see Table 2.7), we can see that the comments made regarding output apply equally to employment. Warwickshire was growing steadily; it employed an increasing number of the UK's colliers and, by 1914, was employing more men than north Wales. Cheshire and Shropshire became increasingly insignificant in terms of the numbers employed while Leicestershire and Cumberland's share of total employment remained below that of north Wales throughout the period. Gloucestershire, like north Wales, saw a fairly significant drop in the proportion employed; between 1875 and 1914 the numbers employed as a proportion of the UK total fell from 2.5 per cent to 1.4 per cent, which put

Gloucestershire and north Wales on an equal footing. It can therefore be concluded that, in terms of the numbers employed, as was the case with output, north Wales was as important to the UK coal industry as Leicestershire and Gloucestershire and was only slightly less important than Warwickshire.

Table 2.7: Employment of 'small' coalfields as a % of UK employment.

	Leics	Warw	Cumb	Chesh	Shrop	Gloc	N. W
Year	%	%	%	%	%	%	%
1875	0.99	0.90	1.27	0.54	1.51	2.50	2.70
1880	0.92	0.91	1.29	0.54	1.03	2.39	2.20
1885	0.98	0.87	1.36	0.47	0.79	2.40	1.90
1890	0.88	0.92	1.18	1.18	0.59	2.12	2.00
1895	1.29	1.55	1.54	0.52	0.79	2.46	-
1900	0.92	1.23	1.11	0.34	0.48	1.69	1.60
1905	0.97	1.44	1.06	0.15	0.44	1.54	1.50
1910	1.01	1.51	1.01	0.11	0.35	1.42	1.50
1914	0.91	1.70	1.02	0.12	0.33	1.40	1.40

Key: Leics - Leicestershire; Warw – Warwickshire; Cumb – Cumberland; Chesh – Cheshire; Shrop – Shropshire; Gloc – Gloucestershire

Note: Nottinghamshire has been excluded because, in terms of output it was so much larger than the other small coalfields.

(Source: Gibson, 1922)

Having examined north Wales and its place within the British coal industry we will now turn our attention to Denbighshire. Thus, in the next section, we will consider Denbighshire's position within north Wales and attempt to assess its position relative to the UK coal industry as a whole.

The Denbighshire coalfield

The Denbighshire coalfield had two main centres: Wrexham and Ruabon. According to a report by the surveyor, William Lowe, in 1862, "the coal of these districts although one and the same field [are]... perfectly distinct" (National Library of Wales, hereafter NLW, NLW/HR/76/117). Three of the main seams in Denbighshire are the Main, Two Yard and Brassey. These are described in turn by Lowe, as follows (NLW/HR/76/117):

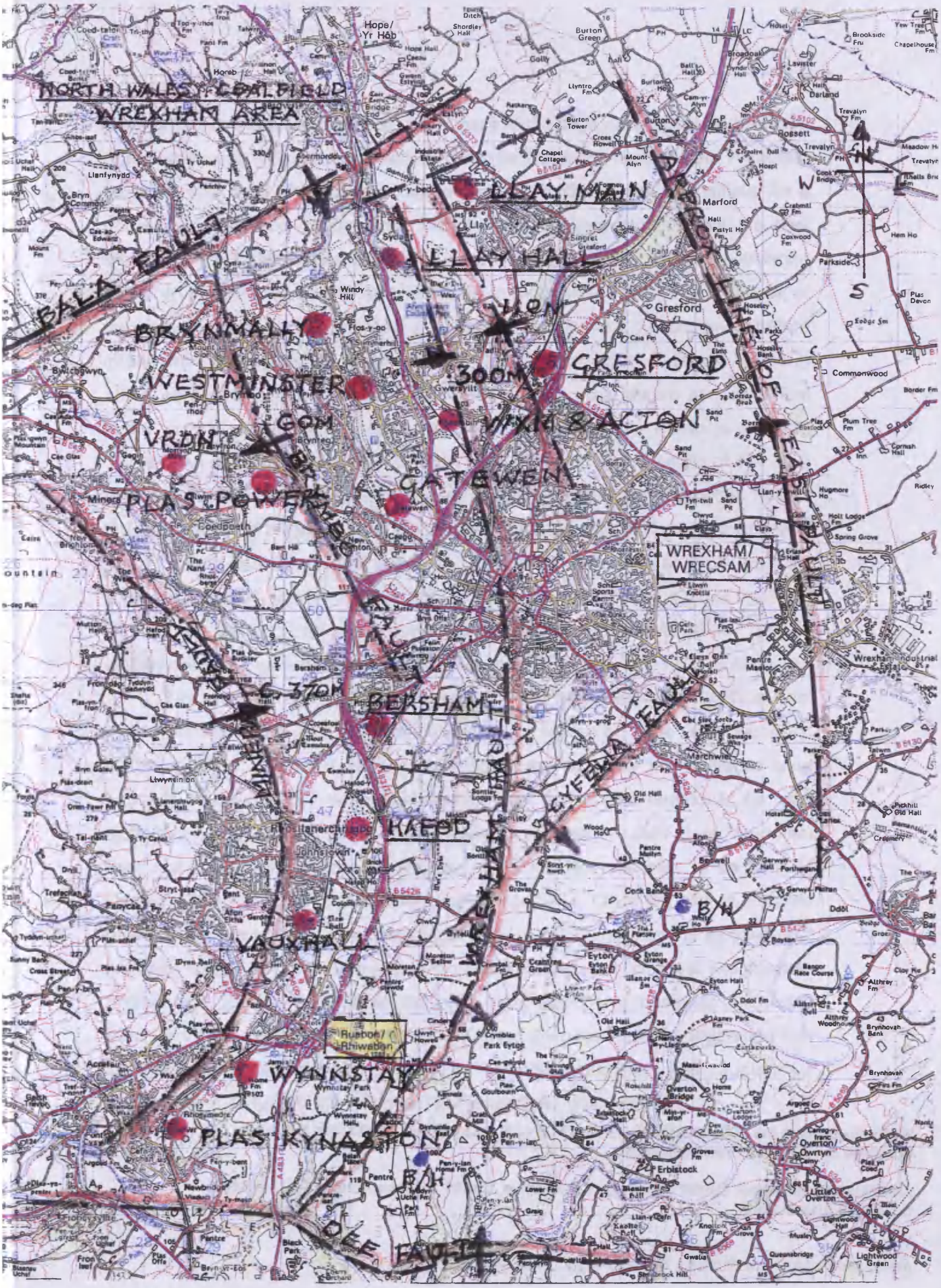
- "the Main coal seam is the principal and most valuable seam in the district, most valuable steam coal, excellent household, good gas, good coking";
- Two Yard - "excellent fuel burning quick steam coal, an inferior house coal, soft";
- "Brassey (also known as Quaker) - first rate smelting coal, very hot, part of the seam a good household coal, part an excellent gas coal and very good steam coal - this seam would be most valuable but it has a vein of black and yellow sulphury particles running through it and its from this it derives its name of Brassey".

Additional types of coal were described by Wedd as follows (D/DM/996/10, and 1928: 41):

- Crank - very good house coal (possibly named after a 'crank' fitting that John Wilkinson developed for Watt's engines (DD/NTD/155))
- Cannel - good house coal
- Powell - very good steam coal (named after a local family involved in coal in the seventeenth century (DD/NTD/155))
- Lower Yard or Ruabon - the best house coal but very bituminous
- Wall & Bench or Queen - very good gas coal.

The depth at which these seams were found depended on the location of the colliery on the coalfield and its proximity to the various faults; an example of the depths of various coal seams is illustrated in Table 2.8, and the locations of the main collieries and faults can be seen on Map 2.2. Map 2.2 shows that there are several faults crossing the coalfield, the most significant being the one labelled 'the Wrexham fault' which runs through the middle of Wrexham and to the east of Ruabon. The Wrexham fault has a downthrow (↓) of approximately 300 metres to the east which means that the Main coal measures are much deeper to the east of this fault. Thus, for example, at the Gresford and Llay Main collieries, the Main coal seam was struck 833 yards below the surface (DD/NTD/155) whereas at Llay Hall, which lies to the west of the Wrexham fault, the Main coal was only 245 yards from the surface (see Table 2.8).

2.2: The main collieries and faults of the Denbighshire coalfield



(Source:PTO)

Annotated by Mr Percy Jackson, Mine Surveyor, MQB, AMinE, FGS.

Map 2.2 also shows, in the west, the Minera fault with a downthrow, to the east, of approximately 370 metres. It was the area between this fault and the Wrexham fault that saw most of the coal mining activity in the Denbighshire coalfield. As a general rule, as one travels from west to east between these faults the coal measures are found further from the surface. Hence, in most cases, the collieries further to the east were sunk at a later date to those to the west. For example, of the collieries highlighted on Map 2.2, Plas Kynaston was in existence before 1854, while sinking began at Wynnstay in 1856, Vauxhall in 1857 and Hafod in 1863. As one travels north and the distance between the Minera and Wrexham faults widens, the coal measures become deeper and the collieries become 'newer'. An additional fault, the Brymbo fault, which is found south of the Bala fault and between the Minera and Wrexham faults, adds to the geological 'mix' of the coalfield as it provides a 60 metre downthrow to the west. In the Vron and Plas Power collieries, which are situated to the west of the Brymbo fault, the Main coal was found at greater depths than in those collieries to the east of the fault. At Vron, the Main coal was found at a depth of 240 yards (NLW/HR/76/117) while at Westminster it was 168 yards and at Llay Hall, 87 yards (see Table 2.8).

The most significant fault to traverse the Denbighshire coalfield is the East fault which lies to the east of the Wrexham fault and can be seen as a 'boundary' to the coalfield. It is interesting to note that there are only two collieries lying between the Wrexham and East faults, Llay Main and Gresford. As was explained earlier, the coal is at much greater depths on this side of the Wrexham fault and it is no coincidence that these were the last collieries to be sunk in Denbighshire, Gresford in 1908 and Llay Main in 1914. Once the coal in the area between the Minera and Wrexham faults had been 'claimed' by the existing coal companies, any new ventures had to 'prospect' outside this 'channel' which made finding and getting the coal an infinitely more expensive business. Indeed a report on the prospects of the Llay Main colliery, prepared in 1911, estimated that £250,000 initial capital would be required because the colliery was situated "on the deep end of the Northern Denbighshire coalfield" (DD/LH/263).

Table 2.8 further illustrates the varying thickness of the seams at the various collieries; the seams of Main coal varied in thickness from 6' 2" in the Vauxhall colliery to 10' 6" in Llay Hall, while the Drowsall seam was only 3' 0" in Westminster but 7' 6" in Llay Hall. Such variations obviously had an impact on the working of the mines as it can be assumed that, ceteris paribus, the thicker the seam, the easier, and cheaper, it was to get the coal.

Table 2.8: Depth and thickness of various seams at the Bersham, Westminster, Llay Hall and Vauxhall collieries on the Denbighshire coalfield

	Depth from surface (yards)				Seam Thickness			
Colliery	Bersham	West-minster	Llay Hall	Vauxhall	Bersham	West-minster	Llay Hall	Vauxhall
Coal seam								
Cannel	344		87		4' 8"		2' 6"	
Drowsall		97	159			3' 0"	7' 6"	
Powell		107	167			4' 4"	3' 3"	
Two Yard	365	115	182		2' 6"	5' 0"	6' 0"	
Crank	365	124	186		2' 4"	2' 8"	4' 8"	
Quaker/ Brassey	384	135	209		6' 0"	5' 6"	5' 6"	
Main	423	168	245	472	9' 0"	9' 9"	10' 6"	6' 2"
Nant				485				7' 7"
Yard				499				3' 0"
Wall & Bench/ Queen								
Upper Queen			344				2' 3"	
Queen			369	515			2' 10"	3' 3"
Lower Queen			396				1' 9"	

(Source: Bales Gregory & Price, *The North Wales Coalfield -map I,* no date).

1854-1875

While it is difficult to establish Denbighshire's relative position re. output in north Wales before 1860 due to the lack of information, figures are available for the number of collieries and the men employed therein, which allows us to assess its importance. According to Hunt (*Mineral Statistics*) there were 60 collieries in north Wales in 1854, 25 of them in Denbighshire, 30 in Flintshire and 5 in Anglesey. These figures would seem to imply that Flintshire was the dominant

area within the region in terms of output, but when the employment figures are examined and average employment per colliery is calculated, it is clear that the collieries in Flintshire were, on average, much smaller than those in Denbighshire. The numbers employed, both above and below ground, were as follows (Hunt's *Mineral Statistics*):

	Total	As % of total
Denbighshire	3,017	65.3
Flintshire	1,555	33.6
Anglesey	51	1.1
	4,623	

The average number of employees per colliery in Denbighshire was approximately 121, while in Flintshire and Anglesey the averages were 52 and 10 respectively. Given the high correlation coefficient between output and employment in the coal industry at the time (Boyns, 1982), the relative contribution of Denbighshire to the output of north Wales as a whole is likely to reflect its importance in terms of the numbers employed. This dominance was largely due to the fact that many of the collieries in Flintshire had worked the readily accessible coal and the remaining coal was affected by many faults that made extraction difficult (W Gibson, 1927: 245).

During the third quarter of the nineteenth century, the Denbighshire coalfield came to dominate the north Wales 'coalfield' to such an extent that, by 1865, Denbighshire coal accounted for over 70 per cent of the coal output of north Wales (see Table 2.9). Table 2.9 also shows that, although this proportion had fallen to less than 60 per cent of total output by 1875, Denbighshire was very much the dominant region within north Wales at this date, indeed, by 1875, Denbighshire accounted for 65 per cent of all the coal carried by rail from north Wales.

What of Denbighshire's position in relation to the UK coal industry? As has already been explained above, for official, statistical purposes, north Wales was the designated coalfield and Denbighshire was simply a 'region' within this coalfield. However, it has been contended, on geological grounds that

Denbighshire should be considered a coalfield in its own right and, if one looks at Denbighshire's output as a proportion of the UK's output, as outlined in Table 2.9, we can see that Denbighshire, between 1854 and 1875, contributed at least 1 per cent of the UK's total output throughout the period. This constituted a higher proportion than that contributed by either the Cheshire or Shropshire coalfields (see Table 2.2 above).

Table 2.9: Statistics re. Denbighshire 1854-1875

	1854	1860	1865	1870	1875
Output- '000 tons		1,139	1,395		1,380
No of collieries	30	39	36	29	50
Amount carried by rail -'000 tons					803
Amount carried by rail as % of total carried from NW					65.4
% increase in output			22.5		
Denbs output as % of UK output		1.4	1.4		1.0
Denbs output as % of NW output		65.1	70.3		59.0

(Source: Hunt's *Mineral Statistics* D/GR/1545-1570; figures re north Wales extracted from data in Table 2.1 above).

1875-1914

Denbighshire's dominance of the north Wales 'coalfield' increased throughout much of the 1875-1914 period. Between 1875 and 1914, Denbighshire's output increased by 91 per cent and, by 1914, Denbighshire was producing 80 per cent of the coal raised in north Wales (see Table 2.10). In relation to the UK as a whole, Denbighshire's output as a proportion of the UK's output can be seen in Table 2.11. These figures reveal that, in the period 1875-1914, there was very little fluctuation in Denbighshire's contribution to the UK's coal output. In a period which saw UK coal production double, the fact that the Denbighshire coalfield

was able to 'keep up' with national growth demonstrates the extent of the region's expansion in this period.

Table 2.10: Denbighshire's output as a percentage of north Wales output, 1875-1914

	Denbigh-shire	north Wales	Denb as % of NW
1875	1,379,560	2,349,118	59
1880	1,555,238	2,429,315	64
1885	1,710,276	2,312,391	74
1890	2,221,497	2,975,046	75
1895	2,206,993	2,848,072	77
1900	2,447,092	3,109,615	79
1905	2,368,259	2,901,998	82
1910	2,598,370	3,410,876	76
1914	2,644,996	3,315,092	80

(Source: FA Gibson, 1922: 11 and 29-30)

Table 2.11: North Wales and Denbighshire output as % of UK output, 1875-1914

	NW as % of UK	Denbs as % of N W	Denbs as % of UK
1875	1.7	59	1.0
1880	1.6	64	1.0
1885	1.5	74	1.1
1890	1.6	75	1.2
1895	1.5	77	1.2
1900	1.4	79	1.1
1905	1.2	82	1.0
1910	1.3	76	1.0
1914	1.2	80	1.0

(Source: FA Gibson, 1922: 11 and 29-30)

If Denbighshire's output as a proportion of the UK's output is compared with that of the small coalfields detailed in Table 2.6 above, we can see that, in its own right, the Denbighshire coalfield, although outstripped by the Nottinghamshire and Warwickshire coalfields, was more significant than Cheshire, Shropshire and Cumberland, and contributed approximately the same

proportion of coal as did the Leicestershire and Gloucestershire coalfields. Taking this evidence, in conjuction with the geological details already presented, leads us to conclude that Denbighshire can be deemed worthy of study in its own right, as a small coalfield.

Having considered the Denbighshire coalfield in relation to north Wales and the UK as a whole, we now turn our attention to the individual collieries within the coalfield, with a view to making comparisons with other coalfields as regards average colliery size. Ideally, when trying to establish the size of an individual colliery, one should examine output figures, however, due to the paucity of archival material available, this has not been possible. It has therefore been necessary to use employment figures as a 'measure' of colliery size but, these too have their limitations. Prior to 1894 there was no official collation of individual colliery statistics but from this date every colliery had to supply average annual employment figures to the Board of Trade. While this means that individual collieries can only be 'monitored' for twenty years, the period is long enough to allow trends to be established and conclusions to be reached.

Colliery size

The output of a region was to a great extent related to the number of pits therein, there being a high, positive correlation between the number of pits in a coalfield and its output. However, amongst some of the smaller coalfields, this correlation was less strong (Boyns, 1982). The figures in Table 2.12 show that the percentage of pits in north Wales corresponds very closely to its proportion of UK output, but for other, smaller regions such as Gloucestershire and Shropshire, they had a far higher proportion of pits than output, whereas Nottinghamshire had a higher proportion of output than pits. This implies that there were many small, less productive pits in regions such as Cheshire and Shropshire, whereas Nottinghamshire had fewer, larger and more productive mines.

Table 2.12: Percentage of total UK collieries in each region

	1894		1899		1913	
	No.	%	No.	%	No.	%
Scotland	565	15.6	533	15.7	551	17.0
Northumberland	121	3.4	123	3.6	134	4.1
Durham	275	7.6	285	8.4	304	9.4
Yorkshire	423	11.7	432	12.7	379	11.7
Derbyshire	195	5.4	187	5.5	115	3.6
Nottinghamshire	**55**	1.5	**56**	**1.7**	**35**	**1.1**
Leicestershire	**33**	**0.9**	**35**	**1.0**	**30**	**0.9**
Warwickshire	**30**	**0.8**	**36**	**1.1**	**29**	**0.9**
South Wales & Monmouthshire	627	**17.4**	551	16.3	621	19.2
North Wales	**68**	1.9	**61**	**1.8**	**44**	**1.2**
Cumberland	**40**	**1.1**	**42**	**1.2**	**39**	**1.2**
Staffordshire and Worcestershire	460	**12.7**	383	11.2	452	14.0
Lancashire	457	12.6	423	12.5	303	9.4
Cheshire	**22**	0.6	**23**	**0.7**	**15**	**0.5**
Shropshire	**96**	**2.7**	**109**	**3.2**	**67**	**2.2**
Ireland	**20**	**0.6**	**27**	**0.8**	**27**	**0.8**
Gloucestershire	**125**	**3.5**	**88**	**2.6**	**89**	**2.8**
Total	3612	100.0	3394	100	3234	100.0

(Source: Boyns, 1982: 194)

In his study of the British coalfield, Boyns (1982: 153) concluded that the average colliery size, measured by the numbers employed, "significantly increased" between 1894 and 1913, although he also concluded that "whilst average colliery size did increase over this period, the most numerous colliery size group in 1913 was still the same as it had been in 1894, i.e. the 10-99 size group". To see whether Denbighshire fits into this pattern, an analysis of the numbers employed and the size of collieries has been carried out for 1894, 1900, 1907 and 1914. All the statistics have been extracted from the annual *List of Mines* which, from 1894, gives details of numbers employed in the individual pits of a region, and details relating to those who owned the pits. The main problem when using the *List of Mines,* as highlighted by Boyns (1982: 132), is the way the list defined a colliery; for example, from 1894 to 1902 the Bersham colliery was

listed as two pits - Bersham 1 and 2, even though only one set of employment figures was given, and despite the fact that the pits were run as a single concern; from 1903 it was listed as a single colliery. This problem of categorisation also applies to the Hafod, Wrexham, Westminster and Wynnstay collieries; the Wynnstay colliery was categorised as a single colliery from 1907 while it was not until 1913 that Hafod, Wrexhan and Westminster were listed as single collieries rather than two or three separate pits. Treating them as one concern is consistent with surviving records which reveal that, as far as the companies running these collieries were concerned, they were running a single operation, even though several collieries may have been involved.

For the purpose of the initial analysis, however, the collieries have been treated as they were given in the *List of Mines*, and therefore if two separate collieries were listed, but only one employment figure was given, the employment figure has been split equally[2]. In other cases where three separate underground figures have been given, but only a single figure for above ground employment (because the collieries were run by a single company) for example, Gwersyllt and Westminster 4 & 5, the above ground figure has been split in the same proportion as reflected in the figures of those working underground. This approach is consistent with that advocated by Boyns (1982: 133), and allows the total number of collieries to agree with that given by the *List of Mines*; this prevents confusion and the necessity for reconciliations to the *List of Mines* figures. Using this approach the size distribution for the selected years is as presented in Table 2.13.

The analysis presented in Table 2.13 shows that, in Denbighshire, the proportion of collieries employing 500 or more persons grew slightly from 14 per cent in 1894 to 16 per cent in 1900, rose rapidly to 37 per cent in 1907 and to 42 per cent in 1914. The higher figures in 1907 and 1914 partly reflect the fact that, in 1907, the Bersham and Wynnstay collieries are each listed as single collieries rather than as two separate collieries (each less than 500 persons), and by 1914 all linked pits are included as single collieries. To overcome this problem, in

[2] While this is unlikely to accurately reflect the true position, a lack of knowledge means that this is the only logical approach that can be taken if conclusions are to be drawn.

Table 2.14 we present the same data, but after treating all the collieries as single entities for each of the years under review. Using this method it can be seen that while there is a significant increase in the size of collieries, it is not so dramatic, the increase in collieries employing 500 or more persons being from 24 per cent in 1894 to 33.5 per cent in 1907 and 42 per cent in 1914.

Table 2.13: The size distribution of collieries in Denbighshire- 1894, 1900, 1907 & 1914

Size	1894		1900		1907		1914	
	No.	%	No.	%	No.	%	No.	%
0	-	-	1	3	-		-	-
1-9	4	12	3	8	4	12	2	8
10-99	7	21	11	30	11	33	7	24
100-249	7	21	4	11	3	9	2	8
250-499	11	32	12	32	3	9	4	15
500-999	5	14	5	13	10	30	8	31
1000-1499	-	-	1	3	2	7	2	8
1500>	-	-	-	-	-	-	1	3
Total	34	100	37	100	33	100	26	100

(Source: *List of Mines* BL/BS/27/1).

Despite this increase in the larger collieries, it was the small colliery, employing less than 100 persons, that remained the largest group (see Table 2.14); 38 per cent of the collieries in Denbighshire fell into this category in 1894, this figure rising slightly to 43 per cent in 1900 and 50 per cent in 1907, before falling to 35 per cent in 1914. However, although this size category may have been the largest in terms of the number of collieries, it was insignificant when the numbers employed by the collieries falling into this category are studied. A study of the numbers employed by the various sized collieries reveals that throughout the four sample years the collieries employing less than 100 persons consistently employed only about 3 per cent of those employed in the coalfield as a whole (see Table 2.15).

Table 2.14: The size distribution of collieries in Denbighshire treating all collieries as single entities

No. of employees	1894		1900		1907		1914	
	No.	%	No.	%	No.	%	No.	%
0-99	11	38	13	43	15	50	9	35
100-249	6	21	4	13.5	4	13.5	2	8
250-499	5	17	6	20	1	3	4	15
500-999	6	21	4	13.5	6	20	8	31
1000-1499	1	3	3	10	4	13.5	2	8
1500>	-		-				1	3
Total	29	100	30	100	30	100	26	100

(Source: *List of Mines*, BL/BS/27/1).

Table 2.15: Numbers employed in the various sized collieries of Denbighshire

	1894		1900		1907		1914	
Numbers employed	No.	%	No.	%	No.	%	No.	%
0-99	238	3	286	3	303	3	347	3
100-249	1375	15	690	7	834	8	291	2
250-499	5097	54	4724	48	1311	12	1469	11
500-999	2647	28	3037	31	5814	56	6528	50
1000-1499	-	-	1048	11	2262	21	2425	19
1500>	-	-	-	-	-	-	1922	15
Total	9347	100	9785	100	10524	100	12982	100

(Source: *List of Mines*, BL/BS/27/1).

Table 2.15 is calculated using the same basis as for Table 2.13, i.e, treating collieries such as Hafod and Wrexham as two separate collieries in 1894, 1900 and 1907. Table 2.15 reveals that the most important category in terms of the numbers employed in 1894 and 1900 was that of the collieries employing 250-499 persons. By 1907 and 1914 it was those collieries employing between 500 and 999 persons that was the most important size group, though collieries employing 1000 or more had increased their 'share' most significantly from 11 per cent in 1900 to 21 per cent in 1907 and 34 per cent in 1914. Recalculating the figures on the basis of single collieries throughout, i.e, consistent with Table 2.14, gives the results presented in Table 2.16. This provides a very different picture.

Table 2.16: Numbers employed in Denbighshire treating all collieries as single entities

	1894		1900		1907		1914	
Numbers employed	No.	%	No.	%	No.	%	No.	%
0-99	238	3	286	3	303	3	347	3
100-249	1375	15	690	7	834	8	291	2
250-499	1882	19	2297	24	480	4	1469	11
500-999	4585	49	3101	32	4070	39	6531	50
1000-1499	1267	14	3411	35	3325	32	2425	19
1500>	-	-	-	-	a1512	14	1922	15
Total	9347	100	9785	100	10524	100	12982	100

(Source: *List of Mines*, BL/BS/27/1).

Note
(a) In the 1907 *List of Mines* (Table 2.14), the Hafod colliery was treated as two separate collieries with the total number of employees falling into the 500-999 category, however, when treated as a single entity, the combined employment figure was over 1500.

Given that the companies owning the collieries treated them as single entities, this revised approach would appear more realistic than trying to make the employment figures 'fit' into the *List of Mines* approach. Recalculating the figures reveals that, whereas only 28 per cent of those employed in Denbighshire in 1894 under the initial analysis were employed by collieries employing 500 or more, under the revised analysis, the figure is 63 per cent. The revised figure for the other sample years also reveals much higher proportions of employment in the larger collieries (those employing 500 or more), 67 per cent, 85 per cent and 84 per cent for 1900, 1907, and 1914 respectively. Table 2.16 also reveals that collieries employing over 1500 men emerged in Denbighshire in 1907; 1907 was a boom year for the coal industry, and that year saw collieries with a workforce of 1000 or more men employing 46 per cent of the total workforce in Denbighshire. Although this had fallen back to 34 per cent by 1914, this was not a 'typical' year, the outbreak of war having caused many miners to volunteer and thereby reduce the workforce available to collieries. Comparison with the 1913 figures (see Appendix D, p.363) is likely to be more useful and these reveal that 42 per cent of the Denbighshire workforce was employed by collieries employing 1000 or more men. It is interesting to note that, in 1913, there were only 4 collieries in Denbighshire employing 1000 or more men which, if considered as a proportion

of all the collieries in that region, accounted for 15 per cent of the total[3]. This is to be contrasted with the picture in the coal industry nationally where these larger collieries "only accounted for slightly less than one-tenth of the total number of collieries within the industry" (Boyns, 1982: 137). The Denbighshire percentage is greater than that for many of the other coalfields of the UK. Table 2.17 shows that only four other regions in the UK, namely Northumberland, Durham, Nottinghamshire and Warwickshire, had higher proportions of mines employing more than 1000 men while the Denbighshire proportion exceeded that for major coalfields such as south Wales and Scotland.

Table 2.17: proportion of collieries employing more than 1000 men in 1913

Region	Proportion of collieries employing >1000 men
Scotland	3.3
Northumberland	17.2
Durham	17.0
Yorkshire	11.2
Derbyshire	7.4
Nottinghamshire	22.4
Leicestershire	3.3
Warwickshire	27.6
S. Wales & Mon.	11.6
N. Wales	9.0
Cumberland	5.1
Staffs. & Worcestershire	2.6
Lancashire	3.2
Cheshire	0
Shropshire	0
Ireland	0
Gloucs., Somerset & Devon	0

(Source: Boyns, 1982: 135)

Average colliery size

Rather than looking at the proportion of collieries employing various numbers of men, a more meaningful measure of a colliery's size might be gleaned from looking at the average colliery size. Using the data on employment, and number

[3] If the Wrexham colliery with a workforce of 998 men is included

of collieries as presented in the *List of Mines* (see Table 2.18), the average size of colliery (total employees/ number of collieries) in Denbighshire increased from 274.9 in 1894 to 499.3 in 1914. The figures for 1913 and 1914, however, are so much higher than those for any of the other years during the 1894-1914 period, due to the practice in those years of treating as a single colliery, pits which were previously treated separately. If the figures for 1913 and 1914 are re-calculated on the basis used for 1894-1912, then the figures become 419.2 and 447.7 respectively, a significant increase, but not as marked.

Table 2.18: Average colliery size (workers) in Denbighshire 1894 -1914 per List of Mines, and average size excluding clay pits

Per List of Mines				Excluding clay pits		
Year	Workers	Collieries	Average	Workers	Collieries	Average
1894	9,347	34	274.9	9,245	28	330.2
1895	9,365	33	283.8	9,263	27	343.1
1896	8,900	33	269.7	8,786	27	325.4
1897	9,031	33	269.4	8,913	27	330.1
1898	9,091	33	273.7	8,957	26	344.5
1899	9,521	35	272.0	9,385	28	335.2
1900	9,785	37	264.4	9,614	29	331.5
1901	10,460	38	275.3	10,298	30	343.3
1902	10,805	37	292.0	10,633	29	366.7
1903	10,754	35	307.2	10,602	27	392.7
1904	10,359	35	296.0	10,213	27	378.3
1905	10,006	33	303.2	9,864	25	394.6
1906	10,739	34	315.8	10,610	26	408.1
1907	10,524	33	318.9	10,367	25	415.8
1908	11,300	35	322.9	11,155	27	413.1
1909	11,514	35	329.0	11,378	27	421.4
1910	11,673	35	335.5	11,545	27	427.6
1911	11,934	34	351.0	11,806	27	437.3
1912	12,394	32	387.3	12,276	26	472.1
1913	12,577	26(30)	483.7/ (419.2)	12,466	21 (25)	593.6 /(498.6)
1914	12,982	26(29)	499.3/ (447.7)	12,868	21 (24)	612.8 /(536.2)

(Source: List of Mines BL/BS/21/1) – for breakdown see Appendix D.

Note: the figures in brackets for 1913 and 1914 are the recalculated numbers based on the way the *List of Mines* categorised collieries until 1912.

It is interesting to note that these average figures are significantly higher than the UK averages discussed by Boyns (1982: 140). In his examination of the average size of colliery in the UK in 1894 and 1913, Boyns (1982: 140) gives the figures of 235.4 and 381.2 respectively for the UK as a whole, and only in Northumberland, Durham, Nottinghamshire and Warwickshire were the averages in 1913 higher than in Denbighshire (see Table 2.19). A possible explanation for this is that the seven largest pits in Denbighshire: Plas Power, Wrexham & Acton, Hafod, Bersham, Brynkinallt, Westminster and Wynnstay accounted for approximately 76 per cent and 63 per cent of total employment in the coalfield in 1894 and 1914 respectively, a factor which may bias the average. Another problem with the data from the *List of Mines* is that it includes all mines that were covered by the relevant Coal Mines Act, which covered mines that extracted coal, even when coal production was not the main occupation, for example, clay pits. In Denbighshire, as in most coalfields, such concerns were usually very small and were all in the 0-100 employees category. As such, their inclusion in the calculation of an average sized colliery may skew the results; to see whether this is indeed the case, the average figures have been recalculated excluding the clay pits and their employees (see the final three columns of Table 2.18). These figures reveal significantly higher averages and show that average employment in Denbighshire increased from 330.2 employees per colliery in 1894 to 536.2 in 1914, an increase of 62 per cent.

It would thus appear that if we measure growth either in terms of average colliery size or the number of collieries employing more than 1000 men, growth in Denbighshire was significant in the period 1894 to 1914. As will be discussed further in Chapter 7, the main impetus behind this growth was the development of a comprehensive railway system. In 1854, Wrexham was linked to both Chester and Shrewsbury but much remained to be done to further extend the railway network. At this date, Denbighshire had 30 relatively small collieries, and it was only when the railway system developed that larger pits were built. Indeed, of the seven largest pits named above, only one, Westminster was sunk before 1850

(1846), the others being sunk between 1856 and 1875 as the railway network was extended.

Table 2.19: Average colliery size (workers) in the coalfields of the UK, 1913

Region	Average colliery size (workers)
UK	327.0
Scotland	267.8
Northumberland	455.3
Durham	543.7
Yorkshire	363.1
Derbyshire	372.6
Nottinghamshire	698.0
Leicestershire	348.6
Warwickshire	662.2
S. Wales & Mon.	375.4
N. Wales	362.5
Cumberland	283.0
Staffs. & Worcestershire	139.5
Lancashire	306.8
Cheshire	62.5
Shropshire	55.5
Ireland	28.8
Gloucs., Somerset & Devon	174.6

(Source: Boyns, 1982: 139)

Conclusion

In the period 1850-1914 the Denbighshire coalfield clearly established itself as the dominant coalfield within north Wales. By 1880 it accounted for over 60 per cent of the total output of north Wales and, by 1905, 82 per cent of the coal extracted in north Wales came from Denbighshire. Although never categorised as a coalfield in any statistical returns, north Wales being deemed the official 'coalfield', Denbighshire, in its own right was, in terms of output, comparable with many of the other small coalfields of the UK. In the period 1875-1914 Denbighshire maintained its production as a proportion of the UK's output at around 1 per cent, and although this proportion had possibly been higher in the 1860s, Denbighshire's growth after 1875 clearly kept pace with that of the

industry as a whole. When compared with other small coalfields, Denbighshire's output ranked alongside that of Leicestershire, Cumberland and Gloucestershire, and above those of Cheshire and Shropshire, coalfields that had virtually disappeared by 1914.

If we consider the size of collieries in Denbighshire we see that, treating all collieries as single entities, there were only 7 collieries employing 500 or more men in Denbighshire in 1894 (see Table 2.14). This had increased to 10 in 1907 and 11 in 1914. When considered as a proportion of the total number of collieries in Denbighshire, treating all collieries as single entities, these larger collieries represented only 24 per cent in 1894 and, although this proportion had increased to 33.5 per cent in 1907, and 42 per cent in 1914 (see Table 2.14), the coalfield was still dominated, numerically, by smaller collieries. This fact clearly influences average colliery size which in Denbighshire increased from 274.9 employees per colliery in 1894 to 447.7 in 1914 (see Table 2.18). Clearly, the collieries in Denbighshire were becoming larger, a fact which is reinforced if we consider the proportion of the workforce which worked in the larger collieries employing 500 or more men; in 1894 these collieries employed 63 per cent of the workforce, a figure which had risen to 85 per cent in 1907 before falling back to 84 per cent in 1914. Indeed, by 1914 15 per cent of the collieries in Denbighshire employed more than 1000 men and only in four other regions of the UK was the proportion higher. The collieries involved, Hafod, Wynnstay, Wrexham & Acton and Plas Power were sunk in 1856, 1863, 1869 and 1875 respectively. Given the geological considerations discussed earlier these collieries were deeper than their predecessors and given their relative 'newness' were able to take advantage of technological innovations which allowed them to access coal on a far greater scale than had hitherto been possible. Furthermore, being deeper and, consequently, more expensive to operate, it is likely that they had to be of a large size in order to operate in a profitable manner.

It would thus appear that if we measure growth either in terms of average colliery size or the number of collieries employing more than 1000 men, growth in Denbighshire was significant in the period 1894 to 1914. It can thus be concluded

that by the end of the nineteenth century the Denbighshire coalfield was dominated by a few large collieries which were newer and deeper than those sunk earlier. The period from 1900 to 1914 saw collieries employing over 1000 become the most important in terms of the proportion of men employed and also saw the emergence of one colliery employing over 1500 men. It was the growth of these larger collieries which helped to sustain the growth of output in Denbighshire and help maintain the coalfield's share of British coal output at around 1 per cent between 1875 and 1914. Since such large collieries had far higher capital requirements than small collieries, the next chapter will consider the ways in which colliery companies in Denbighshire financed the development of their collieries in the period 1854-1914.

Chapter 3

FINANCING COAL COMPANIES

Introduction

In Chapter 2, when discussing the relative size of collieries in Denbighshire, we noted that, in 1894, 76 per cent of the total Denbighshire colliery workforce was employed by seven collieries, namely, the Plas Power, Wrexham & Acton, Hafod, Bersham, Brynkinallt, Westminster and Wynnstay collieries. With the exception of Brynkinallt, which was run as a partnership until incorporation in October 1895, these collieries were run by limited companies as detailed in Table 3.1. These collieries were all sunk after 1850 when technological changes meant that pits could be deeper and the coal could be transported further. However, with these benefits came additional competition and coal companies were often forced to expand in order to maintain their profits. This expansion required finance and this chapter will therefore discuss the capital needs of colliery companies and the main sources of this capital.

Table 3.1: Details of ownership of the largest Denbighshire collieries in 1894

Name of colliery	Name of company
Plas Power	Broughton & Plas Power Coal Co. Ltd.
Wrexham & Acton	Wrexham & Acton Collieries Co. Ltd.
Hafod	Ruabon Coke & Coal Co. Ltd.
Bersham	Bersham Colliery Co.Ltd.
Westminster	Westminster, Brymbo Coal & Coke Ltd.
Wynnstay	Wynnstay Collieries Ltd.

According to Cottrell (1980: 19), "the industrial revolution did not take place uniformly either geographically or across the manufacturing sector of the economy. It was essentially a process of regional economic growth and of the transformation of a limited number of industries". However, there was one common denominator across all the regions and the industries therein: the need

for coal to fuel production. This meant that coal was an increasingly important resource and the industry had to develop methods to ensure that it could meet demand.

Once the period when outcropping and more primitive methods to satisfy local needs was over, more intensive production methods were required. This obviously required innovation and the use of the new techniques being developed throughout the eighteenth and nineteenth centuries, but these required far more investment than had hitherto been necessary. This chapter will therefore consider what form this investment took. The sources we look at will include internally and externally generated sources of finance. For the purposes of this thesis internally generated finance is that generated from the sale of shares. Share capital is deemed 'internal' rather than external because it is generated from the owners of the company rather than from banks or other external sources. Throughout the period from 1850-1914 most coal companies were what we could term 'private family companies' which often resembled partnerships and saw shares being sold to a small circle of family, friends and associates, rather than to the public at large.

Having looked at the sources of finance on which coal companies in general relied, we will turn our attention to the coal companies of Denbighshire and, using the archival material still extant, try to come to some conclusions as to their main methods of raising finance. We will then examine how this finance was utilised by analysing the surviving balance sheets of some of the coal companies in Denbighshire.

Capital needs

The capital needs of coal companies can be divided into two elements: fixed capital and working capital. Fixed capital is the investment in the colliery infrastructure and can be defined as "all costs incurred in the sinking, equipping and initial opening out of collieries including the value of shafts and all surface arrangements that assist in the production, preparation and transport of coal"

(Church, 1986: 101). On the other hand, working capital is the capital generated and expended in the day to day running of the colliery. Due to the nature of a colliery, fixed capital makes up the bulk of its total capital simply due to the expense involved in sinking and equipping a pit. It is very difficult, if not impossible, to say that the parameters for fixed capital should be between particular percentage rates, due to the fact that each colliery was unique and would encounter different circumstances when sinking; the depth at which the coal lay or the specific geological conditions prevalent in a region, would have a significant impact on the time and costs involved. According to the *Colliery Guardian* (2 June 1851, cited in Church, 1986: 104) sinking could take 10 to 38 months if no problems such as water were encountered, and 18 to 48 months if they were. These time-scales only cover the actual sinking of the shaft; opening the pit out and completing necessary building work on the surface could take an additional 12 to 18 months. It was not unusual for 5 to 10 years to have passed before full scale production was realised.

The capital required for such undertakings was often far more significant than was originally estimated by those involved as conditions were encountered that had not been expected. The extent to which this applied to collieries in Denbighshire will be discussed later in the chapter, but it is important to note that this initial optimism was not restricted to any particular region or period. Walters (1977: 240), in his study of the south Wales coal industry, demonstrated that between 75 per cent and 89 per cent of a colliery company's capital was fixed; in north Wales an analysis of those balance sheets that are available for coal companies shows that for the Wrexham Colliery Co. Ltd. the proportion of assets that were deemed fixed varied from 87.9 per cent in 1869 to 94.2 per cent in 1872 to 88.6 per cent in 1876 (D/DM/424/1-2). The fact that the Wrexham Colliery Company's figures are at the top end of, or even exceed Walters' scale, can be explained by the fact that fixed costs were expected to be higher in the years of sinking; this colliery started sinking in 1869 and thus the figure for 1876, when production was fully underway is probably nearer to a 'normal' proportion. The United Westminster & Wrexham Colliery Co. Ltd. also had extremely high

proportions of fixed capital in the years when it was sinking the Gresford colliery; in 1911, the year sinking was completed, fixed capital constituted 98.2 per cent of the balance sheet total, but by 1914 this had fallen to well within Walters' parameters, at 79.2 per cent (National Archives, hereafter NA, NA/37495/85251). The Broughton & Plas Power Coal Co. Ltd.'s balance sheet for 1887 revealed that fixed assets made up 85.9 per cent of the company's total capital; this had increased to 87.3 per cent in 1893, but by 1901 it was down to 74.1 per cent and had fallen further to 62.1 per cent by 1910 (D/DM/309/3-7).

Such figures might indicate that, after the initial investment in plant, workings, etc., a company merely failed to invest the required amounts in its collieries, or it might indicate that the company had a 'flexible' attitude to the way it categorised expenditure, with items going to the profit and loss account which perhaps should have been allocated as capital expenditure. It was usual for colliery companies to charge what would be categorised, in the twenty first century, as capital expenditure to revenue once the capital account had been 'closed off'.[4] This is contrary to modern accounting conventions and it is therefore difficult to analyse nineteenth century balance sheets without knowing what was the policy of the individual company.

Sources of capital

In the nineteenth century finance for colliery companies generally came from one of two sources; it was either raised by the owners themselves, either alone or in partnership with others, or it was borrowed from external sources such as banks. Even when limited liability companies became the norm in the coal industry in the second half of the nineteenth century, they remained, in character, very much like partnerships; very few shares were sold to those who had no connection with the company or its existing shareholders, and many of what Jeffreys (1946: 346) calls the "tradition(s) of partnership" continued long after the partnerships had

[4] When a colliery was sinking a pit all the costs associated with that sinking were put to the capital account but, once the colliery was in production, the capital account was 'closed off' which meant that from that date a separate balance sheet and profit and loss account were prepared and only items of a capital nature were posted to the balance sheet via fixed asset accounts.

been converted into limited liability companies. Even when public limited companies[5] became more prevalent in the late nineteenth century, they only accounted for between 5 and 10 per cent of the total number of business organisations in the UK; and only in shipping, iron and steel, and cotton was their influence considerable (Payne, 1962: 520).

Internally generated finance - Share capital

Throughout the nineteenth century most businesses, including collieries, were small family businesses (Payne, 1962: 252) and in the early part of the century their financial needs were often satisfied by "filial and personal connections" (Cottrell, 1980: 7). It was only when the railways began to open up the markets in the late 1840s, that coalfields such as Denbighshire began any large scale colliery developments, and it was only in the 1850s and afterwards, when the improvements in communications coincided with a change in the laws of limited liability, that the sole trader and small partnership began to be supplanted by the limited liability colliery company. Before the 1855 and 1856 Companies Acts, the limited liability company had been almost unheard of as a business entity in the UK for at least a hundred years. The fiasco of the South Sea Bubble and the subsequent Act of 1720 had severely hindered the development of limited liability companies because, as Carleton-Hunt (1936: 9) comments, "Parliament deliberately placed the corporate form under lock and key". The fear was that if entrepreneurs were using capital other than their own, they would not look after it as if it were their own, and in the event of a business's failure there was "serious public concern over the difficulty of fixing the responsibility of shareholders in an incorporated company in the event of financial embarrassment" (Carleton-Hunt, 1936: 27). It was also felt that limiting shareholders' liability would stifle the 'entrepreneurial spirit'; individuals would not strive as hard to succeed if the fear of failure was cushioned by limited liability.

[5] Technically, the distinction between 'private' and 'public' companies did not come about until the 1907 Companies Act. However, many of the early joint-stock limited companies were essentially private in that their shares could not be freely traded, while other companies increasingly relied on public subscription.

However, this institutionalised fear of limited liability restrictions meant that unless an undertaking could obtain a Royal Charter or ensure the passing of an Act of Parliament, business entities had of necessity to be sole traders or set up partnerships. According to Cottrell (1980: 10), this was "not a major check to industrial development" because most businessmen involved in the manufacturing and extractive industries could get enough capital from small partnerships. However, the need for large amounts of capital to build canals, and later railways, helped relax the views of many because "it was cumbrous and expensive for such enterprises to obtain incorporation by Act of Parliament" (Farrar & Hannigan, 1998: 19). In the early nineteenth century such a cumbersome route was obviously unattractive to those who required only comparatively modest sums, and entrepreneurs relied on partnerships to finance their ventures (Cottrell, 1980: 10). However, by the 1840s, businessmen, realising that partnerships might not be able to provide their future financial needs, began to pressurise the government into relaxing the law and allowing them access to a larger pool of potential investors. The Joint Stock Company Registration and Regulation Act of 1844 "marks an epoch in the history of English company law" (Carelton-Hunt, 1936: 96) because it brought incorporation a step closer. However, "the companies formed under [the Act] ...were unlimited in the sense that their shareholders still had unlimited liability for the debts of the company", but the shareholders were able to negotiate, via individual contracts, limited liability with their creditors (Farrar & Hannigan, 1998: 20). Thus, limited liability companies had become in substance, if not in form, more acceptable to those involved in business. However, there were many complexities involved in creating such relationships and, increasingly, as businesses required more money, and as smaller investors began to explore new avenues for investment, pressure for full incorporation was exerted by the business community.

Limited liability was introduced in the Limited Liability Act of 1855; apart from the fact that it allowed for a widening of investment opportunities, one of the main reasons it was introduced according to Farrar & Hannigan (1998: 20) was that "it prevented prudent men from becoming members of companies which

were..... formed by the rash and reckless", a situation that had arisen in the 1840s with 'Railwaymania'. The 1855 Act offered limited liability on the proviso that certain conditions were met; these were removed by the Joint Stock Companies Act, 1856, which "introduced the modern form of constitution consisting of Memorandum and Articles of Association and separate winding up procedures" (Farrar & Hannigan, 1998: 20). As long as a company could find at least seven subscribers they could achieve limited liability but, as will be demonstrated, although limited liability companies were created, it was to be a long time before the attitudes and principles of partnership receded, and many companies remained little more than 'partnerships cum company' for many years.

One of the main ways in which companies continued the traditions of partnership was in the way shares were issued. According to Jeffreys (1946: 344), there was a reluctance by many involved to embrace limited liability wholeheartedly; the concept that those involved in business could limit their liability was an alien one to those "in commercial and industrial circles schooled in the concept of partnership liability". This did not stop a "substantial number of limited companies" (Cottrell, 1980: 80) from being formed, but many issued high denomination shares which usually had a significant amount uncalled. According to Jeffreys (1946: 345), "shares only partly paid up were a feature of the opening years of limited company finance". He then points out that in what can be termed the 'heavy' industries, i.e iron, coal, shipbuilding etc., high denomination shares remained the norm for much of the nineteenth century, even when £1 shares were becoming prevalent in other industries. An examination of the denomination of shares issued by colliery companies incorporated in Denbighshire between 1850 and 1900, as detailed in Table 3.2, illustrates Jeffreys' findings. Indeed, it was not until the twentieth century that we see companies being created with nominal shares of £1. Jeffreys (1946: 355) believes that the reason for this is that "the shares were taken as long term investments and high denominations presented no obstacles" to investors, furthermore, despite the boom of 1871-1875 leading to the creation of smaller companies with lower share

denominations, "the large semi-private company continued to dominate these [heavy] industries until the late eighties" (Jeffreys, 1954: 355).

Table 3.2: The denomination of shares for colliery companies in Denbighshire 1850-1914

Name of company	Year of incorporation	Denomination of shares- £ (a)
Ruabon Coal Co. Ltd.	1856 (b)	50
Westminster, Brymbo Coal & Coke Ltd.	1858	25
Wrexham Colliery Co. Ltd. / Wrexham & Acton Collieries Co. Ltd. (c)	1863	100 / 25(c)
Minera Coal & Iron Co. Ltd.	1865	?
North Wales Coal, Iron & Firebrick Co. Ltd.	1866	?
Bersham Colliery Co.Ltd.	1868	50
Vauxhall Colliery Co.Ltd.	1871	20
Ruabon Coke & Coal Co. Ltd.	1880	100
Broughton & Plas Power Coal Co. Ltd.	1881	10
Vron Colliery Ltd.	1887	10
Wynnstay Collieries Ltd.	1889	10
United Westminster & Wrexham Collieries Co. Ltd.	1905	1
Black Lane Colliery (Brymbo) Ltd.	1909	1
Llay Main Collieries Ltd.	1913	10

(Source: the individual company records at the National Archives)

Notes

(a) The evidence available suggests that, except where noted, the share denominations remained the same from the date of incorporation to 1914.
(b) This company went into liquidation in 1880 having converted the majority of its shares into debentures.
(c) In November 1872 the company changed its name to Wrexham & Acton Collieries Co. Ltd and reorganised its capital into £25 shares.

Why did colliery companies have such high denomination shares, and why did they have such a high proportion of their share capital uncalled? According to Jeffreys (1946: 347), one of the reasons was that many of the new companies were conversions of existing partnerships and "many early joint-stock companies, although they had a wider basis than a partnership, were established on similar lines and followed similar traditions". This was often due to the mistrust of limited liability that had been inherent in many business circles since the South Sea Bubble debacle; many viewed the fact that shareholders could limit their liability

as an "immoral" concept (Cottrell, 1980: 41). Another factor was the need by companies to give the impression that they were financially stable; in the years running up to the introduction of limited liability, it was widely felt that it would "lead to wild speculation, panics and a decline of commercial morality" (Jeffreys, 1946: 347). If the shares were of a high value this might deter speculation because the investor "incurred a large degree of potential liability as a result of the extent of the unpaid capital" (Cottrell, 1980: 84). By having a large reserve of uncalled capital, it was hoped that, "the greater a limited company could approach to the partnership system of responsibility, the greater would be the security, and the higher its standing" (Jeffreys, 1946: 348). Jeffreys further asserts (1946: 349) that this view "was due more to the strong insistence" of creditors than to any other factor. It was the creditors who wanted uncalled capital to be a "reserve which could be drawn on in an emergency" (Jeffreys, 1946: 349-350), i.e. if the company was on the verge of bankruptcy or in the throes of a financial crisis.

As experience of limited liability deepened, and especially after the financial crisis of 1866, it was found that "the calling up on unpaid portions of shares was a clumsy and disquieting method of obtaining capital at a time of emergency" (Jeffreys, 1946: 351). Shareholders began to question their position; despite their official limited liability status the existence of a significant uncalled element to their shares meant that their liability was not limited simply to what they had paid for the shares. If necessary, they would have to find the funds to pay for the uncalled portion should the need arise, and this portion could prove to be substantial. Indeed in south Wales, the Powell Duffryn company shares were £5,000 each with £200 uncalled, the latter amount only to be called up in the event of the company being wound up. One consequence of the Overend & Gurney-inspired financial crisis of 1866 was that, by the 1870s, there was a noticeable move towards lower denomination shares in general, although the comments of Jeffreys above re. colliery companies must be borne in mind, and many of these shares were fully paid (Cottrell, 1980: 81); this lower denomination

of shares made it easier for members of the 'middle classes' to enter the market for shares and increased the amount of capital available to companies.

Another consequence of 'living' with limited liability throughout the 1850s and 1860s was that "the need to keep part of the shares uncalled in order to secure the goodwill of creditors became less imperative as the limited form proved its efficiency and stability" (Jeffreys, 1946: 353). Rather than rely solely on part-called ordinary shares, companies were now able to issue debenture loans and preference shares[6] which offered lenders security in a form other than the 'uncalled reserve' and these sources of finance became increasingly popular in the last quarter of the nineteenth century. Another important factor in the increased popularity of debentures and preference shares (loan capital), was the fact that by issuing such financial instruments, rather than shares, control was not diluted; in short, by choosing a financial structure that included loan capital, companies "provided themselves with the additional capital that was essential for the survival of their business, and yet managed to avoid any substantial change in their mode of operation" (Watson, 1996: 66).

External finance

Finance, other than from selling ordinary shares, generally came either from the banks, in the form of loans or overdrafts (although it must be noted that banks were often reluctant to offer anything other than short term finance), or from issuing preference shares or debenture loans. The type of finance sought by companies depended on what it was to be used for; as already discussed, the initial fixed capital needed to finance the sinking of a mine was generally raised by the issue of ordinary shares, as were any major future expansions; once a company was up and running internally generated profits could be used, but these were often insufficient to finance anything other than short term working capital needs. If any additional fixed capital was required, and the company did

[6] Preference shares are considered more in the form of a loan if they are redeemable; they offer holders 'preference' in the form of fixed dividends which are payable before ordinary dividends and rank higher than ordinary shares when a company is wound up.

not wish (or was unable to) issue additional ordinary shares, it had to raise longer term finance in the form of a mortgage, preference shares or debentures. More short term needs to meet any shortfalls in working capital, or any unexpected expenses, were usually met by arranging an overdraft or short term loan from the bank.

Banks

Until the late eighteenth century, Wales was largely an "agricultural economy consisting of a few large, almost autonomous country estates, small self-supporting farms.... and a craft workforce" (Rhys-Williams, 1990: 94). This society was largely self-sufficient and the only people who had any sizeable reserves of capital available for spending and [for] investment were "estate owners, large farmers and substantial traders" (Roberts, 1993: 291) who would occasionally lend capital to fledgling industrialists (Rhys-Williams, 1990: 95). However, as industry developed "and the resources of Wales [began] to attract adventurers from across the border" (Dodd, 1926: 23), the need for 'ready' cash increased. This development led to the first private banks being formed. The first banks in north Wales were established in the industrial towns of Wrexham, Mold and Holywell (Chambers Jones, 1978: 70) but many of these smaller banks failed to survive the crisis of 1825-26, and although private banks continued to exist until 1850, from this date banking facilities in Denbighshire and north Wales were to be provided by the larger, more stable joint stock banks.

By 1850 banks had, therefore, become established in Denbighshire, but how useful were these banks to emerging businesses, especially those involved in the coal and iron industries? Were loans and overdrafts readily available, or were coalowners forced to rely on internally generated funds? In a paper written during the First World War, Foxwell (1917: 508-9) asserts that "banks prefer financial to industrial banking" because "our great banks are too timid to take primary risks" and thus industry in the UK was not well served by the banks "which deprive our industrialists and merchants of trade". He explained that the long and large loans that some industrialists wanted were not available from the

banks, thus "the only alternatives are to resort to the company promoter or the sale of debentures.....[which] are mere makeshifts, utterly inadequate". Foxwell also believed that as a result industry was under-capitalised and consequently less competitive than in countries such as Germany or the USA, where banking was much more 'liberal' (Foxwell, 1917: 510). More recent research, for example that done by Capie and Collins (1996: 26), while not as condemnatory of the banks, shows that "there remains a fair degree of suspicion that, in the years before 1914, British banks - which were amongst the most stable and richly resourced in the world - failed to support adequately the development of British industry" (Capie and Collins, 1996: 26).

Cottrell (1980: 210), disagrees with these views; he states that "a substantial amount of evidence has now accumulated showing that banks, during the early phases of the industrial revolution.....did provide long term loans to industrial firms which often financed investment in fixed capital". He cites examples of long term loans being extended to colliery companies in south Wales in the 1840s and 1850s, and to iron companies in that region in the 1870s. He also explains that banks, in the second half of the nineteenth century, were more willing to allow overdraft facilities to cover short term shortages (Cottrell, 1980: 212). Recent research carried out by other authors has suggested that, in many instances, such short term overdrafts were often rolled–over, in effect making them into longer term loans averaging nineteen months duration (Capie & Collins, 1999).

Financing coal companies in Denbighshire

Share capital

The main way in which the companies in Denbighshire raised capital was through issuing ordinary shares. It would appear that very few of the companies in Denbighshire, in common with many throughout the country, actually made realistic estimates of how much capital would be needed to sink and work their

pits. The initial estimates were invariably over optimistic and there are continual references to companies having to increase their share capital. A good example to illustrate this is the sinking of the pits by the Bersham Colliery Co. Ltd. The company was incorporated with capital of £20,000 (400 shares of £50) in October 1868, to sink and work pits on land leased from the Plas Grono Estate (D/DM/309/1). Work on sinking started in June 1869, but a bore-hole sunk to see what conditions might be encountered when sinking proper began, showed that "from the bottom of the pit there was 15 to 18 yards of very bad ground consisting of sand, sandy loam, sand and gravel and between these, beds of stony clay"; in addition there was also a great deal of water (D/DM/309/1, 29 June 1870). Such obstacles were obviously expensive to overcome and the accounts for the year to June 1872 state that net expenditure to date on pits, plant, buildings, etc., was £13,616. It was anticipated that further expenditure of £10,000 would be required to complete sinking, open up the underground roadways and erect railway sidings (D/DM/309/1, 19 August 1872). The report of the Managing Director to the AGM (19 August 1872) stated that "there is yet £4,500 uncalled capital ...[but].. as it is not advisable to go into debt or borrow, I (James Barnes) suggest that the capital be increased by £10,000 which will more than cover the work unless unforeseen difficulties arise" (D/DM/309/1, 19 August 1872). Unfortunately, such unforeseen difficulties did arise; in his report to the shareholders on 5 October 1874 (D/DM/309/1), James Barnes explained that, despite the fact that the company had started working the coal and that the railway facilities were almost finished, the company was still encountering problems: "the seam of coal has turned out very fiery and the safe ventilation has been a cause of much anxiety". To counter this problem the company invested in a Guibal fan which was "very expensive but economical in the long term and the safest" (D/DM/309/1, 5 October 1874). Mr Barnes explained that the £12/10/- uncalled per share would cover the cost of the fan and an air-compressing engine for pumping water out, but still additional capital was required. He proposed that the company's capital be increased from £30,000 to £60,000, and the request was duly endorsed (D/DM/309/1, 5 October 1874).

The Main coal seam was eventually reached in both Bersham pits in 1878, but delays in driving, a fire in September 1879 and an explosion in August 1880, meant that the pits did not start fully working the coal until late 1880/early 1881, a full twelve years after the company had been incorporated. The company was forced to increase its capital from £60,000 to £80,000 to deal with a balance owed to the Managing Director, James Barnes. At 30 June 1880 (D/DM/309/1, 30 June 1880) the company owed Barnes £32,042, and in his report to the shareholders on 15 November 1880, he explained that "it is very advisable that the cash balance (owed to him) should be dealt with and till it is the shareholders cannot have a dividend, and to meet this I am willing to convert it into either shares or a loan"; the company chose to issue him with 600 fully paid shares worth £30,000. The financial difficulties the company encountered due to the problems of sinking the pits is further illustrated by the fact that the company had to negotiate extensions to the debentures issued in 1876 (D/DM/309/1, 2 November 1881), and a second debenture issue had to be made to repay the first, which in turn had to be extended due the company's difficulties in meeting the repayments of this loan.

Bersham Colliery Co. Ltd. was not alone in needing to increase capital on several occasions; the Ruabon Coal & Coke Co. Ltd. was incorporated with capital of £30,000 in July 1880, but between this date and 1890 the capital had been increased to first £50,000 and then £80,000; it was further increased to £120,000 in 1892 and again to £150,000 in 1893 (NA/38192/14301); the exact reasons for these increases are not known, but given that the company worked Hafod, one of the largest collieries in Denbighshire in terms of the numbers employed, it would seem reasonable to assume that the money was needed to extend the working of the pit and to finance technological innovations in haulage, working, ventilation etc.

The Wrexham Colliery Co. Ltd. also experienced great difficulties when sinking its pits; it was incorporated in December 1863 with capital of £25,000 (NA/14345/821C) which had been increased to £60,000 before sinking in Rhosddu began in 1869. Initially there were few problems and the Main coal was

reached in October 1870 (NLW/HR/ 76/79), but when the company began driving into the coal, the pit flooded in January 1871 (NLW/HR/76/469), and it was not until the end of 1873/start of 1874 that the pits were cleared and working could resume (D/DM/424/1). Such were the difficulties encountered that a director, John Jones, in a letter to Thomas Brassey, a shareholder, (NLW/HR/76/155, 21 December 1872) described the operation as "this hitherto unlucky adventure". To meet the costs of sinking and to deal with the problems encountered, the company issued £15,000 worth of 10 per cent preference shares in June 1870, and in December 1872 it issued a further £30,000 of the same shares. The high dividend rate might be indicative of the company's desperation for additional funding; it might have had to make the dividend high to attract the level of finance it required, given the obvious problems it had encountered in sinking its pits. The high dividend rate may have been offered to make the preference shares more attractive to the ordinary shareholders who were given the option to convert their ordinary shares into preference shares (NA/14345/821C). This may have been a means of ensuring that they received a dividend (they were unlikely to receive dividends on their ordinary shares). £7,000 of the preference shares were taken up by the Westminster, Brymbo Coal & Coke Co. Ltd, which owned an adjoining colliery and was experiencing identical problems with water. This latter company also had to increase its share capital to raise additional finance. Incorporated in 1858 with capital of £30,000, by October 1872 this had increased to £80,000, and by October 1875 it had reached £120,000; again the reasons for this appear to stem from the need to deepen pits, or to update transport facilities and working methods.

Overdrafts

The main problem with trying to establish how reliant companies were on bank support "is the lack of the necessary source material" (Cottrell, 1980: 212). This problem is highlighted by the records of the coal companies of Denbighshire; although the surviving information is very patchy, it would appear that overdrafts

were available but that they were used only to meet the needs of working capital. Any longer term funds required were raised either through increasing share capital, or by issuing debentures.

That overdrafts were readily used is evidenced by some of the records that are available; a letter from Dixons & Co, Bankers of Chester, to the Wrexham Colliery Co. Ltd., dated 30 June 1876, states "[we are] willing to allow a floating overdraft at anytime of £10,000 or £12,000, and if the present balance can be reduced to that amount by the end of present month we shall be glad" (NLW/HR/76/182). There is also evidence that the Broughton & Plas Power Coal Co. Ltd. relied heavily on its overdraft; throughout the period 1881-1914 the company banked with Parr's Bank, which had its Head Office in Warrington and branches throughout Cheshire and some in north east Wales. The minutes of the directors' meetings show that, intermittently, the company put pressure on the bank to improve its terms; on 24 February 1892 (D/DM/309/4) the company notes the "very heavy charges" made by the bank, and decided to investigate the possibility of moving its account. With this in mind it approached the North & South Wales Bank which offered a temporary overdraft of up to £3,000 charging half a per cent above base, with a minimum of 4 per cent; it also offered other terms relating to commission on turnover and interest payable on deposits (D/DM/309/4, 23 March 1892). Parr's countered with their own offer which was "deemed excessive" because the minimum rate on the overdraft was to be 5 per cent. The company finally agreed terms with Parr's which gave it an overdraft of up to £5,000 without security. If the overdraft was temporary the interest would be half a per cent above base with a minimum of 4 per cent; if permanent the minimum was to be 5 per cent, any overdraft lasting longer than six months being deemed permanent (D/DM/309/4, 30 November 1892).

The extent to which the needs of the coal companies changed over the years can be illustrated by the fact that the minutes for Broughton and Plas Power Coal Co. Ltd. for 10 June 1914 (D/DM/309/5) state that, in the negotiations for an overdraft of £30,000, the bank had asked the company to deposit with it as security the share certificates of those companies in which it

had invested. In the event, the company did not have to do this as its overdraft was far below this limit, the balance sheet for 31 December 1914 (DD/PP/620) showing an overdraft of £17,160. An analysis of the balance sheets of other coal companies also shows that many of them had sizeable overdrafts; between 1865 and 1876 the accounts of the Wrexham Colliery Co. Ltd. show that its overdraft varied from £5,997 in 1867 (D/DM /424/1) to £17,845 in 1875 (D/DM/424/2), and the United Westminster & Wrexham Colliery Co. Ltd. had an overdraft of £15,503 at the end of June 1911 (NA/37495/85251). It would appear that this latter company later decided, or was pressurised by its bankers, not to rely on an overdraft but rather to pay off the overdraft by issuing debentures. Thus the balance sheet for 30 June 1912 shows the company having no overdraft but debentures of £42,500, a figure which had risen to £48,750 by June 1914. Another reason for this change in financing may have been that the company decided that, in the long term, given that debenture interest was at a fixed rate while bank rates fluctuated, that debentures offered the more stable option.

The above evidence, although sparse, appears to show that, in Denbighshire, companies were able to avail themselves of often significant amounts of money from banks which, as Watson (1996: 70) found in her study of the brewing industry, were flexible in meeting the needs of individual companies. Watson (1996: 71) points out that, in many cases, what started out as short term facilities often turned into long term arrangements, as can be seen by the fact that the Wrexham Colliery Co. Ltd. had a continuous overdraft in the period 1867-1876 (NLW/HR/76/1342 & 1346; D/DM/424/1-2). However, more significant, or long term finance was usually raised via debentures.

Debentures

It would appear that issuing debentures was a popular source of long term finance in Denbighshire. In his work on capital formation in the south Wales coal industry, Walters (1980: 252) states that a "significant contribution to the capital requirements of coalmining in south Wales came from the issue of mortgage

debenture stocks which enabled risks to be spread". The surviving financial records in Denbighshire show that this statement could equally have been made about this region, which also conforms to the view put forward by Cottrell (1980: 87-88) that "the practice of issuing debentures...grew steadily from the 1870s". According to Church (1986: 52) this increased popularity was due to the fact that debentures "offered greater security at lower interest rates than could be obtained from the banks.....[they] also carried the option of liquidation, or possible renewal on improved terms". Watson (1996: 64-65) believes that debentures were attractive to the issuing company, not simply for their fixed interest rates, but because they allowed companies to raise additional fixed capital without diluting control. They were also attractive to lenders in that they offered guaranteed interest payments, as opposed to dividends which fluctuated according to the performance of the company, and also, if secured on specific assets, allowed them to recoup the capital invested in the event of a liquidation.

The importance of debentures to coal companies in Denbighshire can be determined by looking at a number of the individual companies. Thus, the Ruabon Coal Co. Ltd., which was incorporated in July 1856 (NA/BT/31/1/2), issued £10,000 worth of debentures in March 1866 and a further £40,000 in November 1867. By March 1877 the company had converted share capital of £79,150 into debenture stock of the same value; it thus had £129,150 of debentures in issue. The reasons for the conversion are not given; it may have been done to pacify shareholders who had not received dividends due to the poor performance of the company, or, it may have been done to consolidate control in the hands of a few shareholders; whatever the reasons, unsurprisingly, given the consequent burden of interest payments, the company was wound up in July 1878 as a result of its failure to pay debenture interest (NA/BT/32/1/2).

Debentures were important to the Broughton & Plas Power Coal Co. Ltd. from its very incorporation in January 1881; as part of the agreement drawn up to purchase the two collieries, Plas Power and Gatewen, £30,000 was to be borrowed on 5 per cent debentures repayable at five or seven years (D/DM/309/3, 10 January 1881). Of these debentures, £16,400 were issued to

the public, and those not issued by 23 March 1881 were to be taken up by Henry Robertson (the founder and major shareholder) or his nominees (D/DM/309/3/ 23 March 1881). The debentures were secured on a mortgage to Henry Robertson and CE Derby of freehold and leasehold property and by a charge on the uncalled capital of the company (D/DM/309/3, 17 January 1881). An analysis of later balance sheets shows that the company continued to have fairly substantial debenture loans, although after 1893 it began to pay them off. When the redemption date arrived the company gave the debenture holders the choice of redemption or a renewed term; for example, in December 1893, it offered to renew the 5 per cent debentures for another 5 years but at a lower rate of 4½ per cent; of the £5,300 debentures due for redemption, holders of stock worth £4,500 took up the offer to renew (D/DM/309/4, 20 December 1893).

Most of the other companies for which records survive resorted to issuing debentures at one time or another. The Wrexham Colliery Co. Ltd. issued debentures worth £21,000 in 1876, probably to finance the sinking of a new shaft on land at Acton (D/DM/424/2), while the Ruabon Coal & Coke Co. Ltd. issued £40,000 worth of 5 per cent debentures in March 1898, to 'replace' £25,000 5 per cent preference shares issued in February 1894 (NA/38192/14301). In March 1903 the directors of Wynnstay Collieries Co. Ltd. wanted to increase the company's debentures from £15,400 to £30,000 because "[we] have for a long time been endeavouring to prove the existence of coal to be worked.... for the purpose of greatly extending the life of the colliery. This area has now been proved beyond all reasonable doubt. To open out this coalfield it will be necessary to incur considerable outlay" (NA/14998/ 29254). The company issued a further £20,000 of debentures in October 1904 because, to access the coal discussed above, it required an electric haulage system (NA/14998/ 29254). The Bersham Colliery Co. Ltd. had to negotiate the issue of £15,000 5½ per cent debentures in October 1876 to meet the costs of sinking (see page 86 above) and the United Westminster & Wrexham Colliery Co. Ltd had debentures of £48,750 in issue in 1914 (NA/37495/85251).

Mortgages

Additional long term financing was sometimes accessed via mortgages; for example, in September 1895 the Bersham Colliery Co. Ltd. purchased the Plas Grono Estate for £12,000 with a mortgage from the Adelphi Bank in Liverpool (D/DM/309/1/ 16 October 1895), and the Wrexham Colliery Co. Ltd. steadily increased its mortgage from £7,500 in 1867 to £12,500 in 1869 and £18,800 in 1875 (NLW/HR/76/1342 & 1346; D/DM/424/1-2). The Broughton & Plas Power Coal Co. Ltd also had a mortgage of £8,200 in 1897 (NLW/HR/10/25-37).

Having looked at the 'generalities' of financing coal companies in Denbighshire, we can now consider, in more detail two companies, Broughton & Plas Power Coal Co. Ltd., and the Wrexham Colliery Co. Ltd. to establish how the 'financing' element of the balance sheet was broken down. We shall then examine how this capital was 'spent' by examining how the assets of the two companies were distributed.

Two case studies: Broughton & Plas Power Coal Co. Ltd. and the Wrexham Colliery Co. Ltd.

Sources of finance

If we examine the breakdown of 'Capital & Reserves' for the Broughton and Plas Power Coal Co. Ltd. for 1887-1914 (see Table 3.3), we can see that although share capital was always the most significant element of the finance available to the company, reserves, and especially, what we shall call, the Capital Reserve (on the company's balance sheet this is described as 'amount appropriated from profits'), were also important. This reserve was built up between 1891 and 1904 by transferring various amounts from profits and, by 1904, it amounted to £122,300.

Table 3.3 : Broughton & Plas Power Coal Co. Ltd., Breakdown of capital, reserves and liabilities, 1887-1914

Year	Share Capital	Debs	Mortg/ Loans	O/D	Creds	P&L (1)	Capital Res	NWCOA Reserve	Wagon repairs reserve	Gen. reserve	Balance sheet total
	%	%	%		%	%	%	%	%	%	£
1887	62.7	11.2	1.9	-	11.2	13.0	-	-	-	-	269,016
1891	57.8	9.9	1.1	-	7.0	5.6	18.6	-	-	-	291,857
1892	59.6	9.5	0.2	-	5.5	4.2	21.0	-	-	-	283,129
1893	61.5	8.6	0.2	-	5.0	1.0	23.7	-	-	-	274,540
1894	59.6	7.4	0.2	-	6.6	3.2	23.0	-	-	-	283,095
1895	58.6	6.2	0.2	-	7.9	3.4	23.7	-	-	-	288,150
1897	57.5	5.3	2.8	-	5.2	2.6	26.6	-	-	-	293,639
1901	48.9	-	-	-	6.3	14.2	30.6	-	-	-	344,743
1904	49.0	-	-	-	5.9	7.5	35.5	1.5	0.6	-	344,623
1910	76.7	-	-	-	9.3	3.5	-	2.4	1.3	6.8	219,946
1913	67.5	6.7	-	5.6	10.0	4.7	-	-	-	5.5	274,069
1914	68.3	6.9	-	6.2	9.0	4.1	-	5.5	-	-	270,672

Notes:

1. There is sufficient information available to reconcile the trading profits and balance sheet figure for 1891-1897; but this has proved impossible for the remaining years

Key

Debs - debentures; mortg – mortgage; O/D - overdraft; Creds – creditors; P & L – profit and loss account; Res – reserve; NWCOA - North Wales Coalowners Association; Gen - general

(Source: DD/PP/618-620; D/GR/682; D/BC/2249; D/BC/2289; NLW/HR/10/25-37).

This suggests that the company was generating fairly substantial profits which it did not want to distribute to shareholders, but instead wanted to 'plough back' into the company. Unfortunately there are no balance sheets, profit and loss accounts or minutes available for the years 1905-1909 and there is therefore no explanation for the disappearance of the capital reserve by 1910. It would appear that the remaining balance on this account was 'converted' into depreciation and deducted from the carrying value of fixed assets. This would have the effect of reducing the balance sheet total and also reducing the carrying amount of fixed assets, which, if one examines Table 3.5 below, fell, as a proportion of total assets, from 77.3 per cent in 1904 to 62.1 per cent in 1910. (For further discussion of accounting for depreciation see Chapter 8 below).

The Broughton & Plas Power Coal Co. Ltd. was not particularly reliant on 'external' funding; although debentures and mortgages were present in

all but three of the featured years, together they never constituted more than 13.1 per cent of total capital (see Table 3.3). Throughout most of the period from 1887, the company did not rely on an overdraft facility, but this position changed in 1913, the company recording an overdraft of £15,331, which constituted more than 5 per cent of the balance sheet total. In 1911 the company had purchased the Bersham Colliery Co. Ltd. for £42,121 and the company may have decided that an overdraft, combined with a new share issue of £15,000 and a debenture issue for £18,000, was, in the long term, the cheaper option, especially if it was able to negotiate the interest rate with the bank, as it had done in the past.

The profile of the Wrexham Colliery Co. Ltd. was not dissimilar to that of the Broughton & Plas Power Coal Co. Ltd. (see Table 3.4). It too was most reliant on ordinary share capital but, unlike the Broughton & Plas Power Coal Co. Ltd., it also issued preference shares which, in 1873, constituted 10.9 per cent of the balance sheet total. As discussed above (page 87), these were probably issued because of the problems encountered when sinking the pit, and at 10 per cent, they were an expensive form of finance, which may explain why the company had redeemed all but £1,500 of the £15,000 shares in issue, by the start of 1875. During the years under review the company did not generate significant profits, indeed no profit and loss figure was recorded on the balance sheet until 1874. The reason for this is that, as already discussed, not only did sinking take a long time (during which time we would not expect to see a profit figure) but the company was plagued by problems with water which prevented it from working properly until the beginning of 1874.

The Wrexham Colliery Co. Ltd. was more reliant on 'external' funding than the Broughton & Plas Power Coal Co. Ltd. Classifying preference share capital, mortgages, loans and overdrafts as external, in 1869, 41 per cent of the company's capital came from external sources. This was a significant proportion but, given the problems encountered, it was understandable, because the company was unable to trade properly and generate its own funds. Once the company had begun to trade properly, it was able to reduce this reliance on

external sources and, by 1876, the proportion of external capital had fallen to 23 per cent.

Table 3.4: Wrexham Colliery Co. Ltd., Breakdown of capital, reserves and liabilities, 1867-1876

Year	OSC	PSC	Mortgage	Debs	Creds	O/D	Bank loan	P&L	WMCQR	CRR	Depn. Provn	Balance sheet total
	%	%	%	-	%	%		%	%	%	%	£
1867	67.3	-	13.4	-	8.6	10.7		-		-		56,105
1869	59.0	-	14.5	-	5.1	18.5		-	2.9	-		86,081
1872	45.2	12.1	13.3		10.9	13.7		2.8	2.0			124,188
1873 (a)	64.1	10.9	10.3	-	7.5	7.2		-	-	-		150,739
1874	67.5	8.4	7.9	-	6.8	8.6	0.5	0.3	-	-		195,768
1875	74.8	0.7	8.4	-	4.4	8.0	3.2	0.2	-	-	0.3	223,348
1876	74.0	0.6	7.9	8.8	3.9	1.8	-	2.2	-	0.3	0.5	237,774

Key:
OSC = Ordinary Share Capital; PSC = Preference Share Capital; CRR = Capital Redemption Reserve for redemption of preference shares; WMCQR = loan from the Wrexham, Mold and Connah's Quay Railway Co. Ltd; Depn Provn = Depreciation Provision; other items as per key to Table 3.3.

Note:
(a)The Wrexham Colliery Co. Ltd. was reconstituted as the Wrexham & Acton Collieries Co. Ltd. at the beginning of 1873.

(Sources: NLW/HR/76/1342; D/DM/424/1-2)

Capital utilisation

Having examined the sources of finance for these two companies, we now turn our attention to the other side of the balance sheet, to the assets of the companies, to see how the capital raised was 'spent'. Table 3.5 gives details of the balance sheets of Broughton and Plas Power Coal Co. Ltd. for the years 1887-1914.

Table 3.5: Broughton & Plas Power Coal Co. Ltd., Breakdown of assets, 1887-1914

Year	Fixed assets (a)	Stock	Suspense (b)	Debtors	Bank	Cash	Inv.	Shares in Bersham	Value of assets
	%	%	%	%	%	%	%	%	£
1887	86.00	1.80	2.10	9.96	0.04	0.10	-	-	269,016
1891	82.10	2.00	3.10	9.60	0.60	2.60	-	-	291,857
1892	84.60	1.90	3.20	8.60	1.67	0.03	-	-	283,129
1893	87.40	1.80	2.10	8.49	0.20	0.01	-	-	274,540
1894	85.00	2.00	2.00	10.28	0.70	0.02	-	-	283,095
1895	84.40	1.00	2.20	10.28	2.10	0.02	-	-	288,150
1897	85.10	1.20	0.60	10.50	1.16	0.04	1.40	-	293,639
1901	74.10	1.50	0.30	15.10	3.24	0.06	5.70	-	344,743
1904	77.30	1.40	1.80	11.09	4.20	0.01	4.20	-	344,623
1910	62.10	1.90	2.80	21.00	3.00	0.10	9.10	-	219,946
1913	48.30	1.90	0.60	23.56	-	0.04	10.20	15.40	274,069
1914	49.10	2.20	0.70	21.41	-	0.09	10.90	15.60	270,672

Notes:

(a) The fixed assets figure is after deduction of depreciation. This is negligible until 1913 and 1914; by this time over 50 per cent of the cost of the assets is being deducted as 'appropriation from profits for the purchase of property and plant and for depreciation'.

(b) The suspense account relates to 'balance of prepaid mineral rents etc', what we would now simply describe as 'prepayments'.

(Sources: as for Table 3.3)

Table 3.5 shows that, for the years 1887-1904, the breakdown of assets remained relatively stable. As we would expect, fixed assets is the most significant category and, indeed, until 1910, fixed assets make up more than 70 per cent of total assets. In 1913 this proportion falls significantly to just under 50 per cent. The reason for this is that, until 1913, the fixed assets were recorded at cost and any depreciation that was provided for was negligible. However, in 1913 and 1914 the company was deducting from the cost of fixed assets a significant amount (in 1913 it was 49.9 per cent of cost and in 1914, 51.7 per cent) to cover 'appropriation from profits for the purchase of property and plant and for depreciation'. The issue of depreciation and the inconsistencies in its application will be discussed further in Chapter 8, but it would appear that, given that the company was recording all its assets at historical cost, this adjustment was possibly for what modern accountants would call impairment, i.e. a devaluation,

an adjustment of the carrying amount of an asset to a more realistic estimate of its recoverable amount.

Table 3.5 illustrates that, from 1897, the Broughton & Plas Power Coal Co. Ltd. began to buy investments. These consisted of shares in the Broughton Solvay Coke Co. Ltd., India 3% stock and shares in various railway companies. In 1911 the company purchased the Bersham Colliery Co. Ltd. and in 1913 and 1914 this investment accounted for approximately 15 per cent of the company's net assets. Throughout the period under review stocks, prepayments, bank and cash did not fluctuate significantly, but debtors increased as a proportion of total assets, from 10 per cent in the years to 1897, to 23 per cent in 1913. This increase is accounted for by the fact that, in absolute terms, the amounts owed to the company increased from around £30,000 in the years up to 1897, to approximately £50,000, while in 1913 and 1914 debts 'due by Bersham company' are also included on the balance sheet.

The balance sheets of the Wrexham Colliery Co. Ltd., for the years 1867-1876, show that fixed assets account for a very high proportion of total assets (see Table 3.6). As the company was in the process of sinking its pits in the years 1867-1872, this was to be expected and, it was only when trading began properly in 1873-4 that we see fixed assets falling and debtors rising. Until the company started trading properly debtors would be negligible because, obviously, the company would need to have had coal to sell on credit before it could offer its customers credit terms.

Prepayments, or 'dead rents' as the balance sheet describes them, are more significant for the Wrexham company than for the Broughton & Plas Power Coal Co. Ltd. Again this is not unexpected given that the pits were being sunk during this period. Chapter 5 explains, in detail, how dead rents work and these balance sheet amounts relate to the 'shorts' that the company could recoup. Until full working was achieved the company was unlikely to pay significant royalties and the minimum dead rents would have had to be paid; any shortfall would be reclaimed once coal was being produced and sufficient royalties were due to be paid. Given that these 'shorts' were cumulative we can see that, even by 1876,

the company had not produced sufficient coal to enable these shorts to be recouped.

Table 3.6: Wrexham Colliery Co. Ltd./Wrexham & Acton Collieries Co. Ltd.(a), Breakdown of assets, 1867-1876

Year	Fixed assets	Stock	Dead rents	Debtors	Cash	Suspense (b)	Bank (c)	Value of assets
	%	%	%	%	%	%		£
1867	96.90	1.40	1.30	0.40	-	-		56,105
1869	97.30	1.00	1.62	0.02	0.06	-		86,081
1872	97.10	1.10	1.30	0.50	-	-		124,188
1873	94.20	1.30	4.20	0.25	0.05	-		150,739
1874	91.60	1.30	4.40	2.60	0.10	-		195,768
1875	90.45	1.32	4.90	1.90	0.03	1.30	0.10	223,348
1876	89.25	2.40	5.40	2.10	0.05	0.80	-	237,774

Notes:

a) The Wrexham Colliery Co. Ltd. was reconstituted as the Wrexham & Acton Collieries Co. Ltd. at the beginning of 1873.
b) The suspense account relates to 'Winning coal to be raised in future years'.
c) The bank figure relates to 'Bankers; redemption of preference shares'

(Sources: as for Table 3.4)

In his study of the British coal industry Church (1986: 112) attempts to give a breakdown of 'typical' fixed assets. He readily admits that it is a very tentative estimate given the disparities between companies but, nevertheless, it does give us some indication of what we would expect to see when analysing the fixed assets of a coal company. Church's breakdown is as follows (1986: 112):

	%
Shafts	40
Plant	35
Railways	11
Wagons	5
Coke works	4
Brick works	4
Horses	1

If we look at the analysis of fixed assets for the Broughton & Plas Power Coal Co. Ltd. (see Table 3.7) and that for the Wrexham Colliery Co. Ltd. (see Table 3.8)

we can see that if Church's figures for shafts and plant are combined at 75 per cent then the figure for 'works' is not too dissimilar to that for Broughton & Plas Power Coal Co. Ltd. At the Wrexham Colliery Co. Ltd. if the figures for Pits 1, 2 and 3 are combined, in the years of sinking, 1867 and 1869, they together make up a higher proportion of fixed assets than Church's estimate for shafts. In 1872 they indeed make up 40 per cent of the total, but this fell to between 30 and 35 per cent in subsequent years.

Table 3.7: Broughton & Plas Power Coal Co. Ltd., Breakdown of fixed assets, 1887-1914

Year	Works (a)	Freehold land & buildings	Railway wagons	Locomotive plant	Horses	Total value of fixed assets (b)
	%	%	%	%	%	£
1887	79.30	6.60	13.20	0.40	0.50	231,624
1891	77.90	6.40	14.70	0.50	0.50	240,346
1892	77.80	6.10	15.00	0.60	0.50	240,356
1893	77.70	6.10	15.10	0.60	0.50	240,757
1894	77.60	6.10	15.30	0.50	0.50	241,933
1895	76.70	6.00	16.40	0.50	0.40	244,186
1897	73.50	10.00	15.60	0.50	0.40	255,022
1901	71.60	8.90	18.60	0.50	0.40	261,208
1904	71.10	8.70	19.30	0.50	0.40	272,806
1910	70.20	9.10	19.80	0.50	0.40	272,793
1913	69.80	9.50	19.80	0.50	0.40	274,337
1914	69.45	9.85	19.80	0.50	0.40	275,613

Note:
(a) Works is 'pits, buildings, machinery and plant'.
(b) The total value of fixed assets used is before deduction of the provision for depreciation because the provision is not allocated to the individual asset categories.

(Sources: as for Table 3.3)

Further analysis of the balance sheets for these two companies reveal that railway wagons were more 'important' to the Broughton & Plas Power Coal Co. Ltd. than Church (1986: 112) estimates while they were of negligible importance to the Wrexham Colliery Co. Ltd., and neither company owned as many horses as Church would have expected. Given that the Wrexham Colliery Co. Ltd. did not come into production until 1873 it is not surprising that it owned few railway wagons or horses before this date and once production started we see the proportions of both wagons and horses rise. It would appear that the Broughton &

Plas Power Coal Co. Ltd. chose to purchase its own wagons, hence the relatively high proportion of wagons within assets, however, other companies often chose to keep ownership of wagons to a minimum and used the railway companies' own wagons to transport coal. This might well be a further explanation for the low proportion of railway wagons on Wrexham Colliery Co. Ltd.'s balance sheet.

Table 3.8: Wrexham Colliery Co. Ltd./Wrexham & Acton Collieries Co. Ltd., Breakdown of fixed assets 1887-1914

Year	L&B	Pit No.1	Pit No.2	Pit No. 3	RWs	P&M	H	R	Op out	W	Other	RS	Value
	%	%	%	%	%	%	%	%	%	%	%	%	£
1867	22.0	19.1	24.4	-	0.1	30.0	-	0.4	-	-	3.8	0.2	54,362
1869	18.1	20.3	30.0	-	0.3	21.4	-	0.3	-	-	9.3	0.2	83,791
1872	13.6	16.6	24.2	-	0.8	18.4	0.3	1.6	3.7	6.4	12.9	1.7	120,611
1873	13.0	14.6	21.2	-	0.8	17.9	0.1	1.4	3.2	10.3	15.2	1.4	142,005
1874	12.8	11.6	16.8	2.9	0.8	20.7	0.5	1.2	2.5	14.8	13.0	1.2	179,299
1875	14.2	10.3	15.4	4.0	1.2	20.1	0.6	1.1	2.2	13.4	15.2	1.1	202,004
1876	15.2	9.8	14.2	4.7	1.8	20.4	0.9	1.0	2.1	12.7	14.4	1.0	212,199

Key:
L&B = freehold land and buildings; RWs = Railway wagons; P&M = plant & machinery; H = Horses; R = roads; Op. out = this relates to costs of opening out Main coal; W = water, this relates to the costs relating to two 'irruptions of water' in January 1871 and October 1872; Other = 'preliminary expenses, law charges, general charges, interest and commission and redemption of preference shares'; RS = railway sidings.

(Sources: as for Table 3.4)

It would appear that Church expected most companies to lease their land because he does not include freehold land as a category, but this was a fairly significant element on the balance sheets of both the companies studied. Neither does Church (1986: 112) separately categorise buildings, either pit buildings or workmens' cottages. While buildings are not listed separately on the balance sheets of Broughton & Plas Power Coal Co. Ltd., they are separately itemised on the balance sheets of the Wrexham Colliery Co. Ltd. whose 1876 balance sheet reveals that pit buildings accounted for 4.1 per cent of total assets while cottages made up 4.6 per cent of the total (D/DM/424/2)

It would be impossible to give a breakdown of assets that would 'fit' all companies because each company was different and, given that the accounting treatment of fixed assets was not standardised at this time, had the freedom to

capitalise various costs as it saw fit. This is illustrated by the Wrexham Colliery Co. Ltd. which capitalised significant amounts under the headings 'irruption of water'; the company had two major irruptions in 1871 and 1872 and capitalised a total of £26,642 on its 1874 balance sheet (D/DM/424/1)[7]. Another item that the company capitalised in 1875 was £8,375 as 'redemption of preference shares'. There are no explanations as to what this represents and it is difficult to see why fixed assets have been debited; one would expect a 'redemption of preference shares' account', which would be found under 'capital and reserves' to be debited. This transaction certainly does not appear to meet the modern definition of fixed assets which not only requires an entity to own an asset but also to gain benefit from it. It may be that the company felt that because it had had to issue preference shares to cover the costs of problems encountered while sinking its pits that it was justified in capitalising the cost of redeeming those shares.

Conclusion

From the above, albeit limited, analysis, it can be seen that the coal companies in Denbighshire, for which records survive, availed themselves of a combination of financial resources, but it would appear that the most significant, and the one most relied on, was ordinary share capital. The comments made by Walters (1977: 257) regarding south Wales, would once more appear to apply equally to north Wales; he explains that the south Wales coalfield was "primarily financed by partners' subscriptions, calls on shares and retention of profit". According to Walters (1980: 257) mortgages and debentures were used, but "it was rare for whole new pits to be financed in this way"; and while bank credit facilities were "undoubtedly important" for working capital purposes, internally generated finance or "privately derived" share capital, remained the most important source of finance for coal companies throughout the period under review.

When we examine how this capital was 'spent' by the coal companies, not surprisingly, we find that most of the capital employed was tied up in fixed assets,

[7] This can be justified by the fact that these 'irruptions' occurred when the company was 'driving' into the coal face and can thus be deemed part of the sinking costs allocated to the capital account.

namely the pit itself and the machinery needed to work it. The companies we examined revealed that the proportion of fixed assets fell during the period under consideration. This was partly due to the fact that one would expect expenditure on fixed assets to fall once the pit was fully working and also to the fact that, at the beginning of the twentieth century, the concept of depreciation was becoming increasingly important within accounting.

Having examined the types of finance that were used, we now turn our attention to the people who actually provided that finance. The next chapter will therefore examine the key individuals who invested in the coal companies of Denbighshire, namely the coalowners.

Chapter 4

THE COALOWNERS

Introduction

According to Mitchell (1984: 54), "by far the greater part of capital came from sources local to each coalfield", and the purpose of this chapter is to establish whether the pattern of ownership in Denbighshire conformed to this view. Those who invested in the coal companies will be examined, concentrating first on those we will call the 'entrepreneurs' i.e. those who actually set up and/or developed the coal companies, before trying to establish whether there were any significant trends in the composition of the 'other' shareholders. This chapter will also consider whether these trends were similar to those highlighted by authors looking at the UK as a whole, for example, were the entrepreneurs 'indigenous' or 'immigrants' and to what extent were women involved in shareholding? We first consider those individual entrepreneurs who were influential as coalowners within the Denbighshire coalfield, before looking at the overall composition of the shareholders, both in terms of occupation and where they lived.

Entrepreneurs

Before the 1840s most of the coal mined in Denbighshire was not raised for sale, but as a vital ingredient in the iron-making process. Thus, the men who can be described as the pioneers of the Industrial Revolution in Denbighshire were not coalowners but iron masters, who took advantage of the abundance of coal in the Wrexham and Ruabon areas to site their furnaces where supplies of coal were plentiful. Into this category can be put Thomas Jones (Ponkey & Llwyneinion), Edward Lloyd Rowland (Acrefair), William Hazeldine (Pontcysyllte) and, most famously, John Wilkinson (Bersham) (Lerry, 1958: 57). These men all ran successful iron foundries in the late eighteenth century but, by 1844, "only five blast furnaces were at work instead of fifteen... 3000 were out of work,

and...taking five persons per family, 15,000 people were deprived of the means of subsistence by the stopping of the various works" (Lerry, 1958: 57).

It was the railways that breathed new life into industrial Denbighshire. Not only did they open up the coalfield to markets that had previously not existed, but they were also the reason why those who can be described as the pioneers of the 'Denbighshire coalfield' came to the region. Among these men were Robert Roy and Henry Robertson, Scotsmen who, according to Lerry (1958: 46), opened up a "new chapter in the industry of the Denbighshire coalfield". Before proceeding to a broader analysis of investment in the Denbighshire coalfield, we first provide a brief biography of some of the leading pioneers.

Robert Roy (1795 - 1873)

Roy was the first of the 'pioneers' to set up in Denbighshire when, in 1841, he purchased, out of Chancery, the Brymbo Hall Estate. After the death of John Wilkinson in 1808, a long and bitter legal dispute between Wilkinson's nephew, Thomas Jones Wilkinson, and his illegitimate family, to whom he had willed his estate, saw it deteriorate significantly, such that by the time it was bought by Roy it was in a very poor way. In order to buy the estate, Roy, from Fort George in Invernesshire (Boyd, 1991: 46), approached the Scottish Bank for a loan (Ellis Hughes, 1946: 148). This bank employed a young mining engineer to "survey [the] mineral sources and commercial possibilities" of Roy's venture (Lerry, 1949: 8). This young engineer was Henry Robertson and so favourable was his assessment that the bank offered Robertson himself financial backing to move to Denbighshire and exploit the opportunities there (DD/NTD/155).

Henry Robertson (1816 - 1888)

Robertson was born in Banff, Scotland, in 1816, the youngest of twelve children, and trained first as a mining engineer in the Lanarkshire mines and then as a railway engineer; during his career as a railway engineer he worked as assistant

to Robert Stephenson and Thomas Brassey. An article discussing railway building in east Denbighshire (DD/NTD/142) explains that "the designing of overbridges on the Glasgow, Paisley and Greenock Railway, one of Brassey's earliest contracts, had been Robertson's baptism into railway engineering". Once he had moved to north Wales he became a passionate advocate of railway building; he had realised that if Denbighshire was to achieve anything like its industrial potential, it would have to improve its communications infrastructure, because "communication within the Denbighshire coalfield itself and with the outside world was confined to road and canal" (Lerry, 1949: 14). Not only did he champion the expansion of the railway network into Denbighshire from his position as co-owner with Roy, William Betts and Alexander Mackenzie Ross of the North Wales Mineral & Railway Co., but he also worked as engineer to Edward Betts, the contractor on the Chester-Wrexham section of the Chester to Shrewsbury Railway (DD/NTD/142). He also designed what was described by the *Wrexham Recorder* (October 12, 1848, DD/NTD/142) as "the stupendous viaduct over the Dee". Such was his influence over the development of the railway in north east Wales that he became known as the 'Railway King' in the region, who, "by his energy and enterprise over a period of forty years gave a new lease of life to the neighbourhood [for which, on his arrival] the commercial outlook was black" (Lerry, 1949: 7-9).

Over the 45 years in which he lived in north Wales, Robertson became increasingly involved in local industry. His initial relationship with Roy, which saw them sink pits and develop the Brymbo ironworks, soured. After prolonged legal proceedings, which ended up in the Vice Chancellor's Court in 1856, the business was split: Robertson had the Brymbo collieries while Roy retained the Westminster colliery (D/DM/391/1). In 1856 Robertson sold the Ruabon colliery to the Ruabon Coal Co. Ltd., but worked the Broughton Hall colliery himself, and was later one of the major shareholders in the Broughton & Plas Power Coal Co. Ltd. which became one of the largest coal companies in Denbighshire. In addition to his interests in railway and colliery companies, Robertson was a founding partner in the firm Beyer, Peacock & Co., of Gorton Foundry, Manchester which

built locomotives and, according to the *Brymbo Works Magazine* (March 1920), "this business was successful from the start and soon became the largest locomotive firm in England". Later in his life he entered politics and was elected three times as MP for Shrewsbury and once for Meirionydd (Lerry, 1952: 38).

In 1882, after the death of WH Darby (see below), Robertson was keen to produce steel at Brymbo using the new techniques being used on the Continent; with this in mind he sent JH Darby (1856 - 1919, WH Darby's son) to the Continent to study the new basic open-hearth process. The findings were favourable and, in 1883, an experimental steel furnace was set up at Brymbo. This was so successful that, in 1884, the Brymbo Steel Works Co. Ltd., the first company in the UK to use the Semet Solvay system (Ellis Hughes, 1946: 132), was incorporated and production started the following year (DD/NTD/155). At the time of Robertson's death in 1888 a good indication of his widespread interests is given by a list of the companies in which he held directorships: Broughton & Plas Power Coal Co. Ltd.; Vale of Llangollen Railway; Brymbo Steel Works Co. Ltd.; Minera Lime Works; Corwen & Bala Railway; Llangollen & Corwen Railway; and Brymbo Water Co.

William Henry Darby (?- 1882)

In 1845 Robertson met William Henry and Charles Edward Darby, who later joined Roy and himself in the North Wales Mineral & Railway Co.. William and Charles Darby were the sons of Richard Darby and grandsons of Abraham Darby III of Coalbrookdale. From 1836 to 1841 William was apprenticed as a 'broker' to Nicholas Waterhouse & Sons of Liverpool and, after completing his apprenticeship, he started trading as a merchant and agent. Once he had met Robertson, Darby became increasingly involved, first with the coal industry, but more importantly with the iron industry in Denbighshire.

During the dispute with Roy, the Darby brothers sided with Robertson and their relationship with him continued until their deaths in the 1880s. They were partners with him in the Old Broughton Coal Co., and later were major

shareholders and directors in the Broughton & Plas Power Coal Co. Ltd., WH Darby being one of the original subscribers. It is interesting to note that the occupation given by WH Darby in the company's Memorandum of Association is 'iron master' rather than coalowner (D/DM/309/3, 1 Jan 1888). As Robertson's interest in politics grew, he relied heavily on the Darbys to help run his interests, William Darby taking on the responsibility of the iron foundry at Brymbo, while Charles Darby was more involved in the running of the collieries. After the deaths of William in 1882, and Charles in 1885, their sons continued, along with Robertson's son, Henry Beyer Robertson, to run the businesses bequeathed to them.

If Roy, Robertson and the Darbys were the first wave of immigrant entrepreneurs into Denbighshire, perhaps the most significant of the second wave was Henry Dennis.

Henry Dennis (1825-1906)

Born in Bodmin, Cornwall in 1825, Dennis trained as a surveyor before joining the Cornwall Railway Co. as an engineer. In 1850 he joined John Taylor & Son, mining engineers, who sent him to construct a tramway from the Llangollen Slate quarries to the Shropshire Union canal (Lerry, 1952 (2): 33-45). Taylor & Son owned the Bryn yr Owen colliery in Pentrebychan and appointed Dennis as its manager. He left this position in 1857 and he and his partner, William Glennie, traded as surveyors and mining engineers (Lerry, 1952 (2): 33-45).

Over the next forty years Dennis bought substantial interests in the Westminster, Brymbo Coal & Coke Co. Ltd., the Wrexham & Acton Collieries Co. Ltd., the Ruabon Coal & Coke Co. Ltd. and the United Westminster & Wrexham Colliery Co. Ltd. He became Chairman of the North Wales Coalowners Association, represented north Wales on the district's Coal Conciliation Board and, in 1901, was elected President of the Mining Association of Great Britain. He died in June 1906, aged 81, and according to Lerry (1952 (2): 33-45) "the

story of the later development of the mineral resources [of Denbighshire] in the second half of the nineteenth century is closely associated with the manifold activities of Henry Dennis.....which by the time of his death gave employment to over 10,000 workmen".

William Young Craig (1827-1925)

Among the other significant coalowners in Denbighshire in the late nineteenth century was William Craig, born in Hoggerston, Northumberland in 1827. After managing collieries in Harecastle near Stroke on Trent, in 1870 he bought into the Podmore Hall collieries, Staffordshire, and became sole owner in 1880. He entered Parliament as an MP for north Staffordshire in 1880 and, in 1893, he purchased the Brynkinallt colliery in Chirk, which he ran with his sons until his death in 1925 (DD/NTD/155).

James Darlington (1854-1933)

Another immigrant was James Darlington; the son of Ralph Darlington, one-time mayor of Wigan, he was apprenticed as a mining engineer to his uncle, Alfred Hewlett, at the Wigan Coal & Iron Co. Ltd. Subsequently he became colliery manager at Preesgweene, Chirk, and later at Black Park where he was General Manager and Secretary from 1877 until 1932 (Lerry, 1949: 27). Lerry also comments that Darlington was an important member of the North Wales Coalowners Association, and of the North Wales Permanent Relief Society; indeed, he was "one of the most highly respected of all the leaders of the local coal industry and a prominent figure in the public life of Denbighshire for very many years" (Lerry, 1949: 27).

By looking at the backgrounds of these men, who each played a leading role in the industrialisation of Denbighshire, we can see that they gained their initial

experience of mining in major mining regions of the UK. The early pioneers, such as Roy and Robertson were not attracted to Denbighshire in any entrepreneurial sense until they had been brought to the region as employees, but once there, they recognised the area's potential and were prepared to risk their futures to help develop the coalfield.

The experience of north Wales echoes that of south Wales, where the iron industry was initially the dominant industry of the region and coal mining "was merely a subsidiary section of the iron industry" (Morris & Williams, 1958: 10). However, the size of the concerns in south Wales meant that when railways opened up new markets for coal, those that were able to take most advantage were those already producing coal on a large scale, namely, the iron companies; and the "largest of all industrial coalowners were [in the 1840s], if considered as a single group the south Wales iron and steel companies" (Walters, 1977: 78). In north Wales, although the iron works were important users of coal, their failure to keep up with their south Wales counterparts meant that by the 1840s, unlike in south Wales, this sector had little influence.

As was mentioned in Chapter 1, Wales, both north and south, had to rely heavily on immigrant expertise to kick start their development but, in south Wales it appears that once that initial impetus had been given to the region, local, indigenous' businessmen joined in. In Denbighshire, however, throughout the nineteenth century the major 'players' remained Scotsmen or Englishmen. What does link these men with their counterparts in south Wales was that they all had experience of the mining industry; as Walters (1977: 51) explains, "mineral agents and mining engineers were very prominent amongst the pioneers of the steam coal industry" in south Wales. In north Wales the pioneers were mining engineers and people connected with the coal and iron industries in other regions, but not mineral agents. Such men would not only have had experience within the industry, but they would have developed links which would have provided access to sources of capital. In north Wales, not only did local people lack the necessary mining expertise but, due to the lack of an industrial 'history', capital would have been more difficult to access.

Prominent shareholders in Denbighshire coal companies

Even when investment in limited companies became more popular in the last quarter of the nineteenth century, coal companies never attracted the 'general' investor in the same way as, for example, the railway companies had in the 1840s. Payne (1962: 526) explains that many of the businesses in the UK, not simply coal companies, were themselves a barrier to 'widening participation' in share ownership. Many owners who took advantage of limited liability had merely transferred the original partnership into a company, and were reluctant to 'share' ownership with people other than their family and close associates. This was the case in the coal industry and, when coupled with the fact that investment in the coal industry was not likely to offer significant, or even guaranteed dividends, this meant that the 'new' middle classes, keen to achieve a regular, additional income, were not attracted to the coal industry. Hence, we find what Jeffreys (1946: 356) describes as "semi-private" companies dominating the coal industry until the twentieth century.

The term 'semi-private' is used because "the private company was not recognised legally until 1900, and not defined legally until 1907" (Cottrell, 1980: 80). However, many of the companies that were incorporated were *de facto* private companies in that their shares were not, and were never intended to be, offered to anyone other than family and associates. All the companies that were incorporated in the period 1850-1914 in Denbighshire conform with this definition of semi-private, in that the shareholders were either made up of a small number of closely linked individuals, all of whom had links with the coal industry, e.g. Bersham Colliery Co. Ltd., or were made up of a larger, more disparate group, many of whom had no direct links with the industry, but who were related to, or acquaintances of, those who were, e.g. Wrexham & Acton Collieries Co. Ltd.

In addition to those described above as 'entrepreneurs', there were some prominent individual shareholders in Denbighshire companies; these men

included Thomas Brassey, Sir Daniel Gooch, Richard Peacock and Sir Theodore Martin. A brief biography of each of these, and others, will now be presented:

Thomas Brassey (1805-1870) was a significant shareholder in the Wrexham Colliery Co. Ltd. and later the Wrexham & Acton Collieries Co. Ltd. He was born near Audlem, Cheshire, and trained as a surveyor, working mainly on road construction, including the London to Holyhead road when he worked under Thomas Telford. Later, encouraged by George Stephenson, he turned to railway engineering and, by 1841, he had "laid the foundations of his career as a railway builder" (Oxford Dictionary of National Biography). This was the beginning of an impressive career which saw him engaged in the building of railways not only in the UK, but across Europe, north America, south America, India and Australia "which made him the greatest international civil engineering contractor of his time" (Oxford Dictionary of National Biography). Brassey was also one of the original nine shareholders in the Powell Duffryn Steam Coal Co. Ltd. in south Wales, formed in 1864, and his family continued to be involved as Powell Duffryn grew into the largest colliery company in south Wales and a major force in the British coal industry (Boyns, 2003).

Sir Daniel Gooch (1816-1889) was born in Bedlington, Northumberland where his father was bookkeeper to the local ironworks. In 1831 his father took up a position at the Tredegar iron works in south Wales, where Gooch started his working life. He worked in a number of iron works throughout the UK before coming to the attention of Isambard Kingdom Brunel. In 1837 he was appointed locomotive superintendent to the Great Western Railway Co. (GWR) and, in 1866, he was made Chairman, a position he held until his death in 1889 (Oxford Dictionary of National Biography). In 1856 he became chairman and majority shareholder of the Ruabon Coal Co. Ltd.; Gooch had wanted the GWR to acquire its own collieries in Denbighshire but this was prevented by a group of hostile directors within GWR, "who wanted to....[expose the company] to market forces" (Oxford Dictionary of National Biography). Gooch then decided to forge closer

links with suppliers in Denbighshire and was instrumental in creating a company, the Ruabon Coal Co. Ltd. which could have close links with the railway and ensure supplies (Lerry, 1949: 32-3). Gooch was also a shareholder in the Ruabon Coal and Coke Co. Ltd., which bought out the Ruabon Coal Co. Ltd in 1880.

Richard Peacock (1820-1889) was a shareholder in the Broughton & Plas Power Coal Co. Ltd. and a partner, with Henry Robertson and Charles Frederick Beyer, in Beyer, Peacock & Co. In 1838, at the very young age of 18, he became the superintendent of the Leeds & Selby Railway before working briefly for GWR under Daniel Gooch. In 1854, with his father Ralph, and Frederick Beyer, he founded Beyer, Peacock & Co.; a couple of years later they were joined by Henry Robertson, and "a great engineering centre" was created (www.beyerpeacock.co.uk).

Sir Theodore Martin (1816-1907) was an Edinburgh-born solicitor who became famous as an author and translator, his most famous work being a five volume biography of Albert, Prince Consort (*Who Was Who* 1897-1916, 1966: 477). He was one of the subscribers to the Westminster, Brymbo Coal & Coke Co. Ltd. in 1858, along with Robert Roy, and he remained a shareholder until his death. He, along with Henry Dennis, was also a subscriber and majority shareholder of the United Westminster & Wrexham Colliery Co. Ltd. which was incorporated in 1905 with a view to sinking and working the Gresford colliery.

Having examined some of the key entrepreneurs and shareholders in Denbighshire coal companies, we now turn our attention, where possible, to a more systemic analysis of the subscribers and shareholders in such companies.

Subscribers and shareholders in Denbighshire coal companies

Subscribers

The purpose of this section is to examine those who actually set up the coal companies, the subscribers, in Denbighshire between 1850 and 1914, looking in particular at their occupations and their geographical location. It is, however, important to note that, as will be discussed at length later in this section, when analysing the occupations of subscribers, a certain amout of 'fluidity' of classification can make comparisons difficult. As people ascended the social scale they often changed the classification of their occupation; this means that the same person, who may have subscribed to a number of different companies over time, may be classified differently over time.

A further problem is that when trying to compare and contrast trends over time, one should use, for a number of benchmark years, the shareholder details for each company for the various years. However, due to the paucity of the underlying records this has proved impossible. Therefore, the data for different companies relating to different years has been 'pooled', enabling us to construct a table of occupations relating to the whole of the period 1856-1913 (see Table 4.1). Even so, within this period, details of subscribers and shareholders could only be found for thirteen companies. However, given that the sample includes the companies controlling the five largest collieries, in terms of the numbers employed, by the end of the nineteenth century, it can be deemed to form a representative sample.

Despite these problems the analysis nevertheless offers an insight into the people investing in Denbighshire coal companies in the nineteenth century.

Occupation of subscribers

As has already been explained, the companies of Denbighshire were all *de facto* 'semi-private' companies, and therefore the vast majority of the sharholders had connections, however tenuous, with each other. It is, however, interesting to look at the occupations and addresses of subscribers to see whether they differ from general patterns. If one first looks at the occupations of the founders of companies it comes as no surprise to find that, in his study, Church (1986: 451) found that the majority of founders described themselves as coalowners, ironmasters or those involved in business. The second most important category was described by Church as 'professional & private'. This included solicitors, engineers and 'others in the coal trade'. His final category of 'Other' covered landowners, merchants and bankers. If one looks at the occupations of the subscribers in Denbighshire coal companies (see Table 4.1), only 15 per cent of the population described themselves as belonging to Church's 'Business' category, with only 8 per cent describing themselves as coalowners. The biggest sector represented in Denbighshire is 'Professional' with 40 per cent of all subscribers falling into this category. However, the three broad categories used by Church were deemed inadequate for the purposes of analysing the subscribers of Denbighshire because the main occupation given in Denbighshire was 'gentleman', which accounts for 29 per cent of the population. Although these could have been categorised as 'Other', in line with Church, it was considered important to create a specific category because 'gentleman' was the single most important category used by the subscribers to describe themselves.

This self-classification is, according to Cottrell (1980: 95), the biggest difficulty when trying to analyse shareholder occupations. Cottrell (1980: 95) explains that the classification "has to be treated with some caution. Self-classification probably introduces an 'upward' bias in the sense that some significant proportion chose to describe themselves as 'gentleman' ..... for reasons of social prestige". This is illustrated by the case of Henry Dennis, who, in the 1880 return of the Ruabon Coal & Coke Co. Ltd., was described as a mining engineer; by 1890, however, when he had amassed some private wealth,

he was described as a gentleman. In addition to this, there were those who described themselves as having 'no occupation'; due to the fact that these obviously lived on private income in much the same way as those who described themselves as gentlemen, these have been included under the heading of 'gentleman', as have those described as 'Sir' or 'Knight'. Once again there is a problem with 'progression'. Daniel Gooch, was initially described as a railway engineer, then as a gentleman and finally as a Knight, while Henry Robertson 'progressed' over time from coalowner to MP to gentleman. Utilising the descriptions given by individuals as separate classifications would therefore mean that some shareholders 'swapped' categories from one return to another. Combining some classifications, as has been done in Table 4.1, avoids some of this 'swapping'.

. When the subscribers to Denbighshire coal companies are analysed (see Table 4.1), it is interesting to note that women made up 5.8 per cent of the subscribers. At a time when "many companies disliked shares passing into the hands of women" (Pearson, 2003: 10), two companies in Denbighshire, the Wrexham Colliery Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd., involved women as subscribers. In the former company, there was a single female subscriber who owned 5.5 per cent of the subscriber shares (NA/14299/1145), whereas, in the latter company, four women owned 47.5 per cent of the initial shares issued (NA/14299/1145). Although women were not specifically mentioned by Church in his analysis of founders, they may be 'lost' within his category 'not gainfully employed', because women owning shares was not particularly unusual in the nineteenth century, despite the misgivings of some companies (Freeman et al, 2006; Carlos & Neal, 2003).

Table 4.1: Occupation of subscribers in Denbighshire coal companies 1856-1913

Occupation	%
1. Business	
Coalowner	8.10
Ironmaster	2.30
Other business	4.65
	15.05
2. Professional	
Legal	4.65
Other professional	10.50
Mining engineer	2.30
Other engineer	9.30
Shopkeeper/ tradesmen	5.80
Others in coal trade	8.10
	40.65
3. Others	
Landowners	-
Merchants	7.00
Bankers	-
4. Gentlemen	29.10
5. Women	5.80
6. Men in armed forces	1.20
7. Churchmen	1.20
	100.00

Note: Categories 1-3 are as per Church (1986:451); categories 4-7 are per the author
(Source: returns for companies from National Archives records, namely:
Ruabon Coal Co. Ltd., 1857, NA/BT31/ 1/2; Westminster, Brymbo Coal & Coke Co.Ltd., 1858, NA/14299/1145; Wrexham Colliery Co. Ltd., 1863, NA/14345/821C; Minera Coal & Iron Co., 1864, NA/917/1107C; Vauxhall Colliery Co. Ltd., 1871, NA/14424/5486; Llay Hall Coal, Iron & Firebrick Co. Ltd., 1873, D/BC/Clarke (addnl) 1/2; Ruabon Coal & Coke Co. Ltd., 1880, NA/38192/14301; Broughton & Plas Power Coal Co. Ltd., 1881, D/DM/309/3; Vron Colliery Ltd., 1887, NA/3931/24885; Wynnstay Collieries Ltd., 1889, NA/14998/29254; United Westminster & Wrexham Colliery Co. Ltd., 1905, NA/37495/85251; Black Lane Colliery (Brymbo) Ltd., 1909, NA/128571/104122; Llay Main Collieries Ltd., 1913, NA/38330/130545).

Carlos & Neal (2003: 18), in their study of the Bank of England shareholders found that, as early as 1720-1725, women "were clearly present in the [stock] market" and owned approximately 20 per cent of the Bank's stock (Carlos & Neal, 2003: 31). Although women were not actively encouraged into share-ownership, according to Newton & Cottrell (2006: 16), women "were

becoming more prominent as shareholders by the mid [nineteenth] century". This is borne out by Freeman et al (2006: 7) who, in their study of joint-stock companies, found that in the sample studied, women constituted 5.4 per cent of subscribers, a marginally lower proportion than in Denbighshire. This would appear to show that Denbighshire was not alone in having female shareholders, and the role of women as shareholders within individual coal companies in Denbighshire will be discussed more fully in the section examining shareholder occupations.

Geographical location of subscribers

It is equally important to examine where the subscribers came from if one is to establish whether the main impetus for setting up coal companies came from local or external sources. For the Denbighshire coal companies for which information survives, the addresses given by the subscribers to the various Memoranda of Association of the companies are summarised in Table 4.2.

Table 4.2: Analysis of subscribers' addresses in Denbighshire 1856-1913

Address given	%
Wrexham/ Ruabon	15.10
Other Denbighshire	1.20
Other north Wales	4.65
	20.95
Cheshire	3.50
Shropshire	8.10
Lancashire (inc. Merseyside)	8.10
Herefordshire	7.00
	26.70
London	40.70
Other England	7.00
Scotland	4.65
	52.35
	100.00

(Sources: as for Table 4.1).

The most frequent address given by subscribers was London, which accounted for 41 per cent of the total; however, as Cottrell (1980: 91) points out, many people who gave a London address often had an additional address elsewhere which makes meaningful analysis more difficult. Nevertheless, looking at the information available, men 'external' to north Wales made up the majority of the subscribers, as only 21 per cent of subscribers gave addresses in north Wales. However, if one bears in mind the proximity of Cheshire, Shropshire, Lancashire and Herefordshire to north Wales, the proportion of subscribers that can be described as 'local' rises to 47.65 per cent, or almost half of all the subscribers.

The value of analysing the subscribers of a company might be questioned given that, in many cases, the subscribers often had little else to do with the company once it was incorporated, and were often only included to 'make up the numbers' needed so that the company could be incorporated[8]. To see whether this was the case with the companies in Denbighshire the surviving lists of shareholders were scrutinised to assess whether or not the subscribers remained involved with a company five to ten years after incorporation (see Table 4.3).

Table 4.3: Percentage of shares held by subscribers five to ten years after incorporation

Company	Year of incorporation	Year of analysis	Subscribers still involved? How many?	% of shares held by subscribers
Plas Power	1881	1891	Yes – 4	12.7
Westminster	1858	1868	Yes – all	55.9
Ruabon Coal Co.	1856	1862	Yes – 6	22.3
Wynnstay	1889	1894	Yes – 2	00.2
Wrexham Colliery Co	1863	1869	Yes – 6	29.0

(Sources: returns for companies from National Archives and other records, namely:
Ruabon Coal Co. Ltd., 1857, NA/BT31/1/2; Westminster, Brymbo Coal & Coke Co. Ltd., 1858, NA/14299/1145; Wrexham Colliery Co. Ltd., 1863, NA/14345/821C; Broughton & Plas Power Coal Co. Ltd., 1881, D/DM/309/3; Wynnstay Collieries Ltd., 1889, NA/14998/2925).

[8] A total of 7 subscribers were needed on the Memorandum of Association before a company could be incorporated.

Table 4.3 demonstrates that, apart from the Wynnstay company, a majority of the subscribers in the, admittedly, small sample remained shareholders in the company some five to ten years after incorporation and continued to hold fairly significant proportions of the shares. None of the Wynnstay company's seven subscribers was local to north Wales, all coming from London, and none was described as having anything to do with the coal industry: there was a chartered accountant, a solicitor and five gentlemen (NA/14998/29254). Given that, in 1894, these 7 subscribers only held 0.2 per cent of the shares in the company, it would thus appear that, in this case at least, the subscribers were merely people who facilitated the formation of the company by signing the Memorandum of Association, rather than being substantive investors in the business.

Shareholders

Having looked at the subscribers of the companies, the shareholders will now be analysed to establish whether trends highlighted among the subscribers also apply to shareholders more generally. Again the limitations of the analysis must be pointed out. Ideally we should examine shareholder lists for the different companies for the same year but this has proved impossible due to the fact that only selective records for each company have survived. With this in mind it was decided to examine the records within as narrow a period as possible while trying to ensure that the most significant companies within Denbighshire were included in the sample. This has left a sample of 6 companies from the period 1885-1895, details for which can be found in Table 4.4.

Shareholder occupations

The breakdown of shareholders' occupations for those individual coal companies whose records have survived and for the aggregate of all such companies, can be seen in Tables 4.4 and 4.5 below. Table 4.4 indicates the number of shares

held in the individual companies, while Table 4.5 presents the information in percentage terms.

Table 4.4: Analysis of shareholders' occupations in Wrexham coal companies, 1885-1895- by number of shares held

Occupation	PP	West	Wynn	Ruabon	W & A	Vron
Professional	4,440	140	798	116	884	10
Shipowners					32	
Women	3,800	2,130	267	33	1,716	
Members of HM Forces	21,800	218	1,148		491	
Civil engineers	12,680				412	1
Mining engineers	500	384			255	
Gentlemen (inc. Lords)	62,340	1378	3,467	301	3,186	1,252
Merchants and tradesmen	1,020	104	1,300	50	261	
Crown officials		327			220	
Farmers			10		40	
Government officials					117	
Medical doctors		40			195	
Bankers	590				170	
Churchmen					10	600
Agents	34,620				88	
Colliery employees	1,090	79	10			
Ironmasters	250					
Occupation Unknown	25,620					
Total	168,750	4,800	7,000	500	8,077	1,863

(Key/Sources:

PP	Broughton & Plas Power Coal Co. Ltd.	Dec 1891	D/DM/309/4
West	Westminster, Brymbo Coal & Coke Co. Ltd.	Sept 1888	D/BC/2251
Wynn	Wynnstay Collieries Ltd.	Oct 1894	NA14998/29254
Ruab	Ruabon Coke & Coal Co. Ltd.	Aug 1890	NA/38194/14301
W&A	Wrexham & Acton Collieries Co. Ltd.	Apr 1889	NA/145345/821c
Vron	Vron Colliery Ltd.	Dec 1887	NA/3931/24885).

Two total columns have been included in Table 4.5 because the Broughton & Plas Power Coal Co. Ltd.'s issued share capital is so much higher than that of the other companies in the sample that it distorts the totals, and therefore the totals, excluding Broughton & Plas Power Coal Co. Ltd., might be deemed to be more representative. Tables 4.4 and 4.5 show that, overall, the most important occupational category in Denbighshire coal companies was

'gentleman', who held 37.7 per cent of the shares issued by the companies in the sample. If the totals in Table 4.5 including Broughton & Plas Power Coal Co. Ltd. are examined, the second most numerous category was 'agent' (18.2 per cent) but, if that company is excluded, interestingly, women take second place, with 18.6 per cent.

Table 4.5: Analysis of shareholders' occupation in Wrexham coal companies, 1885-1895- by proportion of shares held

Occupation	PP	West	Wynn	Ruab	W&A	Vron	Total% inc. PP	Total% exc. PP
	%	%	%	%	%	%	%	%
Professional	2.6	2.9	10.0	23.2	10.9	0.5	3.30	8.80
Shipowners					0.4		0.01	0.10
Women	2.3	44.4	3.8	6.6	21.3		4.20	18.60
HM Forces	12.9	4.6	16.4		6.1		12.40	8.40
Civil engineers	7.5				5.1	0.05	6.90	1.90
Mining engineers	0.3	8.0			3.2		0.60	2.90
Gentlemen (inc. Lords)	36.9	28.8	49.6	60.2	39.4	67.25	37.70	43.10
Merchants & tradesmen	0.6	2.1	18.6	10.0	3.2		1.40	7.70
Crown officials		6.8			2.7		0.30	2.50
Farmers			0.1		0.5		0.03	0.20
Government officials			1.4		1.5		0.06	0.50
Medical doctors		0.8			2.4		0.10	1.00
Bankers	0.4				2.1		0.40	0.80
Churchmen					1.1	32.2	0.30	2.70
Agents	20.5				0.1		18.20	0.40
Colliery employees	0.7	1.6	0.1				0.60	0.40
Ironmasters	0.1						0.10	
Unknown	15.2						13.40	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.00

(Key/ Sources: as for Table 4.4).

If one looks at the shareholders of individual companies in Denbighshire (see Table 4.5), 'gentlemen' is the most important category for all companies except for the Westminster, Brymbo Coal & Coke Co. Ltd. For this company 'women' formed the largest category and were also significant at the Wrexham & Acton Collieries Co. Ltd, where they occupied second place. In other companies

the group occupying second place varied: in Broughton & Plas Power Coal Co. Ltd. it was 'agents', in Westminster, Brymbo Coal & Coke Co. Ltd. was 'gentlemen'; in Vron Colliery Ltd. it was 'churchmen'; in Wynnstay Collieries Ltd., it was 'merchants & tradesmen', while in Ruabon Coke & Coal Ltd. it was those described as 'professional'.

Recent studies of women shareholders in the nineteenth century (Carlos & Neal, 2003; Newton & Cottrell, 2006; Freeman et al., 2006) reveal that women often held shares, either because they had inherited them from a deceased husband or, because they were spinsters who had been given the shares as part of a paternal package that would provide them with an independent income for the future. Few of the female shareholders in Denbighshire owned shares in their own right once they were married, indeed, only a handful were described as 'wife', or 'Mrs'[9], they were usually 'widow' or 'spinster'. This, according to Newton & Cottrell (2006: 25) was "a direct consequence of the legal status of married women's property" which became that of her husband upon marriage.

Freeman et al. (2006: 5) claim that there is "considerable evidence of women holding shares in family clusters" which is certainly true of the Westminster, Brymbo Coal & Coke Co. Ltd. where Barbara Ross, Anne Ross, Helen Ross and Martha Ross were four of the original eleven subscribers in 1858. Freeman et al. (2006: 18) explain that most women were involved in "kin dependent rather than individualistic investment" and it is highly likely that these women were either related in some way to Roy or one of his associates. Earlier in this chapter (page 104) we noted that one of the original owners of the North Wales Mineral & Railway Co., in association with Roy and Henry Robertson, was Alexander Mackenzie Ross. If we assume that when Roy split from Robertson in 1856 Ross remained close to Roy, it is not unexpected to find females of the same name owning shares in Roy's company and, indeed, three of the four above-named women still owned 16 per cent of the shares in 1889. A review of the surnames of female shareholders in Denbighshire reveals that they usually share the same surname as one of the male shareholders so it is highly unlikely

[9] Six women shareholders in the Wrexham & Acton Collieries Co. Ltd. were described as 'Mrs', in April 1889 (NA/14345/821C)

that they were acting as "independent investors" (Newton & Cottrell, 2006: 28) but, whatever the motivation behind their investment, women were certainly not insignificant shareholders in Denbighshire coal companies.

In all of the companies sampled, those who actually describe themselves as being involved in the coal or iron industries make up a very small proportion of the shareholders. However, as mentioned earlier, prominent coalowners such as Henry Dennis had, by the decade under review, 'graduated' from being described as 'mining engineer' to being a 'gentlemen'. In this way, the true background of shareholders is often obscured by the method of self-classification chosen.

Geographical location of shareholders

To establish whether the share capital of the companies came from local sources, the addresses of the shareholders were analysed. Unlike other studies (Cottrell, 1980), the actual addresses have been analysed rather than the distance from the Registered Office; this allows us to build up a picture of the degree of 'remoteness' that existed between the shareholders and the collieries they owned (see Table 4.6 for numbers of shares held in individual companies and Table 4.7 for the respective percentages).

The overall 'total' figures in Table 4.7, for the entire sample of companies would appear to support Mitchell's assessment (for the British coal industry as a whole) that most of the capital came from local sources. However, the difference in the volume of shares issued by Broughton & Plas Power Coal Co. Ltd. (see Table 4.6), skews all the figures towards the pattern exhibited by this company and therefore the figures excluding Broughton & Plas Power Coal Co. Ltd. have also been presented (see penultimate column of Table 4.7). These figures reveals that the highest proportion of shareholders for the other companies in the sample, resided in London and the south east of England; these shareholders accounted for 33 per cent of all the shareholders, and the only other region with a significant presence was Scotland. Shareholders giving their address as being either in Denbighshire or north Wales accounted for only 6 per cent of the total, excluding Broughton & Plas Power Coal Co. Ltd. If Broughton & Plas Power Coal

Co. Ltd.'s figures are included, the picture changes dramatically: 46.1 per cent come from north Wales (excluding Denbighshire), 23 per cent from London and the south East of England with 13.4 per cent 'not known'.

Table 4.6: Analysis of addresses of shareholders in Denbighshire coal companies, 1885-1895 – by number of shares held

Address	PP	West	Wynn	Ruabon	W & A	Vron
Denbighshire	1,840	727	84	93	346	10
Other north Wales	87,940		80			
Shropshire		40	100	116	414	
Cheshire	4,440	454	1,325		413	
Lancashire (including Merseyside)	12,450	51	1,768		38	
Yorkshire			550			600
London & south east England	36,460	1,510	2,284	291	3,288	3
Herefordshire					40	
Staffordshire		60	125		120	
Cumberland					80	
Warwickshire		73			150	
Devon & Somerset			120		171	550
Hampshire		200	200			700
Scotland		1,685	25		2,873	
Overseas			30			
Lincolnshire			150		144	
Gloucestershire			9			
Rutland			150			
Not known	25,620					
	168,750	4,800	7,000	500	8,077	1,863

(Sources: as for Table 4.4)

If figures for the individual companies are looked at, a rather different story emerges (see Table 4.7). Broughton & Plas Power Coal Co. Ltd. is the only company where 'control' (more than 50 per cent of shares held) lies in north Wales and, of the remaining companies, only Westminster, Brymbo Coal & Coke Co. Ltd. and Ruabon Brymbo Coal & Coke Co. Ltd. exhibit a north Wales holding in excess of 10 per cent, the figures being 15 and 19 per cent respectively. In almost all the other companies, shareholders in London and the south east of England are the most significant category and, in two companies, Westminster,

Brymbo Coal & Coke Co. Ltd. and Wrexham & Acton Collieries Co. Ltd., shareholders in Scotland have important stakeholdings. This latter finding can be explained by the fact that both companies had close connections with Robert Roy, who hailed originally from Invernesshire.

Table 4.7: Proportion of shareholders, analysed by address, 1885-1895 – by percentages

Address	PP	West	Wynn	Ruab	W&A	Vron	Total exc. PP	Total inc. PP
	%	%	%	%	%	%	%	%
Denbighshire	1.1	15.1	1.2	18.6	4.2	0.5	5.7	1.60
Other north Wales	52.1		1.1				0.4	46.10
Shropshire		0.8	1.4	23.2	5.1		3.0	0.35
Cheshire	2.6	9.5	18.9		5.1		9.9	3.50
Lancashire (including Merseyside)	7.4	1.1	25.3		0.5		8.3	7.50
Yorkshire			7.8			32.2	5.2	0.60
London & south east England	21.6	31.4	35.5	58.2	40.7	0.2	33.2	23.00
Herefordshire					0.5		0.2	0.02
Staffordshire		1.3	1.8		1.5		1.4	0.15
Cumberland					1.0		0.3	0.04
Warwickshire		1.5			1.9		1.0	0.10
Devon & Somerset			1.7		2.1	29.5	3.8	0.40
Hampshire		4.2				37.6	4.9	0.60
Scotland		35.1	0.4		35.6		20.6	2.40
Overseas			0.4		1.8		0.1	0.02
Lincoln			2.2				1.3	0.15
Gloucestershire			0.1				0.0	0.00
Rutland			2.2				0.7	0.07
Not known	15.2							13.40
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.00

(Sources; as per Table 4.4)

Table 4.7 also reveals that the shareholders were dispersed across the UK and elsewhere. If we take Shropshire, Cheshire, Lancashire and Herefordshire as coming within the definition of 'local', the local shareholdings for each company are as indicated in Table 4.8. These reveal that only Broughton & Plas Power Coal Co. Ltd. can therefore be said to be truly locally owned, although Wynnstay Collieries Ltd. and Ruabon Coke & Coal Co. Ltd. have a significant local presence (47.9 per cent and 41.8 per cent respectively). It would

thus appear that the Denbighshire coalfield does not conform to the "localised capital market" outlined by Cottrell (1980: 93), and supported by the findings of both Mitchell (1984: 54) and Church (1986: 145) in relation to the coal industry as a whole. Rather, it relied on external funding, just as Church found in the case of the west Midlands and south Wales. Church (1986: 145) explains that in the west Midlands, "the existence of relatively large numbers of small and medium-sized companies offered accessible forms of participant investment" which was likely to attract those with smaller amounts to invest. This is possibly also the case with Denbighshire.

Table 4.8: 'Local' shareholdings in Denbighshire coal companies, 1885-1895

Colliery	PP	West	Wynn	Ruab	W & A	Vron
	%	%	%	%	%	%
North Wales	53.2	15.1	2.3	18.6	4.2	0.5
Shropshire		0.8	1.4	23.2	5.1	
Cheshire	2.6	9.5	18.9		5.1	
Lancashire	7.4	1.1	25.3		0.5	
Herefordshire					0.5	
Total 'local'	63.2	26.5	47.9	41.8	15.4	0.5

(Source: based on figures in Table 4.7)

The majority of coal companies in Denbighshire fell into the small/medium category and, given the 'semi-private' nature of the companies, most of the shareholders would have had strong ties of family or acquaintance with each other, as borne out by the analysis of individual lists of shareholders in Denbighshire. Hence the ties were 'local' to the families but not necessarily 'local' to the actual colliery location. This is illustrated by the number of Scottish shareholders in the Westminster, Brymbo Coal & Coke Co. Ltd. with ties to Robert Roy, and the number of shareholders from London and the south east of England in the Ruabon Coke & Coal Co. Ltd. The significance of London and the south east to the latter company is due to the fact that Daniel Gooch, Chairman of GWR, was instrumental in creating the company, indeed he was the major subscriber and shareholder in the company, and he was based in London.

In the larger coalfields such as south Wales, however, the reason for the widespread geographical nature of shareholdings was somewhat different. Church (1986: 145) believes that the growth of the steam coal export trade "exercised a greater attraction for capitalists, the professions and mercantile sections of the wider investing communities". This meant that the shareholders of coal companies in such regions were much more 'remote' from the other shareholders. The companies were often much larger and 'public' ownership was more of a possibility than in smaller coalfields such as Denbighshire where the shareholders, although sometimes 'remote' geographically from the company in which they held shares, were not remote from each other. In the smaller coalfields such as Denbighshire, it is likely that the shareholders could all be linked, however tenuously, through acquaintanceship with each other.

Conclusion

The purpose of this chapter has been to, first, provide details of the major 'pioneers' in the Denbighshire coalfield in terms of entrepreneurs and major shareholders, before trying to establish whether trends in Denbighshire, in terms of shareholder occupation and geographical location, corresponded to those for the British coal industry as a whole. A major problem with the analysis has been the fact that the source material has not made it possible to conduct an inter-company comparison for any specific year. This has meant that the data for certain companies has had to be pooled across various periods. Athough such an approach has obvious shortcomings, it has highlighted certain trends; Denbighshire does not appear to conform to the views of either Mitchell (1984) or Church (1986). Not only did most of the capital come from shareholders who could not be categorised as local, but the shareholders themselves did not categorise themselves as being involved in business.

In Denbighshire the majority of shareholders in coal companies, if Broughton & Plas Power Coal Co. Ltd. is excluded from the analysis due to the disparity in the number of shares issued, came from outside north Wales. Indeed,

the biggest proportion, 33 per cent, gave their address as being in London and the south east, while the second largest 'contingent', 21 per cent, was from Scotland. This latter statistic is not unexpected given that two of the most important 'pioneers', Robert Roy and Henry Robertson, came to north Wales from Scotland and Roy, in particular, retained strong ties with his homeland. Given that north Wales is a small coalfield, the influence of characters such as Roy and Robertson and the way the former encouraged the involvement of Scottish shareholders in Welsh companies, is far stronger than it would have been in other, larger coalfields where the network links of a 'foreigner' would have been diluted by the scale of investment. Neither is the influence of London as a shareholder-base particularly surprising; London was, after all, the financial centre of the United Kingdom and "probably one of the wealthiest [regions] as well" (Cottrell, 1980: 94).

When the occupations of the shareholders are considered, again excluding Broughton & Plas Power Coal Co. Ltd., the most important categories were 'gentlemen' and 'women' who made up 43.1 per cent and 18.6 per cent of the total respectively. If the companies are considered on an individual basis 'gentlemen' remains the most important category for all but one of the companies and, perhaps very surprisingly, in this company, the Westminster, Brymbo Coal & Coke Co. Ltd., 'women' hold the highest proportion of shares, at 44.4 per cent.

Having examined the background of those who invested in the coal companies, the next three chapters will consider the other major 'stakeholders' in a coal company. Chapter five will consider the mineral owners, chapter six, the employees and their unions, and chapter seven, the customers. All these had a significant interest in the success of the coal companies and the relationships of each of these stakeholders with the coalowners could often have an important effect on the performance and, therefore, the profits of the coal companies.

Chapter 5

MINERAL OWNERSHIP

Introduction

In this chapter we will discuss the issue of mineral ownership and the relationship between the mineral owners, the lessors, and the coal companies, the lessees. In this context, mineral owners are the landowners who owned the land, because ownership of coal (the mineral) was vested in the owner of the surface land. As mineral owners they were entitled to a 'share' of the income derived from the sale of coal; this came in the form of a 'royalty'. Royalties were part and parcel of a coal company's life because land was often leased, rather than held freehold, and therefore maintaining a good relationship with the lessors was important. This chapter will outline the means by which landowners received recompense for allowing the companies to mine their land, and will look at the issues which often caused conflict between lessors and lessees. In particular, we will discuss royalties; what they are, how they were calculated and the reasons why they caused problems between landlords and coal companies.

Leases

According to Mitchell (1984: 250), there are three factors of production within the coal industry: capital, labour and land. Given that, without mineral-bearing land, there is no need for either of the first two factors, buying or gaining access to land was the single most important factor required by any 'coal entrepreneur'. Due to the fact that land was an expensive commodity, most coalowners relied on leasing land to give them this access. For this reason, coalowners had to ensure that they cultivated, and maintained, good relationships with the local landowners because, without these, lease agreements could be difficult to come by or difficult to re-negotiate if the need arose.

The process of obtaining agreement over a lease between a coal owner and the mineral owner(s) could be a very long and protracted affair, especially if more than one mineral owner was involved, as was often the case (Morris & Williams, 1958: 122). One of the most important elements concerning a lease was its duration. This, according to Morris & Willams (1958: 117), was of fundamental importance to the tenant; he required security from the knowledge that the lease would be of long enough duration to ensure that there was ample time to secure a return. This view is reinforced by Cockburn (1902: 271) who stated that " to enable the lessee to recoup his expenditure and to save him from having to hasten the working out of mineral.....it is very desirable that the term should be for as long as possible".

The landlord on the other hand wanted the freedom to change his tenants and have the ability to include new clauses or alter existing ones to his own benefit, which meant he generally favoured short leases (Dron, 1928: 17). This inherent conflict generally resulted in a compromise, with leases normally running for between twenty to forty years in regions such as north Wales (Dron, 1928: 17). In especially successful regions, such as south Wales, leases were often for between forty and sixty years duration. This was possibly due to the fact that, as the nineteenth century progressed and the south Wales coal industry became increasingly successful, the landowners became convinced of the success of the coal industry and realised that if a successful coal mine was located on their land they could anticipate a good income over a guaranteed period. This is not to say that both parties to the lease remained happy with its terms for the whole period of the lease, or that disputes did not occur, but generally the average length of the leases in south Wales was a reflection of the strength of the industry in that region because lease agreements were "the results of the circumstances and expectations of the industry at the particular time [when the lease was negotiated]" (Mitchell, 1984: 251). Landlords in other, smaller, coalfields may not have been quite as confident and 'hedged their bets' when agreeing terms, which generally meant shorter lease terms for the coalowners.

Another important factor that could affect the length of the negotiations over a lease was the number of lessors. If the land that a coal company wished to mine all belonged to a single landlord, the negotiations could usually be concluded quickly. If several landowners were involved, however, the negotiations often became fraught, as different landlords vied for preferential terms. The main contentious issue (in relation to a new undertaking) was where the mine (buildings, shafts etc) were to be situated. Having a mine on a particular piece of land, increased the value of that land, and also ensured that the land was usually worked first. This meant that landlords might argue about where the pit should be sunk, a process which might ultimately result in the pit being sunk in a position that was less than optimal from other perspectives.

We will now consider the payments made to the landlords, what they were made up of, how they were calculated, and what proportion of total cost per ton they constituted, before examining in detail, for those Denbighshire coal companies for which archival evidence is available, the relationship between coal companies and their lessors.

Payments to Landlords

How then did the landlord receive a return for leasing his land to coal companies? According to Sorley (1889: 6), "in this country, payments to landlords consist of:

i) fixed / certain / dead rent

ii) royalty

iii) wayleave".

Dead rent

A dead rent was a specified annual amount which was not charged in addition to royalties, but was payable if royalties did not equal or exceed this specified

amount (Sorley, 1889: 6). Any 'shorts,' i.e the difference between the royalties payable and the dead rent, could usually be carried forward into future years and set-off against royalties which exceeded the fixed rent (Dron, 1928: 20). This, however, did depend on the terms of the lease; most allowed for the recovery of shorts, but some landowners did specify a time-scale for their recovery (Sorley, 1889: 6). The way shorts work is illustrated by the following example taken from Dron (1928: 21) :-

Dead rent £600 p.a

royalties payable	- year 1	£200
	- year 2	£400
	- year 3	£800
	- year 4	£1,200

Year	Dead rent	Royalties	Shorts	Cumulative shorts	Paid to lessor
	£	£	£	£	£
1	600	200	400	400	600
2	600	400	200	600	600
3	600	800		400	600
4	600	1200		-	800

The purpose of a dead rent, was, in part, a method of guaranteeing the landlord a minimum amount per annum, especially in the early years of sinking and opening out a colliery. An additional purpose of dead rent, according to Cockburn (1902: 272), was for it to act "as an incentive to diligence of working"; it prevented a lessee from renting land and then failing to work it (Mitchell, 1984: 251), either because he wished to 'lock-up' the minerals and prevent his competitors from gaining access to them (Cockburn, 1902: 272), or because he wished to concentrate on working the land of another lessor who might be charging less in terms of dead rents and royalties.

In Denbighshire the dead rents varied considerably depending on the size of the colliery and the amount of land leased. For example, larger collieries such as Westminster, which leased its land predominantly from the Duke of

Westminster, agreed to a dead rent of £1,000 per annum in 1872 (D/GR/685), while smaller collieries such as Pentrebychan and Gwernygo which leased land from Colonel Meredith of Pentrebychan Hall had dead rents of £50 per annum in 1882 (D/DM/285/85 & 91).

Royalties

The main method by which landlords received recompense was by royalties, the rates of which could vary significantly both between and within regions. Dron (1928: 16-17) explained that the use of the word 'royalty' rather than 'rent' is important; rent is paid for the use of something which lasts for a period of time, whereas a royalty is paid for the commodity itself, which is removed once and for all. In other words a royalty is a "charge for depletion" (Mitchell, 1984: 252). According to Fine (1990: 50) this issue is not as clear cut as Dron and Mitchell might make it appear, and he concludes that royalties cannot easily be distinguished from rent because, within the royalty payment, an element of rental payment exists "in so far as each (rent and royalty) represents the revenue that accrues to the landlord in return for capital's access to the land for mining or farming".

According to Cockburn (1902: 273-4), the main consideration taken into account when setting the royalty rates were as follows:

a) the geographical position of the mine, "very important because in seasons of depression, the mine best situated geographically gains the trade";
b) conditions for getting the coal: was the mine deep?, did it contain faults or a bad roof?;
c) the facilities for getting coal to market: was the mine well positioned in relation to the railways and ports?;
d) the number and thickness of the seams, and the quality of the mineral;

e) the state of the trade at the date the lease and, therefore, the royalties were negotiated.

Not only did the royalty rates vary significantly, but there were also different ways of applying the rates. There were four main methods of applying the royalty (Cockburn, 1902: 280):

i) according to acreage: x d per acre for the area of the mineral worked;

ii) according to footage: x d per foot in thickness and per acre worked;

iii) according to tonnage: x d per ton of coal got;

iv) according to a sliding scale which varied "according to the price of minerals gotten, and being the saleable value, or the price or value appearing in any trade or market".

Regardless of the method chosen, the main aim of the royalty was to protect the landlord from rapid exhaustion of his asset (Sorley, 1889: 7), and especially with regard to the first two methods, to protect him from wasteful methods of working, which would deprive him of legitimate royalties (Dron, 1928: 20).

The method used, to some extent, depended on the region. Mitchell (1984: 252) observes that "in most of the inland coal fields, it became common early in the nineteenth century to lease mineral land by the acre and thickness of seams". However, in areas such as South Yorkshire, where the seams were fairly uniform and the longwall system was in use, "simple acreage ...which made intermittent measurement easy and reliable... was the normal unit" (see Table 5.1). This contrasted with regions where the pillar and stall method was used, or where faults were common; here, a fixed rate per ton of coal was more common, probably because, by leaving the pillars unworked, establishing the area actually worked was more complex.

Table 5.1: British Mining Royalties for Coal

District	Acreage rent	Footage rent per foot thick per acre	Tonnage rent-average pence per ton	Sliding scale fraction of selling price	Rates of royalty per ton-pence		
					max	min	av
Northumberland			4	Average about 1/12th of av.annual selling price at pit	10	2.5	4
Durham			5	" " " "	10	2.5	5
Cumberland & Westmorland			6	Some cases 1/7th to 1/12th nett sales	8	3	6
South Lancashire & Cheshire		£40 to £150 (av.£72) per foot thick per Cheshire acre of 10,240 sq. yds	very few tonnage rents	Sliding scale not customary			6
South Yorkshire	Thick coal £120 to £400 (av.£275) per acre	Silkstone seam £20 to £60 (av. £30)		Sliding scale not customary			6
West Yorkshire	£50 to £300			" " " "			6
Derbyshire, Notts & Leicestershire	£30 to £200 (av.£80)				6	4	4.75
N.Staffs & Cannock Chase	" " "	£20 to £40		Few cases 1/12th to 1/16th			5.5
S Staffs, Worcestershire & Warwickshire	Thick mine at SW of Staffs £400 to £500 per acre	£10- to£40 (av £27.5)	6	Sliding scales not usual now	8	3	6
Shropshire							6
Somersetshire			Mixed coal 9	Av. 1/10th of selling price	9	5	6
Gloucestershire, Bristol Field & Forest of Dean							6
Monmouthshire & S Wales			Steam coal, large 6, small 3, house coal 7.	1/10th to 1/12th of selling price at pit, with min of 6d per ton	9	4	
North Wales		£15 to £35 (av £.22.5)	4	1/12th to 1/20th	10		4

(Source: The Mining Royalties Report I., 203, 218 (P. P., C.6195, 1890); V.5 (P.P., C.6980, 1893). Cited in Cockburn (1902: 274))

In other areas, especially Scotland, Cumberland and Lancashire, a system prevailed which related the royalty to the value of sales achieved. Dron (1928: 22) believes that royalties were much easier to calculate if based on sales values. This view was reiterated by A Hewlett of the Wigan Coal & Iron Company during the inquiry undertaken for the Toynbee Trustees in 1889 (cited by Sorley, 1889: 34). Hewlett believed that such a system was to the benefit of the landlord and the lessee; for the lessee, as prices fell so did the royalties payable, and for the landlord "the gross royalty yield of a mine will be found to be much greater than it is under the present system of fixed royalties".

Mitchell (1984: 253) states that such agreements were popular in the early to mid-1870s when landlords wanted to take advantage of the high prices being commanded by coal, but that they fell out of fashion for a variety of reasons, including the difficulty of ascertaining average prices when there was "a multiplicity of markets", and the reluctance of the coalowners to allow the landlords access to their records and results. As a result no one system ever prevailed, and lessors and lessees continued to use various combinations of the systems available.

In Denbighshire the method of royalty calculation was not 'uniform' and a mix of lease terms is evident. Mitchell's comment (1984: 253) re. the popularity of royalties based on sales being predominantly in the latter half of the nineteenth century does not appear to apply. Even in the eighteenth century collieries in Denbighshire were paying royalties as a proportion of the coal raised, for example, leases agreed with Sir Watkin Williams Wynne of Wynnstay Hall in 1772 required royalties of "1/6 part of all coal" to be paid (DD/WY/5178-9). In Denbighshire landlords do not appear to have been 'consistent' in their preferred method of royalty calculation and offered a mix of per acre and per ton royalties to different tenants. This is illustrated by the Plas Power Estate; the royalties charged to the Brynkinallt colliery from 1906-1911 were calculated on a per foot per acre basis, but those charged to the Plas Power and Gatewen collieries in the same period, were calculated as a proportion of coal sales. An illustration of a royalty per ton calculation can be found in Table 5.7 below (p.151).

Wayleaves

The final method of paying for the use of land was via wayleaves; it often happened that, in order to access the seam being worked, or in order to remove the coal from the face and move it to market, the land of more than one landlord might have to be traversed, either underground, or on the surface. According to Dron (1928: 17), there was an inherent conflict between the landlord and the tenant; the latter wanted the freedom to work coal from any of his leases as and when he wished, while the landlord wanted to ensure that as much of his land was worked as opposed to those of his co-lessors. As a compromise to this conflict, a wayleave, or fee of, for example, 1d per ton was paid for minerals from adjacent lands which were carried over or below the ground owned by the various lessors. Table 5.2 illustrates the different wayleave rates a landlord, R Middleton-Biddulph, of Chirk Castle, charged the Brynkinallt colliery for the different minerals or products that were carried by rail or tram over his land.

Table 5.2: Wayleaves agreed by Brynkinallt Colliery with R Myddleton-Biddulph, Chirk Castle, 23 June 1875, for tramways crossing the latter's land

Mineral	Rate
per ton of coal	3d
per ton of slack	1.5d
per ton of ironstone	3d
per ton of clay	2d
per 1000 bricks	6d

Source: DD/DM 473/1

Impact of royalties on colliery companies

From the evidence available in Denbighshire, it would appear that the relationship between lessor and lessee was often a difficult one. Despite the fact that leases often took an interminable amount of time to be negotiated and agreed, disputes often arose before the ink had had time to dry. The arguments usually centred on the rate of royalty and the perception, from the point of view of

the coalowners, that the landlords were exploiting the relationship. The biggest problem was that if the leases were agreed during the 'good times', lessees were more than willing to agree to royalty rates which, when trade and, therefore, prices dipped, they soon found it impossible to pay (Sorley, 1889: 32). This issue is illustrated in the evidence given by Sir Lothian Bell to the '[Royal] Commission on the Depression of Trade' (cited by Sorley, 1889: 13), when he said that "it is contended that should the present [1889] low prices continue, those engaged in mining in this country must be reduced to bankruptcy, and a great industry must be extinguished, unless the receivers of royalties are willing to abate something of their legal right".

This may be something of an over-dramatisation, but it does illustrate how significant an impact coalowners felt royalties had on their results. This perception was not borne out by the commission, which demonstrated "that royalties formed a comparatively unimportant fraction of the total cost of the coal industry in the nineteenth century" (Mitchell, 1984: 256). However, despite the fact that "unambiguously ...over the long term, archival evidence suggests that the burden of rents and royalties was downwards (from the mid 1870s to 1913)" (Church, 1986: 506), the coalowners persisted with their view that "royalty owners took an increasing proportion of the value added by the industry" (Mitchell, 1984: 255), which contributed to feelings of great resentment and meant that disagreements over royalties often became very heated and protracted affairs. indeed it was the furore created by coalowners over the issue of royalties in the coal industry and whether or not they were fair, that led to the Royal Commission on Mining Royalties being set up in 1890. The Commission's remit was to investigate "the extent to which the separation of the ownership of land and its minerals from the ownership of the working capital of the mines impeded the progess of the industry, and in particular whether high coal royalties disadvantages the industry" (Fine, 1990: 36). One of the issues discussed was whether lessees tended to be naïve when they agreed to the terms of a lease; James Barnes, of Nantyglo, south Wales, when asked why he agreed to certain terms if he disliked them, replied that "colliery people agree to many things that

afterwards they find they should not have done" (BL/B/S/18). James Haslam, of the Miners' Federation of Derbyshire, when asked about the leases that were agreed in the "high times of 1872" explained that "it is a well known fact that the royalties entered into at that time...when everybody who had a bit of money was rushing for coal, were up to an abnormal price, and a good many people have had to go to the wall as a consequence" (BL/B/S/18).

Another issue discussed was whether royalties had a disproportionate impact on profits, given that they were a relatively fixed element of cost. Evidence was taken from a number of trades union representatives who, perhaps unusually, sided with the coalowners in their condemnation of lessors. The trades unions, however, were concerned with the welfare of their members and the wages paid, unlike the owners who were concerned with their 'bottom line'. The unions, perhaps naïvely, felt that if the royalties were lower, the owners would use the savings to pay increased wages. It was felt by Edward Cavesey, President of the Yorkshire Miners' Association, that because royalty reductions took so long, when owners felt the need to cut costs they immediately looked to cut wages first, as these were seen as the most negotiable cost (BL/B/S/18). James Haslam agreed with this view; he asserted that "any cost imposed upon the production of any commodity is a hindrance to it, and we look upon these royalties as being very largely a cause of rivalry between the workmen and the royalty owners as to which shall have, or which shall not have a certain part of the profits" (BL/B/S/18). Haslam added that "we believe fairly that if the colliery owner was not very often heavily handicapped with royalties.....the miner would do better under his employer, and that the employer very often would be getting a little profit where he does not get any now" (BL/B/S/18).

Whether reduced royalties ever induced coalowners to increase wage rates, or avoid reducing them, is a matter of conjecture but, protracted disputes with lessors in difficult trading conditions, when owners were looking to squeeze costs, did make wage cuts more likely. It would thus appear that although royalties appear insignificant in absolute terms, when looking at their impact on the profit margins of coal companies, a small increase of perhaps half a pence

per ton could mean the difference between the company recording a profit or a loss per ton. During the Royal Commission on Mining Royalties, 1890, evidence was presented that illustrated the significant differences in royalties charged by lessors in the different regions. Table 5.3 shows that royalties per ton varied from a low of 3d per ton in the Forest of Dean, to a high of 9d in Scotland. Given the differing conditions that prevailed in the various coal mining regions of the UK, it is difficult to make comparisons of the royalties per ton in absolute terms; the Royal Commission therefore received evidence showing average royalties as a percentage of the average selling price within a region (see Table 5.3). This again shows some wide variations, but it can be seen that whichever method is used, Scotland suffered the highest royalties. Fine (1990: 57-9) believes that this has much to do with the concentration of ownership in Scotland. Much of the land involved in mining was owned by relatively few landlords which meant that there was less 'competition' with other lessors; in other regions where concentration of ownership was less prevalent, if one coal company mined land owned by more than one lessor, and received a concession from one lessor, the other lessors might be expected to follow suit. This was less likely to happen in Scotland, because "the landowner was in a powerful position to extract a monopoly-type rent" (Fine, 1990: 59).

The Royal Commission did not give a figure for the royalty of Denbighshire and Flintshire as a proportion of the selling price, but an indication of this can be gained if the average price per ton per annum, as provided by FA Gibson (1922: 157) is used. For 1890 the average selling price was 8/3d which means that the average royalty as a proportion of average selling price was 4 per cent and only the Forest of Dean had a lower figure than Denbighshire (see Table 5.3). The average royalty figure for Denbighshire and Flintshire has, however, been calculated from the averaging of aggregated figures for two coalfields, each with collieries of various sizes, paying royalties at different rates to different landlords, and calculated by different methods. It is likely, therefore, to mask some fairly significant differences. These differences are illustrated by figures extracted from the records of the Broughton & Plas Power Coal Co. Ltd. and the Wrexham &

Acton Collieries Co.Ltd. which reveal that although the average royalties paid by Broughton & Plas Power Coal Co.Ltd. between 1911 and 1914 were not much higher than the average, either in absolute or percentage terms (see Table 5.4), those for Wrexham & Acton Collieries Co. Ltd., for 1883, were up to 50 per cent higher in absolute terms, and were significantly higher in percentage terms (see Table 5.5). It must be pointed out that these two sets of figures, however, relate to periods which are thirty years apart and these thirty years saw royalties fall in many of the inland coalfields (Mitchell, 1984: 261), such as Denbighshire.

Table 5.3: Average royalties per ton in the coal mining regions of the UK

Region	Royalty per ton- d	Royalty as % of selling price
Northumberland	4 - 4½	6.18
Durham	5	8.09
Cumberland	6 - 7	8.67
South & west Yorkshire	6	8
Lancashire and Cheshire	6 - 6½	7.14 – 8
Nottinghamshire, Derbyshire and Leicestershire	4¾ - 5	5.37 – 5.95
North Staffordshire	5½	7.06
Shropshire	6	7.14
Cannock Chase	5½ - 6	-
Warwickshire, south Staffordshire and Worcestershire	6	7.08- 7.8
Forest of Dean	3	2.83
Bristol	6	5.66
Somerset	6	5.66
Denbighshire & Flintshire	4	-
South Wales & Monmouthshire	6	6.06 – 7.4
Fifeshire & Clackmannshire, and east and mid Lothian	6 - 7	10.83
Central Scotland, Ayrshire, Argyll and Dumfries	7 - 9	9.09 - 10.48

(Sources: Royal Commission on Mining Royalties, 1890 (cited by Mitchell, 1986: 261), and Royal Commission on Mining Royalties, 1890, Appendix V (BL/ BS/18)).

Table 5.4: Broughton & Plas Power Coal Co. Ltd., revenue, cost and profit per ton 1911-1914

6 months to	Dec. 1911	June 1912	Dec 1912	Dec. 1913	June 1914
Average sales value per ton (including wagon earnings) (s./d.)	8/4.34	9/0.26	9/2.28	10/8.25	10/9.00
Wagon earnings per ton (d.)	4.14	3.80	3.83	4.49	3.49
Total cost per ton (s./d.)	8/2.70	8/10.6	9/0.46	10/3.45	10/6.65
Profit per ton (d.)	1.64	1.64	1.82	4.80	2.34
Profit as a percentage of average seling price	*1.6*	*1.5*	*1.6*	*3.7*	*1.8*
Royalty per ton of coal sold (d.)	4.38	5.05	4.68	4.84	5.24
Royalty as percentage of total cost	*4.4*	*4.7*	*4.3*	*3.9*	*4.1*
Royalty as percentage of selling price	*4.4*	*4.7*	*4.2*	*3.8*	*4.1*

Notes:
i) Items in itallics have been calculated by the author
ii) No information available for the 6 month period to 30 June 1913

(Sources: 1911-1912, D/BC/2289; 1913-1914, DD/PP/620).

One of the main reasons why the average figure for Denbighshire and Flintshire might mask significant differences relates to the preponderance of small collieries in the coalfields, especially Flintshire. In 1894, the first year for which such information is available, in Denbighshire, 54 per cent of the collieries employed fewer than 250 persons (see Chapter 2 above) while, in Flintshire, the proportion was 84 per cent (*List of Mines*). This would have obviously skewed the average in favour of the smaller collieries which were likely to have lower royalty rates than the larger companies, for a number of reasons. In particular, smaller collieries were likely to pay lower royalties because they were usually older, which meant that the better quality coal had been worked out. Additionally, their leases may have been negotiated earlier, possibly before the boom of 1872 which caused royalty rates to increase significantly (Mitchell, 1984: 254). Moreover, the older collieries were likely to have poorer facilities for getting coal and had probably been sunk before the rail infrastructure was in place, which made transporting coal that much more difficult. All these generic problems affected the royalty rates paid by a colliery, but ultimately the rate finally determined was down to the negotiation skills of the lessor and lessee, or their agents.

Fine (1990: 65) asserts that "the significance of royalties cannot be measured by their absolute or relative size in revenue terms", rather it is necessary to look at their marginal impact on profits in order to assess whether the coalowners' complaints about royalties were justified. Before looking at the detailed figures (Tables 5.4 & 5.5) relating to profits and losses per ton for collieries in Denbighshire, it is first necessary to issue two caveats; not only is the scope of the information used very limited, in that it relates to only two coal companies in Denbighshire, but also this information is as provided by the coal companies themselves and, as will be discussed more fully in Chapter 8, such figures were often open to manipulation. However, this having been said, the figures will illustrate the point being made, and also, given that the figures are a contemporaneous record used for management purposes, they might be deemed more reliable than figures that were produced for external reporting purposes.

Table 5.5: Extracts from monthly cost sheets, Wrexham and Acton Collieries Co. Ltd, January to July 1883.

1883	Jan	Feb	Mar	Apr	May	June	July
Average Selling price per ton (s./d.)	5/4.25	5/5.10	5/3.87	5/4.25	5/4.20	5/4.0	5/1.12
Cost per ton (s./d.)	4/11.8	5/4.78	5/4.78	5/6.37	5/6.24	5/8.8	5/6.12
Profit/(loss) per ton (d.)	*4.45*	*0.32*	*(0.91)*	*(1.12)*	*(2.04)*	*(4.8)*	*(5.0)*
Profit as percentage of sales value	*6.9*	*0.5*	*(1.4)*	*(1.7)*	*(3.2)*	*(7.5)*	*(8.2)*
Royalty per ton (d.)	5.47	5.60	4.50	4.54	5.46	4.9	6.06
Royalty as percentage of total cost	*9.1*	*8.6*	*6.9*	*6.8*	*8.2*	*7.1*	*9.1*
Royalty as percentage of selling price	*8.5*	*8.6*	*7*	*7*	*8.5*	*7.6*	*9.4*

Notes:
i) Items in itallics have been calculated by the author

(Source: NLW/HR/76)

Table 5.4 shows how small the margins being earned by the Broughton & Plas Power Coal Co. Ltd. were in the period immediately prior to World War I, and if wagon earnings are excluded from the figures, a profit would only be recorded in one of the five 6-monthly periods for which figures exist, namely that for the period to December 1913. The impact of an increase in royalties on profit margins can be seen if we look at the 6 month period to 31 December 1911; if the royalty had increased by 0.5d per ton from 4.38d to 4.88d per ton, an increase of just under 12 per cent, the profit would have fallen from 1.64d to 1.14d i.e. a reduction of 30 per cent. Such a change would clearly have had a serious impact on the results of any company. Thus, relatively small changes in royalty rates could significantly impact upon a coal company.

Also available are some monthly cost figures for the Wrexham & Acton Collieries Co. Ltd. from a much earlier period, 1883 (see Table 5.5). These again show how difficult it was for colliery companies to achieve profits, although it must be borne in mind that the 1880s was a period of depression for the coal trade. If the figures in Tables 5.4 and 5.5 are taken to be representative of royalties throughout Denbighshire, it can be seen that, as a proportion of total cost, royalties were less significant in the years prior to World War I than they were in the 1880s, a fall which Mitchell (1984: 261) maintains echoed a general trend towards lower royalties in many inland coalfields.

It can also be seen, from Tables 5.4 and 5.5, that the average royalty per ton, and the proportion of royalty per ton to average selling price per ton, for both Broughton & Plas Power Coal Co. Ltd. and Wrexham & Acton Collieries Co. Ltd. (although the figures are not for the same years as those provided by the Commission), lie within the parameters given for average royalties in the UK, issued by the Royal Commission in 1890. Although the proportion of royalty to price for Broughton & Plas Power Coal Co. Ltd. is on the low side, this may be because the figures for this company relate to 1912 and, as has been explained, royalties had a tendency to fall in many areas after the 1890s (Mitchell, 1984: 261). However, the fact remains that, despite assertions by authors such as Mitchell (1984: 262) and Church (1986) that royalties were a comparatively

insignificant element of cost, colliery owners did not believe that this was the case, and they continued, from time to time, to rail against the terms imposed by mineral leases.

The relationship between coal companies and coalowners in Denbighshire

The two issues which caused most disputes were the desire of lessees to obtain reduced royalty payments when trade conditions worsened, and the desire of the lessors to ensure that the mines on their lands were being worked efficiently. These problems, and many of the other issues discussed above, can be clearly illustrated by looking at the correspondence that survives for a number of collieries located on the Denbighshire coalfield. Such disputes were common throughout the UK and, as such, Denbighshire will be used as an example to highlight the main issues being disputed.

The major mineral owners in the Denbighshire coalfield were the Williams-Wynns of Wynnstay Hall, the Myddletons of Chirk Castle, the Fitzhughs of Plas Power Hall, the Yorkes of Erddig Hall, the Merediths of Pentrebychan Hall and the Duke of Westminster of Eaton Hall. These families did not get directly involved in investing in the coal industry; they conformed with the behaviour of the majority of landowners who "prefer[red] the role of royalty recipients to that of entrepreneurs" (Church, 1986: 122). This meant that they were able to benefit from the success of mining enterprises, but did not become involved in the highly risky business of sinking mines and getting coal.

Most of the coal companies in Denbighshire mined land that was owned by a number of landowners; an illustration of the numbers that could be involved can be seen in Table 5.6 which lists the leases held, in 1912, by the Broughton & Plas Power Coal Co. Ltd., one of the largest colliery companies on the coalfield. Table 5.6 shows that land was leased not only in very large parcels, but also in parcels as small as two acres, a factor which made royalty negotiations with lessors all the more difficult. Another factor which made negotiations difficult was the fact that, as already discussed above, different

lessors leased their land under different terms, while some landlords could apply different methods to different tenants.

Table 5.6: Leaseholds held by the Broughton & Plas Power Coal Co. Ltd. - 1912

DATE	Lessor	Land in	Acres leased	Term-years
1880	P Fletcher & R Curries	Coed Eva Farm, Broughton	45	30
1889	T Fitzhugh	Bersham & Broughton	897	42
1892	S.K Mainwaring	Croes Newydd	32	21
1901	G Fitzhugh	Broughton	19	30
1902	W.R Mainwaring	Bryn Offa	?	12
1906	P Meredith	The Court,Wrexham	73	21
1906	Misses Nickson	Vron & Brymbo	?	25.5
1907	Miss Smith et al	Hafod	?	21
1907	Duke of Westminster	Talwrn	?	21
1907	Trustees B.Piercey	Wrexham	20	21
1908	Bishop of Minevia	Plas Maelor	2	21
1908	T Hayes et al	Gatewen	196	60
1910	C Jackson	Felin Puleston	19	21
1910	P Yorke	Erddig	381	42
1911	T James & P Brown	Talwrn	4	21
1911	F Mostyn	Adwyr Clawdd	6	21

(Source: D/BC/2289)

To illustrate the main issues that caused problems between coal companies and their lessors, we examine below in greater detail, certain individual colliery companies and the disputes that they had with their lessors.

Vron

The Vron colliery was run by Messrs Maurice and Low from 1850 to 1882. One important lessor was Colonel Meredith of Pentrebychan Hall who had continuous problems with the colliery. As early as 1866, in a letter dated 17 October to Mr Bury (Meredith's solicitor), Henry Dennis, the royalty agent for Pentrebychan Hall, remarked that "the Vron royalties are a farce this half year... Low is a beautiful promiser but a damn bad performer" (DD/DM/285/102). It appears that one of the reasons for the poor royalties was the fact that the lessees were working

adjoining lands "the coal from which is not chargeable with wayleaves" (DD/DM/285/102, 17 October 1866), to the detriment of the Colonel's royalties. The surveyors, Dennis and Glennie, in a letter dated 26 April 1867, wanted to enforce the clause that said that the lessees "shall at all times during the term ....continue to work and carry on the said mines in a proper uninterrupted, skillful and workmanlike manner" (DD/DM/285/102). They had urged the lessees to work the seams (some of which had not been worked for over twelve months), but they had made "lots of promises but no action". The lessees "allege the badness of the times as an excuse for not having done more" and "as might be expected we have received promises of further progress during the winter, but we cannot but fear that there would have been nothing done during the last half year but for the letter you wrote to them, and we think it would be well that you should remind them again" (DD/DM/285/102, 12 October 1867).

Their entreaties did not have much effect, and the same problem continued for many more years; by 1874 "the [royalty] amount remain[s] very small and there is little chance of any improvement at present" (DD/DM/285/102, 28 March 1874), due mainly to the difficulties of working the pit. These difficulties persisted until, in 1878, the working of the colliery was suspended for four months "owing to the depression in the coal trade"; this depression and the consequent poor performance meant that the colliery had been paying only dead rent to the Colonel for several years.

Colonel Meredith was not alone in his dispute with Vron. The Duke of Westminster was also a significant lessor, and surviving correspondence outlines that Messrs Maurice & Low were also disputing the royalty rates charged by the Westminster Estate. In 1880/81 the company was asking the Westminster Estate for a reduction in royalties because, as Mr Low explained to Isaac Shone, a mining engineer and partner in Shone & Ault, a mining engineering consultancy, in a letter dated 4 May 1881, there were "disadvantages under which we labour as compared with neighbouring and competing collieries" (D/GR/681). He continues, "as you are no doubt aware, the circumstances of the coal trade have completely changed and competition has become so keen that a difference of 1d

per ton will gain or lose orders and prices are so fine 1d per ton either way makes profit or loss. It is therefore evident that no colliery can be carried on for any length of time unless it is on an equality with competing collieries". He felt that "we are not on an equality with our competitors, our royalty is 1/4th higher .....and unless we are relieved by our lessors, we must succumb and stop working" (D/GR/681).

Shone's advice to the Duke's agent, George Hughes, was to "strongly urge upon you ... not to go on with a proportional rate of sales, but rather alter the manner of arriving at the royalties. You might charge so much per acre or so much per statute acre for the full thickness of the mine. These royalties, I consider would be even easier to the lessee than the reduced proportion....suggested" (D/GR/681). This change was not adopted, but the Duke agreed to reduce the royalty from 1/9th to 1/12th of sales value from May 1881. This was after further advice from Mr Shone who, in a letter dated 6 May 1881, pointed out that the great changes that had taken place in the coal trade in recent years, made it "not only difficult but impossible, except in exceptionally favourable situations for colliery proprietors to carry on their collieries to a profit" (D/GR/681). He acknowledged that the shift from local to 'foreign' (non-local) markets meant that Vron, due to its less favourable geographical position, was finding the royalty "a formidable item of cost", and that it should be reduced as requested (D/GR/681). By 1882 the company was in liquidation, and a resolution was proposed "that to enable the liquidator to keep open and carry on the colliery during negotiations for its disposal as a going concern, the lessors will reduce dead rents, royalties and wayleaves, one half from the 25th day of March last. This reduction to terminate, if the colliery be meantime sold, or if and when the average price of coal at the pit reaches 8/- per ton" (D/GR/682).

By 1884, a new company had been created by F Butler, who negotiated a new 21 year lease. He wanted to move away from the proportion of sales royalty to the footage royalty due to the number of lessors involved. As his solicitor explained in a letter to George Hughes, dated 20 January 1885, "the number of properties that will be worked...will render the keeping of the coals raised from

the different estates separate to meet the proportional royalty covenants almost an impossibility" (D/GR/682). The estate, however, would not agree unless **all** the other lessors concurred and, as this was not forthcoming, the 1/12th royalty continued.

A dispute soon developed and, by April 1886, the lessee was asking for a reduction in the royalty rate; in a letter to Hughes, dated 21 April, Butler explained that "there has been a very considerable fall in prices of shipping coal at Birkenhead and I fear that if you cannot meet us in the matter of royalties we shall be compelled to discontinue working one or both of the above seams [Brassey and Two yard]" (D/GR/681). Hughes replied on the 2 May 1886, expressing his disappointment at Butler's dissatisfaction, given that "a good deal of trouble has been taken by the different lessors and their agents to arrive at a reasonable and fair charge" (D/GR/682). He further explained that he was unable to act unilaterally; Butler would have to gain the agreement of all the other lessors (D/GR/681).

An additional dispute arose when the company was looking at taking over the Talwrn colliery; it wanted to alter a clause so that the collieries could be worked as one single concern. Hughes would not agree to this because it would mean that the coal owned by the Duke was not being worked to the Estate's advantage. If the company wanted the Talwrn lease it "must be worked independently of any adjacent collieries in the holding of the lessees and not in connection with any other collieries, also that the Talwrn colliery must be fairly and continuously worked" (D/GR/681). An agreement was eventually reached (the terms of which are not available), and the takeover went ahead.

By 1895, of the original shareholders of the Vron Colliery Ltd., only Butler was alive and the executors of the deceased shareholders wanted the company to be released from its leases due to its extremely poor performance. One of the shareholders, Mr FC Hyde, died in 1892 and his solicitor, in a letter dated 28 June 1892, explained to the Duke's solicitors that "we are sorry to say that the last half year has been more disastrous than ever. There is a temporary improvement in prices just beginning but we have lost very heavily since we saw

you nine months ago, and should only be too glad to be relieved of all our leases, but fear there is no likelyhood [sic] of Mr Fitzhugh doing this with regard to his lease" (D/GR/682). By 1895 "the colliery itself barely pays expenses" (D/GR/682); it was badly in arrears of royalty and, in 1896, the shareholders' representatives made a formal case for a reduction in royalties via a Memorandum, because "they have practically lost the whole of their capital [and] the share and debenture holders have received neither dividend nor interest for several years...The lessees have done all they believe possible in carrying out the terms of the leases and have expended large sums with the object of working as economically as possible, but owing to the extended nature of the old colliery, which they have done all they can to consolidate; to the distance the workable coal is from the shaft, to the extremely faulty nature of the ground necessitating an unusual expenditure in drivings and other dead work; to the excessive consumption of fuel consequent on the mine being so heavily watered, and to the geographical position of the colliery resulting in higher railway rates in several instances than are paid by other collieries in the district, the concern is unfortunately carried on at a loss" (D/GR/682). The lessees continued to struggle under the terms of the lease from which they were unable to extricate themselves but, by 1900 the company had failed, mainly due to the continuing problems with water, and the colliery was purchased by the Broughton & Plas Power Colliery Co. Ltd., principally as a shaft and a pumping station.

Broughton & Plas Power Coal Co. Ltd.

The Broughton & Plas Power Coal Co. Ltd was created in 1881 by the amalgamation of two partnerships: The Old Broughton Company, and the Plas Power Coal Company. It had two collieries, one at Plas Power and one at Gatewen (D/DM/309/2). The amount of land held freehold by the company was minimal (according to a mortgage deed of 1912, approximately 76 acres (D/BC/2289)), and it relied heavily on leasing land for mining purposes. The principal lessor for the Plas Power and Gatewen collieries was the Plas Power Estate owned by the Fitzhugh family; of 1120 acres available to the Plas Power

colliery, 98 per cent was leased from Plas Power, and of the 809 acres available to Gatewen, the proportion was 54 per cent (D/BC/2289).

The leasehold arrangements with the Plas Power Estate had been entered into by the original partnerships, which preceded incorporation, but were later assigned to the company. These gave the mineral owner a fixed percentage royalty based on the sales value of the coal raised. The royalties were calculated on a 6 monthly basis in March and September until 1897 and, June and December thereafter. The sales value was reduced for royalty purposes by an allowance of 2d per ton of coal and 1d per ton of slack raised; the value of the coal supplied to the Estate was also excluded, as was a fixed amount of £21.7.6d (per half year) for the maintenance of 'pit supports'. Once the royalty had been calculated, any tax due on it was deducted; a wayleave of 1d per ton was added and the final balance was then payable in full (see Table 5.7 for an illustration of such a calculation).

Table 5.7: Illustration of royalty calculation by Broughton & Plas Power Co. Ltd. for Plas Power Estate, 1894

	Coal tons cwt	Slack tons cwt	Sales £.s. d	Royalty 1/15 £.s.d
Brassey	30361.50	679.19	11199.09.20	
less allowance				
coal 2d per ton			(253.00.20)	
slack 1d per ton			2.16.80)	
			10943.12.40	729.11.6
Main	34187.13	765.15	12610.17.11	
less supplied to Fitzhugh	(43.10)		(14.07.00)	
			12596.10.11	
less allowance				
coal 2d			(284.10.10)	
slack 1d			(3.03. 10)	
			12308.16.30	820.11.9
				1550.03.3
less allowance- pit supports a.r.p 2.3.16 @£15 per acre p.a				(21.07.6)
Add any wayleave				-
Total due				1528.15.9

(Source: DD/PP/614 Royalties, payable for 6 months to 31.3.1894).

Relations with the Plas Power Estate were generally good; the only time tensions appeared was when the company faced financial difficulties, either due to prolonged strikes or to a general downturn in the industry. When such an event occurred the company negotiated for reductions in royalties; for example, in 1893 a prolonged strike from 29 July to 17 November badly affected the performance of the company, and so the "directors deemed it reasonable to ask the royalty owners to pay a share of the very heavy loss we incurred" (D/DM/309/4). The cost of the strike was estimated at £1,900, of which £1,000 was 'allowed' by Mr Fitzhugh on 29 May 1894 as a deduction from the amount of royalty due (D/DM/309/5). However, the company continued to chafe against what it considered very high royalties of 1/15; on 5 April 1899 a meeting was held with representatives of the Plas Power Estate in an attempt to gain concessions due to "the unprofitableness of the trade in general since the company began to work and upon the disadvantages attaching to our trade in particular arising from the position of the pits insisted upon by the lessor [no details available as to what conditions were]...[and because the royalties paid]....by our neighbours [for example Bersham and Westminster] are much less than those we pay" (D/DM/309/5, 26 April 1899).

Concessions were finally gained at the end of 1902: not only did the lessor agree to a reduction of the royalty from 1/15th to 1/18th, but he also agreed to deduct a 10% 'allowance' from the total royalty, covering the half years from December 1903 to December 1906. Continued pressure from the lessees persuaded the Plas Power Estate to alter its policy from a 'blanket' royalty rate, to separate rates for various coal qualities; from the half year to December 1905 the royalty on Powell, Crank and Two Yard coal was calculated at 1/30th, while that on Main and Brassey coal remained at 1/18th, reflecting the poorer quality and hence lower value, of the former coals compared to the latter.

At the end of 1912 the company applied for further allowances from the Plas Power Estate, citing poor performance, legislation and the national strike as mitigating factors (DD/PP/618). The company estimated that the national strike had cost it £3,756 (D/DM/309/7, 24 April 1912) and since the introduction of the

minimum wage meant that wages could not be squeezed, it turned its attention to its royalty rates. While the directors did "not forget that Mr Fitzhugh has been content to accept much less than the royalty originally stipulated in the lease, recognizing the great change in the conditions of trade since 1881; ...they [did not] think that he...[could] be aware of how great that change has been". To illustrate the extent of this change the directors pointed out that a royalty of 1/18th in the years 1909-10-11 yielded 6 per cent more than in 1904-05-06, and that the increased legislation recently imposed upon them had increased the selling price, "although not to the extent ....it has increased the cost. This legislation [especially the Eight Hours Act] has therefore told in favour of the royalty owner under a sliding scale, by increasing the price" (DD/PP/618, 18 July 1912). The directors further added that "the effects of the Minimum Wage Act and the [National] Insurance Act whilst increasing the cost very largely will no doubt lead to some further increase in the selling price of coal, and this again will raise the royalties to a still higher figure to the advantage of the lessor, but judging from our past experience, without any corresponding benefit to the lessees" (DD/PP/618, 18 July 1912). The mineral agent employed by Mr Fitzhugh, Mr E Lloyd Jones, was given the task of considering the Broughton & Plas Power Coal Co. Ltd. application. In his opinion, "I cannot recommend a larger allowance towards the strike cost than £150 in all" (DD/PP/618, 23 January 1913).

The company continued in its efforts and, in August 1913, asked the Plas Power Estate's solicitor if it could "let the payment of the royalty accounts stand over for a while as we are for the time being very short of cash" (DD/PP/618, 25 August 1913). In a meeting in November the Plas Power Estate countered by saying that "Mr Fitzhugh was under the impression that prices of coal were high and coalowners were doing well [and that]....no other lessee had made an application for an allowance" (D/DM/309/7, 29 November 1913). In its defence the company cited the fact that water was badly affecting the Gatewen colliery and that there was a "falling off in the supply of coal from the best seams which could only be made up by coal from inferior seams at a higher cost [which] was a disadvantage constantly increasing" (D/DM/309/7, 29 November 1913).

Negotiations continued throughout 1914 and finally, in a report on the issue, Mr E Lloyd Jones conceded that "there is no doubt from the figures in the Balance Sheets that the company have (sic) done badly during that half year [31.12.1914]". He cited as reasons the reduction in good coal which increased the cost of getting, the increase in water, the increase of general costs and wages, and the system of contracts which often meant that costs were not covered by the selling price" (DD/PP/620, 3 July 1915). "The general result of the rise in wages and materials over the last 20 years and particularly of late years, has been to send up gradually the price [cost] of coal, whilst at the same time the profits of the coal proprietors have been more restricted than they used to be....The result of the foregoing circumstances alters the value of a proportional royalty rate, and I think that the time has come when the lessor might reconsider the royalty rate with a view to a fair adjustment between landlord and tenant" (DD/PP/620, 3 July 1915). The ultimate result of this report was to reduce, from the half year to December 1914, the royalty payable from 1/18th to 1/19th.

Westminster

The Westminster colliery was developed by the Brymbo Mineral & Railway Co. from the mid 1840s (Lerry, 1958: 47), and was one of the main ventures in which Robert Roy and Henry Robertson were involved. However, the relationship between the two broke down, and by 1855 they and their other partners, R Ellerton and WE & CE Darby, were proposing to split their interest in two; Roy and Ellerton to take on the Westminster pits, leaving Robertson and the Darbys with the Brymbo interests. To be able to do this they had to approach their main lessor, the Duke of Westminster, for approval. In a letter to the Duke's agent, George Hughes, dated 19 February 1856, the surveyor, William Lowe, remarks that "under the circumstances, I would advise you to allow Messrs Darby and Robertson to retire (although I should have preferred they had remained and the others retire) as the two parties can never now work amicably and energetically together again" (D/GR/686). He also strongly advised that the lessor 'keeps an

eye' on the 'new' tenants (Roy & Ellerton) to protect his interest, "the work will however require to be on the part of the Marquis, for some time strictly looked into and the parties greatly urged to open out the works better than has been done during the past six months, otherwise in a short time the royalty will be down to the minimum rental" (D/GR/686 - underlining in the original). In a later letter, he continues, "I have no hesitation in saying that [the work] only requires to be carried out with energy and spirit to become by far the most valuable and important colliery in the neighbourhood of Wrexham" (D/GR/687).

However, a dispute began over the terms of the lease, with the newly incorporated Westminster, Brymbo Coal & Coke Co. Ltd. questioning the method used by the Estate's surveyor to calculate the royalty payable. The essence of the initial dispute was the treatment of pillars; until 1855, no royalty was levied on the pillars that the company left standing during the working of the pits but, from that date, the surveyor, Isaac Shone, deemed that as it was the company's choice not to work the pillars, they could be accused of not working the pits properly, as coal which should by rights have been worked, was not. This view was reiterated by AH Maurice, surveyor, in a report to Mr Meredith of Pentrebychan Hall, in 1868, over a similar dispute. "In ordinary cases all pillars are to be worked or paid for whether worked or not unless there is some good reason for leaving them, such as the support of buildings on the surface....Oftentimes they become difficult or expensive to work owing to the pressure of the roof or other causes, yet the lessee is in no way exempt from payment for royalty on this account" (DD/DM/285/88 - underlining in original).

Thus began an extremely long and acrimonious dispute which covered many issues including royalty rates: in a letter dated 18 September 1866, Robert Roy described the threat of court proceedings against the company as "the most injurious and offensive mode of proceeding". He continued that "the company did not abandon hopes of an amicable adjustment", but he felt that the Westminster Estate was guilty of "grievous overcharges and injustices" (D/GR/688). He explained that the company was "seriously aggrieved by the delay that has occurred - a delay not arising from the merits or difficulties of the questions at

issue which are very simple - but merely from casual obstacles upon your side, to adjusting the machinery for settling them". So bitter did the dispute become that the two sides could not even agree on the appointment of an 'arbitrator' (D/GR/688).

In order to strengthen its arguments, the company commissioned a number of reports; one, by Marcus Scott, "a mining surveyor of considerable experience", dated 3 April 1872, explains that "the Westminster collieries cannot bear higher rates than those above named (£20 per foot thick per acre for 2 yard and Brassey, and £25 for Main). The company will shortly have to meet a strong competition from the Broughton Hall colliery [and given that the company makes] a very small return for their capital [and is also suffering] the heavy expenses of litigation, the Westminster Estate would be advised to accept the lower royalties" (D/GR/689). The Estate, however, would not agree; in a letter to Henry Dennis, colliery manager, dated 17 August 1872, George Hughes explains that "the proposed reduction already agreed to from £35 to £30 per foot per acre is a very liberal one - more particularly considering the present very high price of coal" (D/GR/685). The dispute was eventually resolved in 1873, when a new lease was negotiated, unfortunately however, the terms of this lease are not available (D/GR/688).

Conclusion

The three royalty case studies examined in this chapter have served to outline many of the most contentious issues that the coal companies of Denbighshire faced. For the Broughton & Plas Power Coal Co. Ltd. the legislation that was introduced in 1908 (Eight Hours Act) and 1912 (Minimum Wage Act), coupled with general downturns in trade was behind its relatively regular requests for a revision of its royalty rates. The Westminster, Brymbo Coal & Coke Co.Ltd.'s protracted dispute with the Westminster Estate centred on its desire to change the royalty rates that had been agreed at the inception of the lease while the Vron colliery's difficulties stemmed from geological problems and its poor location. One

can assume that these companies were not unique in having problems with their lessors and that similar disputes happened throughout Denbighshire, as others have indicated was the case throughout the British coal industry.

It can be concluded that, far from being a straightforward business arrangement, the relationship between lessee and lessor was often a difficult one; many protracted disputes arose and in some cases resulted in litigation which ultimately was of little or no benefit to either party. Thus, mineral ownership was far from being a means of guaranteed, 'easy money' for the landowner. From the point of view of the coal companies it is difficult to conclude whether royalties were indeed as significant as the companies often claimed them to be or not. It is certainly true that, in absolute terms, royalties did not constitute a particularly significant element of costs but, it is equally true that changes in royalty rates could severely affect the profit margins of coal companies (see also Chapter 8). Leases entered into when the market was buoyant could soon become onerous if any of the hazards associated with mining, such as water, gas, or simply a downturn in the market, were encountered.

The Royal Commission on Mining Royalties of 1890 concluded that there was nothing unfair in the existing system and recommended maintaining the status quo (Mitchell, 1984: 255) and it is difficult, if not impossible, to conclude whether any particular region suffered disproportionately under the burden of royalties compared to other regions. The coalowners of Denbighshire would probably have asserted that they were at such a disadvantage, but if average royalties are scrutinised (see Table 5.3), it appears that Denbighshire, far from suffering from unduly high royalties in comparison with other regions, had, in 1890, one of the lowest average royalty rates at 4d per ton. This, however, is an average figure which would have been extracted from official statistics and, given the high proportion of 'small' coal companies (those employing fewer than 250 persons) in Denbighshire, and especially Flintshire (54 and 84 per cent respectively), the average undoubtedly reflects the lower royalties paid by the smaller companies.

It may have been concern over the impact that royalties had on their profit margins that made the coal companies grumble so much, or it may be that they simply resented having to pay what they considered a considerable amount to landlords who did little to 'earn' their return. Whatever their reason for disliking royalties so much, the limited evidence available allows us to conclude that, during the period under review, although individual companies may have suffered under the terms of their leases, the coal industry in Denbighshire, as a whole, does not appear to have been economically disadvantaged, as compared with companies operating in other coalfields, by the royalty system that prevailed at the time.

Having looked at the first of our other stakeholders, the mineral owners, we will now turn our attention to the employees of the coal companies, possibly, the most important stakeholders for, without their toil, no coal could be extracted and no profits made. The next chapter will therefore consider not only the relationship of the coal companies with their employees, but also the development of the trade unions in Britain, Wales and Denbighshire, because as the trade unions grew in strength they had a significant impact on the relationship between coal companies and the miners.

Chapter 6

LABOUR RELATIONS

Introduction

The 'miner' and his relationship with his boss, 'the coalowner' was integral to the performance of a colliery. The miner was dependent on the coalowner for his livelihood but, equally, if the miner withdrew his labour then the coalowner was unable to trade. This inter-dependency made for a very turbulent 'marriage' which saw the 'balance of power' shift steadily, in the last decades of the nineteenth and the first decades of the twentieth centuries, from the 'masters' to the 'men'. The main reason for this shift was the growth of trades unions within the coal industry and the main aim of this chapter is to demonstrate how and why the trades unions were able to grow.

This chapter will first chart the development of national miners' unions through the nineteenth century, before focusing on the relationship between Welsh miners and their employers in the period 1850 - 1914, concentrating in particular on the history of trade unionism in Denbighshire. The issue of wages as a component of cost and their impact on profits will be discussed elsewhere in this thesis (see Chapter 8), however, wages as a means of reward and the methods that were used to determine levels of remuneration will be discussed in this chapter. The main focus of the chapter is on north Wales, and Denbighshire in particular, but the development of the union movement in south Wales is covered in some detail. One reason for this is that, despite the disparity in size, many of the issues raised are relevant to both regions. Another is that, as the nineteenth century developed, south Wales and the issues specific to that region came to the forefront of labour relations, not only in Wales, but throughout Great Britain and thus had a direct impact on events in Denbighshire.

South Wales has also been used as a focal point for this chapter because the development of a strong union in north Wales had more similarities with the

developments in south Wales than, for example, those in nearby Lancashire. Although Lancashire is geographically closer to north Wales, it has not been used as the main comparator because, unlike in Wales, mining in Lancashire was not in remote areas where it was the dominant employer "but in large urban areas in which occupational diversity was the norm and where colliers were integrated into a wider industrial workforce" (T Griffiths, 1996: 199). The problems faced by unions in Lancashire and other more developed mining areas were therefore different to those faced by the unions in newer coalfields such as those in Wales, which did not 'take off' until the mid-nineteenth century. However this is not to say that events in Lancashire did not have a significant impact on north Wales and, as such, comparisons will be made with this region as and when they apply.

We will first outline the various attempts that were made throughout the nineteenth century at creating a 'national' miners union before briefly examining developments in Wales, both north and south, in the years to 1875. We will then examine, in detail, the experiences of Denbighshire and south Wales in the years 1875-1914, looking specifically at issues such as the Sliding Scale, the 1893 strike, the 1908 Eight Hours Act and 'hard and difficult places'.

National Miners' unions in the nineteenth century

Pre 1840

The term trade union was not recognised by legislation until 1871; prior to that date the term 'trade society' was more commonly used (Chase, 2000: 2). The early trade societies (eighteenth century) were local affairs "restricted to members of a particular craft in a particular town" (Musson, 1972: 17), and were almost exclusively to be found in the "artisanal sector" (Chase, 2000: 36). Throughout the late eighteenth/early nineteenth centuries, trade societies flourished in the 'craft' sector, but were slower to develop in the non-craft trades

such as mining because here "the division between capital and labour was deepest and the feeling of exploitation keenest" (Musson, 1972: 15). Indeed, rather than organise themselves into a coherent, wide-ranging movement, the miners tended to embark on ad hoc demonstrations which were generally confined to a specific pit or village.

Before a national miners' union was finally successfully created in the last quarter of the nineteenth century, there had been a number of attempts to create such a national movement. The 1830s had seen the "rise of the concept of national trade unionism" (Challinor & Ripley, 1990: 7), and there had been an attempt to create a 'Grand National Consolidated Trade Union' to encompass all the various trades and crafts. This proved to be far too ambitious for the time, and soon failed.

It was also in this period that "in the mining industry, the same desire for 'collective' action made itself manifest" (Rogers, 1928, III: 218). In Lancashire the miners decided to organise themselves on a wider scale than simply a district basis, and the Friendly Associated Coalminers' Union (FACU) was formed (EW Evans, 1961: 39). The main aim of the union was to protect wages and support miners in their struggles against the masters. With this in mind, the union sent its agents into other regions such as north Wales and Staffordshire with a certain amount of success, and it was able to support the south Wales miners in their 1831 strikes. However, the coalowners and authorities were alarmed by such developments and did all they could to stamp out such 'sedition'. Eventually, as a result of a combination of factors, the union disappeared as a potent force for unity among the miners. According to EW Evans (1961; 44), "it is not difficult to find reasons for the catastrophic collapse. Indeed the problem is rather to select the most important". EW Evans (1961: 45) cites three reasons:

i) politics - agitation for parliamentary reform took away the attention of the unionists from the miners;
ii) the 'Truck Act' removed one of the main reasons for discontent; and
iii) the opposition of the non-conformist groups which had a significant influence over many miners.

Ultimately, it was the miners themselves who prevented the success of a national union; "they were too sectional and localised for [such a] general union to be successful" (Musson, 1972: 30). This view is reinforced by Rowe (1923: 5-6) who states that "there are considerable grounds for taking each coalfield as a distinct unit and the mining of coal in each field as an industry in itself.....each coalfield was in the matter of wages, a more or less distinct unit". This obviously meant that miners were more concerned with issues affecting their own coalfield, and it was difficult to find issues that applied to the country as a whole which could unite them.

In 1842 the first national strike of workers occurred, "a cry of anguish and despair" (Challinor & Ripley, 1990: 25) which started when coal and iron workers went on strike in the Black Country to protest against the masters' demands for wage cuts. The strike spread to north Staffordshire and "by the end of July all the North Staffordshire mines were closed and the whole of the Midlands was engulfed. Industry ground to a halt" (Challinor & Ripley, 1990: 25). The millowners of Lancashire and Yorkshire also tried to reduce wages and soon these regions were also at a standstill. "By August, almost all the industrial parts of Britain were involved in industrial strife", and hardship was acute, "especially in the mining communities where opposition was the staunchest and most prolonged" (Challinor & Ripley, 1990: 26). Eventually there were riots in Staffordshire which were put down by troops, and there was a period of savage repression. According to Challinor & Ripley (1990: 34), "this helped to develop a feeling of class consciousness....especially among the miners [who began] to think of themselves as a separate and distinct entity in society".

1840-1860

It was in this context that the next attempt at creating a national miners' union took place when, on 7 November 1842, the Miners' Association of Great Britain (MAGB) was established (Challinor & Ripley, 1990: 7). The aim of the union was

"to unite all miners, to equalise and diminish the hours of labour and to obtain the highest possible amount of wages for the labour of the miner" (Challinor & Ripley, 1990: 8). It was the first union to use the courts to protect its members, and was one of the first unions "to be seriously involved in political and Parliamentary action" (Challinor & Ripley, 1990: 9). The desire to equalise pay throughout the UK was an acknowledgement of one of the reasons for the earlier union's failure; if different conditions persisted in different areas then common issues were more difficult to establish, and factionalism would destroy this union as it had the earlier one. As Taylor (1955: 47) explains, "the miners of the northern counties had learned one lesson above all others from their past experience: that the strongest weapon in the hands of the coal-masters was the ability to break a local strike by importing 'strangers' from other mining areas. Only an organisation with a national basis and membership could counter this decisive advantage". However, despite this realisation, local issues continued to dominate because every coalfield had its own specific problems; in some it was child/women labour, in others it was the truck system and in others the exhorbitant prices charged by masters for powder, lampoil etc. (Challinor & Ripley, 1990: 55).

Nevertheless, the miners were motivated to join the MAGB; possible motivating factors were the repression that followed the 1842 strike and the realisation that only organised opposition had a chance of success, the continued existence of truck shops and other localised grievances, and the shocking publicity stimulated by the "unparalleled volume of documents describing coal-mining conditions" (Challinor & Ripley, 1990: 45) that were published in the 1840s. The miners could see the justice behind their desire to improve conditions for themselves and their mining 'brethren' throughout Great Britain.

The MAGB resolved to "form ourselves into societies, these into Districts and those Districts into one grand body, as speedily as possible, to consist of the whole of the coalminers of England" (cited by Challinor & Ripley, 1990: 62). Initially it made little headway beyond Yorkshire and the north east; when the first 'national' meeting took place, in May 1843, most delegates were from these regions, "with a sprinkling from the Scottish coalfields, only one came from

Lancashire and none came from elsewhere. The union could hardly be described ....as attaining national dimensions" (Challinor & Ripley, 1990: 65). However, the union grew; at the time of the May meeting it had 4,802 members, by July membership "was claimed as 30,000" (*Leeds Mercury,* 22 July 1843, cited by Taylor, 1955: 48) and it "was an object of awe....its size and financial resources were spoken of in legendary terms" (Challinor & Ripley, 1990: 8).

It appeared that the MAGB had "achieved the miracle of becoming a genuinely national union" (Challinor & Ripley, 1990 : 73). However, unfortunately, before the national organisation was firmly established, it had to "undergo a great ordeal" (Rogers, 1928, V: 154). The miners of Durham and Northumberland were determined to free themselves from the Bond, a system of annual employment contracts which gave the men little flexiblility and "left [them with] no safetly-valve for the active expression of discontent" (Taylor, 1955: 54); when the owners refused to compromise they went on strike. The MAGB supported the strike but, "the harshness of the employers" and "the relentless force of economic pressure" meant that after eighteen weeks the miners returned to work (Rogers, 1928, V: 154). The union, having lost here in its heartlands had suffered a body-blow from which it never recovered, and although the MAGB continued strongly in some areas, e.g. Lancashire, its aspirations as a national movement were destroyed. It continued to limp along but by March 1848, "the union had ceased to function and miners throughout the British Isles were unorganised" (Challinor & Ripley, 1990: 234).

The main reason for the failure of the MAGB was the fact that there was such a multitude of grievances in the various parts of the British coalfield. As Challinor & Ripley (1990: 59) explain, "the many evils against which the men pitted their strength [meant that] the Association had many voices, not one. The very things that called the union into being also destroyed it". Another factor that contributed to the union's failure was the severity of the 'cruel forties'; the depression meant that members withdrew through lack of funds, and the instinct for self-preservation meant that the 'common good' was a principle that was soon forgotten. As Mathias (1969: 366) observes, "the economic context was .....a

potent barrier" to union membership, especially as "the malicious hostility of the powers that be" were also ranged against union members (Challinor & Ripley, 1990: 239). Thus had the second attempt at a nationwide miners' union also failed.

1860-1885

Although the attempt to establish a national body had failed, local unions remained (Rogers, VI: 102), and in some regions could even be described as strong (Musson, 1972: 53). On a national scale, despite a "futile attempt" to re-form the MAGB in 1855 (EW Evans, 1961: 86), little was done until the 1860s when the National Association of Miners, "a powerful combination", was created in 1863 (Nelson Boyd, 1879: 160). Unlike the earlier unions, the main aim of this union was not to maintain or improve wages; "its sole function was to press for mining legislation and to defend the colliers rights in the courts" (EW Evans, 1961: 89).

Issues of safety in the mines and the need for some sort of mechanism to enforce minimum standards had been highlighted by the end of the 1840s by the MAGB amongst others. The 1842 Report of the Commission to investigate the employment of women and children was particularly shocking and led directly to legislation to outlaw the employment of women and boys under ten years old underground (Nelson Boyd, 1879: 49). It also introduced the concept of mines inspection which was particularly hated by the masters; they considered the policy "a useless and mischievous prying into the affairs of individuals" (Nelson Boyd, 1879: 58).

A series of serious accidents in the 1840s led the Government to commission a number of inquiries to be made into conditions in the mines; these "disclosed a blameable state of affairs; the collieries were in many cases ill-managed, the overmen illiterate, the ventilation poor, the discipline lax and human life disregarded" (Nelson Boyd, 1879: 78). This resulted in the 1850 Mines Inspection Act which Rogers (1928, VI: 101) describes as a "meagre measure of

reform", and which Nelson Boyd (1879: 105) says "did little else than establish the principle of underground inspection". However, the principle had been established and, in the case of accidents, it meant that at least there now had to be a thorough investigation (Nelson Boyd, 1879: 107). Nevertheless, only four inspectors were appointed and although "they performed their duties admirably" (Rogers, 1928, VI: 101), there were simply too few of them, and agitation continued for more effective legislation. This came about in a series of Acts; the 1855 Act "was a great step in advance of the previous one [because] the responsibility of management became more defined, and the owners became accountable in the eye of the law for keeping the pits in a safe condition" (Nelson Boyd, 1879: 132). The 1860 Mines Regulation and Inspection Act even "more clearly defined the respective duties of masters and men" (Nelson Boyd, 1879: 132), and an Act in 1862 ensured that the men working underground had two effective means of escape in the event of an accident. As mentioned earlier, the main aim of the new union was to push for even stronger legislation to protect the miners.

The new union, the National Association of Miners (NAM), had its roots in Staffordshire in 1861; it had grown quickly there and had spread so successfully into parts of north Wales that 'The North Staffordshire and North Wales Miners Association' became its first district. In November 1863 a national conference of unionists was held and, according to Rogers (1928, VII: 160), this "marks a distinct stage in the miners' movement in this country". This is because for the first time a central fund was established, and a "policy of persuasion was adopted as opposed to a policy of confrontation" (Rogers, 1928, VII: 160), which again marked a move away from the sometimes violent policies of the past.

Unfortunately, within a short time, factions appeared within the NAM and it split into two distinct 'camps'; one supporting Alexander MacDonald, a Scottish unionist, and the other, John Towers, editor of '*The Miner*', who represented the north Wales coalfield. According to Rogers (1928, VII: 168), "the personal enmity that arose between [these two] boded ill for the national movement" and throughout 1863 and 1864 bitter quarrels between the two factions dominated

NAM business. Another problem was that the union did not have a formalised set of rules, a fact that resulted in different areas doing their own thing, which was obviously detrimental to those advocating a truly national body. The animosity between the two camps was so great that eventually a group of unionists seceded from the union and tried to create a new union; this proved unsuccessful, but the development immeasurably weakened any chance of creating a strong national organisation (Rogers, 1928, VII: 175). The NAM continued under the leadership of MacDonald whose faction had prevailed while Towers ceased as editor of *'The Miner'* in September 1865 (Rogers, 1928, VIII: 113). However, the NAM could no longer be deemed a national union, and as Rogers (VIII: 113) states, "the year 1864 left the union in an enfeebled condition".

In 1869, two prominent union leaders from Lancashire, William Pickard and George Halliday, felt that it was time to create a more aggressive union than the NAM, and established the Amalgamated Association of Miners (AAM); they advocated a "national union to replace inefficient local unions [which] were rendered ineffective through competition" (Rogers, 1928, VIII: 129). This meant that two unions co-existed and were often represented within one coalfield. This obviously weakened the workers' negotiations with owners as the different unions had different agendas, and often the most important issue was to 'get one over' on the other union, a policy that would do little to further the welfare of the miners (Rogers, 1928, IX: 196).

The 1870s saw various other alternatives to the NAM being suggested due to the "growing opposition to its moderate policy" (Rogers, 1928, IX: 190). However, the regional nature of both the NAM and AAM meant that, although district associations might be relatively strong, their objectives often differed from those of other districts which made creating a national union very difficult. Furthermore, the depression of the late 1870s saw both the NAM and the AAM "withdraw defensively into their sectional shells" (Musson, 1972: 67), and while such circumstances prevailed the likelihood of creating an effective national union was minimal.

1885-1914

By the late 1880s many of the district associations had come to realise that if they wanted to create an effective opposition to the employers and a mechanism for securing legislation to protect the miners, they had to overcome their local chauvinisms and work together. It was with this principle in mind that in October 1889 the Miners Federation of Great Britain (MFGB) was created. Its specific aims were higher wages and legislation to bring in an eight hour day (EW Evans, 1961: 145).

According to Rowe (1923: 35-6) it is "easy to over-estimate the effective influence of trade unions (MFGB) at that date....[because] in the smaller coalfields there was little or no organisation" but, as those district unions that did exist fought, and usually lost battles with the employers, they gradually came to understand the value of national co-operation, and affiliated themselves to the MFGB which had become "a rallying point for all who were discontented" (EW Evans, 1961: 146) with their current circumstances. Despite this it still took almost twenty years for the MFGB to absorb all the district organisations, and "only in 1919 did the general secretaryship become a full time post" (Howell, 1996: 35).

Although the district unions affiliated themselves to the MFGB, many remained strong, to the extent that Howell (1996: 36) describes the Federation as "more of a collection of disparate unions than a national body", especially in moments of stress because "each district union had its own history - usually longer than the Federation - its own myths and symbols and ethos".

These problems gradually disappeared and the national body grew in strength and influence; its demands for an eight hour working day were met in 1908 and it then concentrated its efforts on improving the wages of the miners; their eventual demand being for a national minimum wage. By 1912, this issue was at the forefront of British industrial relations, and the organisation was by this time sufficiently united to call a national strike, "a strike of a magnitude hitherto

unknown" which meant "a creeping paralysis of the whole of the industrial life of Great Britain" (Page Arnot, 1967: 284).

The 1912 strike had come about largely as a result of issues raised in south Wales, which had emerged as the "'storm centre' of industrial unrest" (C Williams, 1996: 125), in the first decade of the twentieth century. This emergence of south Wales as a proactive, and even leading 'unionist' district within the MFGB is surprising given that the district did not become affiliated to the national organisation until 1899 (EW Evans, 1961: 146) and its history, up until then, had been one of division, defeat and conciliation, which resembled in many ways the struggles of the unionists in its smaller northern neighbour.

Labour history in Wales

In this section we will examine the development of trades unions in both south Wales and Denbighshire in the period to 1914, and will attempt to draw out the similarities between developments in the two regions. Despite the obvious disparities between the north and south Wales coalfields in terms of size, north Wales having an output of 2.4 million tons in 1874, and employing 14,000 men, whereas south Wales had corresponding figures of 16.5 million tons and 73,000 men, the histories of the union movement in each region contain many parallels. One of the strongest parallels between the two regions is the fact that, despite many attempts throughout the nineteenth century at creating a strong regional union, neither region was able to do this until the last years of the nineteenth century. However, it must be pointed out that the sheer numbers involved in south Wales, compared to north Wales, made the creation of such a union much more difficult in the former than in the latter region. It was far harder to create unity among the larger numbers in south Wales; despite the fact that, at various times, in numerical terms, unions in that region might appear strong, local issues often caused regional unity to break down. According to EW Evans (1961: 125) such issues were often more divisive in south Wales than in other regions because "geographical factors and inadequate communications isolated each

mining valley from its neighbours". This factor was exacerbated by the fact that south Wales produced so many different types of coal, each of which had its own market and therefore associated issues and problems.

The analysis will be split into two periods; the period up to 1875 and 1875-1914. Within each section we will follow the pattern of discussing developments in south Wales first and then those in Denbighshire.

The period up to 1875

South Wales

According to EW Evans (1961: 15), the first strike "to involve something that resembled a trade union" in south Wales was in 1822 when a strike protesting against wage reductions and the truck system in the coal industry affected almost the whole of Monmouthshire. This was a marked departure from the earlier pattern of isolated ad hoc strikes; although it was not organised in any way by a union, it was significant in that it involved a 'combination' of men from different pits, who "represented an intermediate stage between the spontaneous riots of the first two decades of the [nineteenth] century, and formal trade union activity" (EW Evans, 1961: 23).

Again, in 1830, the colliers of Monmouthshire went on strike. EW Evans (1961: 38) describes this as "an important turning point in the history of the colliers for it heralded the establishment of the first trade union in the coalfield", undoubtedly, as in Denbighshire, influenced by the recently created FACU. This initial flurry of union activity was short-lived, and "in south Wales as in north Wales no mention of the Friendly Society ....is to be found after December 1831" (EW Evans, 1961: 44). The reason for this failure was common to both regions: disillusionment, victimization and lack of finance (both on the part of the miner and the union), issues that pervade the histories of the Welsh unions throughout the nineteenth century. Attempts by the MAGB to enlist members in Wales in the early 1840s met with little success in either Denbighshire or south Wales. In the former district the union claimed a membership of 400 in 1844, "although they

were too poor to pay union dues" while it failed to make any substantial gains in south Wales (EW Evans, 1961: 68), and union activity was almost non-existent in south Wales until the 1860s.

The revival of union activity in the late 1860s/early 1870s saw three major stoppages in four years at the beginning of the 1870s, culminating with a five month long strike and lockout in 1875; this failed "gan fod yr undeb mewn cyflwr mor wan" (because the union was in such a weakened state) (ID Thomas, 1975: 40) and the men had gone back to face a 15 per cent reduction, "wedi'u concro a'u gwaradwyddo" (having been conquered and disagraced) (ID Thomas, 1975: 40). The AAM, which had supported the strike, found itself "substantially destroyed" (LJ Williams, 1976: 83), and according to ID Thomas (1975: 40) it disbanded, and "edrychai pethau'n dywyll ir glowyr ac i'r undebau" (things looked black for the miners and the unions).

It was in such circumstances that the form any new district union should take was being considered; should it be a centralised union with centralised funds, or should it be more district based? According to EW Evans (1961: 115) it was unfortunate for the miners that they decided on a union format that was based on districts with no central unit, and with each district individually affiliated to the national body. EW Evans (1961: 115) believes that "this ensured that no effective union was to exist in South Wales for over twenty years". The "enthusiasm for independence reigned unchecked" (EW Evans, 1961: 116), and this saw the district organisations splinter into smaller units which meant that, unlike the coalowners who were "united and victorious.....the men were defeated, dispirited and disunited" (LJ Williams, 1976: 84).

Denbighshire

The miners in Wrexham had gone out on strike as early as 1776 (Rogers, 1928, III: 133) against the employment of 'foreign' workers but, before 1830, any industrial disputes were isolated and spontaneous, with little or no organisation beyond the immediate vicinity of the colliery involved. The year 1830 saw the "first large scale strike in North Wales" (Rogers, 1928, III; 237). This was in

Denbighshire and became known as the 'Cinder Hill Riots' (see Appendix E for full details of the riots). The catalyst for these riots was poverty; a countrywide depression had seen conditions for the miners decline to such an extent that "much distress prevails among the working classes in the neighbourhood of Wrexham, Ruabon and other parts of Denbighshire [and] the privations endured by the families of these poor men are very great" (*Shrewsbury Chronicle*, 5 June 1829, cited by Rogers, 1928, II: 135).

This episode was the the first example of men combining together for their common good but it should not be accorded too much significance; it was a purely industrial event precipitated by economic necessity and a loathing of the truck system. It should not in any way be seen as a political event, especially on the part of the Denbighshire miners. Their Flintshire counterparts, who were the instigators of the action, may have been influenced by the FACU (it had become established in Flintshire in 1830 – Rogers, 1928, III: 239), but there is no evidence that the Cinder Hill Riots were anything other than an impulsive demonstration of 'fraternity' by the Denbighshire miners.

The success of the riots (the coalowners conceded a wage of 3 shillings a day and closed the Tommy shop at Acrefair), led to a flurry of union activity in Denbighshire but membership quickly waned as wages continued to fluctuate "according to the whims of the owners and the selling price of iron and coal" (Rogers, 1928, V: 133). In 1841, a slump in the iron trade precipitated a fall in wages and widespread distress prevailed. However, no disturbances on the scale of 1830 occurred, and the coalfield remained quiet (Rogers, 1928, V: 144). The possible reasons for this are twofold: the increasing influence of the Non-conformists who preached 'patience and resignation', and the sheer magnitude of the distress which left the miners with little to strive for other than survival.

In 1843, according to Mr Benjamin Watson, a delegate from north Wales, in a report to the National Conference of the MAGB, north Wales "was probably in a worse plight than any other coalfield" (*Morning Star*, 9 September, 1843, cited by Rogers, 1928, V: 147) and, by 1847, little had improved. Indeed, the *Report of the Commissioners of Enquiry into the State of Education in Wales* –

Part III (1847: 395-396, cited in Rogers, 1928, V: 141-2) described Rhosllanerchrugog as a place where housing conditions were 'repugnant'. The Inspector reported, "I have never beheld anything to equal some of the cottages at Rhosllanerchrugog as regards confinement, filth and utter unfitness for human abode". He continued, "[even] Merthyr Tydfil, the most depraved and uncivilised locality in Wales had yet to reach the depth of poverty and concomitant evils that Rhos had touched". The deplorable conditions prevailing in the Wrexham area were blamed for the poor "moral standard[s]" existing at that time, and such was the reputation of the miners that "when the agents of the society went to North Wales and began to inquire for some of the colliers, the other inhabitants expressed their surprise that any man should inquire for a collier, stating that if they were seen with them, that decent people would avoid their company" (Benjamin Watson, 1843 *Report to the Miners' Association*, cited by Challinor & Ripley, 1990: 53).

According to Challinor & Ripley (1990: 166), only one colliery in Ruabon was without a tommy shop and wages for a 12-14 hour day were between 1s 6d and 2s per day, which, according to Dodd (1971: 343-4), "were at best not much more than three quarters and at worst barely half those paid in England and Scotland". Given such conditions it is hardly surprising that when, in 1843, the recently formed MAGB sent 'missionaries' into Denbighshire, "the response [they] invoked left much to be desired" (Rogers, 1928, V: 149). The union expected men to rush to join but, given the prevailing poverty in the region, the men were unwilling, and in many cases unable to join due to the cost. In addition to this, victimisation by the coalowners, "the rigid church discipline of the non-conformists" and the lack of literacy, especially in English, prevented many miners from knowing what was going on in the wider world which prevented them from being influenced by 'radical' ideas (Rogers, 1928, VII: 147).

In the 1860s, reducing wages became an important objective for the coalowners of Denbighshire because production costs were increasing, and they tried a number of tactics to achieve this end. For example, in 1864 the Ruabon Coal Company wanted to revert to the pre-1860 local ton of 2460 lbs as a basis

for payment. Although the men went on strike, due to the "enfeebled" state of the NAM, they ultimately had to submit and agree (Rogers, 1928, VIII: 113-15). Also, in 1867, the Brymbo owners succeeded in reducing wages by 10 per cent; the union was simply not strong enough to prevent it from happening and, although "these reductions led to considerable ill-feeling", many collieries followed suit "with very little co-ordinated opposition from the men" (Rogers, 1928, VIII: 113-15).

In 1869-70 the AAM made inroads both in Denbighshire and in south Wales mainly due to the fact that it agitated for improved wages, and links were made between north and south Wales, Lancashire and Staffordshire (EW Evans, 1961: 101). However, the union's efforts saw more success in Denbighshire than in south Wales where recruitment was slow. By 1870 there were four districts in Denbighshire affiliated to the national organisation: Brymbo, Coedpoeth, Rhos and Cefn (Rogers, 1928, VIII: 131).

The early 1870s saw the the influence of the AAM in Denbighshire grow significantly; the Franco-Prussian war stimulated both the iron and coal industries until they were "booming" (Rogers, 1928, IX: 191). This boom in trade brought with it a corresponding increase in wages; many miners ascribed these increases to the union's negotiations and, as they could now afford the levies, union membership was popular. However, what the miners may not have realised was that the wages would have increased without the AAM's intervention, simply because the price of coal had increased; in north Wales coal was 8s a ton in January 1872, by October it was 21s and in April 1873 daily wages had risen to between 4s 9d and 5s (Rogers, 1928, IX: 191-3).

Trouble, however, lay on the horizon. The year 1873 saw a decline in coal prices and, "by March 1874 the slump in the coal trade had brought the prices down to 13s 6d a ton and it was difficult to find customers even at that price" (Rogers, 1928, IX: 197). The slump in the economy was echoed by a slump in union membership and "the autumn of 1874 found the tide of trade unionism ebbing" throughout Wales (EW Evans, 1961: 109). EW Evans (1961: 113) sums up the reasons for this as being:

i) the financial weakness of the unions which prevented them from having the resources to support their members in times of industrial unrest;

ii) the co-ordination of the owners; in both north and south Wales the coalowners had joined together to form associations specifically to counter the wage demands of the men; and

iii) the heavy union dues; this was an important issue in both regions, but in south Wales the miners were particularly against having to contribute towards a central fund, wishing to keep the funds locally so that local rather than national disputes could be funded. They wanted "a [southern] Welsh union with Welsh officials, a Welsh treasury, in fact [an] entirely [southern] Welsh [union]" (EW Evans, 1961: 114).

In Denbighshire the coalowners were organised around the North Wales Coalowners Association (NWCOA). This association was created on 20 June 1870 and replaced an earlier employers' group which had been formed in 1855 (Lerry, 1968: 33). The main impetus for the NWCOA was the desire of the coalowners to present a 'united front' to the miners in wage negotiations. All the major coal companies in Denbighshire were members of the NWCOA and the Chairmanship was held at various times by some of the most prominent coalowners in Denbighshire including Robert Roy, Henry Robertson and Henry Dennis (Lerry, 1968: 33).

In 1875 the NWCOA gave notice of a 15 per cent reduction from April; the men "unanimously decided to inform the owners of their determination to resist the proposed reduction" (Rogers, 1928, IX: 205). The owners countered with arguments to support the need for such a reduction; they asserted that wages in 1875 were 32 per cent higher than in 1870 and that the costs of production had increased by 69 per cent in the same period. They "further asserted that while the North Wales coalfield depended chiefly on the export trade, large quantities were directly consumed by such local concerns as the British Iron Company, Brymbo

iron works etc, and hence the slump in the selling prices of iron should also be considered" (Rogers, 1928, IX: 208). The men responded by saying that the selling price of coal should dictate the wages paid, but in effect they 'shot themselves in the foot', because by August 1875 the price of coal had fallen to 9s 4d per ton (Rogers, 1928, IX: 209), and an investigation into prices by the union showed that the coal firms had "incurred a serious loss" (Rogers, 1928, IX: 214). The dispute was taken to a locally organised Conciliation Board, which met twice and advised an initial reduction of 10 per cent and a subsequent reduction of 15 per cent (Rogers, 1928, IX: 210-14). The men were wholly opposed to this latter reduction and, by October 23 "the colliers of Brymbo, Coedpoeth, Cefn and Rhosllanerchrhugog turned out almost to a man". The strike continued for almost two months but, by 17 December, the men returned on the owners' terms, "worn out" by the struggle (Rogers, 1928, IX: 215). These wage reductions heralded "bitter times" for the miners; the depression "wrought havoc in the North Wales coalfield [and] economies were ruthlessly introduced at different collieries, and many owners had either to reduce wages or close the mines" (Rogers, 1928, X: 186).

1875-1914

As can be seen from the above narrative, by 1875, trade unionism in Wales was at a low ebb. However, depite the failure of the different unions, some of the factors that strong unions would require were in place. The most important of these was the men themselves; unions could only work if they had members, and to be truly effective they had to have many members. The growth of the coal industry in north Wales between 1850 and 1875 had seen the number of employees increase from 4,623 in 1854 (Hunt's '*Mineral Statistics*') to 13,592 in 1875 (FA Gibson, 1922: 29-30), an increase of 194 per cent. This increase was mirrored in south Wales where numbers increased from 31,373 (Morris & Williams, 1958: 73) in 1851 to 72,643 in 1875 (FA Gibson, 1922: 12), an increase of 131 per cent. The increase in the potential membership was obviously a good

thing for a union in that the more members it had, the more influence it had, both on non-union miners, and on mine owners. It also allowed the union to grow financially; the more members it had, the more subscriptions it could expect. This would enable it to support its members during strikes, a factor that (hopefully) would encourage increased membership as non-members saw the evidence of the union working to protect its members.

However, as has already been discussed above, agreement was already difficult to achieve during this period and increasing the numbers of members was not likely to make this any easier. Also, as the number of collieries increased, the number of union lodges increased; each of these had its own issues and problems and these were often accorded more importance than more regional issues, let alone national issues, and until this problem could be surmounted the union movement in both north and south Wales was not likely to succeed.

This section will discuss how the trade unions in Denbighshire and south Wales faced these problems and finally succeeded in achieving their aims. The section will be divided up chronologically and will consider the following issues/periods: the sliding scale; 1875-1892; 1893; 1894-1908; the Eight Hours Act, 1908 and 1909-1914.

The sliding scale

According to LJ Williams (1976: 80) "wages were always, either formally or informally, closely geared to price changes" which meant that wages fluctuated, often fiercely, according to the vicissitudes of the coal industry. Without any formalised agreement as to how wage levels should be set, wage changes were often "only won or conceded after some sort of struggle" (LJ Williams, 1976: 80) which meant that industrial strife was an almost constant feature of some coalfields, for example, south Wales. A sliding scale was a mechanism designed to formalise the link between the price of coal and wage levels because it allows for "changing the levels of wages according to the movement of coal prices"

(Rogers, 1928, X: 187) and provides an "easy, almost mechanical method" (Morris & Williams, 1969: 218) of doing so. By formalising this link and by achieving agreement from both coalowners and miners, in theory, industrial disputes should have become less frequent because both sides had signed up to the principle; in practice, as we shall see from examining events in Wales, this was far from the case.

South Wales

The first example of a Sliding Scale in Wales was an agreement made after the strikes of 1875 in south Wales. Here, according to Morris & Williams (1969: 219), "the owners accepted the principle [of a sliding scale] with reluctance and misgivings"; they wanted to assert their position and were generally opposed to any agreement that contained an element of arbitration (Morris & Williams, 1969: 219). However, as EW Evans points out (1961: 98), the employers realised that some form of agreement had to be made because the costs of stoppages could be significant and, as they became more common, a solution to these "ruinous conflicts" (Morris & Williams, 1969: 220) had to be found, so the majority of owners accepted the sliding scale principle.

The miners felt that a sliding scale was something of a "significant concession" (Morris & Williams, 1969: 220); although they had long resisted such a mechanism they nevertheless felt that, at that time, it would help them 'save face' and also force the owners to negotiate with their leaders. More importantly they felt (somewhat erroneously as the future would demonstrate) that "it liberated future variations in wage rates from the arbitrary control of the employers" (Morris & Williams, 1969: 224).

According to EW Evans (1961: 117), negotiations were "protracted and hard fought", but "owing to the weak bargaining position of the men", the agreement that was made looked to be much in favour of the employers. This view is supported by LJ Williams (1976: 86) who says that "the scale that emerged in December 1875 seemed eminently satisfactory to the owners". The

terms of the agreement stated that the minimum cutting rate was to be set at 5 per cent more than the 1869 rate; this meant that the wage was set at a level which corresponded to a selling price of 12 shillings per ton. If prices increased beyond this level, the wage rate would be increased by 7½ per cent "for each complete shilling rise in the average selling price, until wages reached their maximum when the average selling price was 21 shillings" (LJ Williams, 1976: 86). Initially, both sides were happy; the owners anticipated saving money if prices fell, and the men felt that such a mechanism protected them because of the minimum wage rate, which EW Evans (1961: 119) believes was "the only clause advantageous to the men".

It did not take long for both sides to rue their decision to sign the agreement. The reason being that, "no one had anticipated that the depression after 1876 would be as deep or as enduring as it proved to be" (Morris & Williams, 1969: 226). From the point of view of the owners, the fact that there was a minimum wage rate meant that due to the "catastrophic" fall in prices (LJ Williams, 1976: 87), they were unable to reduce the wages as much as they would have liked, and therefore the savings that they made were 'capped' because "the persistent fall in prices under the strict terms of the scale, could not be matched by wage reductions .....the owners in brief had sadly misread the trend of trade at the time the scale was negotiated" (LJ Williams, 1976: 88). From the point of view of the men, it took them a little while to realise that the terms of the agreement "made the scale extremely insensitive" because a half yearly audit would have to be held and an average selling price established, before any change could be effected (EW Evans, 1961: 120). The fact that the wage rates were governed by the average price throughout the coalfield meant that long term contracts for the sale of coal could bring the selling price, and therefore wages down, even if current prices were rising, a situation which EW Evans (1961: 120) describes as "a powerful incentive to sell as cheaply as possible [which] was an important factor in encouraging underselling and overproduction". With both sides having realised the shortcomings of the sliding scale, the rest of

the history of the sliding scale in south Wales was a battle of wills between the two sides as they tried to negotiate better terms for themselves.

Denbighshire

In Denbighshire the experiment with a sliding scale happened later than in south Wales and was short lived. In January 1880, representatives of the employers and workmen met, with WH Darby (Brymbo) as Chairman, and a committee was appointed to draft a scheme (Rogers, 1928, X: 188). Only seven collieries (albeit the biggest and most important collieries in Denbighshire) signed up to the agreement, which obviously left the owners of the other collieries free to 'negotiate' their own wage rates, a division which did little to bring together the miners in the region. The Denbighshire agreement provided for the following: "The wages of all classes of underground workmen and of banksmen shall be regulated by a sliding scale based upon the net average selling price of the output at collieries of owners parties (sic) to this agreement" ('North Wales Sliding Scale of 1880, Memorandum of Agreement', cited in Rogers, 1928, X: 188). The average selling price was to be agreed by two accountants, one appointed by the owners and the other by the workers, who would only disclose the district average, thus allaying the fears of the owners that sensitive information might be disclosed (cited in Rogers, 1928, X: 188). The selling price and wage rate to be used as 'standard' was that of December 1879, and "the advance shall be at the rate of 2½ per cent on the standard rates for every fourpence per ton advance in the average selling price". The average selling price was to be ascertained quarterly "and the wages payable in the following three months shall be regulated thereby" (cited in Rogers, 1928, X: 188), which made the system in Denbighshire more sensitive to price changes than the method used in south Wales where the audit of selling prices happened on a half-yearly basis (LJ Williams, 1976: 86). There is no direct evidence available,

but it is likely that those negotiating the agreement were able to refer to the south Wales experience when determining how the agreement should work.

An initial 7½ per cent increase was promised for February 1880, but this had to be withdrawn when the sliding scale mechanism did not justify it. This left many miners "disgruntled and disillusioned" (Rogers, 1928, X: 189), and even a 7½ per cent increase in February 1881 did little to endear the miners to the scheme. The colliers of Rhosllanerchrugog were especially against the scheme and invited representatives from the Lancashire and Cheshire Miners' Association to visit Denbighshire. The leaders from Lancashire "lost no time in coming" to Denbighshire and "it was doubtless under their influence that miners throughout the Ruabon and Wrexham districts handed in notice on October 1 demanding weekly wages and an advance of 7½ %" (Rogers, 1928, X: 191). This in effect signalled the end of the sliding scale in Denbighshire and, unlike in south Wales, where both sides persevered with the sliding scale until 1902 (EW Evans, 1961: 184), no attempts were made to resurrect the scale; instead, in October 1883, north Wales was accepted as a district of the Lancashire Federation[10] which supported conciliation boards, rather than sliding scales, as a method by which to settle wage disputes. According to the *Wrexham Advertiser* (8 September 1883, cited in Rogers, X: 201) this amalgamation would "improve our position financially, socially and morally" and allow the miners of Denbighshire to negotiate with their employers with the backing of a more effective union movement than they had been able to create on a local level.

'One step forward, one step back' - 1875-1892

South Wales

In south Wales in this period, while the attention of the miners was concentrated on trying to vary the terms of the sliding scale agreement, some unionists, for example, William Abraham (Mabon), who had realised the importance of unity,

[10]The Lancashire, Cheshire, North Staffordshire and Forest of Dean Miners Federation.

tried to push for a centralised union; all he met with was "apathy, indifference and hostility" (EW Evans, 1959: 18). Mabon was "one of its [the sliding scale's] most ardent supporters" (EW Evans, 1959: 14) because he believed that the mechanism would end strife in the coalfield, especially as it included what some interpreted as a minimum wage rate. This minimum rate, however, was not the benefit that it initially appeared to be, and "miners' wages were reduced to subsistence level[s] as a consequence of the existence of a sliding scale" (EW Evans, 1959: 14). As previously discussed, the depression that followed the first sliding scale agreement meant that the miners' wages were often at the minimum level. Having realised that they were unable to make savings in this area, the coalowners sought to reduce labour costs by indirect methods such as abolishing allowances for all work other than hewing. It might seem that such conditions would cause the miners to flock to a strong centralised union which covered the coalfield as a whole, but the opposite was true and, by 1877, EW Evans (1959: 140) asserts that "the cause of [centralised] unionism [in south Wales] was dead".

Despite the weakness of the central, coalfield–wide union in this period in south Wales, there was a proliferation of district unions, covering various parts of the coalfield. These district unions were organised around the 'pit lodge', which was the traditional means of organisation in the coal industry. These lodges were, in essence, mini-unions centred on an individual colliery and it was often the case that the loyalties of the miners were to the lodge rather than to the district union body, an issue which was to create great problems, as we shall see.

Although the district unions had no common policy regarding structure or funding, they did have a number of common characteristics: they wanted legislation for an eight hour day, they wanted to defend the interests of the workmen, and possibly of greatest importance "was their emphasis upon peaceful settlement of disputes" (EW Evans, 1961: 137). This desire for peace, at almost any cost, was reflected in the new sliding scale agreement which was signed in 1880. According to EW Evans (1959: 23), "its terms are noteworthy because the concept of a minimum wage rate was finally discarded", wages were

now dependent on the selling price with no limitation on their movement either upwards or, more importantly, downwards.

There was, however, some hope for a coalfield-wide union; despite the fact that "no effective organisation existed for the coalfield as a whole" (EW Evans, 1961: 133), the foundations for such an organisation existed as the district unions developed and strengthened. Although this was a positive move as far as 'unionism' itself was concerned, it was not a good move from the point of view of those national unionists, such as Alexander McDonald, who wanted to see a strong national union created. The AAM was "horrified" by the number of district unions that existed in south Wales, and rightly recognised it as a source of weakness; the AAM's representatives constantly advocated centralisation, but were consistently ignored (EW Evans, 1961: 116). Mabon, despite being an advocate of a centralised union covering the whole of the south Wales coalfield, had realised, by the end of 1877, the futility of trying to force through a coalfield-wide union; he realised it would have to be achieved gradually, and "from this period [late 1870s] dates the real foundation of mining unionism in the South Wales coalfield" (EW Evans, 1959: 20).

A recession in the coal industry between 1885 and 1887 saw coal prices, and therefore wages, fall continuously (EW Evans, 1959: 47). The miners' representatives tried to revise the sliding scale agreement, but the coalowners would not agree and it was this attitude that was one of the main reasons for the increase in support for a coalfield-wide union. The question of such a union was first discussed in 1886, but it was January 1888 before the South Wales & Monmouthshire Colliery Workmen's Federation (SWMCWF) was created, with Mabon as president. Even then, the districts remained autonomous (EW Evans, 1961: 141), and the Federation was merely "a loose confederation [which] was no stronger than its constituent parts.....and had no real influence over their actions" (EW Evans, 1959: 48).

Agitation against the sliding scale continued and, in November 1888, the SWMCWF won the chance to re-negotiate the agreement; however, conditions were very strained, and the men's demands were so far-reaching that the

employers rejected them all out of hand (EW Evans, 1959: 50). By December 1889 it looked as though the sliding scale would cease to exist, especially as the newly created MFGB was totally opposed to the principle, but Mabon still believed that it was the most effective method and, due to his influence, a new settlement was reached which won the men many of the concessions they had demanded (EW Evans, 1959: 52). Unfortunately, coal prices fell in 1890, and the union was too weak to protect wages; when the owners gave notice to terminate the agreement, the men's representatives, in their determination to keep hold of the sliding scale, gave up many of the concessions they had so recently won. "The miners undoubtedly realised that their triumph ...had been won by the pressures of the coal market rather than by their own efforts" (EW Evans, 1959: 52-3).

Again, many of the miners' leaders realised that a strong central union was essential, but the miners themselves did not want to pay the necessary contributions, "and once again the rank and file withheld their support, and in October 1893, Mabon could only compare the existing lack of organisation with the disorganisation of the years 1877 and 1879" (EW Evans, 1959: 53). The situation was not helped by the creation, in the early 1890s, of an alternative union, the Amalgamated Association of Colliery Workmen of South Wales & Monmouthshire (AACWSWM), by William Brace (EW Evans, 1961: 150). This union was very much against the sliding scale, and more militant in its approach to the owners (EW Evans, 1959: 15). Thus, by 1892, there were two distinct, opposing camps in south Wales, and "as a result, neither party could make much progress" (EW Evans, 1959: 54); the miners, faced with a choice, could not make up their minds, and "their indecision was reflected by apathy and indifference" (EW Evans, 1961: 153). According to EW Evans (1959: 54) "the effect [of this] upon unionism in the district as a whole was disastrous". By 1893, although the principle of a strong centralised union was accepted by many leaders, in practice its successful creation was still a long way off.

Denbighshire

Throughout the early 1880s in Denbighshire the union movement remained weak and any actions that were taken were defeated by the owners' unity of purpose, and the lack of such sentiments among the men; for example, a strike from October to December 1881 ended when the men were told that due to a fall in prices "the masters could not entertain an advance [and] if the men should strike (they had returned to work having been conceded weekly wages and a possible wage rise), they would at once have their weekly pay stopped and be served with notices for a reduction in wages" (Rogers, 1928, X: 192). In March 1882 the owners demanded a 5% reduction in wages which they justified "on the ground that contracts for coal can only be obtained at quotations, not only lower than those of 1878 and 1879, but lower than anything for the past thirty years" (*Wrexham Advertiser,* 22 April 1882, DD/DM/506/4*).* This led to a strike starting on 15 April which saw "scenes of a terrifying description" (*Wrexham Advertiser,* 22 April 1882, DD/DM/506/4*)* at the Westminster colliery which required the attendance of the police and the local militia (*Wrexham Advertiser,* 22 April 1882, DD/DM/506/4*).*

By mid-May, however, the strike was faltering; the owners emphasised the "ruinous condition" of the industry and stressed that "unless some steps are taken to reduce the enormous cost of production [the collieries]... must be closed" (*Wrexham Advertiser,* 13 May 1882, DD/DM/506/4). From the point of view of the colliers, despite the reduction being seen as "nothing but oppression", "the privations prevailing in numerous families is beyond description" (*Wrexham Advertiser,* 15 May 1882, DD/DM/506/4*)* and miners at individual collieries began to agree terms (Rogers, 1928, X: 196). Some collieries, for example Hafod in Rhos, remained on strike in early June. *The Wrexham Advertiser* (3 June 1882, DD/DM/506/4) noting that many families in the village were on the verge of starvation, indicated that the men "feel very embittered against the independent action taken by others". Despite the strength of feeling, lack of union funds soon meant that the men of Rhos had to return to work, on the masters' terms, and by

the middle of June all the pits, bar Black Park in Chirk, had resumed working (*Wrexham Advertiser,* 17 June 1882, DD/DM/506/4).

The main reason for the collapse of this strike, apart from insufficient union funds, was the lack of unity among the men; no single union represented the men as a whole, so disagreements were common. In addition to this, the Lancashire colliers were half-hearted in their support of the strikers, despite the fact that north Wales was an affiliated district of the Lancashire Federation; Lancashire was the main competitor for Denbighshire coal at Birkenhead and therefore a strike in the latter district benefited the former, which was able to fill the 'gap' caused by the strike.

By 1885 the Denbighshire coalfield was relatively peaceful "not for lack of grievances, but because the men were broken in spirit, lacking in unity and suffering from depressed trade.....It was clear that some force was needed to inspire the North Wales colliers to combine" (Rogers, 1928, XI: 74). This impetus was given to the colliers by the actions of the coalowners at the Broughton & Plas Power Colliery Co. Ltd. in 1886. In his report for the year 1885, Henry Hall, the Inspector of Mines for West Lancashire and North Wales, reported that although production was higher than the overall output for 1884, "the output at the pits has nevertheless been irregular owing to the slackness of demand prices [which] have ruled lower than in the previous year, North Wales has suffered very much in these respects, many of the pits being unable to obtain orders sufficient to keep them working more than 2 or 3 days a week.....The selling price of coal has not averaged more than about 5/2d per ton [therefore] in many cases the year's operations will have resulted in a considerable loss.....and the coal trade generally has had as bad a year as perhaps has ever been known" (*Wrexham Advertiser* 11 September 1886, DD/DM/506/9).

Given these circumstances, in July 1886, the directors at Broughton & Plas Power Coal Co. Ltd., to maintain orders and keep the pits open, demanded that their workers bring up 21 cwt to the ton rather than 20 cwt and promised the men five shifts a week (rather than the current three and a half). Although this would enable them to win a significant order and ensure the employment of their

colliers, according to Rogers (1928, XI: 74) this amounted to a 4.8 per cent reduction in wages. In an attempt to justify this move JH Darby (co-owner) explained, in a letter to the *Wrexham Advertiser* (DD/DM/506/9) on 9 September 1886, that "the colliers who had not been working more than 2 days before the order was taken, have now for the last 7 weeks been working full time, greatly to their advantage". He insisted, in the same letter, that the motivation of the company was not to undercut competitors because the order was "formerly supplied by another district which had never been placed in North Wales before", and thus he believed that it would have no implications on any of the other collieries in the district. However, as was reported in the editorial of that same edition, "the reduction, however small it may have been enable(d), it was contended, the proprietors of Plas Power colliery to undersell the other colliery proprietors at Birkenhead" (*Wrexham Advertiser*, 9 September 1886, DD/DM/506/9).

Unfortunately for the directors of the company their actions caused a furore in the district; other coalowners insisted that, in order to maintain their competitiveness, their men should also bring up the 21 cwt ton, while the miners themselves felt that "it would be well for Mr Darby and all the other employers to consider that when they are going to the market and underselling one another they actually give the workingmen's labour away. Coal merchants are doing well when scores of coal proprietors have been ruined and hundreds of colliers starved" (letter signed 'a collier' - *Wrexham Advertiser* 18 September 1886, (DD/DM/506/9).

By the end of September many colliers had been issued with notice of wage reductions or were already working under such reductions, and feelings against the directors and men of Plas Power were running high, "the general impression being that this was the result of the unjustifiable action of Mr JH Darby and the Plas Power employés" (*Wrexham Advertiser*, 25 September 1886, (DD/DM/506/9). Many of the employers were also condemnatory of this action; they felt that JH Darby was undercutting other coalowners, "while his miners were also underselling their fellow labourers" (*Wrexham Advertiser* 2 October

1886, D/DM/506/9). The *Wrexham Advertiser* explained on 2 October that the masters were "unwilling to make [the] reduction[s] but were compelled to do it as they were being underquoted at Birkenhead".

At a meeting on 20 September 1886, the miners issued the following resolution: "the action of the Plas Power men is positively on the eve of casting us, the miners of North Wales into general trouble, and we hereby advise that the above named men come back to their former terms with their employer at once, or, failing this that they at once cease work" (*Wrexham Advertiser*, 10 October 1886, D/DM/506/9). The miners in the Ruabon district had "more than once threatened to stop the colliers at Plas Power from continuing work at the lower scale" (*Wrexham Advertiser,* 2 October 1886, DD/DM/506/9), and were instrumental in getting the vast majority of colliers to stop work on 30 September. "Great dissatisfaction has prevailed throughout the district" (*Wrexham Advertiser*, 2 October 1886) at the decision by the Plas Power men to accept the reduction in wages. The Ruabon miners had resisted all attempts to enforce a similar reduction in the district, and they were determined either to stop the colliery (Plas Power) or to make the owners change their policy. They were also prominent in the "very serious riot [which] took place at Plas Power on Thursday afternoon [30 September]" (*Wrexham Advertiser*, 2 October 1886, DD/DM/506/9).

On the morning of 30 September 1886 "a mass meeting of colliers was convened ....adjacent to Gatewen colliery [sister pit of Plas Power]....when upwards of 3,000 - 4,000 colliers" assembled and, despite being cautioned by their leaders "there were a very large number of turbulent spirits in the crowd... that nothing else would seem to satisfy but a demolition of some property" (*Wrexham Advertiser*, 2 October 1886, DD/DM/506/9). At the meeting a decision was made to send a deputation of men to Plas Power to try to discuss the situation with JH Darby; unfortunately they were preceded by a crowd which "numbered several thousands", and when Mr Darby arrived "he was pelted with a few stones" (*Wrexham Advertiser*, 2 October 1886, (DD/DM/506/9). Mr Darby refused to negotiate with the mob, but conceded that his men could continue to work under the old rules until 9 October, when two weeks notice would be given

of any future change (*Wrexham Advertiser*, 2 October 1886, DD/DM/506/9). It was also reported that "Mr Darby was most reluctant all through to treat or discuss the question with any but his own men, and this fact being known, together with the assertion that the mob had been told to keep from the colliery irritated the men, and it required little more to put the whole crowd into operation in their work of destruction. The mob [was] bent on the greatest destruction imaginable...[and] the anger could not be restrained" (*Wrexham Advertiser*, 2 October 1886, DD/DM/506/9); windows were broken, coal tubs overturned, and machinery was hurled down the shafts, before order was finally restored when rumours of police and military intervention caused the men to disperse. By Friday 1 October work was resumed at all the big collieries and Plas Power went back on Sunday 3 October. When the owners withdrew their demand for an additional reduction, further strike action was avoided (*Wrexham Advertiser*, 10 October 1886, DD/DM/506/9).

At the end of 1885 the only union in Denbighshire that was still in any way active was the Union Society of the Miners of Rhosllanerchrugog which had 183 members (Rogers, 1928, X: 203), but the events of 1886 helped 'kick-start' a new interest in unionism. In November, two delegates from Denbighshire were sent to the Miners' National Conference at Manchester, a decision which "augured well for the future, for it showed that the local leaders had realised the importance of linking up to the national movement" (Rogers, 1928, XI: 78). However, this was something of a false start for "the colliers were not united" (Rogers, 1928, XI: 79); different pits had different attitudes to industrial relations, and often the Ruabon men were more militant, "while Gatewen, Westminster and Plas Power were resolutely opposed to strike action". The leader of the unionists, David Gough, the Rhosddu lodge representative, tried to encourage the men to combine, but in April 1887 the union "was hopelessly disorganised", a major reason being that the Ruabon district wanted to go it alone (Rogers, 1928, XI: 79).

By 1888, when the North Wales Miners Federation (NWMF) was created, this opposition had ceased and moves were made to widen both participation in the union and co-operation between the districts. The leaders of this union

worked closely with the Lancashire Federation and "the year 1889 proved a very successful one for the union", basically because, in conjunction with the MFGB, it secured three advances in wages (Rogers, 1928, XI: 84-5). These pay increases were probably used by the union as recruitment 'propoganda' to attract new members. However, given that the increases came in a time of boom and that wages would have risen anyway, it is unlikely that the union had infuenced the decisions to the extent that they would have the miners believe. Whatever the factors behind the pay increases, by December 1889 wages were 45 per cent above the 1879 standard, and there were 25 lodges in the NWMF.

The years 1890-1892 saw the NWMF progress further, to the extent that, by August 1891, "the union was sufficiently strong .....to appoint an agent", Mr Ioan T Williams; and in 1892 it was able to send two delegates representing 5,000 members to the national MFGB conference. However, this supposed success masked some real problems within the region; there were "difficult cross currents" within the various lodges, especially over how the union was to be organised centrally and, more especially, funded: many of the lodges were reluctant to pay more than a nominal sum into a central fund, wanting funds to remain local. After a great deal of discussion a set of rules, governing levies and benefits was drafted in November 1892; thus, as 1892 drew to a close, the Denbighshire and Flintshire Miners' Federation (DFMF), as it was now named, possessed a new constitution, an active organisation and a membership of 5,750 (Rogers, 1928, XI: 88-9). Although membership figures for individual lodges are no longer available for this period, given that Denbighshire was the prominent 'partner' within the north Wales coalfield, at that time (see Chapter 2), it is fair to assume that the majority of these members were from Denbighshire.

1893 - a year of turmoil

The year 1893 was one of struggle for the miners of Great Britain because, by February of that year, "a depression...had overshadowed the coalfields" (Rogers,

1928, XIII: 238). The MFGB advocated a 'general holiday' to reduce stocks in over supplied markets such as Lancashire, Yorkshire and the Midland counties. This holiday was to apply throughout Britain, but attitudes towards this suggestion varied significantly in different regions.

South Wales

In 1893, the miners in south Wales were still trying to negotiate an improvement to the sliding scale agreement and did not get involved in the MFGB's 'national' strike; they did, however, become embroiled in their own regional dispute, possibly emboldened by the resolve of miners in other regions and "the electric atmosphere" created by the prolonged lock-out in the Midlands (Page Arnot, 1967: 33). In south Wales the dispute was precipitated by the hauliers of the Ogmore Valley who struck work on 1 August 1893, unhappy with the postponement of an anticipated advance and demanding a 20 per cent increase in wages (Page Arnot, 1967: 33). The strike was "rapidly spread by marching bands" (EW Evans, 1961: 156), and by mid-August "it was considered virtually a general strike in most of the coalfield; collieries with two thirds of the coalfield tonnage were stopped" (Page Arnot, 1967: 34). As EW Evans (1961: 156) comments, "this outbreak was clearly directed against the sliding scale", and it was the first time that anger at the agreement had been transformed into violence. The strength of feeling against the sliding scale is illustrated by a resolution issued on the 14 August and cited by Page Arnot (1967: 34): "we the workmen of Monmouthshire and South Wales....denounce the demoralising effect upon us as a body, of the sliding scale.....and that we uphold the actions of the hauliers of Glamorganshire and Monmouthshire, come what may, and that we call upon the few men now at work to join in with the common cause of struggling for freedom".

Despite such rhetoric, according to EW Evans (1961: 156) "the collapse of the strike was inevitable from the first". The owners refused to negotiate and

resolved to prosecute strikers for breach of contract; troops were called in to prevent the marching gangs from traversing the coalfield and, most importantly, the strikers had no financial help either from the MFGB (who were struggling to find money for the strikers in other regions), or local unions (EW Evans, 1961: 156). Another important contributory factor was that the men's own representatives on the sliding scale committee were totally against the strike; they issued a manifesto on 18 August which concluded that "we cannot honourably encourage any attempt to violate the agreement and....it becomes our imperative duty to ask you, in the interests of yourselves and families, as in the interests of the trade....to resume your work.....and honourably carry out the obligations which you entreated us to enter into on you behalf" (Page Arnot, 1967: 36).

By the end of August the men began to return to work, encouraged by a wage increase which the latest sliding scale audit had granted, and the belief that the worst times were over (EW Evans, 1961: 156). According to Page Arnot (1967: 39), a major reason for the failure of the strike was that the "protest came up against the most thoroughly organised counter-force that existed amongst the employers of the British coalfields", namely, The Monmouthshire and South Wales Coalowners Association (MSWCOA). The owners had an effective federation which could offer a united front while the men were totally unorganised and without funds; the strike had been more of a spontaneous event than an organised one, and although it "spread like wildfire" (Page Arnot, 1967: 38), there was no attempt at real effective organisation.

Denbighshire

In north Wales, attitudes were generally against the idea of a general 'holiday' because, as Edward Hughes, then working at Point of Ayr (Flintshire) said, "in North Wales we had no stocks whatsoever" (D/NM/853). Indeed, some collieries were only working a two day week and, therefore, were already suffering an enforced 'holiday'. Despite this, the union officials such as Hughes worked hard

to garner support for the MFGB stance. The difficulties facing them are well illustrated by the problems Hughes faced within his own lodge at Point of Ayr. He had urged the men to support the national organisation, but the manager of the colliery, Mr Isaac Davies, told the men "how unwise it was to have a weeks (sic) play [as] we had no stock of coal, although I argued with him, he beated me fare (sic) and carried a resolution to resind (sic) my resolution of a few days before" (D/NM/853). This public show of disloyalty led the MFGB to expel the Point of Ayr lodge until January 1894, even though the 'holiday' policy was turned down by a narrow majority at the Birmingham Conference on 1 March (Rogers, 1928, XIII: 239).

By July 1894 the Coalowners Federation, an employers' organisation covering the 'Federated Area'[11], was calling for a reduction of 25 per cent in wages. The miners' representatives found this stance difficult to understand, given that, as James Darlington, manager of Black Park colliery, Chirk, had said in a speech, "the outlook of the coal trade [is] more encouraging" (*Wrexham Advertiser*, 24 June 1893, Wrexham Museum, hereafter, (WM)). The coalowners, however, argued that, "no employer seeks to reduce wages from sheer wantonness, it is because he is compelled, or close his works" (ES Clark, Llay Hall colliery, quoted in *Wrexham Advertiser*, 29 July 1893, WM). The employers also pointed out that, to be precise, the reduction was a 25 per cent reduction in the 40 per cent advance in wages that had occurred since 1888, which approximated to a 17 per cent reduction in gross wages, not 25 per cent (*Wrexham Advertiser*, 29 July 1893, WM). The miners' position was outlined by a writer, 'Gwalia', in the *Wrexham Advertiser* (1 July 1893, WM) when he commented, in a letter, that "a miner's aggregate earnings for twelve months will not average more than 17 shillings a week. Can a man maintain himself and his family in the present day with 25% less than this?".

Not all coalowners in north Wales supported the Coalowners Federation, indeed, many of the Flintshire owners actually increased wages when faced with

[11] The Federated Area had been set up in 1888 to govern wages in those regions that believed in collective bargaining rather than a sliding scale, namely Yorkshire, Nottinghamshire, Derbyshire, north Wales, Staffordshire, Warwickshire and Leicestershire (Rowe, 1923: 39).

a stoppage, while some of the Denbighshire owners "were going to the markets to undersell their fellow proprietors" (*Wrexham Advertiser*, 1 July 1893, WM). This division among the owners was unlikely to encourage the miners to unite; those in unaffected collieries would not come out in support of their colleagues who went on strike on 26 July against the pay cut. On 29 July the owners locked the miners out because, according to WF Butler, owner of Vron, "the masters were absolutely compelled to close their pits until the reduction was accepted, not from any desire to oppress the men, but because they really could not go on at the present rate" (*Wrexham Advertiser*, 5 August 1893, WM).

Once again, "the main problem in North Wales was ...lack of unity" (E Griffiths, 2000: 142). The miners of the two counties, Flintshire and Denbighshire, were divided to the extent that, at a meeting of the DFMF, a delegate, referring to the fact that many of the colliers in Flintshire had defied the union and continued working, said that "his men were determined that the Flintshire men must stop, or be compelled to do so" (*Wrexham Advertiser*, 5 August 1893, WM). Even within Denbighshire, individual collieries withheld support, despite the best efforts of union men, such as Hughes, who urged solidarity.

The strike was a long one, ending in November and causing tremendous hardship in Denbighshire; by the end of September, the *Wrexham Advertiser* (30 September 1893, WM) was reporting that in Gwersyllt and Summerhill, a soup kitchen was feeding more than 700 people, three times a week. In October, the men of north Wales asked if they could resume work at the old rates, but this was "not such as the coalowners can entertain" (*Wrexham Advertiser*, 7 October 1893, WM). Indeed, at a meeting of the Coalowners Federation in Westminster, London, it had been affirmed that no agreement could be arrived at that did not include a wage reduction. The hardships continued; the men were forced to "pick coal out of the old spoil banks and workings. The coal so got was of little or no ordinary value, but was saleable, or could be used in lieu of anything better while the pits of the entire district were closed" (letter to solicitors Burne & Wykes, London, from Colonel Meredith's solicitors, Acton, Bury & Acton; 6 February 1896, DD/DM/285/95). Even the national press became involved; a

correspondent for the *London Daily Chronicle* reported that "Ruabon is 150 miles from Bristol, yet here exactly the same conditions are reproduced in an exaggerated form. Here 11,000 men have been locked out for 10 weeks.....reduced to a condition of absolute hunger, and yet nobody knows anything about it because the fate of North Wales is swallowed up in the larger fate of Lancashire and Yorkshire" (cited in *Wrexham Advertiser*, 7 October 1893, WM).

One of the main problems for the men was the fact that the union (both national and local) was unable, through lack of funds, to provide adequate strike pay (E Griffiths, 2000: 142). This was discussed by the reporter for the *Daily Chronicle*, who explained that "the total amount of locked-out pay which they have received has amounted to 4d per head for the whole time". He went on to say that "this ought to say something for the ability of the North Wales miner....as they have solved the problem of existing on two fifths of a penny a week for 10 weeks". The correspondent appeared admiring of the stoicism of the men for "[they] are as firm today as ever they were. 'No reduction' is the word, and their wages are low enough in all conscience already, four and sixpence a day is the very top wage for an experienced collier" (cited in *Wrexham Advertiser*, 7 October 1893, WM). He heaped opprobrium on the coalowners when he remarked that "in spite of all efforts at self-denial and self-sacrifice, gaunt hunger has stalked up and down the hills and vales of Denbighshire at the bidding of the coalowners", and illustrated how far reaching the strike was when he explained that "what aggravates the distress in the Wrexham district is that owing to scarcity and the price of fuel, the steel works and terracotta factories are closed" (cited in *Wrexham Advertiser*, 7 October 1893, WM).

There is no denying that, despite the 'over-the-top' nature of such reports, distress in the county of Denbighshire was widespread, and by mid-October many of the men were desperate to return to work as they felt that the reason for the strike (overstocking) was no longer an issue. David Gough, the Rhos Ddu lodge representative, explained, at a meeting of the miners, that "there was no doubt that the lock-out occurred in the first place because there were large stocks

of coal in Derbyshire, Yorkshire and Lancashire. These had now been dispersed and so there was no cause for a further lock-out on that ground". Prices were starting to rise and so the owners could no longer use that as a stumbling block to agreement. Yet still the lock-out continued and, according to Gough, "the only reason left was one which the masters dare not make public, they desired to starve the men into submission and break up the Federation" (*Wrexham Advertiser*, 14 October 1893, WM).

By 21 October there had been a national offer to let the men back at a reduction of 15 per cent; this signalled the beginning of the end for the strike as men began to drift back to work on the basis of varying individual agreements. For example, the men of Vron and Llay Hall went back at a 15 per cent reduction, whereas the men of Vauxhall and all the men in the Mold district were able to return at the old rates (*Wrexham Advertiser*, 21 October 1893, WM). In November, Gladstone invited representatives of both sides to a conference, and it was agreed that the men would return at the old rate until February 1894, and a Board of Conciliation would be set up in the meantime to look into the whole issue of wages in the 'Federated Area' (*Wrexham Advertiser*, 19 November 1893, WM).

The effect of 1893

The year 1893 therefore saw long strikes in both north and south Wales; in south Wales the issue was a regional one, the sliding scale, while in north Wales, the miners of Denbighshire were dragged into a strike by virtue of the fact that the region was part of the 'Federated area' for union purposes, and the MFGB had called a strike covering this region. The strikes, in both north and south Wales, were doomed almost from the start, neither the national union, nor the local lodges having sufficient funds to sustain the miners in a prolonged strike, and much hardship prevailed. After the long strike "the North Wales coalfield was left with a divided union riven by dissension. [The] Flintshire collieries remained disorganised, the Wrexham and Ruabon districts wanted the executive

committee of the DFMF to consist of their representatives only, while the Rhos union decided to go its own way" (E Griffiths, 2000: 143). In south Wales the main representatives of the miners were at loggerheads; one faction, headed by Mabon, was against using strike action, while the other, led by Brace, was wholly committed to the abolition of the sliding scale. Brace was convinced that new methods were needed if the sliding scale was to be removed, and he felt very strongly that a strong centralised union, with strong ties to the MFGB was required (EW Evans, 1961: 158). However, he 'battled against the tide' in that he was implacably opposed by Mabon who, despite the shortcomings of the sliding scale, had very strong support among the south Wales miners. It was thus that, by the end of 1893, the miners of south Wales were no nearer creating a strong, united union than their brethren in north Wales, and it would be a few more years, in both regions, before this became a reality as, yet again, the colliers failed to find an issue behind which they could to unite.

Towards unity - 1894-1908

The last years of the nineteenth century saw the miners and their organisations, in both north and south Wales, finally realise that, if they were to be effective, they had to speak with one, regional voice, which in turn supported a strong national movement; once this realisation had hit home, union membership and influence began to increase significantly in both regions. One issue which began to unite miners from different regions was the issue of wage bargaining and the pursuit of a national minimum wage. However, before unity could be achieved, several issues had to be resolved, not least that of sliding scales compared to alternative methods of settling wage rates.

In 1894, the sliding scale remained one of the biggest issues that divided the coal miners on a national basis; according to Rowe (1923: 38), since 1888, when the Federated Area had been created, there had been "a complete cleavage in opinion and practice regarding the regulation of wages by [a] sliding

scale". Those in the Federated Area were wholly opposed to the principle, and relied on Joint Conciliation Boards (JCBs), whereas the other main areas, the north east of England and south Wales, continued to support, if somewhat reluctantly in the latter's case, the idea that wages and prices should closely follow each other. In both the Federated and other regions where JCBs operated, much was made of the fact that wages in the 'other' area were generally perceived to be higher by the workmen, or lower by the owners, than in their own area. However, miners in those areas outside the Federation had the same perception, for example, miners in south Wales believed that the sliding scale kept their wages lower than those in the Federated Area. Rowe (1923: 39) argues that although this may well have been the case at different times, it was not because of the way the systems worked, but because of the markets that each area predominantly served. Rowe explains (1923: 40) that, in general, wages in the Federated Area were more stable than in the other regions, but this was due to the fact that the latter were more involved in the export market where prices fluctuated much more significantly than in the home market, which the Federated Area predominantly served. It must be pointed out that although north Wales was part of the Federation, it did not conform to Rowe's (1923: 40) view as it became increasingly involved in the export market and may not have exhibited the same traits as other coalfields in the Federation.

Table 6.1 shows how wages increased above the 1888 standard in both the Federated Area and the non-federated regions; it can be seen that in the Federated Area wages only ever went up, whereas in the non-federated regions they fluctuated both up and down. While increases in, for example, Northumberland, were often higher than those in the Federated Area, at no time do wages in the latter fall, whereas in Northumberland, wage rates could fall significantly as, for example, between August 1894 and October 1895.

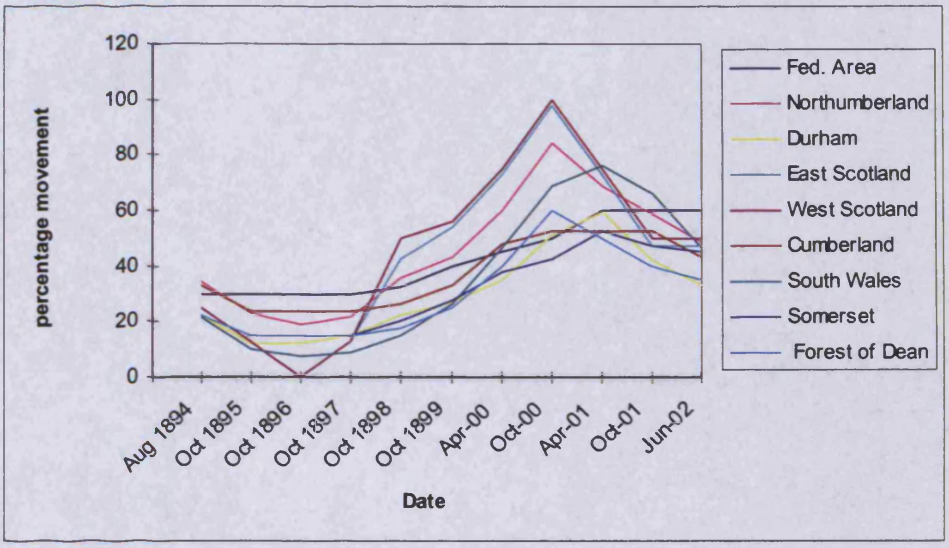
Table 6.1: Statement of percentages above the 1888 standard, by coalfield region, 1894-June 1902

Date	Fed. Area	Northum berland	Durham	East Scotland	West Scotland	Cumber-land	South Wales	Somer-set	Forest of Dean
	%	%	%	%	%	%	%	%	%
Aug 1894	30.00	34.28	21.95	25.00	25.00	33.33	21.25	22.25	22.50
Oct 1895	30.00	22.85	12.20	12.50	12.50	23.81	10.00	15.00	15.00
Oct 1896	30.00	18.56	12.20	par	par	23.81	07.50	15.00	15.00
Oct 1897	30.00	21.42	14.64	12.50	12.50	23.81	08.75	15.00	15.00
Oct 1898	32.50	35.71	21.95	42.50	50.00	26.19	15.00	20.00	17.50
Oct 1899	40.00	42.85	26.82	53.75	56.25	33.33	26.25	27.50	25.00
Apr 1900	45.00	60.00	35.36	72.50	75.00	47.62	46.25	37.50	40.00
Oct 1900	50.00	84.30	51.18	97.50	100.00	52.38	68.75	42.50	60.00
Apr 1901	60.00	68.57	59.54	72.50	75.00	52.38	76.25	52.50	50.00
Oct 1901	60.00	58.56	41.47	47.50	50.00	52.38	66.25	47.50	40.00
Jun 1902	60.00	48.57	32.92	47.50	50.00	42.86	46.25	45.00	35.00
Net increase	30.00	14.29	10.97	22.50	25.00	09.53	25.00	22.50	12.50

(Source: Agreements arising out of Rosebury Conference - 17 November 1893 at the Settlement of the Great Strike of Miners in the Federated Areas, D/NM/312).

These fluctuations, and the steady increase in the Federated Area's wage rate, are perhaps more apparent if plotted on a graph (see Figure 6.1). In all areas, whether the sliding scale was used or not, wages were "formally adjusted by a percentage system on or off the rates existing at a certain date" (Rowe, 1923: 46), i.e. 'the standard'. One of the factors that caused problems in the years before the minimum wage was introduced in 1912, was that 'the standard' was not identical throughout the British coalfield; for example, in Northumberland, Durham, south Wales and Cumberland, the standard year was 1879, whereas in Scotland and the Federated areas it was 1888 (Rowe, 1923: 46). This caused friction because the standard did not provide a 'level playing field' and some coalfields might have been starting from a better position than others.

Figure 6.1: The percentage movements of wage rates, above the 1888 'standard' in the Federated Area and the other regions of the UK, 1894-1902



(Source: as for Table 6.1).

According to Mitchell (1984: 241) the year that was chosen as standard "depended on the way in which collective bargaining developed"; in those regions where it developed earliest, for example in south Wales and Durham and Northumberland, the earlier year of 1879 was used. Additional problems arose at the local level where different collieries could have different standard years. This can be illustrated by looking at north Wales where "the problem of ascertaining the 1888 basis was not solved" (Rogers, 1928, XIII: 244) and three different standards were used: in the Ruabon area they used the 1879 standard, in the Hafod colliery they used the 1882 standard, and the remaining collieries used 1888 (Rogers, 1928, XI: 84). If such were the difficulties in a minor coalfield, the problem can only have been magnified many times over in the larger coalfields. The differing notion of the issues and the problems to which they gave rise can be illustrated by examining the south Wales and Denbighshire coalfields during the period 1894-1908.

South Wales

In south Wales, the 1894-1908 period saw the development of a stronger, more centralised union; again, the issue which brought the miners together was the sliding scale. Although the sliding scale had been renewed in 1892, "in the five years after the hauliers' strike (1893) it had become more and more unpopular" (Page Arnot, 1967: 44); wages had fallen steadily "in a long slow decline", and by August 1896 they were only 10 per cent above standard. "Prices and wages with them seemed to be tumbling into a bottomless pit" (Page Arnot, 1967: 44-5) and, in 1897, the miners began to plead for a minimum wage to be agreed. When this was refused, the miners voted in a ballot by 41,880 to 12,178 to give six months notice to re-negotiate the sliding scale agreement (Page Arnot, 1967: 44-5). By this date, even Mabon had conceded that significant changes were required, but he still clung to the belief that the sliding scale was still the best method of governing wages, although he did now advocate a minimum wage (EW Evans, 1961: 168). Many of the miners also believed in the principle of the sliding scale; it gave them a sense of security despite its shortcomings, and they believed that without it, wages would have fallen faster and further (EW Evans, 1961: 168).

It was unfortunate for the miners that the owners actually welcomed the chance to alter the agreement; EW Evans asserts (1961: 170) that they too wanted a new agreement, skewed in their favour, that would help them reduce the production costs of a region where output per man year was 64 tons lower than the national average, and where labour costs amounted to nearly 80 per cent of operating costs per ton. The circumstances proved unfortunate for the men because they were not in a position to put up much of a fight; their negotiators "found the owners in a very unaccommodating mood" (Page Arnot, 1967: 45). The owners refused to discuss a minimum wage and threatened a lock-out (EW Evans, 1959: 63; Page Arnot, 1967: 45). This threat was carried out at the beginning of April 1898, and yet again the miners found themselves "in a desperate position from the beginning" (Page Arnot, 1967: 47). One of the main problems was the split in the leadership; Brace and Morgan wanted continued

resistance but Mabon advocated compromise (EW Evans, 1961: 173). At the beginning of the dispute, the former leaders prevailed and Mabon was voted out as Chairman of Conference, an event that demonstrated "the rejection of his policy of compromise by the miners" (EW Evans, 1961: 63). However, "after forty days of idle pits and growing privation", Mabon was re-elected by a small majority, and given instructions to settle the dispute (Page Arnot, 1967: 51). The main reason for the "widespread distress" (EW Evans, 1961: 174) was the lack of funds; this is hardly surprising given the general attitude of the miners to union levies and, despite receiving some help from the MFGB, it was becoming increasingly obvious that an agreement had to be reached if further suffering was to be prevented.

However, despite wanting to end the stoppage quickly, Mabon and his co-negotiators found that they were unable to do so. The coalowners knew they had the upper hand, and would not move on any of the men's demands; they insisted that the lock-out would only end when the men agreed to re-establish the 1892 agreement, and abolish Mabon's Day (a monthly 'holiday') (EW Evans, 1959: 63). The miners held out for as long as they could, but "that they should surrender in the end was inevitable" (Page Arnot, 1967: 60), and they finally agreed to return to work, under the owners' terms, on 1 September 1898, after a period of terrible hardship that had seen widespread hunger and deprivation. As Mabon told the *South Wales Daily News* on 2 September 1898 (cited in ID Thomas, 1975: 43), "this has been a terrible day for us, and it ends with a terrible disappointment for all of us". However, there was one clause that the union appeared to welcome as a face-saving opportunity; namely, that wages would not fall below 12½ per cent above the 1879 standard, and Mabon seized on this as meaning that the principle of a minimum wage had been satisfied (EW Evans, 1959: 65). EW Evans (1961: 174), however, comments that "this was probably an unduly optimistic appraisal of the owners' concession"; all the clause did was allow men to terminate the sliding scale agreement, it did not force employers to always pay at least 12½ per cent above the standard. The miners had lost, and all they could do was "accept the inevitable and to prepare to organise for better

things" (Mabon, cited in ID Thomas, 1975: 44). According to Page Arnot (1967: 60), however, "the struggle had not been in vain" because the miners were finally forced to confront the reason for their failure, and "at last the rank and file were aroused from their apathy.....and were wholeheartedly in favour of forming a strong union in South Wales" (EW Evans, 1959: 65).

In October 1898, the South Wales Miners' Federation (SWMF) was formed with Mabon as its President and its main aim being to abolish the sliding scale agreement. The fact that the agreement was still in force was a major stumbling block to acceptance into the MFGB (it did not want affiliates from areas where sliding scale agreements were in force), but the MFGB finally accepted that the sliding scale was more likely to be abolished if the SWMF was incorporated within, and supported by, the national organisation, and the SWMF was eventually accepted as a member in January 1899 (Page Arnot, 1967: 70).

According to Howell (1996: 26) the new union adopted a pit-lodge system because "the miners felt [that] this best enables them to preserve the work control and customs which they had established at the pit". The SWMF was reliant upon voluntary contributions, and had a central fund (EW Evans, 1959: 66), but it was not a federation in the same sense as in other areas: "its title signified only that a number of local associations.....had come together to form a single trade union"; districts still had a great deal of independence, and "the source of effective power remained very largely in the districts ...[which]... jealous of their powers, yielded only the very minimum necessary to the new single trade union" (Page Arnot, 1967: 74-5). Despite the creation of a central fund, funding remained a significant problem; the miners persisted in rejecting any attempts to increase their levies, and indeed their contributions, according to EW Evans (1959: 69), were only half of those paid in England. This, combined with the rules governing the funding of disputes, meant that the central fund was often low on funds but, whatever the shortcomings of the new system, an important principle had been established. The new union achieved "instantaneous" success (EW Evans, 1959: 69); within six months of its creation it had 92,000 members; by the end of 1899 this had risen to 104,212 or 78.5 per

cent of the total workforce, and by the end of 1900 the figure stood at 127,894 or 86.6 per cent (Page Arnot, 1967: 70; Gibson, 1922: 21). EW Evans (1961: 179) attributes some of this success to the intimidation of non-union men by union members; he observes that "it is interesting to note that previous organisations had not attempted to coerce reluctant workmen into becoming members", but now, as in north Wales, this tactic was much used, and many stoppages occurred over the issue.

In 1903 the miners of south Wales succeeded in getting rid of the sliding scale; the 1892 agreement ceased in 1902 and was replaced by a Conciliation Board. According to EW Evans (1959: 73), it still meant that wages moved in line with selling prices, but now the "correlation was not so close". In addition to this, the new agreement included a minimum rate, 30 per cent above the standard, which the miners took as a cause for celebration. However, to all intents and purposes, the agreement was little more than a sliding scale agreement with a minimum rate, and the fact that the miners had also agreed to a 'ceiling' - a maximum rate of 60 per cent above standard, meant that in boom times the miners could not demand wages any higher than this, even if the selling price warranted it.

The years 1903-1908 saw the south Wales coalfield enjoying a period of relative peace; according to EW Evans (1961: 188), the miners were mainly concerned with the questions of Parliamentary representation and non-unionists; the industry was going through a period of prosperity, wages were rising and not perceived to be a problem, and the principle of a minimum rate had been established. This, coupled with the fact that by 1908 union membership had reached "a record level of 145,579" (EW Evans, 1961: 188), meant that the union leaders may well have thought "their troubles were a thing of the past" (Page Arnot, 1967: 126).

Denbighshire

As previously stated, it had finally dawned on some of the miners in Denbighshire that they had to combine if they wanted to negotiate with the owners (who had a relatively well organised coalwners association) from a position of strength. However, in the first years after the 1893 lock-out, little was achieved; there was a "lack of enthusiasm for the union" (Rogers, 1928, XIII: 245), not helped by a scandal in 1895 involving the financial secretary, and a bitter rift between the DFMF and the Rhos section which wanted to create its own union. Such events did little to attract new members and, by December 1896, the union had only 1,885 members (Rogers, 1928, XIII: 246) which was only 16 per cent of the total north Wales workforce of 11,536 (Gibson, 1922: 11-12). By the beginning of 1897, therefore, the situation looked bleak; there was continued disagreement between the districts (Denbighshire, Flintshire and Ruabon), and funding was poor. A resolution in April 1897 asking whether a contribution of 9d per month to a central fund was acceptable, received only 46 votes in favour (Rogers, 1928, XIII: 247-8). However, in November 1897 an important event took place. Edward Hughes, who was already financial secretary of the DFMF, was also appointed general secretary, and he proceeded to "rebuild the union on firm foundations" (Rogers, 1928, XIII: 250).

Hughes was to prove to be one of the most influential figures in the labour history of north Wales. Born in Llanasa, Flintshire in 1856, by the age of 7 he was working in the "washings" (washing the ore so as to prepare it for the smelters) at the lead mine in Trelogan. At 12 he began working in the coal mining industry at the Old Mostyn colliery and, at the age of 14, he went underground (E Griffiths, 2000: 131). He became involved in a wage dispute at the age of 17 and was sacked. He then worked in Liverpool and Wrexham before moving to Durham in 1875. There, he became heavily involved in union activity and was involved in the long strike of 1879. In 1887 he returned to north Wales and worked at Point of Ayr as checkweighman, and came increasingly to be relied upon as the workers' spokesman (D/NM/852). He eventually became the DFMF's delegate at Point of

Ayr which, according to him, "was a very sore matter for the manager" who continually tried to sack him (D/M/853). In his autobiographical notes, Hughes says that he was often before the magistrates at Prestatyn "to show why I should not be removed from my position" (D/M/853). It would appear that the chief motivating factors in Hughes' life were religion and a strong belief in the rights of the miners to be paid a fair wage for the dangerous work they did. He also believed that only by speaking with one voice could the miners ensure that this happened; he explained "what made the Point of Ayr workmen a body of union men was that they [knew] that if to be union men they had to be ruled by the union..... it was the duty of each member to be loyal to [a] resolution...whether it was wise or unwise" (D/NM/853). It was this cohesion that he strove to achieve when he was in a position to influence the union as a whole; with this in mind he saw his first task as centralising the DFMF, especially its finances.

In 1897, the DFMF was the only section of the MFGB not to have a central fund (D/NM/1, 19 July 1897), and Hughes was determined that this situation should not continue. In July 1897 a circular was sent to the men which stated that "we have come to the conclusion that the sooner you decide to form your society on the same principles as other trades unions in connection with the Federation of Great Britain, so soon will you be able to prevent those private reductions taken (sic) place, from which you so much suffer at present" (D/NM/1, 19 July 1897). It continued, "the unreliable state of your funds and the worry and expense of getting levies when due has caused us, your representatives to allow thinks (sic) to take place at different collieries which we feel to be contrary to all trades union principles". The issue was eventually debated at conference in November 1899; the Ruabon section protested and seceded from the Federation, but agreement was forthcoming from the other districts (Rogers, 1928, XIII: 250). Having achieved this, Hughes was determined to eliminate local funds; he wanted local officials to be paid by the central fund and, by 1903, had successfully achieved his aim.

In August 1898, Hughes had also been elected agent for the union and had begun work to increase membership; in a circular to all miners dated 14 May

1900 (D/NM/2), an emotive appeal was made: "we are appealing to you who are outside our ranks not to disgrace your country by being so selfish and to allow your fellow workmen in England to fight your battle and pay on your behalf". The union was not above intimidation in trying to extend its influence; at the annual conference of the DFMF on 1 January 1901, "it was resolved that steps should be taken at any colliery were (sic) the members of the Federation are in favour at such colliery to enforce all to be members by refusing to work with non-union men" (D/NM/2). In March 1901, the union was pushing the NWCOA to make membership of "the Federation ... a condition of labour whenever the members are in a majority" (D/NM/2). The owners neither acceded to, nor rejected this demand, they responded by saying that they felt that "your agent, Mr Hughes would be able to perswade (sic) all the men to join without taking drastic steps" (D/NM/2), and promised not to put any obstacle in his way as long as he used legal means of persuasion. Hughes' tactics appeared to work; when he became agent in 1898, membership stood at 2,212 or 19 per cent of the total north Wales workforce; by 1900 (excluding the Union Society of Rhosllanerchrugog) it was 4,888, or 39 per cent of the workforce; in 1901 it was 7,617, or 57 per cent (the Rhos union had returned to the fold), and by the end of 1902 it had risen to 9,089, or 68 per cent (Rogers, 1928, XIII: 251).

From 1901, one of the main aims of the union was to negotiate a 'price list'[12] that would apply across the region. Hughes had realised very early on in his tenure that having different 'standards' at different collieries was inequitable, and wanted to agree a uniform standard wage which he knew was a prerequisite if a price list was to be agreed across the region (Rogers, 1928, XIII: 252). The prevailing system whereby wages were governed by a Conciliation Board was unsatisfactory from his point of view; this was demonstrated by the fact that there were disputes at individual collieries over the fact that the owners often withheld the rates that had been decided by the Conciliation Board. In the minutes of the DFMF (D/NM/2), there are constant references to disputes/grievances at various

[12] A price list was a detailed list of the prices that would be paid for the various tasks carried out by a miner, both underground and on the surface.

collieries over such issues as men being stopped without notice, seams being closed or changed without notice and the wrong wages being paid. The employers seemed to do everything in their power to put obstacles in the way and to drag their feet in implementing any agreement; for example, the minutes for 6 December 1901 give details of a dispute at Hafod. Here, the miners had agreed, in 1899, "to work in hard and difficult places at the rate of 5s 6d per shift, [but] since [then], the wages have gone up 15% and the employer considers that the men, being (sic) that they agreed to 5s 6d nett are not entitled to the ...advances [decided by the Conciliation Board]". In his Annual Report for the year to December 1901, Hughes told members that "we shall always be troubled by this grievance [owners not paying agreed rates] until we shall secure a standard rate of wages for all classes of work".

Hughes was still fighting over this issue in 1904 but the union, renamed the North Wales Miners Association (NWMA) as of 21 April 1902, was distracted from its campaign by the fact that "this has been an exceptionally bad year.....thousands of miners in North Wales have not average (sic) more than three days per week throughout that year, while hundreds of others have not worked for months" (D/NM/65, annual report 1904). However, they remained committed to the ideal, the same report stating that "we strictly adhere to our previous resolution viz - that nothing will satisfy the members other than the rates of 1888 plus ruling percentages, and that such rates be signed by the employers and posted on every pit bank in North Wales". Some success was achieved when the coalowners agreed to discuss the issue in February 1905 and, despite a total failure at this date to reach agreement, the issue was at least acknowledged by the employers. Further unsuccessful meetings took place at which the union continued to press the issue, but "they [the coalowners] would not agree to the principle of a 4s minimum in hard and difficult places. They also objected to a close (sic [clause]) in the price list providing for a scale of wages for boys" (D/NM/2, 1906).

Mitchell (1984: 167) explains that the negotiation of a price list was "a somewhat tortuous business", and this is borne out by the fact that it was not until

1907 that agreement was reached in Denbighshire "thanks largely to the negotiating ability of Hughes, and the considerate attitude of the employers" (Rogers, 1928, XIII: 253). A meeting was held on 7 October when the North Wales Price List Joint Committee agreed to the following minimum rates, which would apply to the price lists used in all the association collieries, and would come into effect on 1 January 1908:

i) colliers in hard and difficult places - 4/- per day
ii) collier taken out of his place to work for the company - 4/- per day
iii) timbermen and metalmen - 4/- per day
iv) experienced bye-men who had worked underground for more than two years - 3/ 4d per day
v) boys 13-16 years - 1/ 4d
boys 16 + - 1/ 8d

(D/NM/2 , minutes, 7 October 1907).

The collieries covered by the agreement were: Bersham, Vauxhall, Wrexham & Acton, Gatewen, Plas Power, Black Park, Wynnstay, Westminster, Brynkinallt, Hafod, Llay Hall, New Brynmally, Ffos y Go and Vron. In 1908, these collieries employed 10,452 men or 92.5 per cent of the total mining workforce in Denbighshire (*List of Mines*).

The union was jubilant and, in its review of 1908, the first year in which the price list operated, it reported that "on the whole the agreement has been adhered to considering that the universal price list for the coalfield was a very big question" (D/NM/65), but still some coalowners, even those who had signed the agreement, refused to recognise the price list in its entirety. This is illustrated by an article in the *Wrexham Advertiser* (11 January 1908, WM), which reported that "it was arranged that price lists should come into effect at all collieries on January 1st, but up to the present, at only three of the collieries belonging to the coalowners' association have lists yet been signed" (for an example of a 1907 price list see Appendix F). This reluctance on the part of the owners led to an increase in grievances and disputes; for example, at some collieries where the

owners already paid more than the rates agreed in the price list, the owners wanted to cut the wages to the minimum level although the lists were supposed only to apply to collieries where less than the minimum was being paid (*Wrexham Advertiser*, 11 January 1908, WM). This was only one of the tactics used by the owners to avoid their obligations under the agreement, another was to employ non-union men, an issue which greatly upset the NWMA.

In 1905, a union pamphlet had appealed for greater unity; "fellow workmen, so long as we remain united we will be a match for all of our enemies and so prevent the capitalist from being in a position to make slaves of us" (D/NM/2, 6 July 1905), but still a small proportion of men remained outside the ranks of the union, usually because they perceived the levies to be too high. This infuriated the union members because "they [the non-unionists] admit the advantages of organisation and are prepared to receive all the benefits - but to contribute anything to the funds is out of the question. This I consider to be the essence of meanness" (G Rowley, 1903). The issues of non-union men and the price list were closely related because "some unscrupulous employers [employ non-union men]... to do away with the principle of a standard rate of wages as provided in the price list, the legal status of which has been proved beyond question" (D/NM/2, 1 July 1908). The union often threatened to use the strike weapon, but Hughes, like Mabon in south Wales, was not enamoured of strikes; they were to be "strictly avoided.....he advocated patience and tact" (Rogers, 1928, XIII: 255), and was a firm believer in negotiation as the best means of settling disputes because he knew from personal experience the hardship that strikes created.

Conclusion

The years 1894 to 1908 saw the MFGB begin to establish itself as a strong national union but it took almost twenty years, from its creation in 1889, for all the unions representing the different regional coalfields to become affiliated with it (Howell, 1996: 35). In south Wales the miners finally came to realise that if they

were to get rid of the unpopular sliding scale they would need to present a strong, united front and this resulted in the creation of a single, unifying organisation, the SWMF. In north Wales too, the miners, led by the influential Edward Hughes, came to see the advantages of a strong union and, finally, as the last district of the UK to do so, created a central fund in 1897. The issue that united the miners in both regions behind the MFGB was the issue of wages; in south Wales the miners' perceived that the sliding scale gave them lower wages than those paid in the 'Federated area', while in Denbighshire, the union wanted agreement on a local 'price list' covering all the tasks undertaken by colliers. Both aims were met; in south Wales the sliding scale was abolished in 1903, while in north Wales a price list agreement was reached in 1907 and it may well have seemed to the miners that "their trade union, the vessel that held the fortunes of the Welsh miners, was voyaging happily over untroubled seas" (Page Arnot, 1967: 126). The 'seas' at that time were indeed calm; they were soon, however, to became choppier as storms began to gather on the horizon, storms which would plunge all the coalfields of the UK into unparalleled industrial strife.

The Eight Hours Act, 1908

It is ironic that, by achieving legislation which introduced an eight hour day, the MFGB was to contribute to the bitter industrial disputes that took place in the years leading up to World War I. The MFGB had been agitating for an Eight Hour Bill since its foundation; the first attempt at introducing a Bill was in 1889 but it, and a subsequent attempt in 1893, failed. The next attempt was in 1907 and, as always, the employers raised innumerable objections; in north Wales the coalowners articulated their objections to the *Wrexham Advertiser* (18 January 1908, WM), in the following manner:

1. "That Parliament ought not to interfere with the question of hours of labour because it is an interference with the liberty of the individual.
2. That there is no necessity for the working hours of miners to be reduced.

3. That a reduction in hours would not lead to any improvement in the health or physique of miners.
4. That a reduction of hours would lead to a very large decrease in the output of coal.
5. That a large reduction of the output of coal would lead to a considerable increase in the price of it for householders and manufacturers".

It was these final two points that were used by the coalowners as the main thrust of their argument against the Bill; in south Wales, where the coalowners were far more vehemently against the Bill than in other parts of the country, they estimated that the shorter working day would reduce output by at least 15 per cent which would increase working costs by 1s 6d per ton, and lead to a 2s increase in the price per ton to the consumer (Page Arnot, 1967: 132). The south Wales coalowners were so totally against the Bill because the average working day in that region was longer than elsewhere, and also their production costs were higher. Restricting hours would therefore have a greater impact on their profits than on those of coalowners in other regions (Page Arnot, 1967: 132). They argued that such restrictions would reduce wages; "this alteration of one of the main conditions of employment would necessitate the employers seeking a reduction in the basis of the general wage rate of the workmen", which they felt would lead to a "disturbance of the friendly relations between the employers and the workmen" (Minutes of SWMF meeting 8 January 1908, cited in Page Arnot, 1967: 133). This statement was to prove to be prophetic within a very short time.

The pressure put on Parliament by the owners did mean that the miners were thwarted in their demand for a eight hour day from 'bank to bank', i.e the "time spent below ground plus the time taken to wind [all] the men up *or* down; or more strictly, plus the time between the middle man up and the middle man down" (Mitchell, 1984: 130) but, on the whole, when the provisions of the Eight Hours Act came into effect on 1 July 1909, the miners were delighted, especially those in south Wales. However, as mentioned above, the Act, rather than solving

problems on the coalfields, actually added to them as the coalowners tried to find other means of cutting costs.

One of the main problems with the Eight Hours Act was that the eight hour limit was interpreted differently by the unions and the owners. According to Mitchell (1984: 130) the unions' interpretation was that the eight hours should mean the time 'bank to bank'. The owners, on the other hand, believed that the eight hours should be the time spent at the face, and should exclude all winding time. The problems experienced by miners in Denbighshire were outlined by Edward Hughes in an interview with the *Wrexham Advertiser* (10 July 1909, WM). He explained that some of the men were concerned because in one colliery (unnamed), men who started their shift at 2pm were not allowed up until between 10.20 and 10.40 pm; this was because the employer 'allowed' 20 minutes for the cage to descend, and interpreted the eight hours as starting from the moment the men reached the pit floor. Others (again unnamed) insisted that the men were actually at the face for eight hours, which meant that they were not given the time to get from pit floor to face as part of the eight hours; as Hughes pointed out, this meant that for some men it took ten hours to get from 'bank to bank'.

An additional problem arose when the NWMA demanded that the miners be given twenty minutes 'snap time' (meal break), during which winding and haulage should stop. The employers agreed to the 'snap time', but would not allow winding to stop; this meant that, although entitled to a break, the men would not actually get it, the continued winding preventing it. This issue was debated at considerable length without success, and eventually the NWMA told its members "the terms offered by your employers we could not conceentiously (sic) accept, and we decline to be a party to such terms" (D/NM/2/17 July 1909). In protest, on 19 July the NWMA gave notice of termination of all members' contracts which led to further discussions and eventual agreement on 9 August; it was agreed that 'snap time' would be fifteen minutes in length, and winding would be stopped, except on Saturdays (D/NM/2/9 August 1909).

According to Mitchell (1984: 142), after the introduction of the Eight Hours Act, the national average 'bank to bank' day lasted eight hours thirty nine

minutes, a reduction of an hour in south Wales and half an hour in north Wales. Mitchell (1984: 142) also believes that, apart from these two regions, the Act affected only some areas of Lancashire, the Midlands and Shropshire, "elsewhere the Act apparently made little difference to the hewers". It was soon apparent that, in north and south Wales, this reduction in hours would cause the relations between men and masters to be severely tested.

1909-1914

The main problem that was created by the Eight Hours Act was that, in the face of mounting production costs, the owners had to find imaginative ways to reduce them. Having, over the years, already reduced many of the unofficial allowances given to the men, such as a ban on taking home any waste timber, the owners now turned on other allowances, the defence of which would, ultimately, cause the most bitter industrial dispute, up to that date, ever experienced in Britain: the national miners strike of 1912.

'Hard and difficult places'

The history of British miners between 1908 and 1914 has become synonymous with that of the south Wales miners who were behind the industrial unrest that marked this period. Having welcomed the eight hour day, it did not take the miners in south Wales long to realise that the wage reductions the owners had foreseen were indeed a consequence of shorter hours. When the owners began to threaten the removal of the allowance for working a 'hard and difficult' place, the miners' attitude began to harden. It is important to note that "the custom of abnormal places was not peculiar to south Wales" (Boyns, 1982). It also had a tremendous impact in north Wales and, from 1909, there was much agitation in both regions for a settlement of the issue. It must be pointed out, however, that "abnormal places were prevalent in the [south Wales] coalfield because the majority of seams were less consistent in nature than in most other coalfields"

(Boyns, 1982), and therefore the problems associated with such places were commensurately higher in this region than in others.

A 'hard and difficult' or 'abnormal' place can be defined as "part of a seam where a collier cannot, for reasons beyond his control, produce a normal day's output" (EW Evans, 1961: 191). Generally speaking, if a miner found himself working in such a place, it was customary for him to be paid an allowance, determined by reference to the 'place', and also to his level of skill. There were no general norms for these allowances, and they were "determined on a rule of thumb basis" (EW Evans, 1961: 191). This is illustrated by an extract from an agreement relating to Brynkinallt, Denbighshire, signed 4 October 1894; here it was customary "where difficulties such as faults etc. interfere with the production, a consideration will be paid, the amount of such consideration to be a matter of arrangement between the manager and collier" (D/NM/1424). Until the introduction of the eight hour day, any men working in such places could make up their daily wage by undertaking overtime. The new Act took away this opportunity and, when the owners began to look at the whole issue of allowances, the miners could see their already small wage being further eroded.

In 1908 the position of the coalowners had been bolstered by a case in Pontypridd, south Wales, where a miner had sued his employer to recover the difference in his earnings between working a normal and an abnormal place. The judge found in favour of the employer, and stated that such allowances were "a matter of gratuity, and could not be recovered by process of law" (EW Evans, 1961: 192). This left the employers free to reduce allowances, and saw miners wages fall, sometimes significantly. According to EW Evans (1959: 84), many miners "faced genuine hardship owing to the abolition of overtime, and hauliers, riders and trafficmen, the lowest paid workers in the mines were perhaps even more severely affected". By November 1909, unions in south Wales were pressing for a minimum wage for those men working in hard and difficult places This was a new departure because they were now asking for a specified minimum amount - 4s 9d per day (EW Evans, 1961: 193), rather than a minimum wage rate. The employers flatly opposed a minimum wage (EW Evans, 1961:

197); they felt that the miners would put less effort into their working day if they knew they would receive the minimum anyway. In addition to this, they were determined not to see an increase in wage costs per ton which, in south Wales, by 1908 had risen to 7s 4d compared to 6s 7d in 1902 (EW Evans, 1961: 198).

The seeds of conflict in south Wales were being sown; both sides "found themselves subjected to economic forces that made it impossible for them to compromise or make concessions [and] the atmosphere of mutual respect and consideration .....had given way to fundamental distrust and hostility" (EW Evans, 1959: 86). Mabon and other leaders of a like mind were being challenged by the younger, more militant unionists who were being increasingly supported by the men (EW Evans, 1959: 96). This hardening of attitudes on both sides lead to many disputes, which were referred to the Conciliation Board, but these often remained unresolved, a situation which Evans states "underlined the fundamental weakness of the Conciliation Board" (EW Evans, 1961: 200). This failure was obvious to all, and the respect for the mechanism was fast disappearing. The intransigence of the employers was illustrated by their refusal to accept any form of arbitration and, as a consequence of this, the South Wales Conciliation Board failed to resolve 70 of 86 disputes referred to it in 1909-1910 (EW Evans, 1961: 200). The result of this failure was a series of strikes and lock-outs which only served to toughen already hardened attitudes.

In north Wales, the issue also caused great unrest; in some cases the men were able to successfully argue in court that their wages were being unfairly restricted, but in most cases they had to resort to strikes. The main contention of the NWMA was that "the employers have failed to keep to the spirit of the agreement [1907 Price List Agreement] in regard of the payment of a minimum wage for men working in hard and difficult places" (*Wrexham Advertiser*, 4 December 1909, WM). Basically, the employers did everything they could to thwart the agreement, and had to be forced, by painstaking litigation to face their obligations; their lawyers "twisted it [the price list agreement] to mean something very different to what we thought we agreed to" (Annual report NWMA, year to December 1912, D/NM/65). This non-cooperation, as in south Wales, did little to

foster decent relations; as Edward Hughes told the *Wrexham Advertiser* (4 December 1909, WM), "I am sorry to say that the Coalowners Association have not had sufficient courage to acknowledge the principle underlying ....the agreement [and] the colliery companies have not treated us fair (sic)".

Such feelings ran much higher in south Wales, and in 1910 the miners' dissatisfaction boiled over in what was known as the Cambrian Combine dispute, which Thomas (1975: 55) describes as "un o'r cwerylon chwerwaf a welwyd rhwng cyfalafiaeth a llafur yn maes glo De Cymru" (one of the bitterest quarrels between capitalists and labour in the south Wales coalfield).

The Cambrian Combine dispute

According to C Williams (1996: 125), this dispute "heralded the emergence of South Wales as a 'storm centre' of industrial unrest", which culminated in the first national miners' strike in 1912, the impetus for which had come solely from south Wales. One of the main problems that the men in south Wales faced was the determination of the owners to cut costs in whatever way they could; the men, although reasonably well organised, faced a formidable foe. The MSWCOA was "highly and effectively organised, and could afford to adopt a firm attitude in relations with the men" (EW Evans, 1961: 202). In addition to the powerful Coalowners Association, the owners, in their attempts to create economies of scale and profits, had formed large 'combines', which "substantially strengthened the already impressive power of the employers" (EW Evans, 1961: 202). It was in the face of such opposition that the men entered into negotiations re. a new Conciliation Board agreement in early 1910. As mentioned earlier, their demands included a minimum wage; a demand that was hardly likely to be accepted given the determination of the owners to reduce production costs "by reducing wages, by making the work day as long as possible and by adopting new methods" such as introducing an afternoon shift (EW Evans, 1961: 197).

In an effort to strengthen their bargaining position, the SWMF urged the MFGB to call a national strike; the national union was not interested and advised

the miners to accept the employers' terms, feeling that it was a purely local dispute. EW Evans (1961: 199) comments that "perhaps the Conference failed to appreciate the basic problem in South Wales, namely the serious reduction in earnings caused by the eight hours Act". Without national backing, and facing employers who were united, strong and determined, the SWMF had little choice but to accept the employers' terms, and a new agreement was signed on 8 April 1910 (EW Evans, 1961: 199).

This agreement did nothing to improve wages, no progress had been made to resolve the pressing issue of hard and abnormal places and, as the cost of living rose, the miners found it increasingly difficult to make ends meet; they were very unhappy, and little was needed to ignite the simmering resentment that was spreading throughout the coalfield. The spark that lit the flame was the lock-out, in September 1910, of miners at the Ely pit in the Rhondda (Page Arnot, 1967: 176), over the miners' failure to accept particular piece rates. Miners in the other collieries in the Cambrian combine, which employed up to 11,000 men, gave notice to strike, and after a period of negotiation to prevent this, which ultimately failed, they struck on 1 November 1910. Miners in other areas such as Aberdare, also struck unofficially, over issues specific to collieries in that area, so that by mid-autumn, between 27,000 and 33,000 men had stopped work (Page Arnot, 1967: 182). The atmosphere in the region was unsurprisingly tense, especially as the coalowners called for extra police and troops to be situated in the region.

Violence erupted in Llwynypia on the nights of 7 and 8 November and in Tonypandy on the 8 November, as colliers tried "to compel officials and stokers to leave work" (Major-General McCready, cited in ID Thomas, 1975: 65). The events of the 8 November were described as "serious rioting" by the authorities (Page Arnot, 1967: 191), with casualties among both the miners and the constables. A report in the *Western Mail* (9 November 1910, cited in ID Thomas, 1975, 59-62), described the situation: "Mid-Rhondda is in a state of anarchy. Such scenes as these witnessed tonight are almost, if not completely, without parallel in any civilised country. It was pandemonium let loose. The strikers seem

like men possessed, and were obsessed with only one idea and one purpose....destruction". Such inflammatory reports did little to calm an already difficult situation and, indeed, according to Major-General McCready (cited in ID Thomas, 1975: 67-9), who was in charge of the troops in the region, this factor "greatly contributed towards maintaining and developing the atmosphere of tension and excitement in the area". Major-General McCready asserted that "original reports regarding the attacks on the mines....had been exaggerated", and he felt that "had the mob been as numerous or so determined as the reports implied, there was nothing to have prevented them [from overrunning the premises at Llwynypia]. That they did not, was due less to the action of the police than to the want of leading or inclination to proceed to extremities on the part of the strikers" (cited in ID Thomas, 1975: 67-9).

The tactics of the coalowners, in employing 'imported labour' or 'blacklegs', and the employment of troops to quell any disturbances, ensured that, except for some trouble on the nights of 21 and 22 November (Page Arnot, 1967: 211), the coalfield remained relatively peaceful throughout the remainder of the strike. Nevertheless, resentment and bitterness ran deep; the SWMF again asked for, and failed to get, national support for the idea of a general strike; the MFGB still saw the dispute as a purely local one, although it did provide some financial assistance (EW Evans, 1961: 204). This attitude convinced the SWMF that they had to find an issue that would "associate the Cambrian Combine stoppage with some broader problem" (EW Evans, 1961: 204), one which would unite all the miners of Britain. That issue was abnormal places, which the SWMF pushed to the forefront of the national agenda. This they were able to do with such success that "the Cambrian Combine lock-out and strike came to be inextricably mingled in the outlook of the strikers with the question of abnormal places and [a] minimum wage" (Page Arnot, 1967: 241).

Meanwhile, locally, their most pressing problem was to somehow end the Cambrian strike. As EW Evans (1961: 206) explains, by January 1911 "a solution was imperative if the organisation was not to be bankrupted by the stoppage". However, dissension among the union officials themselves made this difficult; the

executive of the SWMF was often at loggerheads with the more militant Cambrian Combine Committee (CCC), the strike committee representing the miners of the Combine, and while the former might have advised the men to come to terms with the employers, the latter was determined that the struggle should continue (Page Arnot, 1967: 219). In March 1911, a ballot of the Cambrian Combine men was overwhelmingly in favour of continuing the strike, and rejecting the employer's offer "to pay such allowances to men engaged in abnormal places as would enable them to earn a fair wage" (Page Arnot, 1967: 219). The SWMF executive had encouraged the men to accept the offer, especially as suffering was widespread. However, the miners supported a more militant confrontational policy, and the strike continued. By May 1911 another possible agreement had been brokered by the SWMF and the MFGB but, in a decision that highlighted the tension between the moderates and the militants, this too was rejected by the miners at their Conference on 28 May; the reason was that "they felt that the employer's assurance of fair wages was valueless" (EW Evans, 1961: 208). They again called for a national strike, "for [the] purpose of securing for all colliery workmen a definite, guaranteed Minimum Wage" (EW Evans, 1961: 208). This decision "was of the greatest significance, for it marked the overthrow of the older leaders who had advocated moderation" (EW Evans, 1961: 208); militancy was the policy that now prevailed. However, by now, conditions for the miners and their families were becoming desperate, and without the practical help of the MFGB (financial help having been withdrawn after the Conference decision), they may well have been forced back to work. It was at this juncture that the owner of the Cambrian Combine, DA Thomas, with possible mischievous intent, announced that the terms offered could not be interpreted as guaranteeing a minimum wage (Page Arnot, 1967: 260). "Since this was what both the Miners' Federation and the supporters of the May terms in South Wales had assumed, the statement made a return to work impossible" (EW Evans, 1961: 209).

By August it was not a case of whether the strike would end with the capitulation of the men, but when. They were "impoverished and dispirited" (EW

Evans, 1961: 210), and given the continued intransigence of the employers "the union executive bowed to the inevitable" and accepted the terms which had originally been offered in October 1910 (EW Evans, 1961: 210). Thus, the Cambrian Combine dispute ended; it had lasted eleven months, cost the union £225,000, and caused untold misery in the region (EW Evans, 1961: 211). Looked at in terms of whether the men actually achieved anything as regards the issue they originally struck over, it would seem that the strike had been a complete failure. However, "in the course of their struggle they had raised the question of abnormal places to be a national mining issue, and in the later stages had carried this still further to the issue of a National Minimum Wage" (Page Arnot, 1967: 267). They may have lost their local dispute, "but they had won the desired national movement to settle [a] wider question" (Page Arnot, 1967: 267), and "it would be difficult to over-estimate its consequences for ....the coal industry as a whole" (EW Evans, 1961: 211). In north Wales there was little mention of the dispute in the papers of the NWMA or in the press, other than as part of the growing agitation for a minimum wage.

The 1912 national strike

The main consequence of the Cambrian Combine dispute was the identification of a national issue, namely that of a minimum wage for those working in abnormal places, around which all the British miners could rally and, according to EW Evans (1961: 210), "it was the ..... miners' [of south Wales] determination to win a universal minimum wage that eventually goaded the Federation into the National Strike of 1912". Throughout the months leading up to the strike, the south Wales delegates were "often at the fore in urging a stiff attitude towards the employers" (Page Arnot, 1967: 276), possibly because the employers in that region showed more intransigence that those in other regions; as Page Arnot (1967: 276), points out, the English Conciliation Boards had already (by 1911) conceded the principle.

In north Wales the employers showed almost as much intransigence as their counterparts in south Wales; in a letter dated 10 April 1911, to the NWMA, the NWCOA stated that "the members do not see what practical result can come from discussing the question of Minimum Standard rate of wages for colliers and other day wage men....as the coalowners have all along resisted and will continue to resist such a demand" (D/NM/2). This attitude merely stiffened the resolve of the miners and even Edward Hughes, a man who very much adhered to Mabon's philosophy that "the strike is a disturbing element in trade and embitters the relationships between masters and men" (cited in EW Evans, 1959: 97), was moved to explain in the *Wrexham Advertiser* (30 September 1911, D/DM/506/35) that "there is much to be said in favour of a strike sometimes and a working man has a perfect right.....to sell his labour for a reasonable price, and to live comfortable and decent, failing this he has a right to withdraw his labour and wait until a fair price is offered for it".

Throughout 1911 local discussions between masters and men continued throughout Great Britain, but to no avail in either south or north Wales; little headway was made in either region. In south Wales there was deadlock, the owners remaining obdurate; they would not recognise the principle of a minimum wage and were totally intransigent (Page Arnot, 1967: 277). In north Wales the minutes of a meeting between the NWMA and the NWCOA, on 13 November 1911, highlight the extent of the rift between the two sides. On behalf of the workmen, Hughes declared that this was one of the most important meetings "ever held in connection with this coalfield" (D/NM/1). He went on, "we make an earnest appeal that you give us what we are today asking for which is after all not more than a bare living wage for the labour they give and the terrible risk they run every time they descend into the mine....we believe that the coal trade, which is the mainstay of all other trades, can well afford to pay the miners who create the wealth of this country, at least a living wage". He explained to the NWCOA that if such a minimum wage was not forthcoming, then a ballot would be held, and "gentlemen, you may take it from us, there is only one answer to the ballot, viz: STRIKE, STRIKE, therefore we hope that it will be possible even at this eleventh

hour to avoid what we must all admit is the most brutal and terrible weapon of settling our differences" (D/NM/1, 13 November 1911). However, despite such an emotive plea, in response the owners said that they "would not even consider the wages of the surface hand and neither would they negotiate with the men re abnormal places and boys' wages" (D/NM/1, 13 November 1911).

The ballot that Hughes referred to was a national one that the MFGB had determined upon when it became obvious that local discussions in some regions were not getting anywhere. The ballot asked miners, "Are you in favour of giving notice to establish the principle of an individual minimum wage for every man and boy working underground in every district in Great Britain?" (cited in Page Arnot, 1967: 279). The response was overwhelmingly in favour of a strike; Table 6.2 illustrates that support for a national strike was almost unanimous, only one region, Cleveland, voting against giving notice of a strike. In the other regions the percentage in favour of a strike was exceptionally high; the lowest margin in favour was 66.7 per cent in Durham, while the highest, 90.1 per cent, was in Somerset. In both south and north Wales, unsurprisingly, there were significant majorities in favour of the strike, 84.89 per cent and 82.4 per cent respectively. The overall average for those regions in favour of the strike was 80.6 per cent; the union was therefore confident in the mandate that it had been given by its members.

Once the union had ascertained the level of grass roots support for its policy, it determined to set an agreed minimum wage for each district, which had to be "as near as can be ascertained the present rate of wages" (cited in Page Arnot, 1967: 280). This process was more problematic than it had been perceived, and caused a rift among the national union leadership. The problem was that some districts wanted to incorporate a wage rise into the minimum set, while others felt that this was not the time to discuss an advance in wages. The latter argument prevailed, but the SWMF was especially unhappy with this as their wages were lower than in other regions and they felt they were entitled to include an element of increase.

Table 6.2 District results of the National Strike ballot, 1912

District	For	Against	*Total*	% in favour
Yorkshire	63,736	10,477	*74,213*	*85.88*
Lancashire & Cheshire	50,517	11,393	*61,910*	*82.59*
Midlands federation	26,069	5,275	*31,344*	*83.17*
Derbyshire	17,999	6,816	*24,815*	*72.53*
Nottinghamshire	17,086	5,386	*22,472*	*76.00*
Leicestershire	3,681	907	*4,588*	*80.23*
South Derbyshire	2,178	593	*2,771*	*78.59*
North Wales	7,327	1,566	*8,893*	*82.39*
Bristol	1,084	342	*1,426*	*76.00*
Cumberland	4,918	813	*5,731*	*85.81*
Somerset	3,378	370	*3,748*	*90.12*
Scotland	60,611	12,035	*72,646*	*83.43*
South Wales	103,526	18,419	*121,945*	*84.89*
Northumberland	22,595	7,557	*30,152*	*74.93*
Durham	57,490	28,504	*85,994*	*66.68*
Cleveland	2,021	5,225	*7,246*	*(27.89)*
Forest of Dean	1,585	243	*1,828*	*86.65*
Total	445,801	115,921	*561722*	*79.36*

Note: those figures in itallics are author's own calculations

(Source: Page Arnot, 1967: 279).

In his study of the British coal industry, Mitchell (1984: 202-5), refutes the view of the south Wales miners. Mitchell (1984: 202-5), demonstrates that the wages of south Wales' miners' did not lag behind those in other regions, in fact, wages had increased significantly more in south Wales than in many of the other regions. Using 1886 as his 'base year', Mitchell (1984: 202-5) calculated an index which demonstrated how wages had increased above this level, from 1886-1914, for four categories of underground workers. He concluded that, only in north Wales and Warwickshire were the increases more significant than in south Wales. According to the index, in 1912, the wages of pieceworkers in south Wales, north Wales and Warwickshire had increased by 70 per cent, 73 per cent and 80 per cent respectively, above the 1886 'base' (Mitchell, 1984: 202-5).

Figures extracted by Rowe (1923: 85) (see Table 6.3) would appear to support this premise. Table 6.3 illustrates that between 1888 and 1914 wages in

south Wales, north Wales and Warwickshire did indeed increase significantly; for skilled workers the increases were 93 per cent, 98 per cent and 102 per cent respectively. A major problem, however, when considering percentage increases is that the different regions were not being measured from the same starting position and that, although percentage increases may have been significant, absolute increases may have been far lower.

Table 6.3: Average wages 1888 and 1914 for piece-work coal getters and labourers in the districts of the UK and percentages changes

District	1888 wages		1914 wages		% increase	
	skilled	un-skilled	Skilled	un-skilled	skilled	un-skilled
	s/d	s/d	s/d	s/d	%	%
Northumberland	5/1	3/4	9/1	6/-	*79*	*80*
Durham	5/-	3/9	8/11	5/9	*80*	*54*
Cumberland	4/5	3/2	8/2	5/8	*85*	*79*
Lancashire	5/2	3/4	8/7	5/10	*66*	*75*
North Wales	4/1	2/8	8/-	5/5	*98*	*103*
Notts & Derby	5/4	3/5	9/10	5/8	*84*	*66*
North Staffs	4/10	3/-	9/1	5/7	*88*	*86*
South Staffs	4/6	3/4	7/1	5/10	*57*	*75*
Cannock Chase	5/-	3/-	8/6	5/7	*70*	*86*
Warwickshire	5/-	3/-	10/1	6/2	*102*	*106*
Leicestershire	4/3	3/6	7/-	5/1	*65*	*66*
Somersetshire	3/3	2/3	5/9	4/4	*77*	*94*
Forest of Dean	4/6	2/10	6/9	4/6	*51*	*59*
South Wales	4/10	2/10	9/4	5/9	*93*	*103*
Lanarkshire	4/7	3/2	8/3	6/6	*80*	*105*
UK average	*4/8*	*3/6*	*8/3*	*5/6*		

Note: the figures in italics have been calculated by the author

(Source: Rowe (1923: 85).

This is illustrated by the figures for north Wales in Table 6.3; these show that although the percentage increases were high, wages rates remained consistently lower than the UK averages and, indeed, only in Somerset were wage rates lower. If we compare the wage rates of north Wales in 1888 and 1914 with the region showing the highest wage rates in that year, Nottinghamshire & Derby and Warwickshire respectively, we can see that the north Wales wage rate, for skilled workers, was 30.1 per cent lower in 1888 and remained 26 per

cent lower in 1914. Although the wage rates for skilled workers in south Wales were above average in both 1888 and 1914 (see Table 6.3), if the same comparison is made with the region with the highest wage rates, we find that in south Wales wage rates in 1888 were 10.3 per cent lower than those in Nottinghamshire and Derby and were still 8 per cent lower than the rates in Warwickshire in 1914.

Whatever the validity of their demands, the south Wales miners were forced to reduce their minimum demand from 8s per day to between 7s 0½ d and 7s 6d (Page Arnot, 1967: 283). In north Wales the miners had also hoped to include an increase in wages within the minimum demanded but, as in south Wales, their hopes were dashed. When negotiating what the minimum rate should be for north Wales, the NWMA had demanded 7s but, as the 'present rate of wages' was 6s, they too had to modify their demand so that no increase was included (D/NM/2, 5 March 1912). Although there was some support for an independent, district dispute in pursuit of the 7s, regardless of the national outcome, Hughes was able to prevent this by telling the men "we are not the lowest paid minimum, although not satisfactory by far, and we are not the only district where the claim has been lowered" (D/NM/2, 5 March 1912).

In south Wales not only were the miners unhappy with events, the employers of that region were also making their feelings clear; in early February 1912 they withdrew from the national discussions, citing their continued belief in the Conciliation Board mechanism, and their determination not to concede the principle of a minimum wage. This determination remained, even when the Government became involved in late February. Despite the fact that practically all coalowners in England and north Wales had accepted the fact that the "the Government will insist upon the minimum wage being conceded [by the owners]", the MSWCOA, and some owners in Scotland, would not agree. As the MFGB would not accept a partial agreement, the prospect of a national strike remained (*Wrexham Advertiser*, 2 March 1912, D/DM/506/37).

Many observers believed that the strike would have been averted had not the south Wales owners been so intractable. Page Arnot (1967: 307) quotes Sir

Arthur Markham, MP, as saying, "I understand that it is said that if Mr DA Thomas [owner of collieries in Cambrian Combine][13] ...had not joined the Coalowners association we should have had no strike in south Wales at all. The fact is [that] it is the South Wales Coalowners who have forced this on, because they wanted a fight and were not satisfied until they could get one....in fact South Wales owners have built up a stone-wall attitude on this question [minimum wage]; they have declared they intend to fight it out and that is the spirit in which the negotiations have been carried on".

The strike in north Wales

In north Wales, on Wednesday 29 February, all members of the NWMA ceased work (*Wrexham Advertiser*, 2 March 1912, D/DM/506/37), and by Friday 1 March "the majority of the miners in Great Britain came out on strike" (Page Arnot, 1967: 290). According to the *Wrexham Advertiser* (2 March 1912, DD/DM/506/37), "the position in North Wales among a large number of miners.....appears to be of the nature of a sympathetic strike. Whilst to a man they will loyally fight for the principles which the national strike is intended to establish, many men have ceased work with great reluctance". The reason for this reluctance was that many of the north Wales miners agreed with Hughes who said "we, in North Wales were ahead of any other district on the minimum wage prior to the strike.....no district will gain as much in this agitation as we did in 1905 and 1907 when the price list was agreed to" (Pamphlet 'The strike & an explanation of the Minimum Wage', 5 March 1912, D/NM/2).

The most reluctant of the north Wales miners were those of Brynkinallt colliery, Chirk, who were the last to join the strike in Denbighshire. At this colliery "relations between [the owners] and men have always been of the pleasantest kind. The men have no grievance against their masters here for there is a minimum wage of 6s a day for work in abnormal places and it was only with reluctance that the men came out" (*Oswestry Advertiser,* 21 February, 1912,

[13] At the time of the Cambrian Combine dispute, DA Thomas had not been a member of the MSWCOA, due to personal differences with key members of the Association.

DD/NTD/944). The owner, WY Craig, made it clear to his men that if they wanted to return to work "you shall have every protection at our command", and according to a reporter for the *Oswestry Advertiser* (21 February 1912, DD/NTD/944) "in conversation one with another, hopes were expressed that it would not be long before they were back again, not for their own sakes only but out of sympathy for their employers, for no one knows better than the men themselves, the expense and loss which the strike will entail upon the owners".

Throughout Denbighshire, the strike created severe hardship; the *Wrexham Advertiser* (9 March 1912, DD/DM/506/37) described, in dramatic terms, the situation in and around Wrexham: "trade is paralized (sic), and every minute sees an ever widening disturbance and upheaval in the nation's life. Every branch of industrial life is affected and everywhere there is a dark shadow of a terrible nemesis killing the country.....The district which will suffer most if the strike continues is Brymbo. The great steelworks are now almost closed down entirely, and 1,000 men out of employment.....much distress and poverty will prevail unless they can get to work again very quickly". By March, the *Llangollen Advertiser* (DD/NTD/944) was reporting that "there has been a curtailment of lighting facilities, a rapid rise in the price of coal and the appearance of hawkers from Ruabon, Rhos, Cefn etc....and the railway service is considerably restricted in Wrexham". In Wrexham "the effect of the strike is being keenly felt....and there is much distress in the town and many houses are without coal.....Coal picking has been carried out in earnest [for example] the spoil banks of the Plas Power colliery were literally covered with coal pickers" (*Wrexham Advertiser*, 16 March 1912, D/DM/506/37).

After three weeks on strike, "How funds are to be raised is the question that has been exacting the miners in North Wales" (*Daily Telegraph*, 21 March 1912, DD/NTD 944). The NWMA had, at the start of the strike, only enough funds to pay for one week's strike pay. Consequently, by 20 March, "the miners of the district are evincing signs of dissatisfaction at there being no funds in existence for the payment of strike pay last week" (*Morning Advertiser*, 20 March 1912, DD/NTD 944). The main problem was the fact that the levies raised were mostly

used up in the payment of unemployment and funeral benefits; "the miners were often warned that they could not go on giving these benefits and at the same time provide a reserve fund for strike purposes. The warnings were without effect and it was only when the strike began that they realised how sparse was their provision for a general out-of-work payment" (*Daily Telegraph*, 21 March 1912, DD/NTD 944).

By this time it was noted that "the distress is keen and widespread. A large number of families are suffering and help is needed at once. They are bearing up bravely, although they are sadly in need of food" (*Wrexham Advertiser,* 31 March 1912, DD/DM/506/37). To help alleviate this distress, the mayor of Wrexham published an appeal for money to help the miners because "the relief committee formed by the mayor finds it impossible with the means at their disposal to cope with the poverty of the town by the distribution of coke, bread and soup" (*Times,* 26 March 1912, DD/NTD 944). Despite this distress, most of "the miners are showing no disposition to resume work" (*Daily Telegraph*, 21 March 1912, DD/NTD 944), and in the many meetings that were held around Wrexham "the miners show no indication of a desire to resume work until their cause is successful" (*Wrexham Advertiser*, 23 March 1912, DD/DM/506/37).

However, dissension appeared in the last week of March; after four weeks on strike some 300 of the men at Brynkinallt broke the strike and returned to work on 25 March. As has been noted, relations between owners and men were very good at this colliery and the men were already being paid the amount that the union was demanding as a minimum wage; as a result they could see no reason why they should prolong the suffering of their families, especially as the NWMA had run out of funds. This action obviously angered those miners who remained on strike and, in an action that was widely reported in the national press, about 300 men marched to Brynkinallt to 'persuade' the strike-breakers to refrain from working. There, they were met by WY Craig who "told them that they were wrong in striking [and].... that he was determined to give protection to his own men ...and that they had better go home" (*Daily Express*, 26 March 1912, DD/NTD 944). This they did, but only with the promise that they would return.

Such was the fear of disturbance that the authorities dispatched a detachment of infantry to Brynkinallt to protect the colliery. The miners returned as promised, but this time "they were larger in numbers...in a more angry mood than yesterday [and] well armed. Altogether they were a formidable and menacing spectacle" (*Times*, 28 March 1912, DD/NTD 944). Again Mr Craig spoke to them, and again they left peaceably. The *Times* correspondent (27 March 1912, DD/NTD 944), believed that one of the main reasons for the resumption of work at Brynkinallt was its position in the county which meant that it was separate from the main body of the Denbighshire coalfield and therefore not as much under the influence of the union which "tends to give them [the striking miners] courage and cohesion in the course they have taken".

Many observers felt that, with the return to work in Brynkinallt, the floodgates would open and other miners would rush back to work. Indeed the *Daily Telegraph* (26 March 1912, DD/NTD 944) reported that "the knowledge [of the return to work] has created a feeling of restlessness among the workers" and "if it were a matter of free will the strike here would be ended in a very few hours, but the men's leaders have still a big, if waning influence". The report then contended that "as far as can be gathered, we are nearing the end of the strike in North Wales ..... in fact the complete collapse of the strike here would surprise no one". This was strongly denied by the union, which condemned the coverage of the national newspapers and reiterated the determination of the men to remain out until a national agreement was reached; this view was backed up by a report in the *Oswestry Advertiser*, 27 March 1912 (DD/NTD 944), which reported that "the bulk of the North Wales miners are remaining on strike and so far the men at the larger collieries of Hafod, Wynnstay, Plas Power and Wrexham have not shown the slightest disposition to follow the Brynkinallt miners in breaking away from the Federation".

By the end of March, the men in north Wales were eagerly awaiting the outcome of events in London. Asquith's government had not wanted to intervene in what was, after all, a dispute in a private industry but, due to the importance of coal to national life, and the continued obstinacy of the south Wales coalowners,

ultimately felt it had little choice. "His Majesty's government came without hesitation to the conclusion that Parliament must be asked to intervene and that if the parties could not agree to a settlement, the state must provide a settlement for them.....we were driven .....to propose that which we had always desired to avoid, namely,....legislation" (Asquith, cited in *Wrexham Advertiser*, 23 March 1912, DD/DM/506/37). Asquith was generally sympathetic towards the miners, feeling that a minimum wage was "consistent with justice and with the best interests of the community" (Page Arnot, 1967: 286); but he insisted that no minimum rates were to be included in the Bill, these were to be agreed by Joint District Boards for each region, because different conditions prevailed in different coalfields (Page Arnot, 1967 307). The MFGB did its utmost to insist that the rates had to be included, but despite their pleas, the Bill was pushed through and became an Act on 29 June 1912. Once this had happened, a ballot was organised asking the question "Are you in favour of a resumption of work pending the settlement of the minimum rates of wages in the various grades of work by the District Boards to be appointed under the Mines Minimum Wage Act?" (Page Arnot, 1967: 308).

After the ballot had been announced, "it had a most tranquilising effect on the district [Denbighshire] because of its promise of an early resumption of work" (*Times*, 29 March 1912, DD/NTD 944). Many were more than ready to return to work; "the prolongation of the strike [was] making the distress very acute in the town [Wrexham] and district, [and] the numbers requiring relief are increasing daily" (*Wrexham Guardian*, 29 March 1912, DD/NTD 944). The knowledge that some among them had broken ranks caused cracks to appear in the united front hitherto presented by the miners; at some collieries, for example, Plas Power and Gatewen, the men voted to resume work before the national result was known, while others at, for example, Llay Hall, Westminster and Brynmally, refused to return until the results were published (*Wrexham Guardian*, 29 March 1912, DD/NTD 944). The result of the ballot "turned out to be very different from what some of the leaders expected, and extremely confounding for those others who held that a handful of men had engineered a national strike of men who were all

looking for a means to return to work". The overall result was as follows: For - 201,013 and Against - 244,011; a 9.66 per cent victory for those against the resumption of work (Page Arnot, 1967: 310). The vote, unfortunately, did not give the required two-thirds majority that was needed for the decision to be fully backed by the union. The MFGB therefore found itself in something of a quandary, and the question was put to a Conference, which advised the miners to return to work.

Table 6.4: Result, by District, for resumption of work, 1912

District	For	Against	*Total*	*% Against*
Yorkshire	13,267	43914	*57,181*	*76.79*
Lancashire & Cheshire	11,334	29,840	*41,174*	*72.47*
Midlands federation	**18,168**	**11,278**	***29,446***	***38.30***
Derbyshire	8,080	13,428	*21,508*	*62.43*
Nottinghamshire	8,187	8,213	*16,400*	*50.07*
Leicestershire	1,195	2,104	*3,299*	*63.78*
South Derbyshire	**1,626**	**1,090**	***2,716***	***40.13***
North Wales	**7,446**	**1,190**	***8,636***	***13.78***
Cumberland	2,980	4,877	*7,857*	*62.00*
Bristol	**772**	**326**	***1,098***	***29.69***
Somerset	**2,130**	**1,220**	***3,350***	***36.42***
Scotland	23,186	30,473	*53,659*	*56.79*
South Wales	**62,538**	**31,127**	***93,665***	***33.23***
Northumberland	10,674	14,195	*24,869*	*57.07*
Durham	24,511	48,828	*73,339*	*66.57*
Cleveland	**4,919**	**908**	***5,827***	***15.58***
Forest of Dean	no ballot			
Total	201,013	243,011	*445,0244*	*54.72*

Notes: districts denoted in bold voted **for** resumption; those figures in italics are the author's own workings.
(Source: Page Arnot, 1967: 311).

The lack of union funds was also one of the main reasons for the vote in north Wales, where there was a big majority in favour of a return to work (86 per cent to 14 per cent). Here, the benefits paid out were too high a proportion of the levies being paid in, but there was another reason; according to a national newspaper, some miners in the district had followed the national line only with reluctance because "the minimum wage for which they were to put down their

tools was the wage they were already receiving" (*Times*, 26 March 1912, DD/NTD 944). Although true of Brynkinallt, this judgement may well have been an exaggeration by a national newspaper generally hostile to the miners when applied to the district as a whole. The general impression given by the more sympathetic local papers is that, while it was indeed a strike in support of the MFGB's policy, there were sufficient inequalities and problems within the district to warrant the backing given to the national organisation.

By 13 April 1912 the strike was over, but had it been successful? According to Edward Hughes (Annual report year to December 1912, D/NM/65), "the greatest strike that ever was experienced by this or any other country had ended in victory for the miners.....not only have we had a victory, but a victory with honour. The strike raised the standard of the miners morally and intellectually". This view may well have been tempered with time and the knowledge of the full terms of the Act. According to Page Arnot (1967: 315), "the Act did little more than lay down in legal terms the principle of the individual minimum wage and establish machinery for subsequent settlement". The problem, as Page Arnot saw it, was that "the minimum wage was not absolute but conditional" (1967: 315), and some workmen would not be covered, it all depended on the district rules which were negotiated between the union and local Joint District Boards.

From the miners' point of view the Act did little to alleviate immediate problems; the miner had to prove his right to the minimum wage and some of the rules were "harsher than they ought to be" (Page Arnot, 1967: 320); the MFGB was especially unhappy with the fact that the minimum, in most cases, was not even 5s, and that some owners were "coercing or bribing workmen to contract out of the provisions of the Act, either by promising or refusing them work, or by offering increases to tonnage rates or percentages" (Page Arnot, 1967: 321).

It would appear that, in its application, the Act was not altogether satisfactory to the miners of north Wales; in the same way that cases had to go before the courts to deal with the price list, so the miners now had to go to court to force certain owners to pay the minimum wage. There were so many cases

throughout 1913 re. the interpretation of various clauses within the Act that the union complained that the owners were not abiding by the spirit of the agreement, just as they had failed in their application of the 1907 Price List Agreeement. On 24 January 1914, Hughes remarked, "I wish to warn you that we shall be very fortunate if we don't experience another general strike during 1914, either on the enforcement question or the Minimum Wage Act" (D/NM/2). Whether further strikes would have happened, as foreseen by Hughes above, will never be known because the First World War intervened and the mining industry embarked on one of the busiest periods in its history.

Conclusion

From the above discussion it can be seen that the process of unionisation throughout Wales was a painful one. The main stumbling block, in both north and south Wales, was a strong sense of parochialism, which prevented the miners from seeing the 'bigger picture'; they were more interested in the problems of their own colliery or village than in the issues that might affect a complete region. This problem was more of an issue in south Wales than in Denbighshire due, not only to its greater size, which meant that for unity to be achieved many thousands of men had to be brought together, but also to the physical nature of the region. The topography of the south Wales valleys meant that many mining communities were almost wholly self-contained and therefore only interested in the issues relevant to their own community. Such factors also operated in other coalfields, for example, the isolation of Brynkinallt from the rest of the Denbighshire coalfield was a major factor in it being the first colliery in Denbighshire to return to work during the 1912 strike. Even where an inter-regional body had been established, as in the 'Federated Area', similar problems could arise. While the miners of Denbighshire formed part of this 'Federated Area', they could not necessarily count on the automatic support of miners from other regions within the Federation. If they went on strike there was no incentive

for the miners of the other regions to join them since their masters could capture Denbighshire's markets and, therefore, protect the jobs of their miners.

An additional problem was one of parsimony on the part of the miner when it came to paying his union dues. Either because he did not want to or, more likely, because he was unable to, the miner was reluctant to increase his, already small, contribution to cover a payment into a central fund. This prevented strong centralised unions from being created in both north and south Wales, and it was only after a number of bitter conflicts in the 1880s and 1890s that the men realised that their most effective weapon was unity, which required the creation of a strong union with centralised funds, including strike funds.

Unity was achieved earlier in Denbighshire than in south Wales and Edward Hughes was instrumental in persuading the miners that a strong union, the DFMF (later NWMA), was needed if their objectives were to be met. In south Wales, however, not only were the miners reluctant to unite, but they were also faced with two potential leaders, Mabon and Brace, who had differing opinions on how the miners' objectives were to be achieved. It was only when the leaders had put aside their differences that the SWMF became a strong centralised union.

In both north and south Wales the coalowners also realised that their objectives were better served if they presented the men with a united front; with this in mind employers' associations were formed; in north Wales the NWCOA (formed in 1870) and in south Wales the MSWCOA (formed in 1873) (LJ Williams, 1976: 83). When the miners' were disorganised these associations were successful in thwarting the demands of the men, especially in south Wales where the association was particularly strong. Even when the unions achieved some success, for example, with the Eight Hours Act, the employers' associations continued to make things as difficult as possible for the unions, arguing over the interpretation of clauses etc. and the intransigence of the employers, especially in south Wales, was an important contributory factor to the 1912 national strike.

Although the unions in both north and south Wales had supported the MFGB in its fight for legislation to govern the hours worked in a day, they could not have foreseen that their success in achieving the Eight Hours Act was to create additional problems for the miners, especially in south Wales. The NWCOA and the MSWCOA had fought passionately against the Act, and when it was forced upon them they made sure that their interpretation of its clauses made it as difficult as possible for the miners to achieve their objectives. The Act had more of an inpact in Wales than in other regions, reducing the working day by half an hour in north Wales and by an hour in south Wales (Mitchell, 1984: 142). This inevitably reduced the amount of coal being got and led the owners to look at every means possible to reduce costs. The main way in which they did this was by taking away the unofficial allowances that, traditionally, the miners had received. One such allowance was that given for working in 'a hard and difficult place'.

The issue of 'hard' places was an important one in both north and south Wales. The regional unions tried to negotiate with the employers but, eventually, as Edward Hughes told a meeting of the NWMA on 10 February 1911, "we have met our employers so often on this matter [hard and difficult places]....that we came to the conclusion that nothing more could be done locally" (*Wrexham Advertiser*, 25 February 1911, D/DM/506/35). It was in 1912 that 'hard' places became a national issue; as a result of agitation by the SWMF, the MFGB demanded a minimum wage for those miners working in such 'hard' places. Met with nothing but intransigence, especially from employers in south Wales, the MFGB balloted for national strike action and Welsh miners voted overwhelmingly in favour (north Wales 82.4 per cent; south Wales 84.9 per cent) of the national strike in 1912. This strike caused tremendous hardship throughout Wales but it did demonstrate how much influence a strong centralised union, the MFGB, supported by strong district unions, could have on a national issue.

Rogers (1928, XIII: 257) believes that much of the credit for the transformation of the miners' union in north Wales, belongs to Edward Hughes, agent, financial secretary and later General Secretary of the NWMA. He worked

indefatigably to establish order to the union's finances and administration, to encourage new membership, and to protect the interests of his members. A measure of his success is that membership of the NWMA, in Denbighshire and Flintshire, in May 1913, was 12,946 or 81 per cent of the total employed in coal mines in north Wales (D/NM/1/ 19 May 1913). There were 16 lodges in Denbighshire and 10 in Flintshire, with membership numbers of 9,742 and 3,204 respectively (D/NM/1/ 19 May 1913). Given that the total workforce for Denbighshire in 1913 was 12,982, these figures reveal that 75 per cent of miners in Denbighshire were members of the NWMA, "a trade union of which they might well be proud" (1928, XIII: 257).

Having discussed the relationship between the coalowners and the miners, we now move to consider the people who purchased the coal, the customers. The next chapter will therefore consider to whom the coal companies in Denbighshire sold their coal, and the methods that they used.

Chapter 7

MARKETS & CUSTOMERS

Introduction

This chapter will consider another of the major stakeholders in the coal industry in Denbighshire: the people who bought the coal, and the ways in which the coal was sold to them. Until communications improved within the UK, the coalfields of the north east of England had what Buxton (1979: 39) describes as a "quasi-monopoly" over the coal trade in London. Until roads, canals and, finally, the railways opened up the inland coalfields, London, the biggest market for coal, was heavily reliant on the coastal coal trade from the north east. However as Buxton (1979: 40) has also pointed out, the railway "cracked open the Northern monopoly" and "began to revolutionise the fabric of the coal industry" (Buxton, 1979: 39). Better transport meant cheaper distribution costs and regular deliveries (Buxton, 1979: 73) which, coupled with the improvements in technology, allowed new industries to be developed in areas not formerly associated with industry. This increased demand, "was of major importance in all the inland coalfields" (Mitchell, 1984: 33-4), of which Denbighshire was one. The first section of this chapter will therefore detail how, after the advent of the railways, the markets available to the Denbighshire coalfield were expanded, before looking specifically at the methods used to sell the coal, and the customers to whom it was sold.

Widening markets

The impact of railway development on external sales

As discussed earlier, in chapter 2, it was only with the improvement in communications that industries in Denbighshire saw their markets develop.

Although, in the early nineteenth century, the Montgomeryshire, and the Ellesmere and Llangollen canals had made transportation of coal and iron easier than it had been when roads were the only option, due to the fact that the proposed extension of the Ellesmere canal to Wrexham never materialised, the commodities of Denbighshire faced a difficult journey "by inadequate roads or circuitously by canal and river" to reach any 'external' markets (Boughan, 1980: 34). This tortuous journey is described by Christiansen (1976: 21) who explains that coal was taken from Wrexham "nearly sixty miles[14] by canal to reach Chester, being despatched from Pontcysyllte wharf near the famous aquaduct, in barges that voyaged via Ellesmere, Whitchurch and Nantwich".

Such conditions meant that, before the advent of the railways, the markets for coal and iron were predominantly local, although coastwise exports from the ports of the Dee Estuary were not unknown. The local iron foundries provided the collieries with their main customers and there was little opportunity for developing a wider market. It was not until the latter half of the 1840s, when the railways reached Wrexham (see chapter 1), that the coal industry was able to develop an inter-regional, rather than simply a local, market. By 1850 then, Wrexham was linked to both Chester and Shrewsbury, but much remained to be done to further extend the railway network of the region.

The 1850s were taken up with constructing just such a network to link the collieries and other centres of industry with the Great Western Railway (GWR) (which took over the Shrewsbury and Chester Railway in 1854) (Turner, 1979: 7). The next major development in railway building in Denbighshire was in the 1860s when demand for a railway to link Wrexham directly with Connah's Quay on the Dee Estuary began. According to Jenkins & Strange (2004: 11), the genesis of the Wrexham, Mold & Connah's Quay railway (WMCQR) was in 1861, "when a group of mineowners, landowners and entrepreneurs met in Wrexham to discuss plans for a rail link serving mines and other industries in the Wrexham area".

The small industrial town of Buckley, "a thriving hub of coalmines, brickworks and clay quarries" (Christiansen, 1976: 27), was already linked by rail

[14] Wrexham is 12.6 miles from Chester by road (www.aarouteplanner.co.uk).

to Connah's Quay via the Buckley Railway, so a railway linking Wrexham to the Buckley line would allow "connection to the wharves at Connah's Quay from which coal and minerals could be exported" (Jenkins & Strange, 2004: 11). Such a link would also offer Wrexham connection (at Connah's Quay) with the London & North Western Railway (LNWR) main line from Chester to Holyhead (Turner, 1979: 8), as well as links with other local towns such as Mold.

The plans for such a railway met with a great deal of opposition from the GWR; one of the most vociferous local opponents was Sir Watkin Williams Wynn in his capacity as a director of the GWR and such was his opposition that not only did he become "one of the most unpopular figures in the district" (Boyd, 1991: 97), but he was instrumental in forcing the setting up of an enquiry by the Select Committee of the House of Lords into the proposed WMCQR Bill (Boyd, 1991: 95).

One of the most important witnesses at this enquiry was Henry Robertson, coalowner and "one of the chief backers of the WMCQR" (Jenkins & Strange, 2004: 17). In his evidence, Robertson described to Committee members the circuitous route by which goods had to travel to Mold via Chester; "it is so inconvenient and there are so few trains from Mold to Chester that the district is as much separated as it has ever been" (NLW/ HR/78/5, 26 May 1862). Robertson explained that between Wrexham and Mold "there is a very considerable traffic, and if we had the facility of passing cheaply and rapidly, no doubt it would be largely increased" (NLW/ HR/78/5, 26 May 1862). Robertson outlined how important the coming of the railways had proved to be for Wrexham; "when I went into the district in 1842.....the town of Wrexham was in a most distressed state; most of the iron works were stopped.. [and] I do not suppose that the district exported a tenth part of coal, local sales and all, that it does now. There was not 40,000 tons sold out of the district; they now sell upwards of half a million tons of coal alone" (NLW/HR/78/5, 26 May 1862). Robertson acknowledged the debt owed by Wrexham to the GWR when he said, "I know no district that has had the accommodation given by a railway company for the benefit of the district that this had had", but he also suggested that the GWR was

not doing enough for the industrialists of the region (NLW/HR/78/5). Additional evidence given by William Lowe, "engineer, manager and part-proprietor of Vron colliery" (cited by Boyd, 1991: 102), gave the enquiry the following production figures for collieries in the Wrexham area in 1861:

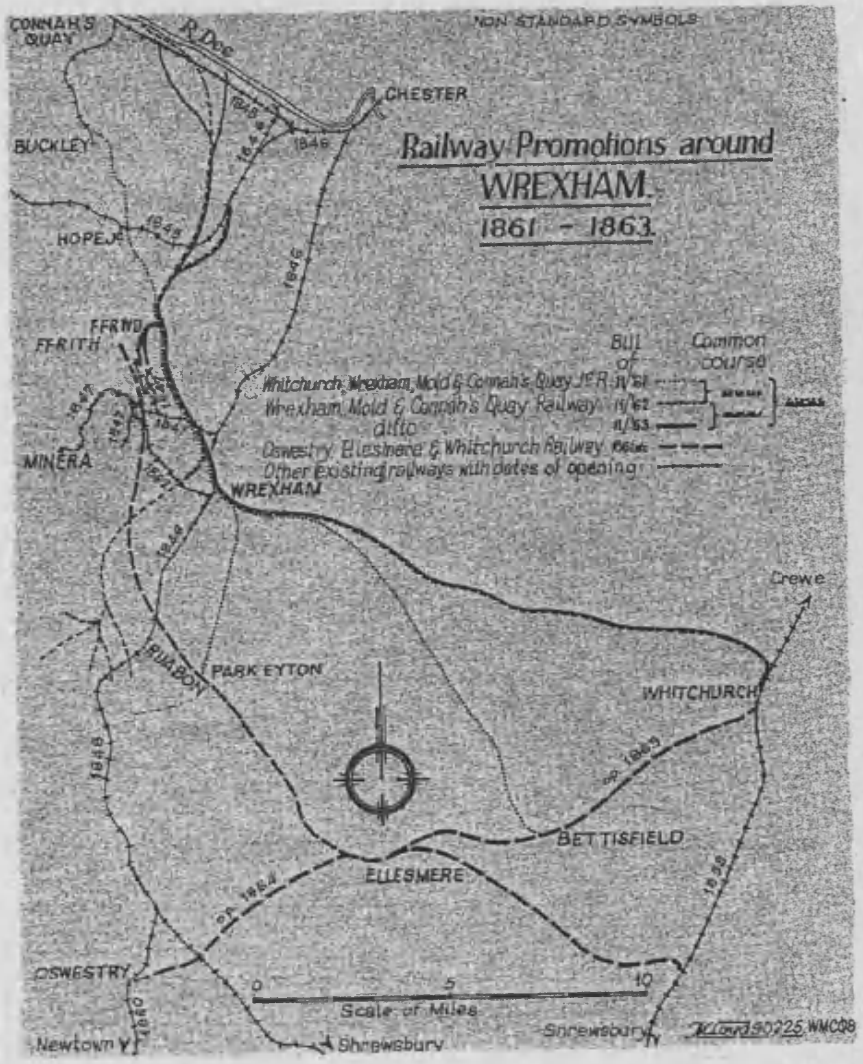
Colliery	Tons
Westminster	106,526
Vron	92,144
Brynmally	91,767
Broughton	74,077
Brymbo	71,538
Ffrwd	30,000
Pen y Coed	11,481
Talwyrn(sic)	15,000
Total	492,533

Further figures presented to the enquiry show that of this production, approximately 350,000 tons was annually being carried by rail (Boyd, 1991: 102).

If this coal was to have access to coastal markets, at that time, it had to go via Saltney (near Chester), thus an important aim of the WMCQR was to develop the port of Connah's Quay which had more potential as a port than Saltney and which would also, eventually, offer an alternative to Birkenhead, the main port from which Denbighshire coal was exported. The LNWR had access to ports at Birkenhead, but the GWR, which "up to the present time has had a monopoly of this district" (Boyd, 1991: 52), did not. According to Robertson, "there is small hope for our Great Western properties and collieries if we do not get a line to a better port" (NLW/HR/78/5); Connah's Quay with its deep waters was seen as the best option.

The Select Committee ruled in favour of the Bill, "despite strenuous opposition from the GWR" (Jenkins & Strange, 2004: 11) and, in 1862, the WMCQR Company was incorporated "to make a railway from Wrexham to join the Buckley Railway at Buckley, with branches to Ffrood (sic), Moss and Gwersyllt, and junctions with the Shrewsbury - Chester branch of the GWR at or near the Wrexham station" (DD/HB/62) (see Map 7.1).

Map 7.1 Railway promotions around Wrexham, 1861-1863



(Source: Boyd, 1991:96)

According to Boyd (1991: 104), the passing of the Bill was greeted with "great celebration by the people of Wrexham", but the company itself was beset by problems. As construction of the railway proceeded the initial capital of £150,000 (15,000 £10 shares) and a mortgage of £50,000 had to be extended to fund construction of the anticipated extension line until, by 1869, the company had a mortgage of £116,650, and preference shares of £75,000, in addition to issued ordinary capital of £262,556 (DD/HB/62). Despite its attempts at raising

additional capital the company "remained chronically short of money, and with its original line as yet unfinished, it appeared unlikely that these diverse extension lines would ever get off the ground" (Jenkins & Strange, 2004: 13). The company was severely hit by the banking crisis that followed the failure of Overend, Gurney and Co. in May 1866, and "by the 1870s all thought of extension towards Whitchurch had been abandoned, and the WMCQR settled down to eke out a somewhat impecunious existence" (Jenkins & Strange, 2004: 13).

The opening up of Connah's Quay did, however, provide an impetus to the Denbighshire coalfield; in a report to A Mackintosh, director of the Wrexham & Acton colliery, dated 11 August 1882, R Wyatt, the company's London agent, commenting on the state of joint sales with the Westminster colliery, reported that "since the collieries have been in a position to ship at Connah's Quay at 1/- per ton less than at Birkenhead, I have been soliciting numerous merchants in the Mediterranean trade, and I trust to have some success. Connah's Quay it appears however is scarcely developed sufficiently, as yet, to induce owners to send ships there, but as it advances in completeness and becomes better known to exporters, trade will undoubtedly be attracted to it" (NLW/HR/50/17).

By the 1880s the main focus for those wanting to improve Wrexham's rail links was to see completion of the Hawarden bridge over the river Dee which would allow direct access to the port at Birkenhead from where steam coal was shipped. Work on the bridge, which was to be part of the Manchester, Sheffield & Lincoln Railway (MSLR) network, started in August 1866, but it was to be more than twenty years (August 1889) before the bridge actually carried rail traffic (Boyd, 1991: 194). Such was the perceived importance of the bridge to the industrialists of Wrexham that, in a petition to Parliament, the mayor, aldermen and burgesses of Wrexham pointed out that such a link "will form a new and direct competitive route from the said county of Denbigh to the port of Birkenhead, and by means of the Mersey Tunnel to Liverpool and other important centres of commerce in Lancashire". The petition added that "the town of Wrexham is the principal town in the Denbighshire coalfield and its prosperity is absolutely dependent upon the prosperity of the industries of the district ...[and

the bridge].. will give a great impetus... to the trade and commerce of Denbighshire" (DD/C/222).

The extent to which the railways opened up the market for Denbighshire coal was alluded to by Henry Robertson in his evidence to the House of Lords in 1862; to establish the veracity of his statement it is necessary to look at the statistics that are available. Hunt's *Mineral Statistics* provide figures for the total amount of north Wales coal that was 'exported' from the region by rail each year. As has been explained in Chapter 2 above, Denbighshire constituted by far the most important coal producing county in the region and it can therefore be assumed that most of the railway borne coal was from Denbighshire. The 'export' figures for coal carried by rail from north Wales given by Hunt can be found in Table 7.1; these show a significant increase in coal carried by rail between 1860 and 1865. The accuracy of some of these figures must be treated, as should all Hunt's early figures, with a certain degree of caution, but there was undoubtedly a big increase in rail traffic in this period. Reasons for this dramatic increase include the impact of the completion of key railway links, and the impetus that this gave to the sinking of new collieries. Among the railway links completed in this period were, for example, the opening of the WMCQR and the completion of many of the branch lines and spurs connecting collieries to the main line railways. One such branch was that built by the GWR from Croesnewydd to Brymbo; this replaced a complex system of tunnels and inclines on the Brymbo-Moss section of the Shrewsbury and Chester line, and made the transportation of coal much easier (DD/NTD/142). Once the railway network was more or less completed, collieries were sunk at locations that were convenient for rail transportation, for example, the Hafod and Gwersyllt collieries were sunk in this period. The Hafod colliery "was situated a short distance from Johnstown Station on the Great Western Railway line between Wrexhan and Ruabon" (Lerry, 1968: 63), while the Gwersyllt colliery was close to the Wheatsheaf Junction of the GWR (DD/NTD/142).

Table 7.1: Coal carried by rail from north Wales 1860-1914

	'000 tons	% increase		'000 tons	% increase
1860	122.5		1890	1,369.4	5
1865	930.0	659	1895	1,429.6	4
1870	1,023.0	10	1900	1,474.5	3
1875	1,226.9	20	1905	2,144.3	45
1880	1,265.4	3	1910	2,630.8	23
1885	1,306.5	3	1914	2,360.7	-10

Source: Hunt's *Mineral Statistics* (D/GR/545-1610).

The increase of 807,500 tons in coal carried by rail from Denbighshire between 1860 and 1865 cannot be attributed to increased production; the output of the coalfield only increased from 1,139,500 tons to 1,395,000 tons, i.e. by 255,500 tons, over the same period. It would thus appear that, if the figures provided by Hunt are accurate, the increase in rail freight must be accounted for by producers shifting from their former methods of conveyance to the new railways.

Table 7.1 suggests two subsequent periods of important growth in rail-borne traffic in north Wales: 1870-75 and 1900-1910, both periods which saw booms in the coal trade. In the former, the growth in coal carried reflects two factors: the expansion of output by existing collieries and the coming into production of new pits. One of the largest collieries in Denbighshire, Hafod, was sunk between 1863 and 1866, and it would clearly have been able to take advantage of the boom period of the early 1870s. Some other very large collieries, for example, the Wrexham, and Bersham collieries, which were sunk in 1868 and 1869 respectively were just coming into production in the period 1870-1875 and would have increased the amount of coal available.

In subsequent years the amounts carried by rail remained relatively constant until 1900-1910 and, as most of the major collieries of Denbighshire had already been sunk (only Gresford, 1908-1911, and Llay Main, post - 1914, were yet to be sunk), the increase recorded in these years must be accounted for by the existing collieries taking advantage of the boom conditions. The collieries

sunk in the 1860s and 1870s (including Plas Power and Brynkinallt) were, by 1900, 'mature' collieries which were able to fully take advantage of the upturn in trade, not least by increasing the number of days worked per week and per year. Increased demand encouraged producers to increase output, and therefore profits, for as long as the boom allowed them to. Another reason for the increase in 'exports' during a boom period was that the economic expansion in Britain and abroad had opened up hitherto inaccessible markets that the companies were able to exploit.

Destinations

Where then did the Denbighshire coalfield sell its coal? There are no official figures available giving details, either of amounts carried by rail from Denbighshire, or its destination, but there are some official figures available for north Wales (see Table 7.1 above), and some archival details for individual collieries, albeit very scarce, which allow some conclusions to be made. The evidence available shows that, for most companies non-local markets were the most important. Table 7.2 reveals that, from 1865 to 1900, around half of all the output of north Wales was 'shipped' out of the region by rail; this increased significantly to approximately three quarters of all output from 1905 to 1914.

Table 7.2: Coal carried by rail from north Wales as a proportion of total output, 1860-1914

	%		%
1860	7	1890	46
1865	47	1895	50
1870	44	1900	47
1875	52	1905	74
1880	52	1910	77
1885	56	1914	71

(Source: Hunt's *Mineral Statistics*, D/GR//1545-1610).

Between 1900 and 1905 the amount of coal carried from north Wales increased from 1.47 million tons to 2.14 million tons, an increase of 45 per cent

(Hunt's *Mineral Statistics*) and, between 1905 and 1910 there was a further increase of 23 per cent, from 2.14 million tons to 2.63 million tons. It is interesting to note that between 1900 and 1905 the output of both north Wales and Denbighshire fell, by 7 per cent and 3 per cent respectively. This fall in output followed a period of boom, and although the output of Denbighshire rose in 1902 and 1903, it fell 9 per cent between 1903 and 1905 (Hunt's *Mineral Statistics*). It is possible that, with local demand falling, the coalowners of Denbighshire were forced to look for markets further afield, or it may be that, because Denbighshire produced good quality steam coal, it was able to take advantage of the increased demand for steam coal. Mitchell (1984: 16-17) explains that, between 1887 and 1913, the proportion of UK coal output consumed by steamships increased from 8.9 per cent to 17.5 per cent. Although much of this came from south Wales, Denbighshire, with its proximity to the important ports of Birkenhead and Liverpool, would have been in a position to take advantage of these developments, as was the case with the Broughton & Plas Power Coal Co. Ltd., which supplied coal to shipping companies such as the Cunard Steamship Co. and the Pacific Steam Navigation Co. Ltd. (DD/LH/239).

The surviving archival evidence illustrates that local markets were relatively unimportant to the larger Denbighshire collieries. For example, in the eight months to August 1883, sales classified as local by the Wrexham & Acton collieries Co. Ltd. made up only 4.5 per cent of its total turnover, whereas coal carried by rail accounted for 67 per cent, and that by ship for 22 per cent (NLW/HR/76). The only other figures available that illustrate the split of sales are those for the Broughton & Plas Power Coal Co. Ltd. which show a similar pattern; in the half years to 31 December 1913 and 30 June 1914 local sales accounted for only 6 per cent of its total sales, whereas shipping sales and railway sales accounted for 29 per cent and 65 per cent respectively (D/BC/2289).

However, Wrexham & Acton Collieries Co. Ltd., and Broughton & Plas Power Coal Co. Ltd. were among the largest companies in Denbighshire, and they would therefore have had the resources to ensure that they did not have to rely on the truly local market as was probably the case with many of the

collieries. Some of the smaller collieries listed in the *List of Mines* only produced coal as part of another process, for example, the Delph, Erwlwyd and Abernant pits raised coal only as part of the process for extracting fireclay for brickmaking. Many of the smaller collieries were often among the older collieries, they had often been sunk before the advent of technological advances and had not been sunk with the railway network in mind; this meant that they did not have the ease of access to the railway network that their newer 'tailor-sunk' competitors had, and many of the mines listed by Hunt in 1854 (D/GR/1545) had disappeared by 1901 (Lerry, 1968: 40).

Customers

The information available about individual companies and their customers is very limited; little has survived, but what there is sheds light onto some of the sales methods used by Denbighshire coal companies and also how varied were the markets that were being targeted.

As Church explains (1986: 57), there were three main methods of sale available to coal companies; they could sell direct to a coal merchant from the colliery; they could sell via an agent or factor; or, from the 1880s, they could sell coal by the wagon load to customers who had their own rail sidings and/or wagons. Mitchell (1984: 10-11) further explains that most customers bought on contract; these could last anything from three weeks to three years, but six or twelve months were the norm. According to Mitchell (1984: 13), in the early nineteenth century, contracts were largely confined to the north east of England or other areas where large amounts of coal were shipped to their markets but, by the late 1870s, "more than half the output of most companies was sold by contract, the scarcities of 1872-3 having induced more customers to adopt the practice" when they found themselves unable to access sufficient supplies. Coal that was not sold in this way was sold in smaller amounts, on the 'spot' market, to local customers, other collieries which could not meet their own demand, or existing customers who had underestimated demand (Mitchell, 1984: 13). Selling

by contract, especially a long term contract of over six months, could be a risky business for both buyer and seller; although the contract offered security of supply to the buyer, and security of demand for the seller, a price was fixed for that supply at the start of the contract. This offered benefits to coal producers if prices were falling, but the profits to be earned from rising prices were foregone if the contract price was agreed just before a period of higher prices.

The only archival records giving a comprehensive overview of an individual company's affairs that survive for Denbighshire are those of the Broughton & Plas Power Coal Co. Ltd. This was one of the largest colliery companies in Denbighshire; in 1901 it employed 1,789 men at its Gatewen and Plas Power collieries (Lerry, 1968: 40), and its output for the year to 31 December 1901 was approximately 438,000 tons (D/DM/309/4). The main method of selling coal at Broughton & Plas Power Coal Co. Ltd. was by long term contract: anything from 6 months to 3 years. The contracts were usually settled in the summer "as the circumstances of the north Wales coal trade compel the owners to make contracts in or about the month of June in each year for the greater portion of their output for the ensuing 12 months" (D/DM/309/4, 28 November 1888). This often caused problems for the company because the price at which coal was supplied was fixed, and if the general market for coal improved, wages tended to increase which meant that profits were squeezed. As was pointed out in the minutes of a meeting in November 1888, "the advance in wages and cost of stores during the past year rendered many contracts expiring in July quite unremunerative" (D/DM/309/4, 28 November).

The price charged for coal depended on whether the coal was delivered in the company's own wagons or in those of the customer, and from the list of agreed contracts available (see Appendix B) it would appear that one of the main customers for coal delivered in the company's wagons, in May 1888, was the Birmingham Corporation, which contracted for 50,000 tons (27 per cent) from a total of 184,815 tons. There are no details given as to what this coal was to be used for, but it is likely that it was used to power the city's gas works; an undated brochure for the company (DD/LH/239) maintaining that "this well known and

widely used Gas Coal,.....is supplied to a great number of Gas works". Indeed gas companies contracted for 48,670 tons or 26.3 per cent of the supplies detailed in the sample, covering contracts entered into in June, July and September 1888, and if it is assumed that the supplies ordered by the Birmingham and West Bromwich Corporations were also to produce gas, these figures rise to 82,670 and 44.7 per cent respectively. Some of these companies were located at quite a distance from Wrexham, for example, Taunton and Northampton, but the majority tended to be concentrated in the north west and the Midlands.

Other significant corporate customers included the railway companies; of the total tonnage contracted for in the 1888 sample, 40,400 tons (21.9 per cent) was taken by railway companies, 30,000 tons being supplied to the LNWR, and 10,400 tons to the GWR. The remainder of the contracts relate to smaller businesses, sole traders or partnerships, who possibly traded as coal merchants or agents. These contracts included some for substantial amounts. For example, the contract with F Chubb of Hereford was for 15,000 tons or 8.1 per cent of the total sample, but the majority of the remaining contracts were for much smaller amounts; many customers, e.g. Edward Jones & Son, Coal Merchants of Corwen (*Slaters Trade Directory*, 1895), agreed to buy what would appear to have been the minimum amount, namely, 100 tons.

The terms of the contracts varied from customer to customer; the larger customers, the railway companies and some of the gas companies, received a 'heavier' ton (21 cwt as opposed to 20 cwt) than the other customers, and prices often varied significantly. The price of coal delivered to the customer varied from 6/1d per ton (2,000 tons - Bilston gas Co.) to 7/6d (100 tons - Cricklade Gas Co.), and the price of coal supplied at the pit varied from 5/6d (5,000 tons - Wolverhampton Gas Co.) to 7/4d (100 tons - Coward & Co.). The prices varied not only according to the amount purchased but the length of the contract; most were for 12 months or less, to 30 June 1889, but some were for longer, for example, the contract with Northampton Gas Co. (4,000 tons (21cwt) @ 6/3d) was for 2 years (to 30 June 1890), and the one with F Chubb (15,000 tons

(20cwt) @ 6/-) ran for 3 years (to 30 June 1891). These customers were given good terms either for the price, the weight or, in the case of the former, both.

Some customers were also offered discounts ranging from 1¼ per cent to 2½ per cent, but those customers who were given favourable terms in the first instance were not usually offered any discount. The minutes of 15 May 1889 (D/DM/309/4) also reveal that the company was considering offering a reduction of 3d per ton to those gas companies that took supply of equal quantities all year round, which would help equalise revenue throughout the year.

A number of Denbighshire coal companies entered into 'special relationships' to expand their markets. One example of such a relationship is that between Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. (and later Broughton & Plas Power Coal Co. Ltd.). These companies' collieries joined together to sell their coal via agents in Birkenhead and London. The bulk of the coal that these companies sold via their joint arrangement was for 'shipping' and thus of the best quality. The price the companies were able to charge for this coal was therefore higher than the average price the coal companies of Denbighshire received for their coal. If the prices illustrated in Table 7.4 (p.255), for Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd., are compared with the average Denbighshire selling prices (see Table 8.11 in Chapter 8 below, p.309) we can see that the former are significantly higher than the latter. For example, the average price of 9/9d received by Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. for shipping sales in 1883 (see Table 7.4) was 82.8 per cent higher than the average selling price of 5/4d for Denbighshire in that year (see Table 8.11).

A different type of venture was undertaken by the Broughton & Plas Power Coal Co. Ltd. to ensure a market for its coal. In January 1897 the company's minutes report that "your directors have long desired to open up a new market for slack as the supply is often in excess of the demand and very low prices have ruled in consequence". The directors therefore decided to invest in the by-product industry and established a coke company, The Broughton Solvay Coke Company

Ltd. The company invested £4,000 and, by the end of 1898, it was reported that the investment "has yielded a fair dividend and the advantage of the outlet for the disposal of slack has been marked in the busy season" (D/DM/309/4, 22 February 1899).

Selling techniques

The Broughton & Plas Power Colliery Co. Ltd., like other coal companies throughout Britain, used adverts and brochures to bring its products to the notice of potential customers. In a brochure produced in the late nineteenth century, it advertised itself as "producers of the Brymbo Main coal - a well known steam coal of high quality; also of best Gas and House coals" (DD/LH/239). The brochure also illustrates the company's reliance on agents or 'representatives' listing the following agents: 'shipping' - Rogers & Bright (Liverpool and Birkenhead); London and Birmingham – F Brown; Cheshire and North Wales – FL Rawlins, and Simon Roberts; and Birkenhead - The Mersey Coal Co.

The terms offered varied between agents as follows:

- The Mersey Coal Company was appointed the agent for the company's coal in July 1883 (D/DM/309/3, 16 July 1883); it was paid a percentage of the nett price realised at the pit <u>after</u> paying expenses and wagon hire. In September 1884, this percentage was set at 2d per ton after paying expenses and 9d per ton wagon hire; from this time, the salary of a clerk and the rent of offices at Birkenhead was now to be paid by the company.
- FL Rawlins became an agent in October 1889, initially for 12 months, working exclusively for the Brymbo Company, the Brymbo Steel Company, and the Broughton & Plas Power Coal Co. Ltd. The terms of the agreement gave the agent 2½ per cent on the pit price after deduction of wagon hire and carriage costs of coal and slack sold in his 'district'. This covered "North Wales, Cheshire, and Shropshire.....(including Shrewsbury); but <u>excluding</u> Birkenhead shipping, Gas works, locomotive coal, Brymbo Steelworks, coal supplied to directors and Mr Fitzhugh [a major mineral owner], Birkenhead local with Wirral peninsula as far east as Hooton, and retail trade at pits".

The company was to pay three quarters of his expenses, to include second class rail fares and 5/- per day for other expenses - up to 246 days in the year (D/DM/309/4, 27 November 1889).

- Rogers & Bright were appointed in January 1890 as sole shipping agents at Liverpool and Birkenhead for the sale of all coal for shipping and export (except Ireland). The salary to be paid depended on the quantity shipped, according to the following scale:-

tons	£
up to 55,000	400
55,000-65,000	480
65,000-75,000	560
75,000-85,000	640
85,000-95,000	720
95,000-105,000	800

  All Dock Board charges were to be advanced by the company, and payment on account was to be made on half-yearly sales to be made every September with full settlement in March.

- Simon Roberts was appointed in charge of the 'Dolgelly' (sic) agency in April 1890; no further details of his terms are available apart from the fact that they would be fixed after a trial period (D/DM/309/4, 16 April 1890).

The Broughton & Plas Power Coal Co. Ltd. also involved itself in one-off selling 'speculations'; in November 1885 it decided "to pay half [no details are available of the other contributor(s)] the expenses of sending a traveller to India to push the sale of our coal in the Indian market", the contribution not to exceed £70 (D/DM/309/3, 6 November 1885). In March 1886 it decided not to appoint Thomas Hudson as its agent in Rio de Janeiro (he had earlier sold a cargo of the company's coal there) "as all the information obtained proves this kind of business to be hazardous" (D/DM/309/3, 4 March 1886). However, in July 1886 it resolved to continue an agreement with JD Spreckels Brothers in San Francisco, whereby the agents confined their purchases of north Wales coal exclusively to the company, and the company continued to ship coal only to the agents (D/DM/309/3, 4 March 1886).

The company was also keen to open up new markets closer to home; in January 1886 it outlined plans to apply to the GWR for a special rate to Aberdovey (sic) for shipment to see whether an avenue for trade could be opened up (D/DM/309/3, 26 January 1886). It also decided, in December 1894, to rent an office on the quay in Belfast and, in March 1895, it agreed to an agency in Ulster run by Mr JB Cooper; this was subject to the fact that the Gas Coal trade was to be left in the hands of F Brown (London & Birmingham) and that commission was to be paid at three and one third per cent on the pit price.

Joint selling agreements

Throughout the period under review, the Broughton & Plas Power Coal Co. Ltd. was also involved in some 'combined' ventures with its local competitors, the Wrexham & Acton Collieries Co. Ltd. and the Westminster, Brymbo Coal & Coke Co. Ltd. From 1873, these two companies had worked together to sell coal from Birkenhead; in May 1876 a London agent was appointed and, in February 1887, the 'joint committee' was extended to include the Broughton & Plas Power Coal Co. Ltd. This agreement guaranteed that the coal shipped on behalf of the companies would come from each colliery company in agreed proportions. The relationship between Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. appears to have been successful; the amounts sold for the years 31 December 1876 to 1888 fluctuated between 155,500 and 208,800 tons (see Table 7.3).

Table 7.3: Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. - joint sales 1876-1888

	Tons		Tons		Tons
1876	155,572	1880	176,548	1884	190,732
1877	225,206	1881	192,218	1885	197,956
1878	235,194	1882	155,344	1886	208,800
1879	185,109	1883	204,337	1887	206,432
				1888	205,023

(Source: NLW/HR/74/28-57).

Figures showing how the Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. sales were split between 'shipping', and 'gas and rail' sales are available for the years 1881-1888 and are detailed in Table 7.4. These figures illustrate that for this joint venture the most significant sales were those for shipping, which were conducted at Birkenhead. During the years illustrated, the proportion of sales which was categorised as 'shipping sales' fluctuated between 70 per cent and 87 per cent of total joint sales and the annual average price per ton achieved fluctuated between 7/10d per ton and 9/9d. While these annual variations are significant (there is a 28 per cent fluctuation), they are not as volatile as the underlying quarterly figures for price per ton from which they have been extracted. If the quarterly figures are examined (see Table 7.5), more volatile figures are apparent. For example, in March 1876 the average price received was 12/3d per ton, but by December 1886 this had fallen to 7/4d, an overall variation of 67 per cent.

Table 7.4: Wrexham & Acton Collieries Co. Ltd.& Westminster, Brymbo Coal & Coke Co. Ltd. - joint sales 1881-1888, split between shipping, gas and rail sales

	Shipping -tons	Shipping sales £	Average annual price	Gas & Rail -tons	Gas & Rail sales-£	Average annual price	Total sales-tons
1881	148,966	65,857	8/10	43,252	13,267	6/1	192,218
1882	118,706	52,844	8/11	36,638	11,446	6/3	155,344
1883	154,353	75,033	9/9	49,984	16,019	6/5	204,337
1884	143,302	69,757	9/0	47,430	15,081	6/4	190,732
1885	172,308	79,577	9/3	26,548	8,885	6/8	197,956
1886	174,863	71,561	8/2	33,937	11,333	6/8	208,800
1887	165,436	65,589	7/10	40,996	12,526	6/1	206,432
1888	143,901	57,772	8/0	61,122	19,118	6/3	205,023

Note: These figures exclude Broughton & Plas Power Coal Co. Ltd. even though they relate to the period after it joined the 'committee'.

(Source: NLW/HR/74/28-57).

Table 7.5: Average quarterly selling prices for coal sold jointly by the Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd., March 1876-December 1888

Quarter to	'shipping' s/d	'gas & rail' s/d	Quarter to	'shipping' s/d	'gas & rail' s/d
Mar 1876	12/3		Sep 1884	9/2	6/4
Jun 1876	11/0		Dec 1884	9/1	6/4
Sept 1876	10/3		Mar 1885	9/0	6/4
Dec 1876	10/0		Jun 1885	9/0	6/4
			Sep 1885	8/9	6/10
Mar 1881	9/4	6/3	Dec 1885	8/6	7/0
Jun 1881	8/5	5/11	Mar 1886	8/2	6/10
Sep 1881	8/5	6/1	Jun 1886	8/0	6/7
Dec 1881	8/5	6/3	Sep 1886	7/4	6/3
Mar 1882	8/7	6/2	Dec 1886	7/4	6/9
Jun 1882	8/2	6/0	Mar 1887	7/5	6/8
Sep 1882	8/3	6/3	Jun 1887	7/6	6/5
Dec 1882	8/6	6/5	Sep 1887	7/7	5/10
Mar 1883	8/11	6/5	Dec 1887	7/6	5/11
Jun 1883	8/11	6/2	Mar 1888	7/10	6/0
Sep 1883	9/5	6/6	Jun 1888	8/0	5/10
Dec 1883	9/2	6/6	Sep 1888	8/0	6/8
Mar 1884	9/2	6/4	Dec 1888	8/3	6/10
Jun 1884	9/4	6/5			

(Source; NLW/HR/74/28-57)

The prices received for 'gas and rail' sales were lower than those for 'shipping' for a number of reasons. First, the coal used for gas and rail purposes was of a lower quality than the steam coal used by shipping. Second, it is likely that the railway companies used their own wagons to collect the coal from the collieries and, thirdly, the contracts were for longer periods. It is also evident, from Table 7.5 that the prices for 'gas and rail' sales fluctuated far less than those for 'shipping' indicating the greater volatility / competition in the latter market.

The joint scheme between the Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. appears to have progressed smoothly. However, problems were encountered almost immediately following the inclusion of the Broughton & Plas Power Coal Co. Ltd. into the agreement. As early as July 1887 the amount of Broughton & Plas Power Coal Co. Ltd. coal to be included in joint shipments from Birkenhead was much less than agreed. Although the company was producing sufficient output, its coal was not being

'chosen' for sale and, as early as 23 July in fact, the company needed to ship 10,190 tons to make up their 'share' (D/DM/309/3, 29 July 1887). In discussions with the Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. it was decided that, in August 1887, those companies would only ship 3,000 tons from their collieries to meet a contract with a customer, GJP, leaving the balance to Broughton & Plas Power Coal Co. Ltd. (D/DM/309/3, 31 August 1887).

Following the resolution of this disagreement, problems continued; in June 1888, Broughton and Plas Power Coal Co. Ltd.'s share of shipping sales was 4,440 tons in arrears, a problem that had "arisen from the Westminster Company's practice of stipulating for delivery of coal from their pits. It was resolved to insist upon all orders being taken henceforth for coal to be delivered from any of the union collieries" (D/DM/309/3, 13 June 1888). It would appear that it took Wrexham & Acton Collieries Co. Ltd. and Westminster, Brymbo Coal & Coke Co. Ltd. a long time to get used to the inclusion of Broughton & Plas Power Coal Co. Ltd., perhaps because of their previous, long established relationship; this is illustrated by the breakdown of union sales for 1889 shown in Table 7.6.

As is revealed in Table 7.6, in 1889, the Broughton & Plas Power Coal Co. Ltd.'s coal was 'undersold' by 19.7 per cent, and such a discrepancy does not appear to have been unusual. Indeed, the minutes of the Broughton & Plas Power Coal Co. Ltd. (D/DM/309/3-4) contain many references to the disagreements that occurred between the three companies. In November 1889 it was reported that "wagons belonging to the Ruabon Coal Company had been loaded up at the Wrexham & Westminster collieries with coal... for Swan Village for the Birmingham Corporation, the Wolverhampton Gas Co., and the Bilston Gas Co. contrary to the agreement. It was resolved that having regard to the importance to all parties in the union that the agreement should be fairly and honourably carried out; this Board failing a satisfactory explanation of the above, withdraw from the union at the expiration of 3 months from this date" (D/DM/309/4, 27 November 1889). The representatives from the other union

collieries acknowledged that they were in the wrong, and the company decided to remain in the union (D/DM/309/4, 27 November 1889).

Table 7.6; Sales by the joint union of the Wrexham & Acton Collieries Co. Ltd., Westminster, Brymbo Coal & Coke Co. Ltd. and Broughton & Plas Power Coal Co. Ltd., 1889

Quarter to	Shipments by: (in tons)				
	Westminster	Wrexham	Plas Power	TOTAL	Over/(under) agreed amount for PP
30 March	21,444	14,960	6,256	42,660	(6,542)
29 June	21,504	19,840	12,850	54,194	(3,408)
28 Sept	22,304	15,134	11,029	48,467	(3,510)
9 Nov	12,480	7,251	12,646	32,377	2,932
	77,732	57,185	42,781	177,698	(10,528)
	Agreed amounts per Agreement				
30 March	16,574	13,288	12,798	42,660	
29 June	19,900	18,036	16,258	54,194	
28 Sept	17,797	16,131	14,539	48,467	
9 Nov	12,185	10,478	9,714	32,377	
	66,456	57,933	53,309	177,698	
Over/ (under)	11,276	(748)	(10,528)		
% over/(under)	17	(1.2)	(19.7)		

(Source: NLW/HR/ 74/28-57).

Additional agreements with other companies were made by the Broughton & Plas Power Coal Co. Ltd.; in 1894 a proposal for joint shipping of sales with the Wynnstay Collieries Ltd. was "considered and deemed advantageous" (D/DM/309/4, 26 January 1894). In the following year, Sir HB Robertson, of the Broughton & Plas Power Coal Co. Ltd., was invited to join the Board of Wynnstay Collieries Ltd., an invitation which the company accepted because "it was considered that his doing so would promote the interests of both companies" (D/DM/309/4, 18 December 1895).

In addition to sales agreements with individual companies, there were attempts by all the collieries in the region to agree various sales and pricing

policies. In September 1891 a meeting in Chester was called by Messrs Barnes (Bersham), and Butler (Ruabon) with a view to appointing a committee of the Denbighshire Coalowners "to control the sales of coal for shipment at Birkenhead" (D/DM/309/4, 24 September 1891). It would appear that while willing to enter into sales agreements with other companies, the Broughton & Plas Power Coal Co. Ltd. would not allow prices to be fixed. The minutes state "that we could submit to no control in fixing the prices of cargoes for America [and] that this must be clearly understood if we joined the shipping sales committee" (D/DM/309/4, 23 December 1891). This same reluctance to commit the company to fixed price agreements was revealed when an initiative by the 'Ruabon Committee', in November 1891, attempted to fix the price of landsale coal; the company felt that this move was "imprudent", and despite "All the other members of the Ruabon Committee [being] in favour of advancing the price of landsale coal by 10d per ton...[the Board] ...decided that we would make no advance, as an advance.....might be likely to cause difficulty with the men about wages" (D/DM/309/4, 5 November 1891). The other members of the Ruabon Committee continued to press for price-fixing, but the Broughton & Plas Power Coal Co. Ltd. continued to withhold its approval, because "any advance is wholly unwarranted by the state of the markets and possibly dangerous in its effect upon wages" (D/DM/309/3, 23 December 1891). It would appear that this reluctance to fix prices had been overcome by November 1896; "the secretary reported that shipping sales were now under the control of a committee representing the Denbighshire Coalowners - the first committee of the kind which has included all the Denbighshire Coalowners and that all had worked smoothly since the committee was formed in November" (D/DM/309/4, 27 January 1897).

Additional, more national, initiatives were considered by the directors of the Broughton & Plas Power Coal Co. Ltd.; in March 1894 a scheme was proposed by the Yorkshire Coalowners for a gas coal syndicate to fix prices, but "it was decided not to join in any event unless the Ruabon Coal Co. and the Wynnstay Colliery Co. also did so" (D/DM/309/4, 21 March 1894). Further meetings on this issue took place in 1895, but the company decided that "as the

greater part of the Yorkshire and Derbyshire trade lies in districts where the North Wales coal cannot compete, anything partaking of the nature of a common fund must be more or less of a speculation for North Wales coalowners, so it was decided not to join the scheme which was regarded however as admirable for the purpose" (D/DM/309/4, 1 May 1895). Again, however, the company eventually succumbed to the price-fixing proposals of the larger coal districts; by May 1900 it could be stated that "the Yorkshire, Lancashire and North Wales districts are acting together with regard to contracts for the coming season, and there is reason to expect an advance of at least 5/- per ton" (D/DM/309/6, 2 May 1900).

Conclusion

From the above discussion it can be seen that, although it was a small coalfield, Denbighshire was not restricted to merely supplying its immediate environs and indeed had a wide and varied market. The main impetus to the creation of a non-local market, which allowed the coalfield to expand rapidly in the 1860s and 1870s, was the further development of the railway infrastructure. The building of the WMCQR to link Wrexham with the newly developed port at Connah's Quay, considerably extended the market for Denbighshire coal. Not only did it allow access to Connah's Quay's dock facilities but, when the Hawarden Bridge, which linked Connah's Quay and Birkenhead by rail, was opened in 1889, this allowed the Denbighshire companies far quicker and easier access to the significant port of Birkenhead.

Despite the paucity of primary records, those that do survive establish that the larger companies in Denbighshire were pro-active in their approach to expanding markets, and would try many different approaches. Rather than relying solely on the traditional agency system, companies such as Broughton & Plas Power Coal Co. Ltd. became involved in more varied methods; these included sending out travellers to different parts of the world, joining local selling agencies/'cartels', and investing in the by-product industry. Such was the success of the first two methods that the Broughton & Plas Power Coal Co. Ltd.

counted among its customers not only some of the biggest railway companies in Britain, such as the GWR and LNWR, but some of the biggest shipping companies in the world such as the National Steamship Co., Cunard Steamship Co. and the Pacific Steam Navigation Co. Ltd, as well as companies across the world, such as the Great Indian Peninsular Railway Co. and the South Indian Railway Co. (DD/LH/239).

Having examined how, and to whom, the coal companies of Denbighshire sold its coal, we have completed our survey of the stakeholders in the Denbighshire coal companies. We now turn our attention to trying to establish how successful the companies were. The next chapter will therefore examine the productivity and profitability of the Denbighshire coal companies.

Chapter 8

PERFORMANCE

Introduction

Earlier chapters have shown us that the coal industry in Denbighshire grew considerably between 1850 and 1914 and this required considerable investment by the stakeholders in the coal companies. None of the stakeholders would have 'invested' in the companies if they did not anticipate receiving a return; the shareholders anticipated dividends, the mineral owners expected royalties and the employees required wages. None of these could be paid if the companies did not perform well and dividends, in particular, depended on the companies making profits. It was therefore important, if the companies wished to keep their shareholders happy, to make sufficient profits to pay dividends. It was also important for a company to be profitable if it was to achieve any sort of longevity; if a company did not perform well then the investment that it might need to become successful was not likely to be forthcoming, whereas a successful company could either generate funds internally or would find it easier to attract the outside investment it needed to expand. Profitability was therefore an extremely important issue for coal companies. However, ultimately, the companies could not make profits if they were not getting coal efficiently and, therefore, labour productivity was of vital importance; this chapter will therefore consider the performance, in terms of both productivity and profitability, of the coal companies of Denbighshire.

To assess the performance of a nineteenth century coal company, either in terms of labour productivity or profitability, is, however, not without its problems. According to Church (1986: 472), measuring labour productivity is problematic. The preferred measure of 'Output per Man Shift' (OMS) is often impossible to calculate due to the lack of primary material and, therefore, "the historian, for want of a more satisfactory indicator, is thrown back upon the returns of 'Output per Man Year' (OMY)" (Taylor, 1960: 48), as these are often

the only figures that can be derived from historical statistics. This means that, as Walters (1977: 280) explains, "any discussion of labour productivity is seriously handicapped by use of such [a] crude global measurement".

Given the shortcomings of labour productivity as a measure of coal companies' performance, it might be thought better to rely on profitability, however, this too, is beset by problems. In the context of the twenty first century, performance is synonymous with profitability and, for public limited companies in particular, profitability goes hand in hand not only with the ability of the company to keep its shareholders happy, but with maintaining the market's confidence in the company's performance. A slight downturn in profits can wipe thousands, if not millions, of pounds off a company's value as shareholders sell their shares and analysts transfer their allegiance elsewhere. However, when attempting to assess the performance of nineteenth century companies, it is important to establish what performance meant in a nineteenth century context. It would appear that, "[nineteenth century] coalowners were inclined to measure the efficiency of their industry ...in terms of...financial success" (Taylor, 1960: 66) which meant that the directors of the coal companies were usually profit driven, and especially keen to pay the shareholders (of which they themselves often constituted a large proportion!) dividends. The problem with 'profit' is that, especially in the nineteenth century, there were no strict accounting conventions determining the definition of profit, and companies were therefore able to establish a subjective definition. This lack of standardisation meant that assets and liabilities which, by modern accounting conventions would be deemed to have been 'misstated', were included in nineteenth century accounts because companies "individually adopted general accounting conventions to suit the circumstances of their particular concern" (Wale, 1990: 253).

Despite the highlighted shortcomings of both profit and productivity as measures of performance, they remain the only real measures at our disposal; this chapter will therefore review the performance of the companies on the Denbighshire coalfield first in terms of productivity and then in terms of

profitability. Before looking at the available data on productivity we first examine the problems associated with trying to measure productivity in the coal industry.

Labour Productivity

Measures of labour productivity

If labour input was measured simply in terms of whether the numbers employed increased over time, then one look at the employment figures for the UK coal industry reveals a significant increase in the last quarter of the nineteenth century. During this period the numbers employed grew from 510,523 in 1875 to 1,124,326 in 1914, an increase of 120 per cent (see Table 2.3) (FA Gibson, 1922: 11 and 29-30). In simple terms, if one assumes a close correlation between the amount of coal raised and the numbers employed, it is to be expected that, as employee numbers increase, so will output. However, "employment figures alone are misleading as a measure of the input to the industry of labour as a factor of production" (Church, 1986: 258) in that they are not an accurate reflection of the actual amount of labour effort put in over a year. Although more workers meant more output, the correlation between the average number of workers and output will never be 100 per cent, either due to a decline in the effort put in by each worker or to other factors such as differences in shift lengths and the working week. While various measurements can be used to assess the overall efficiency of labour (see below) they do little to measure the efficiency of individual workers. It is almost impossible to measure the efficiency of one hewer against another; even if both produced the same amount of coal during a shift, one may have had to work as hard as he possibly could, while the other, possibly physically stronger, or working a better seam, may have only worked to seventy five per cent of his capabilities.

Nonetheless, some form of measurement of the output achieved by the hewers is needed if we are to assess labour productivity, and those available include Output per Man Hour (OMH), Output per Man Shift (OMS), or Output per

Man Year (OMY). Each of these measures is closely linked; the output achieved by a hewer per hour obviously helps to determine the output he achieved in a shift, while the output per shift, when multiplied by the number of shifts worked per year, gives the output for the year. As all the measures are averages, per hour, per shift or per year, the figures are more meaningful when less averaging is involved. This means that the best measure, according to Church (1986: 474) is OMH, calculated by dividing daily output by the man- hours worked. Unfortunately the information required to make such OMH calculations is very difficult to find. Even if one was able to find such information for a single colliery, as a tool for comparison it would be almost useless, due to the lack of comparable information for other collieries.

OMS is therefore the second choice measure; this divides output by the number of shifts worked. This is obviously easier to calculate than OMH because annual, rather than daily output figures can be used. However, although annual output figures are readily available for officially designated regions, they are far more difficult to obtain for individual collieries. More importantly, to calculate OMS, the number of man-shifts or man-days worked by a colliery or coalfield, are needed. Given the disparities, not only between, but within, coalfields of the numbers of days worked by collieries, and the fact that much of the underlying data have been lost, OMS is often difficult to calculate. However, statistics for OMS were only officially required to be compiled after 1920 and can be affected by length of shifts. Thus, for our study period, Church (1986: 473) believes that OMS is "not truly accurate as it disregards variations in the duration of shifts which altered considerably between 1830 and 1914".

This leaves OMY, or output divided by the average number of men working during the year, which has become the measure most commonly used by historians. Despite this, it is generally agreed by historians that OMY is the least useful of the measures discussed; Taylor (1960: 48), explained that "for purposes of historical comparison....the statistics of output per man shift ...are a more sensitive measurement of labour productivity than are those of output per man year" but, given that the information to calculate OMY is readily available, at

least on a coalfield to coalfield basis, it has, by default, become the measure of productivity on which historians have relied.

Although OMS figures are not readily available, when discussing the factors that affected the overall output of a colliery, given that, in simple terms, OMS multiplied by the number of man-days worked equals OMY, these factors can be split between those that impacted on OMS, such as the age of a pit, legislation or the length of shift, and those affecting OMY such as short working and absenteesim. With this in mind, the next section of this chapter will consider first those factors affecting OMS before looking at those that affect OMY.

Factors affecting OMS

Geology and Age

The productivity of a coal mine depends on two main things, the accessibility of the coal and the efficiency of the hewer in extracting the coal. Geological conditions and the age of the pit are the main factors affecting the accessibility of the coal; if geological conditions are good, for example, the seams are thick, the coal is much easier to get than if the seams are thin or the 'roof' is liable to 'crushing', or 'squeezing', as it was in south Wales (Morris & Williams, 1958: 55).

In general, as a pit ages, the coal becomes less accessible; the most easily available coal is often worked first, which means that any remaining coal is more difficult to access. Not only this, but, unless a technique such as 'longwall retreating'[15] is being used, as a colliery 'spreads out' underground, the face being worked gets further away and the hewers have to spend more and more time travelling from the shaft to the face, which obviously reduces their OMS (Mitchell, 1986: 322). Church (1986: 489) believes that the geological conditions within a coalfield or colliery were an important factor determining productivity in the nineteenth century coal industry; if seams were accessible and faults were not prevalent, the easier access to the coal inevitably meant that productivity was higher than in collieries where faults or water made the coal less accessible.

[15] This involves going out ot the boundary of a pit and working back towards the shaft.

Mitchell (1984: 307) believes that the age of the coalfield or colliery was the most important factor affecting productivity. The longer established collieries had been able to access the coal that was easiest to work, and therefore newer collieries invariably had to be sunk in less convenient spots where the coal was usually deeper and harder to access. Church (1986: 482) believes that mines were often sunk with a view to simply accessing coal; little thought being given to issues of efficiency, output being put above productivity.

The older the colliery, the less likely it was that the owners would invest in new technological advances as they became available, for example, advances in ventilation and haulage (Church, 1986: 482). There was often a reluctance to invest the capital required given that, generally, it took such a long time to generate profits and therefore a return on investment in the form of dividends. This meant that many of the older collieries were using outdated, less efficient working methods, which obviously affected productivity. In addition to this, Taylor (1960: 58) believes that, as the nineteenth century advanced, technological changes were not "by nature or consequence of a revolutionary character", and were not as likely to have had as significant an impact on output and productivity as earlier advances. Church (1986: 393) believes that even if a colliery did invest in new equipment, etc, it did not necessarily increase productivity, as the benefit of the new technology was often offset by poor and/or declining geological conditions.

The traditional assumptions relating to a colliery's age and productivity were questioned by Boyns (1982). Boyns (1982) argued that collieries did not necessarily suffer from reduced productivity as they aged and that generalisations such as those put forward by Taylor (1960) should be challenged. Although Boyns (1982: 112) accepts that, in theory, as a colliery ages and the face retreats then the ratio of hewers to oncost workers will fall and so will productivity, he challenges the view that this is automatically what will happen. Traditionally it has been assumed that a colliery will work the coal in the best, thickest seams first and then that in the thinner, less accessible seams; as a consequence productivity would fall. Boyns (1982: 115) points out that for this to

happen the colliery owner would need "perfect geological knowledge of all the coal seams under his leased area" and would then rank them "according to their potential yield in terms of labour productivity" and then work them accordingly. This is an unrealistic assumption because coalowners "would rank them [the seams] not in terms of labour productivity but in terms of their respective profitabilty, and there can be no presumption that these two rankings will be identical" (Boyns, 1982: 115). If a thick, and therefore more productive seam lies at a greater depth than other thinner seams, in terms of profitability, the thinner seams will be worked first because of the costs involved in accessing the deeper coal, "thus it does not follow that the second seam to be mined will necessarily yield a lower return in terms of labour productivity than the one currently being mined" (Boyns, 1982: 115). However, Boyns (1982: 104) acknowledged that even if, in the short term, a colliery's productivity levels could be boosted by, for example, labour saving technological changes, "labour productivity could not be offset forever, and eventually productivity would decline".

The hewer and his effort.

According to Mitchell (1984: 100), "few will quarrel with the statement that the hewer was the most important man; the man whom all the others were, in effect, employed to serve". Before attempting to assess his efficiency and, therefore, his productivity, it is essential to know what the hewer's remit was. Did he simply work the coalface and nothing else, or did his duties involve additional tasks? According to Church (1986: 207-8), in some regions hewers did constitute "an easily identifiable group performing specialised tasks [but] such a marked division of labour was not characteristic of colliery workers in all coalmining regions". Church (1986: 208), further explains that the division of labour in, for example, the north east of England, was very strict and therefore, in this region the hewer did simply extract the coal. This contrasts with other regions, such as south Wales, or the Midlands, where the hewers not only got the coal, but "did all the face work including timbering and stone work".

Given the lack of uniformity in the definition of a hewer and the merging of roles, it is difficult to measure the performance of hewers in one region against those in another. Table 8.1 illustrates this difficulty; the proportion of hewers as a percentage of the total underground workforce in the north east of England was only 49.9 per cent, (but these were likely to be the most accurate in terms of categorisations given the strict division of labour in the region), whereas in Scotland 68 per cent of underground workers were described as hewers. In north Wales, in 1889, the proportion of hewers was 60.3 per cent, which suggests that there was more blurring of responsibilities here than in the regions where tasks were more strictly delineated; workmen might be classified as hewers even though they spent little time actually working the face. By 1905, when more detailed job categories were being used, the proportion of hewers in Scotland was still higher than in any other region, but it had fallen to 59.4 per cent while in north Wales it had fallen to 49.8 per cent. This suggests that workmen were more strictly classified but, even so, the spread between regions still varied from 44.4 per cent to 59.4 per cent.

Table 8.1: proportion of workers described as hewers in 1889 and 1905

Region	1889	1905
	%	%
Scotland	68.0	59.4
North east	49.9	
North east & Cumberland		47.5
Cumberland	67.1	
Lancashire & Cheshire	61.5	46.1
North Wales	60.3	49.8
Yorkshire	61.6	48.4
East Midlands	68.1	
West Midlands	61.1	
East & West Midlands		44.4
South Wales	60.5	55.6
South west	53.9	45.0

(Source: Church, 1986: 212).

An additional problem with the figures in Table 8.1 is that while they split the workers into categories of what they do, they give no indication of how long

they spend doing this, which is the most important factor when looking at the productivity of the individual hewer. It is easy to assume that merely employing more men to work the face would increase the output of a colliery, because more men would be able to get more coal. However, this assumption pre-supposes that not only could each hewer work at the same pace as another but that the hours worked would be the same. When considering labour productivity over time, there is no reason for hours worked per shift to have remained identical. Indeed the Eight Hours Act reduced it in north Wales by half an hour (see Chapter 6).

Apart from the hewer's physical capabilities the most important influence on his work rate was his attitude towards his work and what he wanted to achieve from it. As Walters (1975: 288) explains, the "productivity of labour does not depend simply on [the] time spent by a man at his work; it also depends on the intensity with which he works", and also the numbers of days he decides to work. Although the numbers of days worked is a factor directly affecting OMY rather than OMS, if a hewer 'chose' not to work every day, he might well have chosen to work harder during the days he did attend so as to attain whatever level of income he considered acceptable. This would obviously have had an impact on OMS.

Hours worked

According to Mitchell (1984: 130), when trying to assess a normal working day, "there was an immense range of experience even within each coalfield". The number of hours worked obviously had a direct impact on the miner's productivity, and this was affected not only by the state of the coal industry, but by legislation. Until legislation in 1872 and 1908, the hours worked by miners were largely dictated by the mine owner and prevailing conditions in the industry, and twelve hour shifts were commonplace before 1872. The 1872 Mines Regulation Act restricted the hours that could be worked by boys under 16 to 54 hours a week which had "the effect of reducing hours of labour for other workers to this level too" (Walters, 1975: 286). According to Walters (1975: 286), this Act

did little to affect productivity because "the reduction in working time was not likely to have been of sufficient significance to have affected production".

The 1908 Eight Hours Act, in restricting the number of hours of winding, had the potential to further reduce productivity, but because the eight hour restriction related to winding time, and not the hours 'bank to bank', if the hewer wished to maintain his efficiency he "could intensify his efforts in order to maximise tonnage" (Walters, 1975: 287). This increased effort was unlikely to be sustained for extended periods; given the arduous nature of his job, the hewer could work harder to make up for any shortfall in his wages in the short term, but was unlikely to be able to sustain this effort over the long term. Further disagreement about how the eight hours of winding should be measured and what contituted 'bank to bank', meant that there was still no "common definition of the working day" (Church, 1986: 248) even after the 1908 Act.

Mitchell (1984: 157) believes that "coalowners did not expect their men to work every possible shift [in fact] it is unlikely that many employers viewed one or two shifts missed with much disfavour". It would thus appear that a certain amount of 'absenteeism' was condoned by the employers, who, according to Mitchell (1984: 157), would have found it difficult to "accommodate a one hundred per cent attendance of their workforce". One of the main factors behind the absenteeism of an individual miner was likely to be his view of what constituted an acceptable level of income. If he was paid by piece-work he could increase or reduce his level of effort depending on the prevailing conditions in the industry, and still achieve what he considered a decent wage (Church, 1986: 488). Walters (1975: 288) believes that in south Wales this was the main reason why miners worked less efficiently, but it is difficult to make generalisations about wages because "wages have always varied enormously between different pits....and the general level of wages as greatly between districts" (Rowe, 1923: 4) (see Table 6.3 in Chapter 6).

Walters (1975; 289) believes that "the collier's productivity might certainly have been very sensitive to fluctuations in wages for the simple reason that he was his own master, and paid by the ton of coal hewn, could determine his own

rate of exertion". Consequently, if wage rates were low, he could work harder than in periods when wages were higher, and still maintain an adequate income.

Wage levels

The wages paid to miners were largely based on the selling price of coal. Indeed, in south Wales (and in north Wales for a short period – see Chapter 6) a sliding scale meant that wages moved directly in proportion to the selling price; it is difficult to find actual selling prices and wage rates for either individual pits or a region such as Denbighshire that cover a sufficiently long period to show this correlation, but a statement showing how wages and selling prices moved between 1889 and 1904 shows the extent to which wages fluctuated in Denbighshire (see Table 8.2). The wage rate movements in Table 8.2 have all been calculated using 1888 as the 'base' year because, in Denbighshire, that year was considered 'the standard year' for wage negotiations. Table 8.2 demonstrates that, between 1889 and 1904, wages were between 30 per cent and 75 per cent higher than the wages being paid in 1888. However, from 1901 the trend in wage rates was down; between February 1901 and August 1904 miners saw their wage rates fall by 20 per cent. To ensure comparability, movements in the selling price have also been measured against the average price per ton for 1888, of 5/4d. Table 8.2 reveals that the movements in selling prices were much more violent than the movements in wages, for example, the selling price in January 1900 was a full 116 per cent higher than the 1888 price, but only four years later this had fallen to only 40 per cent higher. It can be seen that wages and selling prices clearly followed the same general path. It is also apparent that there was a time-lag between the movement in selling prices and the corresponding increase or reduction in wage rates; due to the volatility of selling prices the coalowners waited until a definite trend in prices could be discerned before re-negotiating wages.

Table 8.2: Percentage movements in wage rates above the 1888 standard in Denbighshire 1889-1904, and the corresponding movement in selling prices

Date	% movement in wages	% movement in selling price
1 July 1889	+30	
12 Oct 1889	+35	
11 Jan 1890	+45	+17
5 Apr 1890	+50	+55
16 Aug 1890	+55	
4 Aug 1894	+45	+20
8 Oct 1898	+47.5	+26
8 Apr 1899	+52.5	+45
14 Oct 1899	+55	
13 Jan 1900	+60	+116
13 Oct 1900	+65	+73
9 Jan 1901	+70	+59
13 Feb 1901	+75	
9 Jul 1902	+65	+59
30 Dec 1903	+60	+45
24 Aug 1904	+55	+40

(Sources: wages D/NM/261; selling prices- Hunt's *Mineral Statistics* D/GR/1545-1610).

The coalowners would also have wanted to delay any increases so as to benefit from the increased prices for as long as possible. Where a sliding scale was used the time lag between an increase in selling prices and an increase in wages was due to the fact that an average selling price had to be ascertained before wage rates were altered, and this average was calculated based on figures for the previous accounting period. This was also a feature of the Conciliation Boards that were increasingly responsible for wage negotiations especially in north Wales. It must be pointed out that the figures for selling prices used in Table 8.2 are the average annual prices; these therefore do not show how significantly prices and wages moved within the year, but they do help give an indication of the close relationship between the two.

From the previous discussion we can see that OMS was affected by a number of factors. The age of a pit and the geological conditions therein had a significant impact on the accessibility of coal which directly affected the amount of coal raised in a shift. Another important factor was the attitude of the hewer to his work; this determined not only how hard he worked while on shift but also

how many shifts he worked. If wage rates were high the hewer might decide to work fewer shifts and still achieve what he considered to be an adequate income; this level of income would be harder to achieve, and require more effort, and more shifts, if wage rates were lower. Having considered OMS we can now turn our attention to the most widely used measure of productivity, OMY.

Factors affecting OMY

Short working

The attitude of the miner to his work and, therefore, his ability to alter the intensity of his work rate, was not the only factor which affected his individual performance in each year. He could only work, hard or otherwise, if the mine was actually open and, therefore, the length of the working year and the number of days worked, were also crucial to the measurement of a mine's OMY. Not only did the length of the working day vary from pit to pit and region to region, especially before 1908, but the length of the working week also differed. According to Mitchell (1984: 146), a six day week was almost universal until 1870 but, thereafter, it varied considerably. Church (1986: 239) explains that some regions continued to work a six day week, while others worked a five or five and a half day week, or even an eleven day fortnight (six days one week and five the next).

Looking at the number of days worked as a guide to the OMY of the hewers, however, assumes that they were either able, or willing to work all these days. Mitchell (1986: 149) points out that "whatever the length of the working week, one can say with a good deal of confidence that at no time anywhere was it worked by all, or even a majority of miners". The willingness of the miner to work, or not, on a particular day was not always "a conscious leisure preference" (Church, 1986: 238). Church (1986: 234) explains that the seasonal character and cyclical nature of the sale of coal "meant that a policy of engaging sufficient labour to meet the needs of a colliery at times of maximum demand" was often employed. This, however, meant that during periods of reduced demand, there was a surplus of labour. Rather than reduce the number of men working, in case

demand picked up in the short term, the mine owner would reduce the number of days worked (*Labour Gazette*, October 1895: 308, cited by Mitchell, 1984: 150), and three or four day weeks were not uncommon. It was only when the demand remained depressed that coalowners actually 'let go' some of their men (Boyns, 1982: 346).

These 'short' weeks were sometimes the result of necessity, i.e. a downturn in the coal trade, but sometimes they were a deliberate ploy by the mineowner to manipulate the market, "to reduce output until [there was] an improvement in prices" (Church, 1986: 237). According to Taylor (1955: 52), "restriction of output...by masters...was a practice well known in the coalfields", especially before the railway age. Once the railways arrived, it was not as easy to maintain the monopoly over supply that was needed if this restriction of output was to succeed in a price increase. Short working did not necessarily affect the output of individual miners because "if anything hewers' output was likely to increase in an attempt to earn as much as possible within the shorter time allowed" (Walters, 1975: 292). It did, however, affect the output of the colliery as a whole.

Even short periods lost were worthy of mention in the minute books of companies; on 2 June 1882 the manager's report to the directors of the Broughton and Plas Power Coal Co. Ltd. explained that the loss of three days in May 1882 had meant that the cost per ton of coal in May was higher than it should have been because wages of maintenance men, etc., had still had to be paid (D/DM/309/3, 2 June 1882). Longer periods obviously had a more profound impact; at the Annual General Meeting (AGM) of the Broughton & Plas Power Coal Co. Ltd. in November 1883, it was reported that "during the spring and summer of 1883 the coal trade has been in a very depressed state" and out of a potential working year of 306 days, only 218 had been worked due to a lack of orders; this obviously had a detrimental impact on trading results (D/DM/309/3, 29 November 1882). A similar report to the 1885 AGM revealed that out of the 309 potential working days only 235.5 days were worked, and in 1886 the situation was even worse, only 204.5 days from 309 days were worked. It was

unfortunate for both miners and coalowners that the latter were sometimes forced to curtail working in this way but they often had little option, the economic conditions in the coal trade being out of their control.

Absenteeism

A major reason for absenteeism has already been discussed above; if the wage rates were low miners could increase their effort, but if wage rates were high, absenteeism often increased; the miner no longer had to exert himself so much to achieve his target income and took more time off as a result. According to Taylor (1960: 48), there was "a close correlation between declining productivity on the one hand and rising wages and absenteeism on the other", and Church (1986: 242) also believes that it was "not surprising ...[that] absenteeism was cyclical, increasing when piece-rates and the demand for labour was high".

Absenteeism was not simply influenced by the wage rates offered; mining, especially hewing, was an extremely physical and arduous job and sometimes days were taken off simply because the miner needed a rest from "the relentlessly difficult work" (Church, 1986: 240). An additional factor influencing absenteeism was the prevailing custom in a coalfield. Customarily, in most coalfields, miners worked hardest in the days immediately before pay day or times of high expense such as Christmas, and often decided to take a holiday on pay day or the day after. Mondays were notoriously poorly worked, to such an extent that, in south Wales, an official holiday on the first Monday of every month was introduced (this became known as Mabon's day) (EW Evans, 1959: 49).

According to both Mitchell (1984: 161), and Church (1986: 247), an additional influence on voluntary absenteeism was the location of a colliery. Mitchell (1986; 161) believes that absence was lower in rural than in urban collieries because, in the latter, the collieries were more integrated into the towns. This may have provided the miners with more opportunities to 'play' than in rural areas. Church (1986; 247), on the other hand, believes that the men in urban areas did not have to work as hard to achieve their desired income because there were greater opportunities for their wives to work and supplement the family income.

Proportion of underground to surface workers

As we have already said, ideally, OMY should be calculated by reference to OMS and the number of man-days worked. However, the lack of relevant information means that OMY is usually calculated by reference to annual output and the average annual number of workers. OMY, calculated in this way, can be criticised for two main reasons; firstly, it can be calculated by reference to either total workforce, i.e underground and surface workers combined, or total underground employment figures only, but not with respect to the number of hewers, since these are not separately identified in official returns. Secondly, if it is used for comparative purposes, it assumes that every employee worked at the same rate and for the same length of time in each coalfield and in each year. Furthermore, coalfield OMY figures could only be used for comparative purposes if the proportion of hewers within the workforce was comparable from region to region but, as has already been explained (see Table 8.1 above), the proportion of hewers varied considerably between and within coalfields and therefore this is not the case.

Given that OMY figures based on total employment (underground and surface) are often used as a series to establish trends over time, to be meaningful, the proportion of underground to total workers should not have changed. According to Church (1986: 209), the proportion of workers who worked above ground in the UK remained at around 20 per cent throughout the period after 1873. This is borne out by the statistics of Gibson (1922: 11-12), which show that between 1874 and 1914 the proportion fluctuated between 18 and 20.5 per cent (see Table 8.3). Such a small degree of variation means that the difference between OMY based on total workforce and that based on underground workers only, was not significant. Indeed, Table 8.4 shows that, for the UK as a whole, the proportional difference between OMY based on underground workers and OMY based on total workers remained fairly constant over the period 1874-1914, fluctuating within the narrow margin of 21 to 26 per cent.

Table 8.3: Proportion of underground and surface workers in the UK, 1874-1914

Year	u/g	above	Year	u/g	Above	Year	u/g	above
	%	%		%	%		%	%
1874	79.5	20.5	1888	82	18	1902	81	19
1875	80	20	1889	82	18	1903	80	20
1876	79.5	20.5	1890	81	19	1904	80	20
1877	80	20	1891	83	17	1905	80.5	19.5
1878	80	20	1892	83	17	1906	80	20
1879	81	19	1893	82	18	1907	80.5	19.5
1880	81	19	1894	81.5	18.5	1908	80	20
1881	80	20	1895	81	19	1909	81	19
1882	80	20	1896	80.5	19.5	1910	81	19
1883	81	19	1897	80	20	1911	81	19
1884	81	19	1898	80	20	1912	81	19
1885	81	19	1899	80	20	1913	81	19
1886	81	19	1900	80	20	1914	81	19
1887	81	19	1901	80	20			

Key: u/g - underground workers; above - surface workers

(Source: FA Gibson, 1922: 11)

The UK figures for OMY, however, are obviously an average of all the regions, and hide variations in the regional figures. If one looks at the OMY figures for north Wales (see Table 8.4), in the earlier years, the difference between the two OMY figures was higher and more volatile than the national difference, but by the early 1880s, not only did the difference remain more or less constant but it was generally lower than the UK difference. The same can be said for the Denbighshire figures which can only be calculated for the period 1894 to 1914 due to an absence of any breakdown between the total workforce and those employed underground before 1894. With the exception of a small variation in 1901, the difference between the two OMY figures in Denbighshire ranges between 20 and 22 per cent. It would therefore appear that, when looking at trends in OMY figures, especially for Denbighshire, it makes little difference whether one looks at those based on the total or underground employment figures.

Table 8.4: OMY per person underground, and per total workforce in UK, north Wales and Denbighshire, and percentage difference, 1874-1914

	UK u/g	UK total	%	N.W u/g	N.W total	%	Denb u/g	Denb total	%
1874	310	246	26	219	171	28			
1875	327	261	25	219	172	28			
1876	344	274	26	256	201	27			
1877	357	285	25	297	229	30			
1878	363	292	24	291	230	26			
1879	364	293	24	273	219	25			
1880	394	318	24	291	231	26			
1881	405	326	24	323	262	23			
1882	403	325	24	290	239	21			
1883	411	332	24	331	272	22			
1884	396	321	23	308	255	21			
1885	391	318	23	300	248	21			
1886	383	312	23	332	274	21			
1887	390	317	23	334	277	21			
1888	399	327	22	326	269	20			
1889	389	320	22	323	269	20			
1890	362	299	21	293	242	21			
1891	349	288	21	296	246	20			
1892	333	275	21	280	232	21			
1893	301	247	22	212	174	22			
1894	333	271	23				305	252	21
1895	338	273	24				302	248	22
1896	354	284	25	304	250	22	304	251	21
1897	365	293	25	304	250	22	307	254	21
1898	359	288	25	337	277	22	328	272	21
1899	381	304	25	325	266	22	322	264	22
1900	364	291	25	302	246	23	306	250	22
1901	340	273	25	282	229	23	283	239	18
1902	345	277	25	291	237	23	294	240	22
1903	343	275	25	292	240	22	294	243	21
1904	344	276	25	281	231	22	288	239	21
1905	344	277	24	279	227	23	295	241	22
1906	357	287	24	299	244	22	292	242	21
1907	356	287	24	295	241	22	314	261	20
1908	331	267	24	275	226	22	283	235	20
1909	325	262	24	270	220	23	271	222	22
1910	314	254	24	274	224	22	271	223	22
1911	317	257	23	271	223	22	272	225	21
1912	298	241	24	252	207	22	251	207	21
1913	318	256	24	268	219	22	266	219	21
1914	293	236	24	249	203	23	248	204	21

Key: u/g - underground workers; above - surface workers; UK – United Kingdom; N.W – north Wales; Denb – Denbighshire.

(Sources: UK and N. Wales – FA Gibson, 1922: 11 and 29-30; Denbighshire extracted from *List of Mines* (BL/BS/27/1) and Hunt's *Mineral Statistics* (D/GR/1545-1610)).

Validity of OMY as a measure of productivity

Looking at all the figures available for OMY, if one takes them at face value then it would appear that productivity within the coal industry was definitely falling from 1881 onwards (see Table 8.5). Taylor (1960: 50) believed that this was inevitable because "in the long run, coalmining, like every other extractive industry, has an inherent tendency to diminishing returns". Among the reasons given for this are many of the issues discussed above; the age of pits, the length of the working week, absenteeism, the increase in oncost workers and legislation.

However, the problems associated with using OMY have already been outlined, so is it not dangerous to rely on them to underpin a premise of falling productivity? Boyns (1982) certainly thinks so. In his study of the British coal industry, Boyns (1982: 31) refutes Taylor's (1960) thesis that there was a decline in both the rate of growth of output and productivity in the period 1850-1914. Boyns (1982: 72) believes that "for almost half of the 1874-1914 period, i.e. from 1890 to 1907, most of the coalfields show either a constant or upward productivity trend in contrast to the generally held picture of the period from 1883 to 1914 representing a continuous decline in productivity". Boyns (1982: 72-3) acknowledges that productivity fell in the years after 1907 but, due to "several traumatic experiences" in this period, including the introduction of the eight hour day in 1908, and the first national strike in 1912, he considers that "it is difficult to determine what the underlying trend, if any, was".

It is important, when trying to make generalisations about 'the British coal industry,' to remember that the industry is made up of many coalfields, all subject to different conditions and performing differently, a point which is well highlighted if one looks at the average OMY figures for the different coalfields in Table 8.6. Church (1986: 477) points out that the decline in productivity in the period after 1894 "was mainly the result of trends peculiar to two of the largest coal mining regions - south Wales and the north east". Boyns (1982: 80) also points out that "the different paths of productivity noted for different coalfields is sufficient to suggest that the forces affecting productivity in the coal industry were

complicated, and that they varied from coalfield to coalfield". Given such differences, it is now time to examine more fully the course of OMY in north Wales and Denbighshire.

Table 8.5: Productivity averages and percentage movements,1874-1913

Coalfield	1874-1880	% >>/(<<)	1881-1889	% >>/(<<)	1890-1907	% >>/(<<)	1908-1913
Scotland	331	11.5	369	(15.0)	310	(5.8)	293
Northumberland	261	12.6	294	(2.7)	286	(14.3)	245
Durham	346	8.9	377	(18.3)	308	(15.3)	261
Yorkshire	260	16.1	302	(11.9)	266	(2.3)	260
Derbyshire	255	20.0	306	(3.6)	295	1.0	298
Nottinghamshire	285	18.9	339	(10.6)	303	(2.3)	296
Leicestershire	228	14.5	261	-	261	6.8	279
Warwickshire	217	37.3	298	-	299	(5.3)	283
S. Wales & Monmouthshire	253	17.3	297	(11.1)	264	(10.6)	236
North Wales	206	27.7	263	(9.6)	240	(9.1)	220
Cumberland	232	16.4	270	(11.1)	240	(10.8)	214
Staffordshire & Worcestershire	287	25.8	361	(18.3)	295	(16.6)	246
Lancashire	315	0.6	317	(14.5)	271	(15.5)	229
Cheshire	253	15.4	292	(5.8)	275	(1.4)	271
Shropshire	161	27.3	205	(3.4)	198	15.1	228
Ireland	100	26.0	126	2.3	129	(13.2)	112
Gloucestershire, Devon & Somerset	159	15.1	183	-	182	(1.1)	180

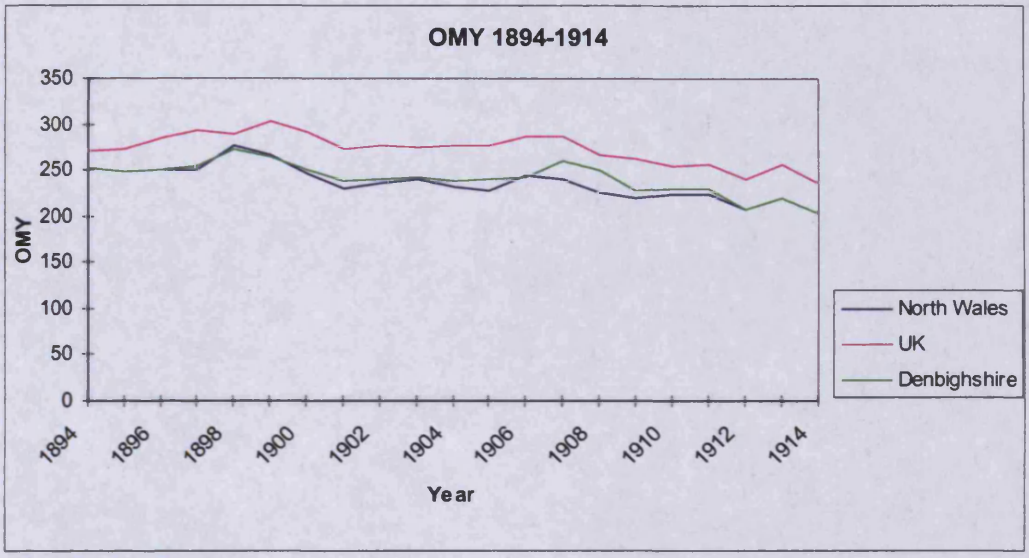
(Source; Boyns, 1982: 64).

Output per Man Year in north Wales and Denbighshire

Despite all the reservations already discussed, the OMY figures for each coalfield are the most comprehensive figures available and will, therefore, be analysed to establish the trends within the UK as a whole and within north Wales and Denbighshire. Table 8.4 above reveals that the UK trend was for OMY (based on total employees) to rise until 1883 and then to fall steadily in the years to 1914 with a peak of 332 tons being reached in 1883. In north Wales a peak of 277 tons was achieved in both 1887 and 1898, while in Denbighshire the peak year was

1898 (272 tons), but thereafter the local figures follow the downward trend shown by the national figures, as demonstrated in Figure 8.1.

Figure 8.1: OMY (total employees), UK, north Wales and Denbighshire, 1894-1914



(Source: UK and N. Wales - FA Gibson, 1922: 11 and 29-30; Denbighshire extracted from *List of Mines* (BL/BS/27/1) and Hunt's *Mineral Statistics* (D/GR/1545-1610)).

In Chapter 2 we established that Denbighshire, although never categorised for statistical purposes as a coalfield in its own right, ranked alongside other, officially recognised, 'small' coalfields in terms of its output and employment figures. With this in mind, a comparison of the OMY figures for these regions (Leicestershire, Warwickshire, Cumberland, Cheshire, Shropshire and Gloucestershire) and those of Denbighshire has been carried out to shed some light on the comparative efficiency of Denbighshire. Unfortunately, as was explained earlier in this chapter, OMY for Denbighshire can only be calculated from 1894 and thus comparisons are restricted to the period 1894-1914.

Table 8.6: Output per Man Year (total employees) of Denbighshire and other 'small' UK coalfields, 1894-1914

	Denbs	Leics	Warwick	Cumb	Chesh	Shrop	Gloc
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1894	252	231	278	248	281	180	166
1895	248	226	286	243	289	175	171
1896	251	233	312	248	281	189	174
1897	254	257	316	254	270	191	188
1898	**272**	276	312	263	278	195	204
1899	264	286	**322**	**265**	281	202	**206**
1900	250	295	312	236	264	208	200
1901	239	266	293	237	208	192	184
1902	240	262	290	240	285	200	185
1903	243	243	292	236	313	202	181
1904	239	268	300	236	291	214	186
1905	241	276	300	238	293	212	178
1906	242	273	298	243	310	227	189
1907	261	**304**	312	237	**318**	238	200
1908	251	283	308	222	283	**242**	184
1909	227	265	290	231	269	238	176
1910	229	264	296	206	290	228	181
1911	230	277	288	217	287	220	170
1912	207	278	259	198	247	210	176
1913	219	302	264	210	247	227	190
1914	204	286	263	206	222	212	182

Note: peak year of productivity for each coalfield in bold

(Sources: FA Gibson, 1922; Denbighshire extracted from *List of Mines* (BL/BS/27/1) and Hunt's *Mineral Statistics* (D/GR/1545-1610)).

According to Boyns (1982: 131) "it has been argued that the United Kingdom coal industry was over-burdened with small mines [i.e. those employing small numbers of colliers]" in the period up to 1914 which, Taylor believes (1960: 64-5), had a direct impact on the productivity of the coal industry. If we assume that smaller mines have lower productivity than their larger counterparts we would therefore expect a region with a high proportion of small collieries to have lower OMY figures than those regions where there was a higher proportion of collieries employing large numbers. It would therefore follow that regions with higher OMY figures should also have higher average colliery sizes. This assumption is based, not on the belief that small collieries will, per se, have lower

productivity levels than larger collieries, but rather that the process of aggregating a larger number of collieries will reduce the overall average colliery size.

Looking at the sample coalfields, if the assumption outlined above is correct, we would expect to see Warwickshire, which consistently has the highest OMY until 1912, also having the highest average colliery size. Table 2.19 (see p. 69 above) reveals that in 1913 the average colliery size in Warwickshire was 662.2 workers while that of Leicestershire, Cumberland, Cheshire, Shropshire and Gloucestershire was 348.6, 283.0, 62.5, 55.5 and 174.6 workers respectively. It would thus appear that in the most 'efficient' coalfields, Warwickshire and Leicestershire, the correlation between OMY and average colliery size is highly positive and we would, therefore, expect to see those coalfields with the smallest average colliery size, Shropshire and Cheshire, displaying the lowest OMY figures. However while Table 8.6 reveals that this is certainly true of Shropshire, Cheshire, which has a significantly lower average colliery size than Cumberland and Gloucestershire, has a higher OMY figure.

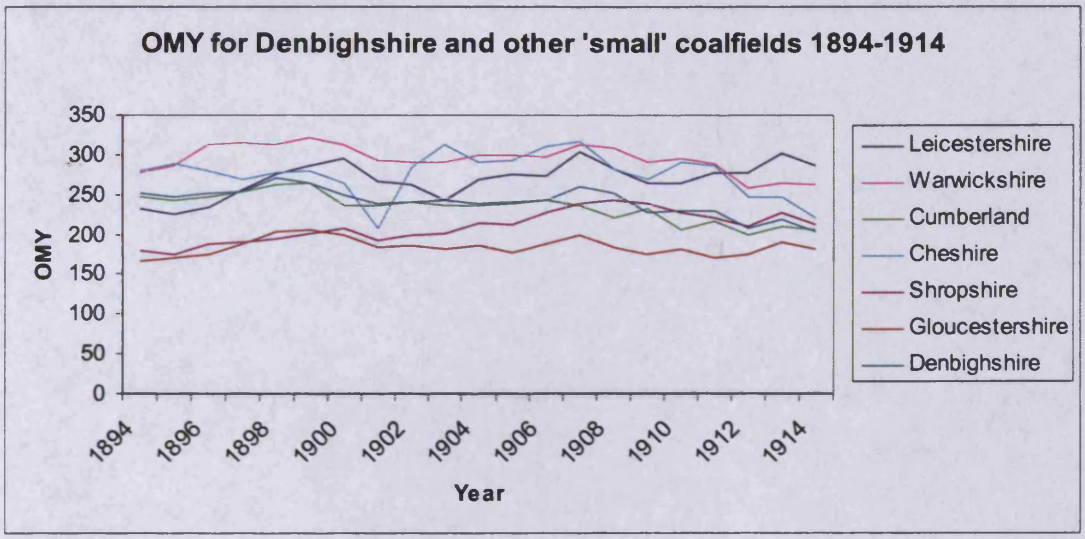
If we consider the proportion of small collieries (those employing fewer than 100 persons) in each coalfield, we find that, as we might expect, in Warwickshire, only 14 per cent of collieries fell into this category while in Shropshire the proportion was 85 per cent. The proportions in Denbighshire and Leicestershire were very similar at 32 per cent and 33 per cent respectively, while the figures for Gloucestershire, Cumberland and Cheshire were 62 per cent, 41 per cent and 75 per cent. The OMY figures for each coalfield would appear to correspond to the hypothesis above except for Cheshire which, despite the high proportion of small collieries, had higher than expected OMY figures. The explanation lies in the very small total number of collieries in Cheshire. In 1908 there were only 18 collieries in Cheshire of which just 5 (28 per cent) employed more than 100 persons (*List of Mines).* However, these 5 collieries employed 86 per cent of the total Cheshire workforce and, if the average colliery size is calculated for these collieries only, it works out at 210.8 workers, a far higher figure than the 67.9 workers which is the aggregate figure for all 18 collieries. It would thus appear that the higher than expected OMY figures arise because the

Cheshire coalfield was dominated by these 5 collieries which were much more efficient than the other collieries which averaged a mere 12.7 workers each.

If we examine the OMY figures detailed in Table 8.6 we find that the peak years, in terms of OMY, for the selected coalfields fall into two distinct periods; those of Denbighshire, Warwickshire, Cumberland and Gloucestershire fall in 1898-99, while those of Leicestershire, Cheshire and Shropshire fall in 1907-08 (see Table 8.6 and Figure 8.2). The 1898-99 and 1907-08 peaks can be explained by the fact that, according to Taylor (1960: 52), after being at a low ebb in 1896 the fortunes of the coal industry began to revive and "before the end of 1899...boom conditions were clearly developing" while "at least among those coalfields most heavily involved in the the home trade during the early-1900s, there was another boom in 1907" (Boyns, 1982: 69). These peak years contrast with the overall peak in the UK coal industry, 332 tons, which was achieved in 1883 and, indeed, contrasts with the peak year of productivity in all the other coalfields reviewed by Boyns (1982). Boyns (1982: 64) demonstrates that the peak year of activity for the remaining UK coalfields occurred between 1880 and 1891, and that for many of the major coalfields, including Durham and south Wales, "productivity was more than 10 per cent lower in the period 1890-1907" than in the period 1881-1889.

Figure 8.2 reveals that productivity for each of the 'small' coalfields fluctuated quite considerably in the period under review. The ferocity of these fluctuations, which clearly illustrate the volatility of the coal trade can, perhaps, be more easily demonstrated if one looks at the difference between the highest and lowest levels of productivity for each coalfield (see Table 8.7). Table 8.7 reveals that the range in OMY over the period 1894-1914 was almost 35 per cent for Cheshire; Denbighshire, Leicestershire, Cumberland and Shropshire showed a range of between 25 and 28 per cent while Warwickshire and Gloucerstershire's OMY exhibited a range of approximately 20 per cent. These 'swings' in productivity, which occurred over the twenty year period, show how similar was the experience of each of the coalfields.

Figure 8.2: OMY (total employees) for Denbighshire and other 'small' coalfields' 1894-1914



(Source: as for Table 8.6).

Table 8.7: Highest and lowest OMY figures for Denbighshire and other 'small' UK coalfields 1894-1914.

Coalfield	Highest OMY (tons)	Lowest OMY (tons)	Fall in OMY	Percentage difference
Denbighshire	272	204	68	25.0
Leicestershire	304	226	78	25.7
Warwickshire	322	259	63	19.6
Cumberland	265	198	67	25.3
Cheshire	318	208	110	34.6
Shropshire	242	175	67	27.7
Gloucestershire	206	166	40	19.4

(Sources: FA Gibson, 1922; Denbighshire extracted from *List of Mines* (BL/BS/27/1) and Hunt's *Mineral Statistics* (D/GR/1545-1610)).

The most likely explanation, certainly for Denbighshire, for the peak year in terms of productivity being later than for other coalfields, is the fact that Denbighshire was a relatively 'new' coalfield where most of the collieries were not sunk until after 1860 (see Chapter 2). In 1898, the peak year for OMY, of the five biggest collieries, in terms of employment, only one had been sunk before 1850, and the collieries belonging to the Broughton & Plas Power Coal Co. Ltd.

(Gatewen and Plas Power), the biggest employer in the Denbighshire coalfield, had not been sunk until after 1875. Sinking could often take a long time (see details re the sinking of the Bersham and Wrexham collieries in Chapter 3), especially if problems such as water were encountered. During the period of sinking and opening out of a colliery large numbers of men were needed but there was little or no output of coal, consequently if these individuals were included in the calculations of OMY they would have a negative impact (Boyns, 1982: 101).

According to Church (1986: 104) it would often take five to ten years from the start of sinking for a pit to become fully functional and it would still need a period of development before it reached "'full capacity' working" (Boyns, 1982: 102). This meant that, in Denbighshire, some of the bigger collieries would not have been fully working until the 1880s and this would, inevitably, have 'pushed back' the peak period which could only be achieved when all the big collieries were working at full capacity. Another factor which might have 'pushed back' the peak year for productivity was that, by the end of the nineteenth century, production was concentrated in fewer, larger collieries. This is illustrated by the fact that, in 1894, 76 per cent of the Denbighshire coalfield workforce was employed by seven collieries (see Chapter 2). As older, less efficient pits closed, the coalfield's OMY figures would rise, being influenced more heavily by the higher OMY levels of the newer, modern, more productive collieries.

An additional factor affecting OMY throughout the UK was the increasing power of the MFGB whose policies, for example, to reduce the number of hours worked, had a direct impact on the productivity of its members. If we examine Denbighshire's OMY from 1899 to 1906 the fall from 264 tons to 242 tons might well be due to pressure from the NWMA, which was trying to increase its influence over 'coalfield politics'. The union encouraged the miners to engage in more militant action than previously which meant more man-days were lost. The boom of 1905-6 would have accounted for the overall increase in OMY for 1907, and the implementation of the 1908 Eight Hours Act would have helped to reduce OMY in 1909 and thereafter while the bitter national strike in 1912 would account

for the 10 per cent fall in Denbighshire's overall OMY from 230 in 1911 to 207 in 1912 (see Table 8.6).

According to Boyns (1982: 79), the Eight Hours Act had a "long term effect" on productivity in the UK and he concludes that "the average level of productivity in most coalfields over the 1908-1913 period was somewhat below that of 1890-1907" (Boyns, 1982: 73). However, some coalfields were affected more than others, for example, in south Wales the average number of hours worked per day were considerably higher before the Act than in other coalfields. While the new Act was greeted with enthusiasm in south Wales (EW Evans, 1959: 79) "there can be no doubt that the decrease in working hours hit the labour productivity of hewers in the South Wales coal industry hard" (Walters 1975: 287). This contrasted with areas such as Yorkshire which saw a slight increase in productivity after 1908 (Boyns, 1982: 73). Indirectly, the 1908 Eight Hours Act was a major cause of the 1912 strike; once working hours were restricted the miners began to demand a guaranteed minimum wage. This, as was discussed in Chapter 6, led to deteriorating industrial relations; strikes were increasingly common and these, inevitably, had an impact on productivity as an increasing number of man-days were lost. Taylor (1960: 55), while acknowledging that time was increasingly lost through disputes, believes that the reduction in hours worked was "more pervasively significant in its effect on productivity" than the time lost through strikes.

OMY for individual Denbighshire coal companies

The OMY figures for each coalfield, since they represent an average of all the individual colliery statistics 'smooth' out any significant variations in company/individual company figures. To determine the productivity performance of individual companies/collieries requires therefore data at this micro level. However, although the *List of Mines* gives employment figures for each colliery within a coalfield, the output figures for an individual colliery are needed to establish its OMY and, unfortunately, this information is not readily available on a comprehensive basis for the coal industry. Nevertheless, it has been possible to

calculate OMY for three Denbighshire companies (see Table 8.8). Despite the shortcomings of such a small sample (too few companies; periods covered too short and insufficient overlap) these figures (see Table 8.8) reveal that, unlike the regional and national statistics, the OMY figures for individual companies fluctuated significantly. It should be noted, however, that the Broughton & Plas Power Coal Co. Ltd. figures given in Table 8.8 above are themselves an average of the figures for the two collieries owned by the company, Plas Power and Gatewen. Figure 8.3 (page 292) reveals the way in which the coalfield's statistics mask the fluctuations in the companies' figures.

Given the cyclical nature of the coal industry, one would expect the OMY figures for individual companies to fluctuate significantly over the economic cycle and, if one looks at the company figures for Denbighshire, the peaks and troughs in productivity become apparent. For example, Broughton & Plas Power Coal Co. Ltd.'s OMY fluctuates from a low of 217 tons in 1894 to a high of 314 tons in 1896, a variation of 45 per cent while that of Brynkinallt shows an even bigger fluctuation, from a high of 330 in 1898 to a low of 202 tons in 1914, a variation of 63 per cent. The peak year for Broughton & Plas Power Coal Co. Ltd. was 1896, when OMY was 314 tons, and for Brynkinallt it was 1898, when an OMY of 330 tons was recorded. At Llay Hall, the peak year appears to have been 1906 when an OMY of 333 tons was recorded. However, since this figure reflects a fall in the recorded level of employment of 20% between 1905 and 1906, there must be some doubt over the accuracy of the 1906 employment figure of 429 given that of 510 for 1907; the figures have been extracted from the *List of Mines* and it is difficult to verify their accuracy by reference to another source.[16]

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[16]Errors or differences in colliery/coal industry employment figures are not unusual. FA Gibson (1922) gives employment figures only for north Wales, while the figures given by Hunt in his *Mineral Statistics* often disagree with those per the *List of Mines*. For example, per Hunt, the 1900 employment figure for north Wales was 9,802, whereas adding up the individual totals per the *List of Mines*, gives a total 9,774. Given that the totals used in this chapter have been arrived at by adding up the individual totals for each of the collieries in Denbighshire, per the *List of Mines*, it is possible that a transposition error was made when the original information was collected in 1906; it is possible that the employment figure *should have been* 529 which would make OMY 270, a figure which would be a more 'sensible' total. If the peak in 1906 for Llay Hall is ignored, the trend for this colliery follows, more or less, the trend displayed by the other collieries, which, from 1906, despite a brief upturn in 1907, is generally downwards.

Table 8.8: Output and OMY for three Denbighshire coal companies 1894-1914

	Broughton & Plas Power Coal Co. Ltd.			Brynkinallt (a)			Llay Hall			Denb
Year	Tons	Men	OMY	Tons	Men	OMY	Tons	Men	OMY	OMY
	000			000			000			
1894	299	1380	217							252
1895	363	1409	258							248
1896	438	1394	314	103	459	224				251
1897	445	1440	309	119	427	279				254
1898	521	1676	311	152	461	330	130	445	292	272
1899	470	1637	287	141	460	307	130	426	305	264
1900	498	1722	289	122	477	256	120	411	292	250
1901	438	1749	250	130	503	258	129	460	280	239
1902	462	1802	256	128	508	252	136	465	292	240
1903				139	520	267	135	514	263	243
1904				138	531	260	144	582	247	239
1905				154	572	269	145	533	272	241
1906				158	662	239	143	429	333	242
1907				164	622	264	129	510	253	261
1908				153	678	226				251
1909				156	693	225				227 (b)
1910				150	700	214				229
1911				173	770	225				230
1912	491	1855	265	194	831	233				207 (c)
1913	495	1828	271	208	906	230				219
1914	471	1880	250	188	930	202				204

Notes:

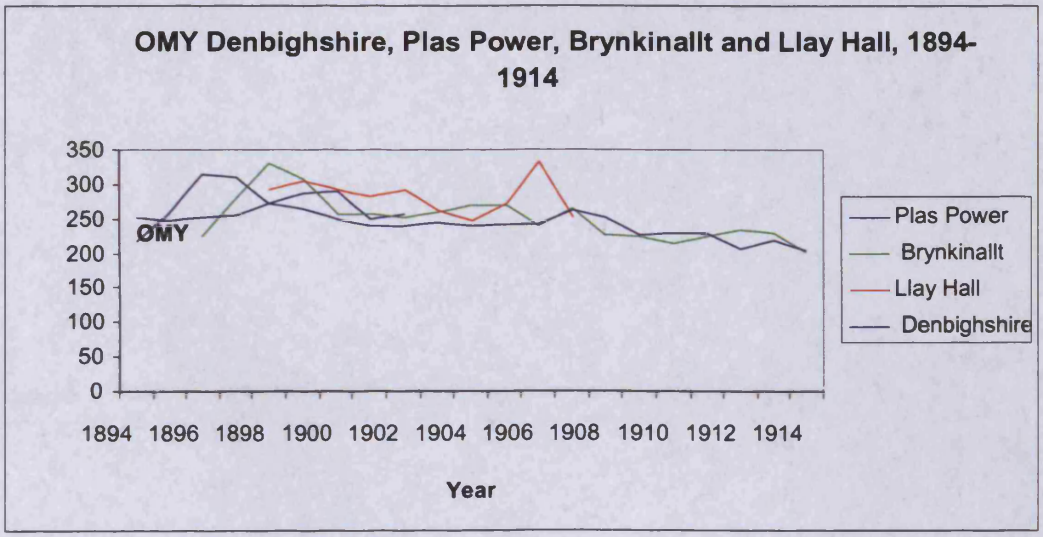
(a) these figures are based on actual amounts of coal sold as opposed to the amount raised; this is likely to give a lower OMY as the amount raised was usually higher than that sold.
(b) This fall is likely to be as a result of the implementation of the Eight Hours Act
(c) The productivity of 1912 was severely affected by the national strike

(Sources: Broughton & Plas Power Coal Co. Ltd. - D/DM/309/3-6; Brynkinallt - D/CB/1/2; Llay Hall - D/BC/1/6; Denbighshire extracted from *List of Mines* (BL/BS/27/1)).

It would appear that Llay Hall fell into the category of what Taylor (1960) described as a 'mature' colliery; although its output remained fairly constant, the number of men required to maintain the levels of output had to increase at a faster rate (there was a 20 per cent movement in output, but a 42 per cent movement in men between 1898 and 1907), which would suggest that the colliery was suffering from diminishing returns. In his study of the south Wales coalfield, Boyns (1982) challenged Taylor's theory. He examined 64 collieries to determine whether there was any truth in Taylor's (1960) assertion that, as a colliery aged it, inevitably, suffered from 'diminishing returns' i.e. a fall in productivity. Boyns found that there was no overwhelming support for Taylor's thesis. No significant downward trends in OMY were found for these collieries for the period 1894-1908/9 (i.e. prior to the effect of the Eight Hours Act) and Boyns concluded that by introducing new technology "collieries are able to counter diminishing returns for many years" (Boyns, 1982: 117). A further conclusion that Boyns (1982) was able to make, after examining the output per man-day (OMD) data for 15 collieries, owned by the Powell Duffryn Company and the Ocean Coal Company was that the main factor which affected OMY was the number of days worked in any given year. He also, perhaps surprisingly, found that there was no evidence of an observable relationship between movements in wage rates and movements in productivity, within the 15 collieries (Boyns, 1982).

In Denbighshire, while Llay Hall may have been displaying 'symptoms' of diminishing returns, Broughton & Plas Power Coal Co. Ltd.'s output and employment figures had not altered substantially between 1902 and 1912. Given that the Plas Power and Gatewen collieries (run by the Broughton & Plas Power Coal Co. Ltd.) were the same age as Llay Hall, this might suggest that the company was using technology more effectively to counter the threat of diminishing returns. Indeed, Lerry (1968: 135) describes the company as being a "pioneer in the use of electricity underground" and as running "two of the most modern collieries [which were] inspected....from as far afield as Japan".

Figure 8.3: OMY, Denbighshire, Brought & Plas Power Coal Co. Ltd., Brynkinallt and Llay Hall, 1894-1914



(Sources: as for Table 8.8).

These variations in OMY figures would have been affected by all the factors discussed above in the previous sections but, especially, by the number of days worked. No records of the number of days worked by individual collieries are available, but extracts from Broughton & Plas Power Coal Co. Ltd.'s minute books reveal that as many as 105 days could be lost in a year, while the annual report of the NWMA for 1904 states that "[this] has been an exceptionally bad year.....Thousands of miners .... have not average (sic) more than 3 days per week throughout the year, while hundreds of others have not worked for months" (D/NM/65). This might go some way to explain why Llay Hall, despite an increase in output of 9,000 tons and an increase of 68 in the number of men employed, recorded a drop in OMY of 16 tons between 1903 and 1904 (see Table 8.8). At Brynkinallt and in Denbighshire as a whole this reduction was not so marked which might suggest that the miners, when given the opportunity to work, worked harder in order to ensure a decent pay packet (see Table 8.8).

Isolated disputes between coalowner and men could significantly affect OMY at a particular colliery in a year when another colliery was unaffected. In the early years of the twentieth century, the minutes of the NWMA are full of references to disputes at individual collieries over issues such as men being stopped without notice, seams being closed or changed or the wrong wages paid (D/NM/1). These disputes escalated in 1905-6 as the NWMA pressed for an agreed 'price list' for each colliery, and culminated in September 1907 with the NWMA giving notice of a strike to start on 7 October (D/NM/1, 9 September 1907). The strike was averted because agreement over price lists was reached in January 1908. Nevertheless, the impact of this dispute can be seen if we consider the figures for Brynkinallt and Denbighshire as a whole in Table 8.8. At Brynkinallt OMY fell from 264 tons in 1907 to 226 tons in 1908, a fall of 14 per cent. For Denbighshire as a whole the fall was less severe; OMY falling from 261 tons in 1907 to 251 tons in 1908, a reduction of just 4 per cent.

Conclusion re productivity

When trying to assess the productivity performance of a colliery or individual coalfield some form of measure is needed and, despite the shortcomings discussed in this chapter, the measure most readily available to historians is Output per Man Year (OMY). If one looks at OMY for the UK as a whole, historians, such as Taylor (1960), have held that productivity in the coal industry fell from the early 1880s. According to Taylor (1960: 49), 1883 "proved to be the industry's high water mark [and although] over the next thirty years the tide of productivity ebbed and flowed,....each recovery was less pronounced than its predecessor". This assessment, however, fails to take into account the many changes that took place within this period which had an impact on the OMY figures. Boyns (1982: 79) refutes Taylor's thesis and explains that "to talk of productivity in the coal industry as simply rising to 1883 and then falling thereafter is too simplistic", mainly due to the fact that the performance of the various coalfields within the UK did not always mirror that of each of the others. Indeed, it

must be remembered that the UK figures are an average of all the individual coalfields and are therefore liable to mask some fairly significant differences between coalfields.

In Denbighshire, OMY reached its highest level of 272 tons in 1898, a full 15 years after the UK's peak (1883), but Denbighshire was a 'new' coalfield, developed largely after 1850, and it is thus to be expected that its peak would be achieved later. If Denbighshire's OMY is compared with that of other 'small' coalfields it would appear that Denbighshire was not as efficient as coalfields such as Warwickshire (peak OMY of 322 tons), Leicestershire (304 tons) or Cheshire (318), but was more efficient than Cumberland (265 tons), Shropshire (242 tons) and Gloucestershire (206 tons). In 1914, Denbighshire had fewer small collieries than Cumberland, Shropshire and Gloucestershire, which is likely to account for these regions being less efficient, but Cheshire, which had far more small collieries than Denbighshire, managed to achieve a higher OMY than Denbighshire. This can be explained by the fact that the largest collieries in Cheshire, which in 1908 employed 86 per cent of the workforce, skewed the statistics relating to OMY but the smaller collieries, which averaged only 13 workers per colliery, skewed the average colliery size statistics. In Warwickshire, another 'new' coalfield, only 14 per cent of the collieries employed fewer than 100 persons, and it can thus be assumed that collieries were larger, more modern and, therefore, more efficient. Other factors affecting OMY were geological conditions, the length of the working day, wage rates, coal prices and local customs; these could differ significantly from coalfield to coalfield and therefore 'like with like' comparisons are difficult to make.

Unfortunately, due to the paucity of the archival material available, little analysis of individual Denbighshire companies has been possible. Some OMY figures exist for three companies but, of these, figures only exist for more than ten years for one company. For the three companies analysed, OMY fluctuates significantly. This is to be expected given that the OMY figures are directly affected by the number of days worked by a colliery and, in 'bad' years, a colliery could lose many days through short working. In addition to this, agitation by the

NWMA, which had grown significantly by the early 1900s, might have made the miners more conducive to walk outs than previously, which would also have caused man-days to be lost.

The peak years for these three companies examined, if one ignores Llay Hall's 1906 figure due to possible source error, fall in the latter years of the 1890s, and therefore fit into the pattern displayed when the OMY figures for Denbighshire and some of the other 'small' coalfields are analysed. After reaching these heights, OMY for these companies then fluctuated at significantly lower levels through to 1914 reflecting not only potential long-term influences but also the impact of legislation in the form of the Eight Hours Act, and the national strike of 1912.

From the above we can conclude that, in terms of OMY, Denbighshire's performance was comparable to other small coalfields; it was neither significantly better nor worse than its competitors. However, this has been measured using overall output and employment figures for the coalfields which, due to the significant aggregation involved, is likely to mask the 'true' efficiency of coalfields because it does not allow OMY for individual collieries to be calculated. Where it has been possible to calculate individual OMY figures for companies in Denbighshire we see that, for the most part, they were higher than the overall figures for Denbighshire which would lead us to believe that the OMY figures have been skewed by the preponderance of small collieries.

Traditionally, productivity has been considered by historians to be the most important measure of performance in the coal industry, whether assessing the industry as a whole or an individual coalfield or colliery. However, to the owners of the coal companies, success was measured in terms of profitability, and thus, when assessing the performance of a colliery company, we can, perhaps, more legitimately, examine the financial rather then the 'physical' performance of a colliery. With this in mind the next section will consider the profitability of the coal companies in Denbighshire.

Profitability

Background

Before discussing the profitability of individual companies in Denbighshire it is important to point out the shortcomings of some of the source material. The source material consists of both 'management' and 'financial' figures; 'management' figures, in this context, are those that have been generated for internal management use, such as revenue and cost per ton figures, while 'financial' figures are those presented in the published financial statements. The problem with such sources, especially the latter, is the extent to which they can be trusted. According to Brief (1965: 12), the "standards of financial disclosure were so ill-defined [that] financial reports from this period [the nineteenth century] are at best ambiguous and at worst unreliable". Wale (1990: 266), in her study of the coal industry, agrees; she asserts that "asset and profit figures in the coal industry are in most cases highly unreliable".

Marriner (1980: 203), too, has warned of the dangers of taking nineteenth century financial statements at face value: "the battery of criticism against their accuracy, reliability and consistency is so intense that one might be tempted to conclude that they contain no useful information at all". However, as long as "the historian fully acknowledges their many serious defects" (Marriner, 1980: 203), they can shed a great deal of light on how businesses performed. This caveat was reinforced by Parker (1991: 2) who argued that although nineteenth century accounts can "be of immense benefit to historians, [they should] be approached with caution". Mason (cited by Arnold, 1995: 40) also believes that "provided their limitations are acknowledged, accounting records can be an extremely valuable source of evidence for the business historian". Arnold (1995: 49), further asserts that "although accounting practices were highly inconsistent, levels of disclosure in published statements were far better than they were to become in, say, the second quarter of the twentieth century"; this, he believes, means that "business

historians may find the published financial statements of the latter half of the nineteenth century more reliable than they have supposed, although some caution on their part is still clearly advisable" (Arnold, 1995: 50).

In addition to the issues discussed above, a further problem exists when trying to assess the performance of an individual coalfield such as Denbighshire, and that is the lack of primary records. Very little information relating to output, costs or profits exists prior to 1870 and, even for the period after this, comprehensive records have only been found for one company, the Broughton & Plas Power Coal Co. Ltd. Periodic information has been found for various other companies which will be used to illustrate various issues, but it has proved impossible to undertake case studies of the various companies, which is ideally what the author would have liked to have done. This analysis will consequently concentrate on the period 1870-1914, and will draw on information found for the following collieries (and the companies that owned them):

Plas Power and Gatewen (Broughton & Plas Power Coal Co. Ltd.)
Wynnstay (Wynnstay Collieries Co.Ltd.)
Westminster and Gwersyllt (Westminster, Brymbo Coke and Coal Co. Ltd.)
Wrexham (Wrexham & Acton Collieries Co. Ltd.)
Bersham (Bersham Colliery Co. Ltd.)
Llay Hall (ES Clarke)
Brynkinallt (WY Craig & Sons).

Almost all of these collieries were significant players in the Denbighshire coalfield, only Llay Hall employed fewer than 500 employees (438) in 1914, and collectively the collieries employed 43 per cent, 62 per cent and 61 per cent of those employed in the coalfield in 1894, 1900 and 1914 respectively. Indeed, four of the collieries, Plas Power, Westminster, Wynnstay and Bersham, were in the top five of the largest collieries in Denbighshire (in terms of employment) in both 1900 and 1914. Unfortunately the 'missing' member of the top five collieries, the Hafod colliery, owned by the Ruabon Coal & Coke Co. Ltd., is not represented by surviving records.

The risks and rewards of coal mining

In a lecture to mining students in 1881, Mr M Littlewood of Rockingham Colliery, Barnsley, explained that "few occupations followed by man are so uncertain and enigmatical, so full of risks and losses as mining" (1881: 3). Littlewood (1881: 3) added that "there are great prizes to be gained [but] such prizes are rare and fall to the lot of the few". Although this is a rather pessimistic view of coal mining, it would appear to be a fair appraisal of the industry; many mines were sunk by investors in boom periods in anticipation of profits but, as trade slumped and/or unanticipated problems were encountered during sinking and working, there were many colliery companies that "struggled on for years and never earned a dividend for their unfortunate shareholders" (Dron, 1928: 8). As Mitchell (1984: 306) explains, "this was the speculative element which always remained in the industry".

In Denbighshire the problems and costs associated with unforeseen obstacles during sinking are illustrated by the cases of both the Bersham and Wrexham collieries. The Bersham Colliery Co. Ltd. began sinking in 1870 but did not reach the Main Coal seam until 1878, and a profit was not reported until the year ended 30 June 1881, a full twelve and a half years after the company was incorporated (D/DM/309). The Wrexham Colliery Co. Ltd. began sinking in 1869 and was initially successful; the Main Coal was reached in October 1870 (NLW/HR/76/79) but, in January 1871, the pit was flooded and the water caused such a problem that it was not until April 1874 that the directors were able to report "the entire clearance of [the] colliery from water" (D/DM/424/1). Such delays were extremely costly and did little to endear the directors to the shareholders; indeed letters from shareholders to the company in 1883 complain that there had been "ten years without any return to shareholders" (NLW/HR/76/98).

Keeping the shareholders happy was important in the late nineteenth century, especially if a significant number of shares were held by those other

than the directors and their nominees. Pitts (1998: 39) explains that as "the proportion of passive shareholders....increased...these investors came to rely on the dividends as an important guide to the prosperity of the enterprise". This meant that the ability to pay dividends was of paramount importance to the directors. The nineteenth century Table A (the model Articles of Association contained in Company Law) "specified ... that dividends were to be paid from the profits of trade, [but] without defining profit in any way" (Pitts, 1998: 39). This meant that as long as profits were reported, dividends could be paid which "led to great flexibility in determining the profit figure" (Pitts, 1998: 39). Pitts (1998: 40) further believes "that dividends were regarded by directors as the most important use of trade surpluses".

The pressure put on directors by shareholders is illustrated by surviving letters to the directors of the Wrexham & Acton Collieries Co. Ltd. In 1883, a Mr A Dougall of Inverness, who owned 184 shares in the company, wrote a series of letters to the Secretary of the company. He was particularly scathing of the management skills of the directors; on 5 April 1883 he wrote that he "[is] much disappointed with the state of the collieries" (NLW/HR/76/98) and that performance "[is] without any prospect of being better, unless a radical improvement in the management is carried out without delay". He was angry that in the year to 31 December 1882 the company had spent a total of £2,364 on new boilers, underground haulage and stables (£1,020, £1,041 and £303 respectively). "I have no hesitation in saying that these works should have been postponed until the shareholders got some return on their capital, and I and the other shareholders in this locality object in the strongest manner to any more money being spent in this way or on capital account". He continued, "it seems to me to be extraordinary that year after year we are selling to the public nearly 200,000 tons of coal without a single penny of return, while a large sum is yearly spent on general expenses [and the shareholders] will not submit to it much longer" (NLW/HR/76/98). Mr Dougall persisted with his demand for a change in management; on 16 April 1883, in another letter, he stated that "the present management having existed ten years without any return to the shareholders it is

desireable to make a change" (NLW/HR/76/98). This criticism of the management was also a theme of the letters from Stewart, Rule & Burns, the solicitors for another group of Scottish shareholders. According to a letter dated 20 September 1883, "the directors have spent of the shareholders' money between £40,000 and £50,000 on the Acton pit which is perfectly useless. This was a serious blunder on the part of the engineer and the Board and cannot be reconciled with the credit you take for the good management of the undertaking". The letter further states that "the only people who appear to have benefited from the concern during the last ten years are the directors and the officials who received during the last year no less than 6% of the gross income of the company which we venture to say is monstrous and much beyond what it should be" (NLW/HR/76/98).

When dividends were paid they fluctuated significantly, as can be seen from Table 8.9. The fluctuations in the dividend payments of the Broughton & Plas Power Coal Co. Ltd. and the Bersham Colliery Co. Ltd. coincide with the fluctuations in the general performance of the coal trade. Wale (1990: 254) explains that "apart from 1890 virtually every year between 1880 and 1897 witnessed low profits. There was then a violent upswing to an enormous boom in 1900".

The dividends of Broughton & Plas Power Coal Co. Ltd. and Bersham Colliery Co. Ltd. (as far as figures are available) would appear to conform to Wale's pattern. Between 1882 and 1889 no dividend was declared by the Broughton and Plas Power Coal Co. Ltd., while the dividend for the Bersham Colliery Co. Ltd. remained at less than 2.5 per cent from 1882 until 1888. In 1890 and 1891, dividends of 8 and 10 per cent were paid by Broughton & Plas Power Coal Co. Ltd. while Bersham Colliery Co. Ltd. paid 6 and 10 per cent respectively. The years 1895 to 1898 saw Bersham Colliery Co. Ltd. fail to pay a dividend while those paid by Broughton & Plas Power Coal Co. Ltd. did not exceed 3.5 per cent in the years 1894-1897. Broughton & Plas Power Coal Co. Ltd. then began to increase its dividend payments until, in 1900, they reached a high of 15 per cent.

Table 8.9: Dividends paid by the Broughton & Plas Power Coal Co. Ltd. and the Bersham Colliery Co. Ltd. 1882-1914

Year	Bersham Colliery Co. Ltd.		Broughton & Plas Power Coal Co. Ltd.	
	Dividend paid	% of capital	Dividend paid	% of capital
	£		£	
1882	888	2.5	0	
1883	0		0	
1884	1,776	2.5	0	
1885	888	1.25	0	
1886	888	1.25	0	
1887	888	1.25	0	
1888	1,420	2.0	0	
1889	3,551	5.0	0	
1890	4,261	6.0	13,500	8
1891	7,102	10.0	16,875	10.0
1892	7,102	10.0	10,125	6.5
1893	2,841	4.0	0	
1894	1,776	2.5	5,062	3.0
1895	0		5,906	3.5
1896	0		4,219	2.5
1897	0		5,062	3.0
1898	0		10,125	6.5
1899	a		13,500	8.0
1900	a		25,312	15.0
1901	a		16,875	10.0
1902	a		9,281	5.5
1903	a		a	
1904	1,065	1.5	a	
1905	0		a	
1906	0		a	
1907	1,776	2.5	a	
1908	1,420	2.0	a	
1909	a		a	
1910	a		3375	1.8
1911	b		3700	2.0
1912			3700	2.0
1913			5550	3.0
1914			1850	1.0

Notes:
a: no information available for these years;
b: Bersham was purchased by the Broughton & Plas Power Coal Co. Ltd in 1911;
All the dividends were paid in arrears and therefore relate to the previous year's performance.
Bershams's year end was June, while Plas Power's was December.

(Sources: Minute Books, Bersham - D/DM/309/1-2; Plas Power - D/DM/309/3-5)

It would thus appear that the directors of these companies were either not able to, or did not even try, to 'smooth' profits so that steady dividends could be paid. JR Edwards (1989: 116), in his review of nineteenth century accounting practices, points out that many railway company managers believed that steady dividends were so desirable that many of them employed "procedures designed principally to produce a pattern of reported profit sufficient to cover the planned level of dividend". This was more likely to apply to companies with higher proportions of 'detached' shareholders, what we would now call public companies i.e those companies that raised capital with a general 'offer' to the public rather than from a 'pool' of family and acquaintances. The coal companies in Denbighshire were not public companies and were often controlled either solely by the directors, or by the directors and their nominees. Thus, this consideration would not have been as important as for a public company, although it was certainly a consideration when Broughton & Plas Power Coal Co. Ltd. decided to change its year end from 30 September to 31 December. The minutes of the AGM on November 30 1892 (D/DM/309/4) explain that "the extreme depression which prevailed during the last few months has been intensified by the summer season, and has forced upon the consideration of your Board, the desirability for closing the accounts from March and September to June and December, so that both half years may share in the advantages of the winter trade and thereby tend to equalize dividends".

Methods of manipulating reported profits

One of the main methods adopted by companies in the nineteenth century to manipulate their profits was the use (or misuse!) of provisions for depreciation. JR Edwards (1989: 115) explains that the modern aim of depreciation is to ensure that the revenue earned by fixed assets is matched by a cost for the use of the asset. However, in the nineteenth century, "the term depreciation was often used to describe the difference between fixed asset valuations at two different dates - but later the percentage deduction for wear and tear became the norm"

(JR Edwards, 1989: 115). The problem was that there was neither any compulsion on companies to provide for depreciation, nor any guidelines on the methods to be adopted if they did. According to Marriner (1980: 219) "even within one firm's accounts depreciation can be treated differently from one year to another [and] there is no uniformity". JR Edwards (1989: 116) believes "this was partly the result of ignorance, and partly because accounting practices had to be coordinated with management's desire to keep its options open regarding the level of reported profit".

It was this ability to vary depreciation provisions that gives rise to what Marriner (1980: 219) describes as "the largest single factor distorting the accuracy of financial statements". In their study of the iron and steel industry, 1865-1914, Edwards and Boyns (cited by Arnold, 1995: 467) refute this view because they found "no real evidence that any systematic attempt was made to mislead external users by manipulating the trend of reported profit". Whatever the main impetus behind depreciation policies, it is true that individual companies had a less than consistent approach to depreciation. As early as 1875 and 1876, the balance sheets of the Wrexham & Acton Collieries Co. Ltd. show an amount under liabilities for a "freehold depreciation fund" (D/DM/424/2) but, given that there was a great deal of aggregation under one heading, and little additional information was given, it is difficult to assess what the entry actually meant (Marriner, 1980: 216). More meaningful information can be found in audit reports, directors' reports and trade accounts, if they are available, but unfortunately this is often not the case. The surviving balance sheets for the Broughton & Plas Power Coal Co. Ltd. covering the years between 1891 and 1904, show a depreciation provision for freehold property as follows:

	£		£
1891	745	1895	994
1892	848	1897	5,238
1893	918	1901	5,677
1894	978	1904	6,191

Note: no balance sheets are available for the years 1896, 1898-1900 and 1902-1903

Source: (D/BC addnl: 36/1)

It is impossible to establish whether these figures represent a fixed percentage of the freehold cost without a breakdown of the balance sheet totals. In 1910 (the balance sheets for 1905-1909 are not available), the company included an 'appropriation from profits for the purchase of property and plant, and for depreciation' of £136,144 (DD/PP/619). According to JR Edwards (1989: 116), it was "common for depreciation to be accounted for as an appropriation of profit rather than a charge against profit, and for the amount deducted to vary depending on the desired level of reported profit". Where audit reports are available for the company, they reveal that a deduction for the depreciation of horses was made, but no details are given as to how the large appropriations from profits were arrived at. Such appropriations had long been a feature of Broughton & Plas Power Coal Co. Ltd.'s accounts; although not disclosed on the balance sheet, details are revealed in the minutes of directors meetings. The company began to transfer amounts to capital in 1890 when, due to the fact that the accumulated profit figure was £68,299, "the auditors suggest that £54,250.... should be transferred to a separate account as representing the profits appropriated from time to time to capital purposes in the purchase of wagons and other property" (D/DM/309/4/ 26 November 1890). This would suggest that the company was rather lax in its allocation of capital and revenue costs, and there is no evidence to suggest that the amount transferred is anything other than an arbitrary figure devised by the auditor and the directors. Such practices led to "asset and profit figures in the coal industry [that] are in most cases highly unreliable" (Wale. 1990: 266). Throughout the records of Broughton & Plas Power Coal Co. Ltd. there are examples of the inconsistency of the treatment of capital expenditure (as defined in the twenty first century). In February 1898 the minutes record that "the following items [have been] charged to revenue:

	£
slack conveyor	1,221
spoil bridge	155
boilers	470
wagons (part cost)	817
	2,663....." (D/DM/309/5, 22 February 1898).

Such items would now be treated as additions to fixed assets, capitalised and depreciated. An important factor in this unreliability was "the failure to systematically distinguish between capital and revenue expenditure" (Brief, 1965: 14), although, during the sinking of a mine, all costs were allocated to capital, and it was only thereafter, once the capital account had been 'closed off', that this problem arose. There were no statutory requirements, neither as to what should be categorised as capital, nor as to when the capital account should be closed off, or indeed whether it should be closed off and, according to Wale (1990: 254), it was common for what would now be defined as capital expenditure to be "charged entirely against profits of the year in which it was incurred, even though the benefits of such [costs]....might be felt for several years".

It would appear that the debate regarding capital versus revenue and what constituted profit, was exercising the minds of even the Broughton & Plas Power Coal Co. Ltd. directors for, in 1899, FA Sturge, the company secretary, pointed out that "it would not have been difficult to make our revenue accounts look considerably better without making an entry which an auditor could refuse to sanction, for the following sums charged to the trade account were for things which might have been charged to plant -

	£
electric lighting	584
new lamp room	86
new pit tubs	536
spoil bridge(1/2)	172
boilers	220
wagons	1,602
	3,200" (D/DM/309/5, 22 February 1899)

He goes on to state that,

> "as regards our general system of accounts - I wish to point out that the word profit is misleading unless we bear steadily in mind that nothing is allowed for the exhaustion of our minerals, never more rapid than in a good time like the present. It is impossible to estimate this exactly but probably 2½d per ton would not be too much to allow. As the Share

> Capital of the company was not enough to meet the needful expenditure on plant we have transferred from the profit & loss account in aid of capital a very large sum which is to all intents and purposes a depreciation fund. I am strongly of the opinion that we ought to have had a regular and systematic charge for depreciation, but the directors, acting upon the advice of the auditors decided otherwise long ago, and it is now probably too late to adopt a new plan" (D/DM/309/5, 22 February 1899).

This extract from the minutes shows that the whole concept of systematic depreciation was contentious, even at company level. If Mr Sturge's 2½d per ton depreciation had been applied throughout the period studied, the profits per ton being reported, which in some years were marginal at best, would have been markedly worse, or even negative (see the discussion on profits on pp. 317-323 below).

Revenue

According to Church (1986: 496) "in the production of coal for sale it was revenue rather than the physical productivity which in the economics of colliery enterprise was the critical factor". However, as Boyns (1993: 345) explains, "for most colliery companies....market prices were largely outside their control". Indeed "the coal industry was notorious as one in which prices could be extremely volatile" (Mitchell, 1984: 272). A further problem was that the price of coal was not homogenous; "both between, and even within, different varieties of the major kinds of coal....prices varied according to quality and between and within different regions" (Church, 1986: 48). This means "it is very difficult to make generalisations and comparisons between different companies and regions" (Mitchell, 1984: 266).

For much of the nineteenth century the market price for coal was closely related to the market price of iron. This is certainly true of the first 60 years of the nineteenth century because, according to Jevons (1865: 295), a quarter to a third

of the total yield of coal was used by the iron industry (see Table 8.10). However, the last quarter of the century saw a huge increase in the amount of coal exported, and prices became less reliant on the iron industry as the proportion of coal used by it fell. Hull (1897: 20) elaborates further on the impact of the iron trade on coal prices, explaining that the years 1879/80 to 1883 saw "a period of extraordinary prosperity in the iron trade; such as it never attained before or since". Vast amounts of coal were required for smelting and as people thought that this situation would go on and on, they invested in new collieries "generally on a large scale, as the coal had to be reached at ever increasing depths" (Hull, 1897: 20). Unfortunately for them, the mid to late 1880s saw a collapse in the demand for iron; the new pits could not be closed without vast sums being lost and so production of coal continued at high levels, even though demand had fallen off considerably; prices inevitably fell (see Table 8.11) (Hull,1897: 20).

Table 8.10: The proportion of coal used in the iron industry and exported, 1830-1913

	% of coal used by iron industry	% of coal exported
1830	18.5	1.6
1840	22.5	3.8
1855	24.9	6.8
1869	24.3	9.8
1887	16.3	15.3
1903	13.2	20.4
1913	11.6	26.8

(Source: Church, 1980: 19).

Factors affecting the price of coal

Apart from the prevailing macro-economic conditions there were micro-economic factors causing short-term fluctuations in the demand, and therefore the price of coal. According to Walters (1977: 331), these included: movement of freight charges; customers' 'bearing' tactics; and war and the rumour of war. The price charged by collieries varied according to the type of coal, whether the coal was

delivered in wagons belonging to the colliery itself, to the customer or to the railway companies (Mann & Judd, 1909: 31). Church (1986: 82) explains that the management of wagon stock had important commercial implications because the "ownership and control of wagons was a major advantage in competition" at times when the demand for coal, and therefore wagons, was high. An additional competitive 'edge' was gained by those collieries that had good links to the railways; the shorter the distances involved, the lower the freight charges (Mitchell, 1984: 282).

According to Walters (1977: 334), some customers used 'bear' tactics to try to influence the price of coal; they would use a temporary real or threatened withdrawal of demand, in the hope of causing prices to fall, a tactic that was "a common and much resented feature of the south Wales coal trade" (Walters, 1977: 334). Foreign wars could have a positive impact on prices, for example, the Franco-Prussian war, 1871-1875, significantly increased the demand for iron and therefore coal (Kirby, 1977: 6) but, conversely, wars in countries that were either customers of UK exporters or were en route to those countries, could have a detrimental impact on demand and price (Walters, 1980: 335).

The colliery companies themselves were not averse to trying to influence the price of coal by restricting supply, in the hope that prices would rise or entering into a 'cartel' with other local companies to fix prices. If such a strategy was adopted by an individual colliery, it was unlikely to be successful due to the availability of other supplies. However, if collieries combined with each other, then, in theory, they would be able to fix prices. This strategy was tried in 1893-4 by collieries in south west Lancashire and Cheshire, but failed when owners outside the scheme undercut the 'cartel' (Kirby, 1977: 9). A variety of similar schemes, which involved coalfield-wide agreements, were also mooted in Denbighshire but were unsuccessful for the same reason (see Chapter 7).

Table 8.11: Average price obtained - UK , north Wales and Denbighshire, 1878-1914

Year	UK price s/d	north Wales price s/d	Denbigh-shire price s/d
1878		9/6	
1879		10/0	
1880		10/6	
1881			
1882	5/0	5/3	5/3
1883	5/8	5/4	5/4
1884	5/5	5/4	5/4
1885	5/2	5/2	5/2
1886	4/10.5	5/6	5/0
1887	4/9.87	5/5	4/11
1888		5/4	5/4
1889	6/4.25	6/3	6/3
1890	8/3	8/3	8/3
1891	8/0	8/0	8/0
1892	7/3	7/0	7/0
1893	6/9.51	6/10	6/10
1894	6/7.43	6/5	6/5
1895	6/0.42	6/2	6/2
1896	5/10.26	5/9	6/2
1897	5/10.93	5/9	5/9
1898	6/4.22	6/9	6/9
1899	7/7.03	7/9	7/9
1900	10/9.66	11/6	11/6
1901	9/4.29	9/3	9/3
1902	8/2.84	8/6	8/6
1903	7/7.93	7/7	7/9
1904	7/2.58	7/5	7/6
1905	6/11.38	7/5	7/6
1906	7/3.5	7/5	7/6
1907	9/0.01	7/11	8/0
1908	8/11	8/5	8/6
1909	8/0.7	8/0	8/0
1910	8/2.37	8/2	8/2
1911	8/1.79	8/4	8/4
1912	9/0.65	8/11	8/10.97
1913	10/1.52	10/0	10/1.79
1914	9/11.79	9/7	9/8.17

(Sources: Denbighshire and UK - Hunt's *Mineral Statistics* D/GR/1545-1610: North Wales-*Digest of Welsh Historical Statistics*, SN4095: 337).

It would thus appear that the price of coal, although largely determined by the state of the coal trade, could, in the short term, be manipulated slightly by coal companies. Such strategies were only successful if all the coal companies in a coalfield collaborated otherwise undercutting by non-members rendered agreements unenforceable and, even if all the collieries in a coalfield were able to come to such an agreement, this was rendered ineffective if companies in competitor coalfields were able to offer lower prices.

The volatility of the coal trade

It is understandable that, given their inability to control the external factors affecting their industry, the coalowners were so preoccupied with the price of coal and the prevailing conditions in the industry. The surviving records are full of references which illustrate the volatility of the coal trade; these include comments such as, "during the year (1875) the coal trade was (and still continues) seriously affected by the depressed condition of the iron manufacture and its dependent industries" (D/DM/424/1); or "the coal trade has remained very depressed, and orders were only obtainable at prices which left a very bare margin" (D/DM/309/3, 30 November 1887). The directors' reports to shareholders that accompanied the annual financial statements often give a fairly detailed review of the state of the coal trade and demonstrate its volatility. The reports to the Broughton & Plas Power Coal Co. Ltd. shareholders, for the period 1890-1902, reveal a trade with marked ups and downs. The 1880s had been difficult for the company; its pits were sunk in the late 1870s, in the period immediately after a major boom, and throughout the 1880s the directors were lamenting the state of trade. By 1890, however, the first glimmer of optimism becomes apparent in the Annual Report; it being noted that the directors "have pleasure in stating that the results of the year's trade have been much better than for a long time past and there is reason to look forward to a profitable trade through the winter and spring" (D/DM/309/4, 26 November 1890). In 1891 it was reported that "the collieries have been kept at

full work, but the serious fall in the price of slack has made the trade less profitable than it was a year ago" (D/DM/309/4, 5 November 1891).

Unfortunately by 1892-93, despite the fact that the price of gas coal at "slightly over 9/- per ton at the pit.. [was]..highly satisfactory, ...[during].....the second half of the year the depression in the shipping trade caused a heavy fall in prices at Liverpool", and thus had an impact on the company's profitability (D/DM/309/4, 30 November 1892). In 1893 there was a substantial downturn in performance, sales were down by 44 per cent and the coal raised was 38 per cent less than in 1892. According to the minutes, "this result is due to the bad state of trade in the first half of the year and the prolonged strike in the second half" (D/DM/309/4, 21 February 1994). These views are substantiated if one looks at the average profits per ton reported by the company for the years 1891-93 (see Table 8.17 below, p.319); in 1891 profit was 1/2.1d per ton, this fell to 11.3d in 1892 and there was then a significant drop in 1893 when the company made a loss of 0.2d per ton. Although trade picked up in 1894, there was no significant improvement until 1898 when, according to the directors' report, "the increase in profit was mainly due to the strike in South Wales and the consequent demand for North Wales coal at high prices for shipment at Birkenhead" (D/DM/309/5, 22 February 1899).

The great fluctuations that can take place in the coal trade are clearly demonstrated by events at Broughton & Plas Power Coal Co. Ltd. in 1900-01. At the beginning of 1900 it was stated that "there is reason to expect that the contracts made in the coming season will be at higher prices and fully cover the great increase there has been and will be in wages and the cost of materials" (D/DM/309/6, 7 February 1900) and yet, by July 1901, the directors were reporting "a great change for the worse in our trade" (D/DM/309/6, 30 July 1901). This can be better illustrated by a comparison of the company's trade accounts in Table 8.12.

Table 8.12: Broughton &Plas Power Coal Co. Ltd., trade accounts December 1900- June 1902

Half year to:	December 1900	June1901	December 1901	June 1902
Profit - £	48,839	33,020	9,256	2,663
Coal raised – Tons	240,983	229,815	227,888	229,686
Profit per ton	4/ 6d	2/10d	9.7d	2.8d
% movement- profit		-32%	-72%	-71%
%movement- coal		-4.6%	-0.8%	0.8%

(Source: D/DM/309/6)

These figures reveal that, despite coal raised falling by 4.6 per cent between December 1900 and June 1901 and only a marginal movement between December 1901 and June 1902, the internally reported profits, and the profits per ton raised, fell significantly. In the eighteen month period between December 1900 and June 1902, profits fell from £48,839, or 4/6d per ton, to £2,663 or 2.8d per ton, a dramatic fall of 94.2 per cent. The year 1900 was, admittedly, a boom year, but the figures clearly illustrate the impact that changing selling prices could have on the performance of a company, and the speed with which a boom could be reversed.

Expenditure

Before looking at the profits earned by coal companies the costs that they incurred will be reviewed. In this context it is the working costs that will be discussed since it was these that influenced reported profits; although the cost of sinking was the main cost associated with a colliery, this was a capital cost, and has already been discussed in Chapter 3 above.

According to Church (1986: 497) making generalisations about working costs is difficult because "marked regional variations and diversities within regions, localities and even within colliery companies" meant that the conditions met when working coal could vary considerably. Mitchell (1984: 497) agrees that generalisations are difficult because "the costs of each colliery were peculiar to

itself", but while it might be difficult to generalise about what an average cost per ton should be, the components of this cost are more easily identifiable.

"The first and largest item of cost in the production of coal is wages" (Lloyd, 1921: 479), and these can be split into productive and non-productive wages (Mann & Judd, 1909: 5). Productive wages were paid according to the "weight of mineral gotten" (Lawn, 1904: 16), but other underground work, such as driving levels and securing roads, was often paid according to "linear measurement" and is described as "deadwork" or 'oncost' because it is a non-productive occupation (Lawn, 1904: 14). Most surface men were paid by the day, as were some underground workers such as haulage attendants and onsetters (Lawn, 1904: 12).

According to Church (1986: 502) wages could account for between 50 and 75 per cent of total cost, and this proportion increased from the 1880s as coal became more difficult, and therefore more expensive, to get and as miners were able to obtain higher wages (Mitchell, 1984: 288). One of the reasons for this increase in wages was the increasing ability of the miners to associate and achieve concessions from the coalowners, an issue which was fully discussed in Chapter 6. This meant that owners were unable to 'control' wages as they had once done and, as the unions grew in strength, the coalowners found themselves having to concede wage increases (Taylor, 1960: 53) which, unlike in earlier years, they were unable to 'claw back'. This meant that wages increased as a proportion of the total cost per ton and margins were squeezed further and even small fluctuations in the selling price of coal could have a serious impact on the profitability of coal companies.

To assess the veracity of Church's assertion as regards coal companies in Denbighshire, a review of costing information is needed. However, as Boyns & Wale (1995: 55) explain, "the problem for all historians ....is the lack of surviving evidence", and in Denbighshire the evidence is minimal and very patchy. However, although Boyns & Wale (1995: 55) assert that "cost information was rare prior to the dawn of the twentieth century", some cost sheets for Wrexham & Acton Collieries Co. Ltd. have survived (see Table 8.13). These show that very

detailed costing information was available. The trade accounts of some of the colliery companies survive and these also give an analysis of cost but limited to a much smaller number of cost categories (see Tables 8.14 and 8.15).

Table 8.13: Wrexham & Acton Collieries Co. Ltd, extract from monthly costing sheets, January to September 1883

1883	4-Jan	4-Feb	5-Mar	4-Apr	5-May	4-Jun	4-Jul	1-Sep
	s/d per ton	s/d per ton	s/d per ton	s/d per ton	s/d per ton	s/d per ton	s/d per ton	s/d per ton
Getting	1/6.08	1/6.11	1/6.05	1/5.76	1/5.81	1/5.93	1/5.63	1/6.03
Driving in coal?	1.36d	1.39d	1.42d	1.67d	1.53d	1.49d	1.49d	1.27d
Hauling & hooking	4.69d	4.9d	4.83d	4.78d	4.82d	4.95d	4.8d	4.69d
Shift work & deputies	8.3d	10.69d	10.06d	9.35d	9.13d	10.66d	9.52d	8.23d
Pumping & filling water	0.4d	0.61d	0.6d	0.66d	0.55d	0.57d	0.51d	0.52d
Driving in metal	1.03d	0.42d	0.77d	0.87d	0.94d	1.45d	2.24d	1.89d
Raising & ventilating	0.96d	1.22d	1.49d	1.62d	1.41d	1.44d	1.19d	1.16d
Banking & putting into trucks	1.75d	1.93d	2.11d	2.15d	2.22d	2.3d	2.18d	2.22d
General surface labour	1.8d	1.93d	1.91d	2.48d	2.18d	2.21d	1.71d	1.8d
Mechanics	1.72d	1.76d	2.21d	2.43d	2.3d	2.12d	1.67d	1.52d
Total wages	**3/ 4.09**	**3/6.96**	**3/7.45**	**3/7.77**	**3/6.89**	**3/9.12**	**3/6.94**	**3/5.33**
Labour for horses	0.19d	0.24d	0.26d	0.29d	0.28d	0.28d	0.22d	0.22d
Provender for horses	0.63d	0.87d	0.93d	1.15d	1.1d	0.96d	0.87d	0.66d
Stores for horses	0.08d	0.14d	0.14d	0.1d	0.07d	0.07d	0.1d	0.05d
Depreciation on horses	0.9d	0.12d	0.13d	0.15d	0.13d	0.14d	0.11d	0.1d
Timber	3.07d	3.16d	3.62d	3.24d	3.73d	4.22d	4.61d	3.87d
Coal & slack to engines	1.97d	2.03d	1.97d	2.0d	2.07d	1.98d	2.09d	1.53d
General stores	1.44d	1.41d	1.47d	2.02d	1.27d	1.2d	1.01d	1.08d
Bricks, lime & mortar	0.15d	0.12d	0.3d	0.39d	0.2d	0.24d	0.18d	0.15d
Iron, steel & castings	0.97d	1.64d	1.36d	1.12d	1.05d	1.87d	1.38d	1.01d
Wire, ropes & chains	0.5d	0.5d	0.5d	0.6d	0.5d	0.5d	0.5d	0.5d
Water		0.1d	0.1d			0.17d	0.05d	0.05d
Directors, officials & clerks	2.59d	3.13d	3.36d	3.46d	3.39d	3.26d	2.77d	2.65d
Surface rent & wayleave	0.55d	0.57d	0.45d	0.54d	0.6d	0.73d	0.62d	0.57d
Rates & taxes	1.28d	1.33d	1.35d	1.44d	1.49d	1.36d	1.2d	1.16d
Miscellaneous expenses	0.73d	0.86d	0.89d	1.66d	2.01d	1.8d	1.41d	1.33d
Royalty	5.47d	5.6d	4.5d	4.54d	5.46d	4.9d	6.06d	5.4d
Total expenses	**4/11.8**	**5/4.78**	**5/4.78**	**5/6.37**	**5/6.24**	**5/8.8**	**5/6.12**	**5/1.66**
Wages as % of costs	67	66	66	67	65	65	65	67

(Source: NLW/HR/76).

A review of the figures in Tables 8.13, 8.14 and 8.15 reveals that the proportion of wages to total costs does indeed fall within the parameters, and follows the trends, outlined by Church; in the 1880s wages at Wrexham and

Acton Collieries Co. Ltd. account for 63-66 per cent of cost (see Table 8.14), while in 1911-1914, for Broughton & Plas Power Coal Co. Ltd. the proportions are 72-76 per cent (see Table 8.15). Additional information for the Brynkinallt colliery is available for the years 1896-1914 (see Table 8.16). The figures in Table 8.16, extracted from the detailed trading accounts, reveal that the proportion of wages to total cost fluctuated between 72 per cent and 81 per cent, slightly higher than Church's figures would lead us to expect. These figures would appear to tie in with Church's view that wages began to account for a greater proportion of the total cost after the 1880s but, unfortunately, as no complete series of figures is available covering this whole period for a single company, no further conclusions can be drawn. It is also important to note that the wages figures prepared by each company might not have been prepared in exactly the same way so, strictly speaking, like with like comparisons may not be being made.

Table 8.14: Wrexham & Acton Collieries Co. Ltd, breakdown of costs per trade accounts 1884-1889

Years to 30 June: (note 1)	1884	% of total	1886	% of total	1887	% of total	1888	% of total	6m to June 1889	% of total
	£		£		£		£		£	
Costs-										
Labour	32,015	63.0	33,083	65.0	32,285	66.0	32,484	65.0	19,545	66.0
Materials	7,928	15.5	7,046	14.0	6,411	13.0	6,605	13	3,896	13.0
Stables	3,217	6.5	3,494	6.5	3,191	6.5	3,120	6.5	1,590	5.5
General	4,380	8.5	4,026	8.0	3,703	7.5	3,820	7.5	1,857	6.5
Mineral rentals	3,403	6.5	3,421	6.5	3,315	7.0	4,122	8.0	2,001	7.0
Wagon repairs									550	2.0
Total cost	50,943	100.0	51,070	100.0	48,905	100.0	50,151	100.0	29,439	100.0
Cost per ton s/d	5/7.73		5/3.92		[5/2.4] note 2		5/2.44		5/4.31	

Notes:1 - No information is available for the year to 30 June 1885
2 - This figure has been calculated from information given elsewhere in the table.

(Source: NLW HR/76/1356-1372)

Table 8.15: Broughton & Plas Power Coal Co. Ltd, breakdown of costs per ton per trade accounts 1911-1914

½ Year to	31.12.11		30.6.12		31.12.12		30.6.13		31.12.13		30.6.14	
	s/d	%	s/d	%	s/d	%	s/d	%	s/d	%	s/d	%
Labour	6/3	76.0	6/6.1	73.0	6/8.2	74	7/2.2	72.0	7/7.3	74.0	7/7.9	73.0
Materials	10.7	11.0	1/0.8	12.0	1/2.0	13	1/5.6	15.0	1/4.4	13.0	1/6.4	14.0
Stables	1.4	1.5	1.75	1.5	1.83	2	1.73	1.5	1.53	1.5	1.67	1.5
Pumping	0.63	0.5	1.12	1.0	0.64	0.5	0.82	0.5	0.7	0.5	0.59	0.5
Mineral rents	4.38	4.5	5.05	5.0	4.68	4	5.05	4.0	4.84	4.0	5.24	4.0
General charges	6.45	6.5	7.81	7.5	7.10	6.5	8.43	7.0	8.72	7.0	9.22	7.0
Total cost per ton	8/2.7	100.0	7/11	100.0	9/0.5	100	10/0	100.0	10/3	100.0	10/7	100.0

(Sources:1911-1912 D/BC/2289
1913-1914 DD/PP/620)

Table 8.16: Brynkinallt colliery, wages as proportion of total costs 1896-1914

	Total costs £	Wages £	Wages as % total costs		Total costs £	Wages £	Wages as % total costs
1896	37,644	29167	77.5	1906	64,880	49,044	75.6
1897	32,956	24,293	73.7	1907	69,138	49,857	72.1
1898	42,988	32,458	75.5	1908	73,049	55,322	75.7
1899	44,924	34,505	76.8	1909	74,075	54,321	73.3
1900	43,267	32,921	76.1	1910	65,129	49,248	75.6
1901	58,855	46,532	79.0	1911	73,981	54,132	73.2
1902	53,845	43,382	80.6	1912	84,685	62,156	73.3
1903	55,556	44,191	79.5	1913	100,669	74,625	74.1
1904	58,449	44,918	76.8	1914	103,699	76,873	74.1
1905	63,085	46,808	74.2				

Note: in the years 1901 and 1902, wages includes directors' remuneration which, in 1900, had amounted to approximately £1100.
(Source: D/CB/1/2)

According to Church (1986: 505), the second most important cost after labour was stores, which are defined by Lawn (1904: 530) as "the numerous and very various articles which it is necessary for a mining company to buy in order to carry on operations". These included pit timber, rails, castings, ropes, candles, oil and grease (Church, 1986: 505). Church (1986: 505) cites an 1871 survey by the

Colliery Guardian which said that it was usual for stores to account for 5-18 per cent of total costs, and that the costs of keeping horses and stables should be between 1 and 7 per cent of total cost. Tables 8.14 and 8.15 reveal that for Wrexham & Acton Collieries Co. Ltd., and Broughton & Plas Power Coal Co. Ltd. the proportions of these costs did indeed fall within these parameters.

Of all the costs, other than wages, that companies had to pay, the most controversial would appear to be royalties or mineral rents. Although these only account for a small percentage of total cost, 4-5 per cent in the case of Broughton & Plas Power Coal Co. Ltd. and 6.5-8 per cent for Wrexham & Acton Collieries Co. Ltd., from the records available for Denbighshire it would appear, as noted above in Chapter 5, that the management of companies accorded an importance to royalties that was disproportionate to their importance in total costs. While it is true that royalties may not have seemed unduly significant in absolute terms, given the often very marginal profits per ton, any movement in royalties per ton could mean the difference between a company reporting a profit and a loss (see below).

Profits

The minute books of Broughton & Plas Power Coal Co. Ltd. reveal that detailed financial information was prepared on a regular basis; the company preparing, on a monthly basis, a statement outlining the following: sales, debtors, coal raised, profit and bank balance. The figures for profit, coal raised and sales were also calculated on a cumulative basis from the start of the financial year to the end of that particular month. Each month, figures were prepared comparing the profit figure for the month with that of the corresponding month in the previous year, and an analysis of the difference was calculated. This analysis covered the movements in quantities sold, costs per ton for the two main pits, selling prices and profits from the use of wagons. On a six monthly basis the company prepared a detailed trading account which gave a breakdown of sales, both quantities and values, for shipping, railway and local sales, which were further categorised into the various types of coal and slack sold. A breakdown of costs

into labour, materials, stables and 'general' was also calculated. Each cost was broken down for each colliery, Plas Power, Gatewen and Vron, and a cost per ton for each expense, for each colliery, was calculated (see Appendix A). This enabled the company to work out a 'profit per ton' (see Table 8.17) but this was a rather arbitrary figure given that the actual selling prices of the different types of coal were averaged over the year, and these final figures were in turn averaged to give an overall selling price per ton. Church (1986: 521) believes that such profit figures per ton should be seen as "little more than a rough guide to the level and chronology of [a company's] profitability". However, it would appear that, inexact or not, these figures formed an extremely important element of the management information used for decision making, because they allowed comparisons, however crude, to be made.

The profit figures that are available for Broughton & Plas Power Coal Co. Ltd. and Brynkinallt (see Table 8.17), reveal that colliery companies were usually working with very small margins of profit, and they also reveal the volatile nature of the industry. For example, if we look at Brynkinallt's profits per ton (see Table 8.17) we see the profits plunge from 3/1.6d in 1901 to 2.3d in 1902, a fall of 94 per cent. Furthermore, the company suffered four consecutive years of losses from 1903 to 1906 and suffered its biggest loss of 11.7d per ton in 1906, a figure which is a full 131 per cent lower than the high of only five years previously.

As has already been discussed, the selling price of coal was subject to significant fluctuations, and given that many of the elements of cost were difficult to alter significantly, a very small downward movement in selling price could wipe out profits very quickly. If we look at the profits and losses recorded by Brynkinallt in the years 1903-1910 and compare them with the average price obtained in Denbighshire for the same period (see Table 8.11, p.309) we see that the 9 per cent fall in the selling price between 1902 and 1903 caused profits per ton to drop by 126 per cent and these profits, like prices, did not recover until 1907 when prices increased by 7 per cent and corresponding profits per ton increased by 121 per cent.

Table 8.17: Broughton & Plas Power Coal Co. Ltd.and Brynkinallt, average profits per ton 1896-1914

	Broughton & Plas Power Coal Co. Ltd.			Brynkinallt		
	Coal Raised	Profit	Profit per ton	Coal Sold	Profit	Profit per ton
	Tons	£	s/d	Tons	£	s/d
1884	313,485	15,286	0/11.7			
1885	297,691	11,564	0/9.3			
1886	339,459	13,943	0/9.8			
1887	386,849	14,569	0/9.0			
1888	362,826	7,180	0/4.7			
*1889	309,969	1,352	0/1.0			
1890	344,519	22,101	0/4.0			
1891	347,141	20,468	1/2.1			
1892	367,863	17,334	0/11.3			
1893	226,547	-179	-0/0.2			
*1894	299,190	6,651	0/5.3			
*1895	363,038	9,948	0/6.6			
1896	438,026	8,661	0/4.7	103,482	-8,289	-1/7.2
1897	444,994	9,213	0/5.0	119,218	2,309	0/4.6
*1898	457,786	21,418	0/11.2	151,995	4,661	0/7.3
1899	470,245	22,890	0/11.7	141,547	6,824	0/11.6
1900	498,060	63,663	2/6.7	124,420	11,718	1/10.6
1901	438,068	38,636	1/9.2	130,411	20,412	3/1.6
1902	462,220	8,613	0/4.5	128,065	1,219	0/2.3
1903				139,890	-342	-0/0.6
1904				138,274	-3,475	-0/6.0
1905				153,654	-4,008	-0/6.3
1906				158,394	-7,709	-0/11.7
1907				163,845	2,348	0/3.4
1908				153,182	8,403	1/1.2
1909				155,593	-4,524	-0/7.0
1910				150,160	-9,568	-1/3.3
1911				173,064	1,039	0/1.4
*1912	491,541	1379	0/0.7	194,146	12,952	1/4.0
1913	495,456	1802	0/0.9	207,829	8,543	0/9.9
1914	470,599	1726	0/0.9	187,671	4,275	0/5.5

Notes:

a) Broughton & Plas Power Coal Co. Ltd.'s financial year end was December, while Brynkinallt's was June.
b) Profits per ton have been calculated as follows: profits/tons * 240d
c) No information is available for Broughton & Plas Power Coal Co. Ltd. for 1903-1911 inclusive
d) Information for years marked * is incomplete

(Sources: Broughton & Plas Power Coal Co. Ltd. D/DM/309/3-6; Brynkinallt D/CB/1/2)

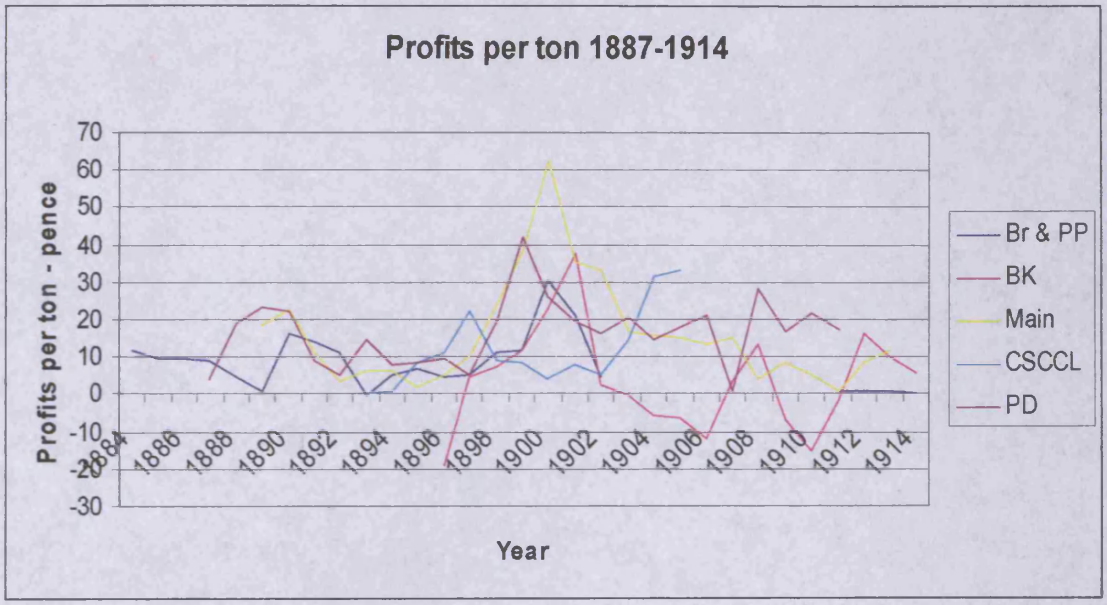
Such wild fluctuations meant that some collieries continued working, despite making losses, in some cases, for many years because the possibility of a quick reversal of fortune always existed. Boyns (1993: 345-6) explains that if a colliery closed it would involve writing off large amounts of capital investment; not only this, but reopening collieries was often impossible or very expensive, so loss-making companies often continued to operate "in the hope that the coal market would improve, prices would rise and large profits could be made which would more than offset previous losses". It was not therefore profitability, or lack of it, that was the overriding reason for closing a colliery; it was usually exhaustion, geological problems or problems finding markets for a particular type of coal that was the decisive factor (Boyns, 1993: 345-6).

The figures in Table 8.17 do little other than indicate the trends of the profits for the two companies involved; they cannot be compared directly because they have been prepared differently. The figures for Brynkinallt have been calculated from the annual profit & loss accounts, and the net profit figures per the financial statements have simply been divided by the amount of coal sold to give a profit per ton figure. The figures for Broughton & Plas Power Coal Co. Ltd. have been derived from internally prepared data; on a monthly basis the minutes of the directors' meetings listed the amount of coal raised and a profit figure, which is assumed to be the gross or trading profit. These monthly figures have been aggregated into annual figures and the profit per ton is the profit figure divided by the amount of coal raised. Given that the shortcomings discussed above in relation to the two companies in Denbighshire would be repeated if comparisons with other coalfields were attempted, no systematic, comparative analysis of levels of profit per ton with those in other regions has been attempted.

Nonetheless the figures do give an indication of the highs and lows of the coal trade and also illustrate the marginal nature of the profits earned by the coal companies. Small changes in costs could eliminate profits; if we take, for example, the profit per ton for Broughton & Plas Power Coal Co. Ltd. for the years 1912-1914 (see Table 8.17) we see that a penny increase in, for example, royalties per ton or wages per ton would have wiped out these profits completely.

If the 2½ d depreciation charge advocated by FA Sturge (see p. 306 above) had been applied then not only would the profits for 1912-1914 have disappeared then so too would the profits for 1889, and the profits of 1888, 1894, 1896 and 1897 would, more or less, have been halved.

Figure 8.4: profits per ton for Broughton & Plas Power Coal Co. Ltd., Brynkinallt, the Main Colliery Co. Ltd., Cardiff Steam Coal Collieries Co. Ltd. and the Powell Duffryn Steam Coal Co. Ltd.1887-1914



Key: Key: BR & PP – Broughton & Plas Power Colliery Co. Ltd; BK – Brynkinallt; Main - the Main Colliery Co. Ltd; PD - the Powell Duffryn Steam Coal Co. Ltd and CSCCL - the Cardiff Steam Coal Collieries Ltd.

(Sources: Plas Power - D/DM/309/3-6; Brynkinallt - D/CB/1/2; Main, CSCCL & PD - Walters, (1977): 291-2)

To discover whether trends in north Wales tied in with those elsewhere, Figure 8.4 plots the profit per ton figures for Broughton & Plas Power Coal Co. Ltd. and Brynkinallt, presented in Table 8.17, alongside those for three south Wales companies, the Main Colliery Co. Ltd., the Powell Duffryn Steam Coal Co. Ltd. and the Cardiff Steam Coal Collieries Ltd. (see Table 8.18). Despite the fact that the south Wales companies' profits are generally much higher than those of the north Wales companies, which is to be expected given the demand for south

Wales steam coal in this period, the graph clearly shows that the trends in profits, for the period for which information is available, with only a few exceptions, followed the same basic patterns, with profits experiencing peaks, in south Wales at least, in the boom periods of 1890, 1898-1901 and 1908. Figure 8.4 also clearly demonstrates, especially if we look at Brynkinallt, the sheer volatility of profits per ton in this period.

Table 8.18: Broughton & Plas Power Coal Co. Ltd., Brynkinallt, Main Colliery Co. Ltd., Powell Duffryn Steam Coal Co. Ltd., and the Cardiff Steam Coal Collieries Ltd.average profits per ton 1884-1914

	Br & PP	BK	Main	PD	CSCCL
	s/d	s/d	s/d	s/d	s/d
1884	0/11.7				
1885	0/9.3				
1886	0/9.8				
1887	0/9.0				0/4.3
1888	0/4.7		1/6.3		1/6.9
1889	0/1.0		1/10.0		2/3.6
1890	0/4.0		0/7.0		1/10.3
1891	1/2.1		0/11.1		0/9.0
1892	0/11.3		0/3.5		0/5.1
1893	-0/0.2		0/6.3		1/2.5
1894	0/5.3		0/6.2	0/0.5	0/7.9
1895	0/6.6		0/1.8	0/8.6	0/8.3
1896	0/4.7	-1/7.2	0/5.0	0/11.0	0/9.6
1897	0/5.0	0/4.6	0/10.1	1/10.0	0/5.2
1898	0/11.2	0/7.3	2/1.0	0/9.0	1/7.7
1899	0/11.7	0/11.6	3/2.0	0/8.3	3/6.1
1900	2/6.7	1/10.6	5/2.1	0/3.9	2/4.2
1901	1/9.2	3/1.6	2/11.2	0/7.9	1/7.6
1902	0/4.5	0/2.3	2/9.0	0/5.3	1/4.4
1903		0/0.6	1/ 4.5	1/2.6	1/8.3
1904		0/6.0	1/3.6	2/7.1	1/2.7
1905		-0/6.3	1/3.0	2/9.1	1/6.0
1906		-0/11/7	1/1.4		1/9.1
1907		0/3.4	1/2.9		0/1.0
1908		1/1.2	0/4.0		2/4.0
1909		-0/7.0	0/8.2		1/4.7
1910		-1/3.3	0/4.9		1/9.6
1911		0/1.4	0/0.7		1/5.1
1912	0/0.7	1/4.0	0/8.3		
1913	0/0.9	0/9.9	0/11.9		
1914	0/0.9	0/5.5			

(Sources: as per Figure 8.4)

The peaks experienced by coal companies in both north and south Wales correspond to the booms experienced by the British coal industry as a whole with two of the three south Wales companies achieving their highest profits per ton in 1899 and 1900 while in north Wales the peak years were 1900 and 1901 (see Table 8.18). For example the profit of the Main Colliery Co. Ltd. in 1900 was 5/2.1 per ton a full 102 per cent higher than the profit for Broughton & Plas Power Coal Co. Ltd. for the same year (2/6.7).

While the south Wales companies experienced a fairly significant increase in profits in the late 1880s/early 1890s, in Denbighshire, the same period saw a slump in the performance of the Broughton & Plas Power Co. Ltd. According to the minutes of a meeting held on 27 November 1889 (D/DM/309/4), increases in wages ("since November 1st 1888, the colliers have received an advance of 20 per cent in their wages") and "unremunerative" contracts meant that there was insufficient profit to declare a dividend. Although Broughton & Plas Power Coal Co. Ltd.'s performance improved in 1891 with profits per ton reaching 1/2.1d per ton, profits per ton fell in 1892, and the company made a loss of 0.2d per ton in 1893 (see Table 8.17). In 1891, despite making profits, the company's minutes note that although "the collieries have been kept at full work throughout the summer,...the serious fall in the price of slack has made the trade less profitable" (D/DM/309/4, 5 November 1891). The year 1892 saw a fall in profits because "during the second half of the year, the depression in the shipping trade caused a heavy fall in prices at Liverpool" (D/DM/309/4, 30 November 1892). As was discussed in Chapter 6, 1893 saw a prolonged strike in Denbighshire which, along with "the bad state of trade in the first half of the year", contributed to Broughton & Plas Power Coal Co. Ltd. making a loss (D/DM/309/4, 21 February 1894). These poor performance figures were reflected in the lower dividend payments made by Broughton & Plas Power Coal Co. Ltd. after the boom years of 1891 and 1892 (see pp. 298-302 above).

Conclusion re profitability

When looking at the profitability of nineteenth century coal companies, the most important consideration to take into account is the fact that accounting practices at that time could differ considerably from company to company, which means that the analyses that can be carried out are limited, and the conclusions drawn therefrom must be treated with a certain amount of scepticism. Church (1986: 517) believes that "any figures, especially of net, but even of gross profit [must be seen] as less than completely reliable". This having been said it is therefore difficult, even if the source material is available, to measure the performance of one company against another. It is easier, therefore, to conclude that, during their lifetimes, the coal companies of Denbighshire, like those in other coalfields, rode the roller coaster that was the coal trade. When times were good, returns could be very good, for example, in 1900 the profits of the Broughton & Plas Power Coal Co. Ltd. were over 2 shillings per ton, while those of the Brynkinallt colliery were over 3 shillings per ton in 1901. However, boom periods did not last for long and, in most years, the companies struggled to return a profit, indeed, Brynkinallt colliery suffered a loss in 6 of the 10 years between 1901 and 1910 (see Table 8.17). Average annual profit margins were small and subject to the vagaries of the coal markets with movements in profits or losses closely matching movements in the price of coal. This meant that the most important factor in determining whether the company was going to make a profit or not was, to a great extent, out of the control of the company. This lack of control over price manifested itself in an obsession with controlling costs, especially wages and royalties as both these costs were deemed more 'controllable' than many of the other costs. As a consequence, relations with employees and royalty owners were often marred by disagreements. While, on the face of the evidence presented in Chapters 5 and 6, the willingness of coal companies to get involved in litigation or disagreements with their landlords and in lengthy, disruptive disputes with their workmen, might seem irrational, the low levels of profits, their

volatile nature and their sheer 'marginality', helps us to understand why coal companies took what might otherwise be seen to be an illogical position.

When compared with the profits of companies from south Wales it was demonstrated that, while the profits of Denbighshire coal companies followed the same general trends as those of the south Wales coal companies, the profits of the latter were significantly higher than for the Denbighshire companies probably due to the 'desirability' of south Wales steam coal.

Overall conclusions re performance

The productivity of Denbighshire coal companies demonstrates specific trends that can be tied in with the overall performance of the coal industry, and we have demonstrated that the productivity of Denbighshire was comparable to that of other small coalfields. However, in terms of profitability, the companies for which we have information demonstrate very volatile profits. Furthermore, profits appear to have been marginal for Denbighshire coal companies in most years and significant profits were unusual.

Chapter 9

CONCLUSIONS

Having examined each of the issues discussed in the foregoing chapters, this chapter brings together the main conclusions of the research. In the Introduction the aims of this thesis were outlined and the conclusions will be addressed against each of those aims in turn.

Can Denbighshire be considered as a coalfield in its own right?

During the third quarter of the nineteenth century Denbighshire came to dominate the north Wales coalfield; by 1880 it accounted for over 60 per cent of the total output of north Wales and, by 1914, this proportion had increased to 82 per cent. In terms of output, Denbighshire, which has never been seen as anything other than an area within a 'small' coalfield was, in fact, comparable with many of those coalfields that were, officially, considered 'small', for example, Leicestershire Cumberland and Gloucester. In addition, throughout the period 1875-1914, Denbighshire was able to keep pace with the growth of the coal industry as a whole. It was able to maintain its production as a proportion of the UK's output at around 1 per cent, and this, at a time when the UK coal industry's output was increasing significantly.

In numerical terms the Denbighshire coalfield was dominated by small collieries, however between 1894 and 1914 the proportion of collieries employing more than 500 men increased from 24 per cent to 42 per cent of the total (see table 2.14). This increase in colliery size is reinforced if we consider the fact that the average size of a Denbighshire colliery rose from 274 employees in 1894 to 447.7 in 1914, a figure which was significantly higher than the national average. Further, if the proportion of the workforce which was employed by the larger collieries is considered, they clearly employed the majority of the workforce. In 1914 84 per cent of the total workforce was employed by collieries employing

more than 500 persons, and of these 15 per cent were employed by collieries employing more than 1,500 men (see Table 2.16).

These statistics show us that Denbighshire grew significantly in the period 1875-1914 and the research undertaken demonstrates that Denbighshire dominated the north Wales coalfield. Its performance in terms of OMY was found to be comparable to other 'small' coalfields and, in terms of colliery size, the collieries of Denbighshire were often far larger than those in the other 'small' coalfields, indeed, 62 per cent of the total workforce was employed by only 7 collieries. A possible explanation for this is the relative 'newness' of the Denbighshire collieries; of these 7 collieries, only one, the Westminster colliery was sunk before 1850 (1846), another, the Wynnstay colliery was sunk in 1856 while the remainder were all sunk between 1863 and 1875. As was explained in Chapter 2, due to geological conditions in Denbighshire, the newer collieries had to be sunk to greater depths which inevitably meant that the collieries had to be much bigger concerns than previously.

Although, for official, statistical purposes Denbighshire was often included within the north Wales 'coalfield', geologically speaking, the coalfield is quite a distinct entity which suggests that it is worthy of study in its own right. The statistical information which was collected and analysed for the purpose of this thesis reinforces this view; Denbighshire, if treated as a separate coalfield, was comparable to other, officially designated 'coalfields'. It has, therefore, been contended that Denbighshire can be considered a coalfield in its own right and hence a legitimate focus of study.

What were the obstacles to economic & industrial development that faced the Denbighshire coalfield at the turn of the nineteenth century and how were these overcome?

The main obstacle facing the Denbighshire coalfield was that it was a landbound coalfield with a poor transport infrastructure which strictly limited the markets that

were available for the county's coal. The improvements to the road network in the late eighteenth century, and the building of the Ellesmere canal in 1805, went some way to opening up markets for Denbighshire but not to the extent that had been anticipated. When the Ellesmere canal was first planned it was to have extended as far as Wrexham, but problems of geography and finance meant that this never transpired. It was, therefore, only when the railway infrastructure was built that Denbighshire was able to look beyond its local market and expand.

The opening of a railway line from Chester to Shrewsbury, via Wrexham and Ruabon, in 1848 was a major step towards opening up Denbighshire to external markets as was the connection to the GWR in the 1850s. By the 1860s the industrialists of Wrexham were fierce proponents of a direct railway to the port of Connah's Quay which would link Wrexham with the LNWR main line from Chester to Holyhead and allow direct access to an export facility. The railway was completed in the mid-1860s and provided a significant boost to the Denbighshire coalfield; not only did 'exports' by rail increase, but the improved rail links provided entrepreneurs with the impetus to sink collieries now that they had access to outside markets.

Who were the coalowners and shareholders who invested in the coalfield and were they similar in background to shareholders in coal companies elsewhere?

Perhaps unsurprisingly, given the parallel experience in south Wales, we find that the main coalowners in Denbighshire were 'immigrants' to the county; men such as Robert Roy and Henry Robertson, who arrived as the 'first wave' of immigrants, were both Scottish, while Henry Dennis, the most important 'second wave' immigrant, was Cornish. Given the 'unimportance' of north Wales, and consequently Denbighshire, in coalmining terms, it is therefore perhaps surprising to discover that some of the major shareholders in Denbighshire coal companies were important national figures, for example, Thomas Brassey, Sir Daniel Gooch and Sir Theodore Martin.

When the background of the Denbighshire shareholders was analysed (excluding Broughton & Plas Power Coal Co. Ltd. due to the disparity in the

number of shares issued), the most prominent category was 'gentleman' who made up 43.1 per cent of the total (see Table 4.5). However, given the desire for 'upward mobility' within Victorian society, this might reveal more about the social aspirations of the men concerned rather than their actual occupation. For example, Henry Dennis began his shareholding career by describing himself as a 'mining engineer' and ended it as a 'gentleman'. Another, perhaps unusual, feature of shareholders in Denbighshire, was that women made up a surprisingly high proportion of the total shareholders, 18.6 per cent of the total and, in one company, the Westminster, Brymbo Coal & Coke Co. Ltd., women constituted the most important category at 44.4 per cent (see Table 4.5).

According to research undertaken by historians such as Church (1986), if Denbighshire had followed the pattern typical in the UK coal industry, most of Denbighshire's capital should have come from local sources but, when shareholder addresses were analysed it was found that most shareholders lived outside the county, indeed, outside Wales. The highest proportion of shareholders (excluding Broughton & Plas Power Coal Co. Ltd. from the analysis), 33 per cent, was found to live in London and the south east of England, while there was a sizeable proportion, 21 per cent, living in Scotland (see Table 4.7). This latter finding reflects the strong ties which Roy and Robertson retained with Scotland. It may be that the Scottish 'element' is so significant in Denbighshire because, unlike in other, larger coalfields, the investment from a specific region has not been 'lost' in the sheer scale of investment. With a small number of shareholders in total, it is obviously easier for one regional group to dominate, reflecting personal and other network ties.

Who were the other major stakeholders in the coal industry in Denbighshire and what were the relationships between these stakeholders and the coal companies like?

The other main stakeholders in the Denbighshire coalfield were mineral owners, employees and customers. Relations between the coal companies and their

mineral owners were often fraught, as was illustrated by the three case studies examined in Chapter 5. Mineral ownership was far from being a straight forward guarantee of 'easy money'; mineral owners were often involved in protracted negotiations, even disputes, with their lessees and often had to make significant concessions. The marginal nature of coal industry profits meant that coal companies were constantly looking for ways to cut costs, and royalties were deemed an 'easy' target compared to other costs. The coal companies of Denbighshire, like their counterparts in other coalfields, considered royalty rates to be onerous and indeed small changes in royalties per ton could have a severe impact on profits. However, if royalty rates are considered on a national level (see Table 5.3), those of north Wales appear to have been one of the lowest and therefore we might assume that the coal companies of Denbighshire were not disadvantaged by the royalty system that prevailed at the time. This, however, assumes that the coal companies of Denbighshire earned comparable profits to those in other companies which our research leads us to conclude that they did not.

The only other cost that was deemed an 'easier' target to cut than royalties was wages and until the miners succeded in creating strong, centralised unions on a local and national level, they had to put up with severe fluctuations in their wage rates. Unlike the miners, the coalowners were able to present a united front. For example, in Denbighshire, the NWCOA represented the coalowners against the miners from 1870 and, given that it was not until the 1890s that the miners in Denbighshire, under the leadership of Edward Hughes, began to work collectively, the owners were able to thwart the demands of the miners time and again during the second half of the nineteenth century.

By the start of the twentieth century, however, the miners of the UK were unified under the MFGB and Denbighshire had a strong, local union in the NWMA. The MFGB began to agitate for a restriction in working hours and achieved success when the 1908 Eight Hours Act was passed. However this Act created unforeseen problems, especially in south Wales. Here, the issue of 'hard and difficult' places festered until, in 1912, it became a national issue that

culminated in a national strike which caused tremendous hardship throughout the UK and heralded decades of bitter industrial relations between coalowners and miners.

In Denbighshire, the issue of 'hard and difficult' places had long been important; in 1907 a 'price list' had been agreed that was supposed to address this issue but, dissembling by the employers meant that, by the time of the 1912 strike, there was strong support for the MFGB stance. The strike caused severe hardship in Denbighshire and when the vote to return to work was held there was an overwhelming vote in favour. Despite the distress caused by the strike, the NWMA remained strong, a testament to the influence of its inspirational leader, Edward Hughes, who had worked indefatigably since 1897 to create a strong, regional union.

Turning to customers, once Wrexham was linked to the important GWR and LNWR railways the infrastructure was in place for Denbighshire coal companies to take advantage of national and, via the docks in Birkenhead and, later, Connah's Quay, international markets. The records that survive show that the coal companies used a variety of methods to expand these markets which included employing 'travelling salesmen', joining local 'cartels' and investing in the by-product industry. The records also show that, despite being a small coalfield, Denbighshire's coal was purchased by some very prestigious companies, for example, the Cunard Steamship Co. and the Pacific Steam Navigation Co. Ltd.

How did the coal companies of Denbighshire perform?

In terms of productivity, Denbighshire's OMY was comparable with that of other 'small' coalfields. The highest recorded OMY for Denbighshire was in 1898, a full 15 years after the UK peak. This, however, is not surprising given that Denbighshire was a 'new' coalfield, developed largely after 1850. Little analysis of OMY figures for individual companies was possible, but those figures that are available demonstrate the volatility of OMY. This, again, is not unexpected; OMY

figures are affected by the number of days worked by a colliery in a year and, if conditions in the coal industry were not favourable, many days could be lost consequently lowering OMY greatly. The OMY figures, for the companies examined, exhibited similar trends reaching a high in the late 1890s and then taking a downward trend. As a result the OMY figure for Denbighshire peaks at 272 tons in 1898 and then decline to reach its lowest level, 204 tons, in 1914 (see Table 8.6).

In terms of profitability, coal company profits were not only very volatile but precarious; small movements in the selling price of coal and/or costs could severely affect a company's profits and therefore the dividends it was able to pay its shareholders. In Denbighshire the coal companies earned extremely narrow profit margins even in 'good' years (see Table 8.17), which meant that they were always searching for ways to cut costs. For this reason, coal companies appeared obsessively preoccupied with labour and royalty costs (despite the latter being low compared to those in other coalfields), a preoccupation which often manifested itself in disputes with the mineral owners and increasingly bitter industrial relations.

Does examining a small coalfield offer different insights into issues that might not be revealed by studying a larger coalfield and were these issues different to those being raised in larger coalfields?

The studies that have been carried out on the UK coal industry have, logically, concentrated on the larger coalfields such as Durham and Northumberland or south Wales when attempting to determine the issues that affected the coal industry at a national level. Likewise, studies of individual coalfields have tended to focus on the same large coalfields rather than smaller, 'insignificant' coalfields. These studies do consider issues specific to individual coalfields, for example, the issue of 'hard and difficult' places in south Wales but often only in the context of how it affected the national industry. National studies often only touch on issues that the study of Denbighshire has shown were extremely important at a

local level. One such issue was royalties. While important enough to warrant a Parliamentary Commission in 1890, very little has been written about the impact of royalties on individual companies. Examining the detailed correspondence between companies and their mineral owners, and the actual financial records of these companies, has allowed a deeper understanding of the reasons behind the coal companies' attitude to royalties to be developed. Similarly, the problems that individual companies faced when sinking mines, in terms of geological and financial problems, explains why so many companies were forced to raise far more finance than had originally been anticipated.

It would appear from the study of the Denbighshire coalfield that the issues that dominated the region, for example, wage rates and royalty rates, were not specific to the region; these were universal issues that were also causing problems in other coalfields as coalowners did everything in their power to maximise their returns. Even if a dispute was confined to a specific coalfield, for example, the 1882 strike in Denbighshire, it was usually related to the coalowners' desire to cut costs.

Further Research

This thesis has attempted to compile a comprehensive study of a relatively understudied area – the small coalfield. While large coalfields such as south Wales have been extensively researched the small coalfields have tended to be ignored. National histories of the coal industry tend to concentrate on the 'influential' and therefore large coalfields while local studies tend to concentrate on specific collieries, towns, areas or events rather than on the coalfield as a whole. Various authors have examined specific aspects of the Denbighshire coalfield, for example, Lerry (1968) gives details of individual collieries, Rogers (1928) examines the development of trade unionism and Gildart (2001) looks at post nationalisation but this thesis is the first time that an attempt has been made to examine the development of the coalfield in the Victorian era.

While this study has not been able to establish that the Denbighshire coalfield was 'different' to other coalfields it has allowed us to gain an insight into issues, for example, 'non indigenous' investors and women shareholders in coal companies that might be 'subsumed' in the sheer volume of detail associated with larger companies and larger coalfields. This opens up possibilities for further research into small coalfields to discover whether the findings of this thesis are replicated in other small coalfields. Further research into Denbighshire is also possible; no comprehensive study of the inter-war period has been carried out to date. Such a study would, given Gildart's (2001) post-war contribution, allow us to 'close off' the study of the Denbighshire coalfield and would enable us to examine, in detail the 'life and death' of a small coalfield.

BIBLIOGRAPHY

Primary sources

British Library, London

BL/BS/27/1, List of Mines, 1894-1914.

BL/BS/18, Commission on Mining Royalties, 1890.

BL/POWE/7/5-40, Mines Inspectors' Reports, 1863-1914.

Flintshire Record Office, Hawarden

D/BC/Clarke(addnl)/Brymbo Co. 1/1, Brymbo Company, expenditure on plant & improvements from September 1872 to September 1881.

D/BC/Clarke(addl)/Brymbo Co. 1/2, Brymbo Company, letter from WH Darby to Birch Cullimore & Douglas, Solicitors, Chester.

D/BC/Clarke (addnl) 1/1 & 2, Llay Hall Coal, Iron & Firebrick Co. Ltd., Memorandum of Association, February 1873; trade accounts, 1887-1911; miscellaneous correspondence, 1873-1909.

D/BC/Clarke (addnl) 2/4, Llay Hall colliery, balance sheets, 1898-1900.

D/BC(addnl), Robertson Box 36/1, Broughton & Plas Power Coal Co. Ltd. Balance sheets, 1891-1987, 1901 and 1904.

D/BC/1/6, Letter from Harrison West, Ledson & Co., Chartered Accountants to trustees of ES Clarke's estate, dated 26 May 1908 re output and performance of Llay Hall colliery.

D/BC/2/1/6, Letter from GJ Brown & Son to Walker Smith & Way re Llay Main colliery, June 1911.

D/BC/2/4, Letters from West, Ledson & Co., Chartered Accountants to trustees of ES Clarke's estate, dated 21 March 1905 and 10 August 1905.

D/BC/2236, Details of freehold and leasehold land held by Broughton & Plas Power colliery Co. Ltd, 1914.

D/BC/2239, Plas Power Coal Co. Ltd., Memorandum of Association, August 1877.

D/BC/2244, Memorandum and Articles of Association, Broughton & Plas Power Coal Co. Ltd., 1881.

D/BC/2245, Agreement between Henry Robertson and Broughton & Plas Power Coal Co. Ltd. for sale of Plas Power colliery, 14 January 1881.

D/BC/2249, Broughton & Plas Power Coal Co. Ltd., Balance sheet, 1 October 1887.

D/BC/2250, Schedule of salaries paid to officials employed jointly by Brymbo Steel Co. Ltd., Brymbo Co. and Broughton & Plas Power Coal Co. Ltd, Brymbo colliery trade account, 1887.

D/BC/2251, Westminster, Brymbo Coke & Coal Co. Ltd., Summary of Capital and Shares, September 1888.

D/BC/2289, Various correspondence and financial statements 1908-1913, including a schedule of freehold and leasehold land held by the Broughton & Plas Power Coal Co. Ltd. 1912; Trade account and directors' report year to 31 December 1912.

D/CB/1, Brynkinallt colliery balance sheets, 1883, 1884, 1887, 1894, 1895.

D/CB/1/1, Brynkinallt colliery, profit and loss accounts 1894-1899.

D/CB/1/2, Brynkinallt colliery, profit and loss accounts 1900-1914.

D/CB/1/6, Brynkinallt colliery, labour cost book, 1895-96.

D/CB/1/10, Brynkinallt colliery, pay abstract book, 1900-1914.

D/CB/4/1, Bersham Colliery Co. Ltd., Colliers Wages Book, 1909.

D/DM/38, Plas Power colliery price list, 2 May 1906.

D/DM/101, Ellesmere Canal Reports 1805, 1817, 1821, 1825, 1827-29, 1831-32.

D/DM/151/8, Agreement between Broughton & Plas Power Co. Ltd. and the Wrexham Gas light Co.

D/DM/285/82, Royalty accounts, the South Sea Company, 1852-54.

D/DM/285/85, Royalties paid by Pentrebychan colliery to Colonel Meredith of Pentrebychan Hall, 1882-1886.

D/DM/285/91, Royalties paid by Gwernygo colliery to Colonel Meredith of Pentrebychan Hall, 1882-1884.

D/DM/309/1, Bersham Colliery Co. Ltd., Minute Book, October 1868-October 1904.

D/DM/309/2, Bersham Colliery Co. Ltd., Minute Book, November 1904-January 1912.

D/DM/309/3, Broughton & Plas Power Colliery Co. Ltd., Minute book 1880-89.

D/DM/309/4, Broughton & Plas Power Colliery Co. Ltd., Minute Book 1889-94.

D/DM/309/5, Broughton & Plas Power Colliery Co. Ltd., Minute book,1894-99.

D/DM/309/6, Broughton & Plas Power Colliery Co. Ltd., Minute Book, 1900-1902.

D/DM/309/7, Broughton & Plas Power Co. Ltd., Minute Book, 1912-1915.

D/DM/391/1, Common place book owned by WH Darby, extracts from diaries etc recording important events.

D/DM/424/1 & 2, Wrexham & Acton Collieries Co. Ltd., balance sheets, directors' reports and AGM minutes, 1873-1877.

D/DM/809/7, Letter from W Jones to J Catherall, Hawarden, 27 September 1813.

D/DM/832/25, Valuation of Llay Hall colliery, 15 February 1897.

D/DM/996/10, Wedd, CB, Smith, B & Wills, LJ (1928), *The Geology of the Country around Wrexham,* Geological Survey of Great Britain, HMSO.

D/DM/996/12, The North Wales Coalfield – the Main Seam- Fuel Research- Physical and Chemical Survey of the National Coal resources. No. 45.

D/E/1519, Correspondence re. Ellesmere canal, 1806.

D/GR/681, Correspondence to George Hughes, agent to the Duke of Westminster, re. Vron colliery 1880-87.

D/GR/682 Correspondence as above, 1892-1900; Broughton & Plas Power Coal Co. Ltd., balance sheet 1901.

D/GR/685, Correspondence re. Westminster Colliery 1860-90.

D/GR/686, Letter, William Lowe, surveyor, to George Hughes, 19 February 1856.

D/GR/687, Reports by William Lowe into the working of the Westminster colliery to George Hughes, 1855-57.

D/GR/688, Miscellaneous correspondence re Westminster colliery, 1860-63.

D/GR/689, Reports re. Westminster colliery by Marcus Scott, April 1872.

D/GR/1531, *Bainbridge on Mines and Minerals,* 1900.

D/GR/1545-1610, R Hunt, *Mineral Statistics of the UK of Great Britain and Ireland,* 1854-1883; *Mineral Statistics*, 1884-1914.

D/MFD/159, *Wrexham Guardian*, 11 September 1869.

D/NM/1, Denbighshire & Flintshire Miners Federation Minute Book, 15 February 1897-1 January 1900.

D/NM/2, Denbighshire & Flintshire Miners Federation Minute Book, 14 May 1900-24 January 1914.

D/NM/65, Annual Reports of the Denbighshire & Flintshire Miners Federation, 1900-1914.

D/NM/160, North Wales Miners' Association, miscellaneous papers.

D/NM/257, Notes of meeting of North Wales Price List Committee, 7 October 1907.

D/NM/260, North Wales Miners' association, price lists for individual collieries, 1 January 1908.

D/NM/261, Statement showing when and how wages were advanced from July 1889-July 1909 (in Denbighshire).

D/NM/262, Coal Mines Minimum Wage Act, 2 Geo.5, Ch.2, 1912.

D/NM/312, Agreements arising out of Rosebery Conference- 17 November 1893 at the settlement of the Great Strike of Miners in the Federated areas.

D/NM/852-853, Autobiographical notes by Edward Hughes.

D/NM/1131, "Black Diary", accidents in north Wales.

D/NM/1165, Minutes of meeting of the Joint Committee of the Joint District Board for the District of North Wales, held in Wrexham, 18 & 20 February 1920.

D/NM/1424, Copy of price agreement at Brynkinallt colliery, 4 October 1894.

D/WY/5178-5205, Details of leases entered into by the Wynnstay Hall Estate, 1705-1863.

Denbighshire Record Office, Ruthin

DD/C/222, Petition of mayor, aldermen and burgesses of Wrexham, to the Parliamentary session, 1889.

DD/DM/151/8, Draft agreement between Broughton & Plas Power Coal Co. Ltd. And Wrexham Gas Co., 1898

DD/DM/243/1, Day book of Walter Eddy, 1881-2.

DD/DM/285/88, Report on Bryn-yr-Owen colliery by AH Maurice, mineral surveyor to Mr Meredith, Pentrebychan Hall, 21 May 1868.

DD/DM/285/95, Extract from letter from solicitors Acton, Bury & Acton, Wrexham, to Messrs Burne & Wykes, London, 6 February 1896.

DD/DM//285/99, Vron Colliery, terms of lease with Pentrebychan Hall.

DD/DM/285/100, Letters re royalties from WH Glennie to Mr Meredith of Penrebychan Hall.

DD/DM/285/102. Correspondence between agents and surveyors, and Colonel Meredith's solicitors, 1866-74.

DD/DM/329/1, Diary of B Roberts who worked for W Eddy, mining surveyor.

DD/DM/473/1 & 2, Wayleaves agreed by Brynkinallt Collieries Ltd. with R Myddleton-Biddulph, Chirk Castle, 23 June 1875, for tramways crossing the latter's land.

D/DM/473/2, Agreement between GWR and Brynkinallt colliery.

DD/DM/506/4, *Wrexham Advertiser* 1882.

DD/DM/506/9, *Wrexham Advertiser* 1886.

DD/DM/506/35, *Wrexham Advertiser* 1911.

DD/DM/506/37, *Wrexham Advertiser* 1912.

DD/DM/689/12, Notes by the owner of Brynkinallt colliery, WY Craig.

DD/DM/833/40, Agreement between Ruabon Coal Co. Ltd. and Kenyon Colliery Co. Ltd. for working of land, 22 December 1870.

DD/DM/833/50, Draft letter from W Eddy (mineral agent for Cornwallis-West), to R Webster, manager of Ruabon Collieries.

DD/DM/910/1, Wrexham & Acton Collieries Co. Ltd., report of directors, 1874.

DD/HB/62, The Wrexham Mold and Connah's Quay Railway Bill, 1869.

DD/HB/1108, Report on Westminster colliery by Nathaniel Griffith, 19 July 1883.

DD/LH/225, Draft partnership agreement, Broughton Coal Co., 28 July 1858.

DD/LH/227, Correspondence re pumpimg house at Broughton colliery, 1868.

DD/LH/229, Royalties paid by Broughton Coal Co. to the Westminster Estate, 1875-78.

DD/LH/232, Broughton Coal Co. balance sheets as at March and September 1882.

DD/LH/236, Draft partnership agreement for the Plas Power Coal Co. Ltd.

DD/LH/239, Brochure of the Brymbo Company and the Broughton & Plas Power Coal Co. Ltd.

DD/LH/257, Agreement between GWRC and Gatewen colliery, 25 March 1884.

DD/LH/262, Report re. Llay Main Colliery.

DD/LH/263, Prospectus of Llay Main Collieries Ltd, 1911.

DD/LH/273, Report on Vron and Broughton collieries, 29 April 1873.

DD/LH/276, Draft report on Brymbo colliery, 19 February 1897.

DD/LH/285, Draft agreement of sale between FW Barnes (Bersham) and Broughton & Plas Power Co. Ltd., Minute Book Broughton & Plas Power Co. Ltd.

DD/LH/303, Draft agreement between between the Brymbo Co. and the Great Western Railway Co., 1874.

DD/PP/600, Act of Parliament, 1793, 33 Geo.3.Cap. XCI.

DD/PP/611, Royalties paid by Bersham Colliery Co. Ltd. to TL Fitzhugh, Plas Power Estate.

DD/PP/612, Details of royalties paid by the Coedpoeth and Vron collieries to TL Fitzhugh, Plas Power Estate.

DD/PP/613, Royalties paid by the Bersham Colliery Co. Ltd. to the Plas Power Estate, 1893-1914.

DD/PP/614, Broughton & Plas Power Coal Co. Ltd. Royalties payable to the Plas Power estate, 1894-1914.

DD/PP/615, Broughton & Plas Power Coal Co. Ltd. (Gatewen colliery), royalties payable to the Plas Power estate, 1894-1914.

DD/PP/616, Royalties paid by Brynkinallt colliery to the Plas Power Estate, 1906-1911.

DD/PP/617, Costs relating to Broughton & Plas Power Coal Co. Ltd.'s use of Vron pumping station.

DD/PP/618, Letters re. Broughton & Plas Power Coal Co. Ltd.'s royalties, including a balance sheet as at 31 December 1901.

DD/PP/619, Broughton & Plas Power Coal Co. Ltd. Balance sheet, profit & loss account and directors' report, 31 December 1910.

DD/PP/620, Report by Mr E Lloyd Jones to Mr HJ Birch, re request by Broughton & Plas Power Coal Co. Ltd. to reduce royalties payable to Plas Power Estate, 3 July 1915.; Auditor's reports and balance sheets, December 1913, June and December 1914; detailed trading accounts for the 6 months to 31 December 1914 and 30 June 1914.

DD/PP/623, Broughton & Plas Power Coal Co. Ltd., Auditor's report year to 31 December 1914.

DD/WY/5178-5205, Details of various leases agreed with the Wynnstay Estate.

DD/WY/6843, Letters to Sir Watkin Williams Wynn re failure of Ruabon & Wrexham Savings Bank, July 1832.

DD/WY/7305-7308, Details of royalties received by Sir Watkin Williams-Wynn from a variety of lessees including Wynnstay, Hafod & Vauxhall.

DD/NTD/142, Various articles, no authors, relating to the coming of the railways to Wrexham.

DD/NTD/144, Handwritten notes by GG Lerry.

DD/NTD/155, Various articles re Brymbo Steelworks including Vol.1, Nos.1& 2 of the *Brymbo Works Magazine*, 1920.

DD/NTD/944, Collection of press cuttings from local and national newspapers re the 1912 national miners' strike.

National Archives, Kew

NA/BT/31/1/2, Ruabon Coal Co. Ltd., Memorandum of Association, July 1856; analysis of shareholders March 1857, February 1862.

NA/31/7167/50600, Broughton Solvay Coke Co. Ltd., Memorandum of Association, December 1896.

NA/917/1107C, Minera Coal & Iron Co. Ltd., Memorandum of Association, March 1864.

NA/3152/18232, Beyer Peacock & Co. Ltd., Memorandum of Association, April 1883.

NA/3931/24885 Vron Colliery Ltd., Memorandum of Association, August 1887; details of shareholders, December 1887, August 1887, August 1897.

NA/128571/104122, Black Lane Colliery (Brymbo) Ltd., Memorandum of Association, July 1909.

NA/14299/1145, Westminster, Brymbo Coal & Coke Co. Ltd., Memorandum of Association, February 1858; details of shareholders October 1868.

NA/14345/821C, Wrexham Colliery Co., Memorandum of Association, December 1863; analysis of shareholders, March 1864, June 1870, April 1889.

NA/14424/5486, Vauxhall Colliery Co. Ltd., Memorandum of Association, June 1871.

NA/14998/29254, Wynnstay Collieries Ltd, Memorandum of Association, June 1889; details of shareholders, October 1894.

NA/37495/85251, United Westminster & Wrexham Colliery Co. Ltd., Memorandum of Association, July 1905; balance sheets year to June 1908-1914; details of shareholders, September 1910.

NA/38192/14301, Ruabon Coal & Coke Co. Ltd., Memorandum of Association, July 1880; details of shareholders October 1880, August 1890, October 1904.

NA/38330/130545, Llay Main Collieries Ltd., Memorandum of Association, August 1913.

National Library of Wales, Aberystwyth

NLW/BB/1/2, Register of Directors, United Westminster and Wrexham Collieries, 1905.

NLW/HR/10/25-37, Broughton & Plas Power Coal Co. Ltd. Examples of revenue accounts, trade accounts, balance sheets and directors' reports, 1883-1907.

NLW/HR/50/13, Minutes of Denbighshire Sliding Scale Committee, April 1880 and April 1881.

NLW/HR/50/17, Wrexham & Acton Collieries Co. Ltd., report by R Wyatt to A Mackintosh (shareholder) re the joint sales with Westminster, 11 August 1882.

NLW/HR/50/24, Average price realised for steam coal in wagons at Birkenhead, 1854-1882.

NLW/HR/57/61, Agreement between Ruabon Coke & Coal Co., Westminster Co. and Brymbo Co. to amalgamate into one company, Westminster & Ruabon Coal Co., 30 March 1852.

NLW/HR/57/70, Report by Henry Robertson on Westminster colliery, 1852.

NLW/HR/57/84, Extracts of trade accounts, re. Ruabon Coal and Coke Co., 1852-1856.

NLW/HR/74/ 28-57, Details of joint sales by the Westminster and Wrexham collieries, 1875-1888.

NLW/HR/76, Wrexham & Acton Collieries Co. Ltd. Analysis of costs per ton, January – September 1883.

NLW/HR/76/78, Copy contract for sinking at the Wrexham Colliery Co. Ltd., 1869.

NLW/HR/76/79, Wrexham Colliery Co. Ltd., significant dates, 1870-1876.

NLW/HR/76/80, Wrexham Colliery Co. Ltd., list of shareholders 1870.

NLW/HR/76/98, Correspondence re. Wrexham & Acton Collieries Co. Ltd. from Scottish shareholders, April 1883.

NLW/HR/76/100, Wrexham Colliery Co. Ltd, list of shareholders in Inverness.

NLW/HR/76/102-103, Correspondence and profit details re Wrexham & Acton Collieries Co. Ltd, 1882-3.

NLW/HR/76/117, Wrexham Colliery Co. Ltd., 1863 report by William Lowe, surveyor, to A Mackintosh (director), re. possibilities for coal mining in Rhosddu.

NLW/HR/76/155, Wrexham Colliery Co. Ltd., letter from J Jones (director) to Thomas Brassey (shareholder), 21 December 1872.

NLW/HR/76/182, Wrexham & Acton Collieries Co. Ltd., letter from Dixon's & Co., Bankers dated 30 June 1876.

NLW/HR/76/186, Wrexham & Acton Collieries Co. Ltd., letter from Jacob Higson, surveyor to Sir Cunliffe, Acton Hall dated April 1877.

NLW/HR/76/469, Wrexham Colliery Co. Ltd., report from William Wilson (sinker of pit) to A Mackintosh (director).

NLW/HR/76/483-530, Wrexham Colliery Co. Ltd., various letters to A Mackintosh (director) re sinking of pit, June-Sept 1871.

NLW/HR/76/749, Wrexham & Acton Collieries Co. Ltd., letter dated 16 April 1875 to A Mackintosh re potential strike.

NLW/HR/76/790, Wrexham & Acton Collieries Co. Ltd., letter from A Young (colliery manager) to A Mackintosh, 22 December 1876.

NLW/HR/76/857, Wrexham Colliery Co. Ltd., letter from A Young (colliery manager) to A Mackintosh, May 1878.

NLW/HR/76/863-1022, Wrexham & Acton Collieries Co. Ltd., various correspondence1878-1883.

NLW/HR/76/1342, Wrexham Colliery Co. Ltd., Balance sheets 31 December 1867 and 31 December 1869.

NLW/HR/76/1346, Wrexham Colliery Co. Ltd., trade account, year to 31 December 1872.

NLW/HR/76/1351-1372, Wrexham & Acton Collieries Co. Ltd, details of trade accounts, 1884-1889.

NLW/HR/78/5, Evidence given by Henry Robertson to the House of Commons re. The Mold & Connah's Quay Railway Bill, 26 May 1862.

NLW/HR/83/2769-2784, Newspaper cuttings, *Wrexham Advertiser*, 1875-1880.

NLW/HR/469-1020, Reports and letters re. the Wrexham Colliery, 1871-1883.

Wrexham Museum, A.N Palmer Rooms

Wrexham Advertiser, 1893, 1908, 1909.

Secondary

Aldcroft, DH (1964), 'The Entrepreneur and the British Economy, 1870-1914', *Economic History Review*, Vol. 17: 113-134.

Alford, BWE (1977), 'Entrepreneurship, Business Performance and Industrial Development', *Business History*, Vol.19: 116-133.

Anderson, BL & Cottrell, PL (1975), 'Another Victorian Capital Market- A Study of Banking and Banking Investors on Merseyside', *Economic History Review*, Vol.28: 598-615.

Arnold, AJ (1995), 'Should Historians Trust Late Nineteenth Century Company Financial Statements?', *Business History*, Vol.38, No.2: 40-54.

Asteris, M (1986), 'The Rise and Decline of the South Wales Coal Exports', *Welsh History Review*, Vol.13: 24-43.

Bales Gregory, J & Price, J, *The north Wales coalfield Map I* (no date)

Baskin, JB (1988), 'The Development of Corporate Financial Markets in Britain and the United States, 1600-1914: Overcoming Asymmetric Information', *Business History Review*, Vol.62: 199-237.

Benson, J (1980), *British Coalminers in the Nineteenth Century – a Social History,* New York: Holmes & Meier.

Boughan, PE (1980), *A Regional History of the railways of Great Britain, Vol.II, North and Mid Wales*, London: David & Charles.

Boyd, JIC (1991), *'The Wrexham, Mold & Connah's Quay Railway'*, Usk: Oakwood Press.

Boyns, T (1982), 'Productivity in the British Coal Industry, 1874-1913', unpublished Ph.D., University of Wales (Cardiff).

Boyns, T (1993), 'Cost Accounting in the South Wales Coal Industry, c.1870-1914', *Accounting, Business and Financial History*, Vol.3, No.3: 327-352.

Boyns, T, & Edwards, JR (1994), 'Accounting Practice and Business Finance: Some Case Studies from the Iron and Coal Industries, 1865-1914', *Journal of Business Finance and Accounting,* Vol.21, No.8: 1151-1178.

Boyns, T & Edwards, JR (1997), 'The Construction of Cost Accounting Systems in Britain to 1900: The Case of the Coal, iron and Steel industries', *Business History,* Vol.39, No.3: 1-29.

Boyns, T & Wale, J (1995), 'The Development of Management Information Systems in the British Coal Industry, c.1880-1947', *Business History*, Vol.38, No.2: 55-80.

Brief, RP (1965), 'Nineteenth Century Accounting Error', *Journal of Accounting Research*, Vol.3: 12-31.

Buxton, NK (1979) 'An Economic History of the British Coal industry from 1700', unpublished Ph.D. thesis, Heriot-Watt University.

Capie, F & Collins, M (1992), *Have the Banks failed British Industry?,* London: Institute of Economic Affairs.

Capie, F & Collins, M (1996), 'Industrial Lending by English Commercial Banks, 1860-1914: Why Did English Banks Refuse Loans?', *Business History*, Vol.38. No.1: 26-44.

Capie, F & Collins, M (1999), 'Banks, industry and finance, 1880-1914', *Business History*, Vol 41. No.1: 37-62

Carelton-Hunt, B (1936), 'The Development of the Business Corporation in England, 1860-1867', *Harvard Economic Studies,* Vol.52: 3-138.

Carlos, A & Neal, L (2003), 'Women Investors in the Bank of England in the Time of the South Sea Bubble, 1720-1725', paper presented at the Economic History Society Conference, Durham.

Challinor, R & Ripley, B (1990), *The Miners Association - a Trade Union in the Age of the Chartists,* Whitley Bay: Berwick Press.

Chambers-Jones, R (1978), *Arian – the Story of Money and Banking in Wales*, Swansea: C Davies.

Chase, M (2000) *Early trade Unionism - Fraternity, Skill and the Politics of Labour,* Aldershot: Ashgate.

Christiansen, R (1976), *Forgotten Railways, North and Mid Wales*, London: David & Charles.

Church, R (1986), *The History of the British Coal Industry vol.3, 1830-1913,* Oxford: Clarendon Press.

Cockburn, JH (1902), *The Law of Coal and Other Minerals,* London: Stevens.

Coleman, DC & Macleod, M (1986), 'Attitudes to New Techniques: British Businessmen, 1800-1950', *Economic History Review,* Vol. 39, No.4: 588-611.

Collins, M (1988), *Money and Banking in the UK - A History*, London: Croom Helm.

Concise Oxford Dictionary, (1982), London: Guild Publishing.

Copeland, J (1968), *Roads and their Traffic, 1750-1850*, Newton Abbot: David & Charles.

Cottrell, PL (1980), *Industrial Finance, 1830-1914*, London: Methuen & Co.

Courtney, LH (1897), 'Jevons's Coal Question – 30 years after', *Transactions of the Royal Statistical Society,* Vol.7, No.28: 789-810.

Davies, DL (1976), 'Sir William Lloyd of Bryn Estyn in the Hundred of Bromfield and Nagpur in the Deccan', *Denbighshire Historical Society Transactions,* Vol.25: 13-48.

Davis, M (1993), *Comrade or Brother? - A History of the British Labour Movement, 1789-1951*, London: Pluto Press.

Dodd, AH (1925), 'The Roads of North Wales, 1750-1850', *Archeologica Cambrensis*, Vol.80: 121-148.

Dodd, AH (1926), 'The Beginnings of Banking in North Wales', *Economica*, Vol.81: 16-30.

Dodd, AH (1929), 'The North Wales Coal Industry During the industrial Revolution', *Archeologica Cambresis,* Vol.84: 197-228.

Dodd, AH (1971), *The industrial Revolution in North Wales,* 3rd Edition, Cardiff: University of Wales Press.

Dodd, AH (1989), *A History of Wrexham*, Wrexham: Bridge Books.

Dickinson, J (1854), 'Statistics of the Collieries of Lancashire, Cheshire and North Wales', *Memoirs of the Literary and Philosophical Society of Manchester,* Vol.12: 71-107.

Dron, RW (1928), *The Economics of Coalmining,* London: E Arnold & Co.

Edwards, I (1965), 'Iron Production in North Wales – the Canal Era, 1795-1850', *Denbighshire Historical Society Transactions,* Vol.14: 141-184.

Edwards, JR (1989), *A History of Financial Accounting,* London: Routledge.

Egan, D (1996) 'A cult of their own - syndicalism and the Miners' Next Step' in A Campbell, N Fishman & D Howell (eds), *Miners, Unions & Politics 1910-1947*, Aldershot: Scolar Press: 20-27.

Ellis Hughes, H (1946), *Eminent Men of Denbighshire*, Liverpool: Brython Press.

Evans, DG (1989), *A History of Wales 1815-1906,* Cardiff: University of Wales Press.

Evans, EW (1959) *Mabon - A Study in Trade Union Leadership*, Cardiff: University of Wales Press.

Evans, EW (1961) *The Miners of South Wales*, Cardiff: University of Wales Press.

Evans, N (1989), 'Two Paths to Economic Development: Wales and the north-east of England', in P Hudson (ed), *Regions and Industries – A Perspective on the Industrial Revolution in Britain*, Cambridge, Cambridge University Press: 201-227.

Farrar, JH & Hannigan, BM (1998) *'Farrar's Company Law'* 4th edition, London: Butterworth

Fine, B (1990), *The Coal Question, Political Economy and Industrial Change from the Nineteenth Century to the Present Day,* London & New York: Routledge.

Foxwell, HS (1917), 'The Financing of Industry and Trade', *The Economic Journal,* Vol.27, No.28: 502-522

Freeman M, Pearson, R and Taylor, J (2006), 'A Doe in the City: Women Shareholders in Eighteenth and Early Nineteenth-Century Britain', *Accounting, Business & Financial History,*Vol.16, No.2: 265-291.

Gregson, P (1990), 'State Involvement in the British Coal Industry Before Nationalisation', *The Mining Engineer, Vol.149: 297-299.*

Gibson, FA (1922), *A Compilation of Statistics of the Coalmining Industry of the UK, the various coalfields thereof and the principal foreign countries of the world*, Cardiff: Western Mail.

Gibson, W (1927), *Coal in Great Britain,* London: Arnold.

Gildart, K (2001), *North Wales Miners: A Fragile Unity, 1945 – 1996*, Cardiff: University of Wales Press.

Griffiths, E (2000) 'Edward Hughes: the Making of a Miners' Agent', *Denbighshire Historical Society Transactions*, Vol.49: 128-150.

Griffiths, T (1996) 'Work, Class and Community - Social Identities and Political Change in the Lancashire Coalfield 1910-1939', in Campbell, A, Fishman, N & Howell, D (eds), *Miners, Unions & Politics 1910-1947,* Aldershot: Scolar Press; 199-214.

Griffin, AR (1977), *The British Coalmining Industry – Retrospect and Prospect*, Buxton: Moorland Publishing.

Hawke, GR (1970), *Railways and Economic Growth in England and Wales, 1840-1870*, Oxford: Clarendon Press.

Howell, D (1996) 'All or Nowt - the Politics of the MFGB' in A Campbell, A, Fishman, N & Howell, D (eds), *Miners, Unions & Politics 1910-1947,* Aldershot: Scolar Press: 35-37.

Hull, E (1897), *Our Coal Resources at the Close of the Nineteenth Century*, London: E & FN Spon Ltd.

James, AA (1894), 'Collieries: Their Management and Accounts', *The Accountant,* November: 1010-1017.

Jeffreys, JB (1946), 'The Denomination and Character of Shares, 1855-1885', *Economic History Review,* XVI*: 344-357.*

Jenkins, P (1992), *A History of Modern Wales, 1536-1990*, London: Longman.

Jenkins, SC & Strange, JM (2004), *The Wrexham and Ellesmere Railway,* Usk: Oakwood Press.

Jevons, WS (1865), *The Coal Question,* London: Macmillan & Co.

Job, B (1993), 'The First Coalmine Inspectors', *British Mining,* Vol.48: 152-158.

John, AH (1995), *The Industrial Development of South Wales,* 2nd edition, Cardiff: Morton Priory Press.

Jones, GE (1984), *Modern Wales – A Concise History c.1485-1979*, Cambridge: Cambridge University Press.

Jordanova, L (2006), *History in Practice*, London: Arnold .

Kelly, I (1990), *The North Wales Coalfield,* Wrexham: Bridge Books.

Kirby, MW (1977), *The British Coalmining Industry, 1870-1946 – A political and Economic History,* London: Macmillan.

Lawn, JG (1904), *Mine Accounts and Mining Book-keeping – A Manual for Students*, London: Griffin & Co.

Lerry, GG (1949), *'Henry Robertson - Pioneer of Railways'*, Oswestry: Woodhalls.

Lerry, GG (1952), 'Henry Dennis – A Cornish Captain of Welsh Industry', *Denbighshire Historical Society Transactions,* Vol.1: 33-45.

Lerry, GG (1958), 'The Industries of Denbighshire from Tudor Times to the Present Day', *Denbighshire Historical Transactions,* Vol.7: 38-66.

Lerry, GG (1968), *The Collieries of Denbighshire*, 2nd Edition, Wrexham: Wynn Williams.

Lewis, B (1971), *Coalmining in the Eighteenth and Nineteenth Centuries - Seminar Studies in History*, London: Longman.

Lister, R (1981), 'Company Financial Statements as Source Material for Business Historians: Observations on the Underlying Conceptual Framework', *Business History*, Vol.XXIII: 233-239.

Littlewood, M (1881), 'Risks and Losses of Coalmining', *Transactions of the British Society of Mining Students,* Vol.V, No.12: 174-178.

Lloyd, E (1921), 'Colliery Accounts and Colliery Costing', *The Accountant,* October: 479-484.

Lloyd Gruffydd, K (1996), 'The Export of Flintshire Coal Before the Industrial Revolution', *Flintshire Historical Society Journal,* Vol.34: 53-88.

Mann, J & Judd, HG (1909), *Colliery Accounts,* London: Gee & Co.

Marriner, S (1980), 'Company Financial Statements as Source Material for Business Historians', *Business History,* Vol.22: 203-237.

Marwick, A (1989), *The Nature of History*, London: Macmillan Education Ltd.

Mathias, P (1969), *The First Industrial Nation - An Economic History of Britain 1700-1914,* London: University Paperbacks.

McCloskey, DN & Sandberg, LG (1971), 'From Damnation to Redemption: judgements on the Late VictorianEntrepreneur', *Explorations in Economic History*, Vol.9: 89-108.

Minchinton, WE (1969), 'Industrial South Wales, 1750-1914', in W.E Minchinton (ed), *Industrial South Wales, 1750-1914. Essays in Welsh Economic History*, London: Frank Cass & Son: ix-x.

Mitchell, BR (1964), 'The Coming of the Railway & UK Economic Growth', *Journal of Economic History*, Vol 24: 315-336.

Mitchell, BR (1984), *The Economic Development of the British Coal Industry 1800-1914,* Cambridge: University Press.

Morris, JH & Williams, LJ (1958), *The South Wales Coal Industry 1841-1875,* Cardiff: University of Wales Press.

Morris, JH & Williams, LJ (1969) 'The South Wales Sliding Scale 1876-1879 - An Experiment in Industrial Relations' in W E Minchinton (ed) *Industrial South Wales 1750-1914- Essays in Welsh Economic History*, London: Frank Cass & Co Ltd.: 218-234

Musson, AE (1972),*Trade Unions 1800-1875,* London: Macmillan Studies in Economic History.

Nelson Boyd, R (1879) *Coal Mines Inspection: its History and Results,* London: WH Allen & Co.

Newton L & Cottrell PL (2006), 'Female Investors in the First English and Welsh Commercial Joint-Stock Banks', *Accounting, Business & Financial History,* Vol.16, No.2:315-340.

Nixon, E (1865), 'The Coalfields of Denbighshire and Flintshire', *Proceedings of the Liverpool Geological Society,* Session 7: 46-53.

North, FJ (1931), *Coal and the Coalfields of Wales*, Cardiff: National Museum of Wales.

Ordnance Survey (2005), *Landranger Series, 117, Chester & Wrexham.*

Page Arnot, R (1967) *South Wales Miners - A History of the South Wales Miners Federation 1898-1914,* London: George Allen & Unwin.

Palmer, AN (1899), *John Wilkinson and the Old Bersham Iron Works* Wrexham: private publication.

Pamely, C (1891), *The Colliery Manager's Handbook*, London: Crosby Lockwood & Son.

Parker, RH (ed) (1984), *Papers on Accounting History,* New York & London, Garland Publishing Inc.

Parker, RH (1991), 'Misleading Accounts? Pitfalls for Historians', *Business History,* Vol.33, No.4: 1-18.

Payne, PL (1962), 'The Emergence of the Large-scale Company in Great Britain, 1870-1914', *Economic History Review* ", Vol.20: 519-542.

Payne, PL (1988), *Entrepreneurship in the Nineteenth Century,* 2nd edition, Studies in Economic and Social History, Basingstoke: Macmillan Education.

Pearson, R (2003), 'Shareholder Democracies? English Stock Companies and the Business Politics of Corporate Governance during the Industrial Revolution', paper given at the European History Association Conference, Helsinki.

Phillips, E (1925), *A History of the Pioneers of the Welsh Coalfield*, Cardiff: Western Mail.

Pitts, MV (1998), 'Did Dividends Dictate Depreciation in British Coal Companies, 1864-1914?', *Accounting History,* Vol.3, No.2: 37-67.

Pollard, S (1964), 'Fixed Capital in the Industrial Revolution in Britain', *Journal of Economic History*, Vol. 24: 299-314.

Pritchard, RT (1963), 'Denbighshire Roads and Turnpike Trusts', *Denbighshire Historical Transactions,* Vol.12: 86-109.

Pryce, WTR (1971), 'The Social and Economic Structure of north-east Wales, 1750-1890', unpublished Ph.D., Lanchester Polytechnic, Coventry.

Pryce, WTR (1975), 'Industrialisation, Urbanisation and the Maintenance of Culture Areas: North-East Wales in the Mid-nineteenth Century', *Welsh History Review*, Vol.7, No.3: 307-340.

Rhys-Williams, J (1990), 'The Growth and Development of Banking in Clwyd', *Denbighshire Historical Society Transactions*: 91-106.

Roberts, RO (1971), 'Banks of Wales in the Nineteenth Century', *Bankers Magazine*: 290-291.

Roberts, RO (1993), 'Financial Developments in Early Modern Wales and the Emergence of the First Banks', *Business History,* Vol.16, June, No.3: 291-307.

Rogers, E (1928) 'The History of Trade Unionism in the Coal Mining industry of North Wales to 1914', unpublished MA dissertation, University of Wales, Bangor, reprinted in *Denbighshire Historical Society Transactions,* Volumes I- XIII.

Rowe, JWF (1923) *Wages in the Coal Industry,* London: P S King & Son Ltd.

Rowley, G, (1903) 'Unionism in the present', *North Wales Miners Magazine*, Vol.1 No.2, August.

Saunders, M, Lewis, P and Thornhill, A (1997), *Research Methods for Business Students,* London: Pitman.

Slater's Trade Directory of North and Mid Wales, (1895)

Sorley, WR (1889), *Mining Royalties and their effect on the Iron and Coal Trades - Report of an Inquiry made for the Toynbee Trustees,* London: H Frowde.

Taylor, AJ (1955), 'The Miners' Association of Great Britain and Ireland, 1842-48: A Study in the Problem of Integration', *Economica,* February: 45-60.

Taylor, AJ (1960), 'Labour Productivity and Technological Innovation in the British Coal Industry, 1850-1914' *Economic History Review*, Vol.14: 48-70.

Thomas, ID (1975) *Datblygiad Mudiad yr Undebau Llafur yng Nghymru*, Caerdydd: Gwasg Prifysgol Cymru.

Thomas, JE (1889), *The Best Means of Developing the Industrial Resources of Wales,* Wrexham: C.E.

Tosh, J (1991), *The Pursuit of History,* Harlow: Longman.

Turnbull, G (1987) 'Canals, Coal and Regional Growth During the Industrial Revolution', *Economic History Review,* Vol.40. No.4: 537-560.

Turner, K (1979), *North Wales Tramways*, London: David & Charles.

Vent, G & Milne, RA (1989), 'The Standardisation of Mine Accounting', *Accounting Historians' Journal,* Vol.16, No.1: 57-74.

Wale, J (1990), 'The Reliability of Reported Profits and Asset Values, 1890-1914. Case Studies from the British Coal Industry', *Accounting & Business Research*, Vol.20, No.79: 253-267.

Walters, R (1975), 'Labour Productivity in the South Wales Steam-Coal Industry, 1870-1914', *Economic History Review*, Vol.28: 280-303

Walters, R (1977), *The Economic & Business History of the South Wales Steam Coal Industry, 1840-1914*, New York: Arno Press.

Walters, R (1980), 'Capital Formation in the South Wales Coal Industry, 1840-1914', *Business History,* Vol.10, June, No.1: 69-92.

Watson, K (1996), 'Banks and Industrial Finance: the Experience of Brewers, 1880-1913', *Economic History Review*, XLIX, (1): 58-81.

Who was Who 1897-1916 (1966), 5th Edition, London: A & C Black Ltd.

Williams, C (1996) 'The Hope of the British Proletariat - the South Wales Miners 1910-1947' in Campbell, A Fishman, N & Howell, D (eds), *Miners, Unions & Politics 1910-1947,* Aldershot: Scolar Press: 121-144.

Williams, D (1977), *A History of Modern Wales,* London: John Murray.

Williams, DJ (1924), *Capitalist Combination in the Coal Industry,* London: Labour Publishing Co. Ltd.

Williams, LJ (1976) 'The Coalowners of South Wales, 1873-80: Problems of Unity', *Welsh History Review*, Vol 8: 75-93.

Williams, J (1983), 'The Economic Structure of Wales since 1850', in Williams, G (ed), *Crisis of Economy and Ideology: Essays on Welsh Society, 1840-1980:*35-46, Bangor: British Sociological Association, Sociology of Wales study group.

Williams, WA (2002) *The Encyclopedia of Wrexham*, Wrexham: Bridge Books.

Wilson, E (1975), *The Ellesmere and Llangollen Canal,* London: Phillimore.

Internet Sources

www.beyerpeacock.co.uk/history , accessed 22 June 2006.

Digest of Welsh Historical Statistics, SN 4095, http://www.dataarchive.ac.uk, accessed 10 November 2003.

Oxford Dictionary of National Biography, *http://www.oxforddnb.com/articles,* accessed 2 November 2004 and 15 November 2004.

www.aaroutemaster.co.uk , accessed 22 June 2006

Appendix A

Broughton & Plas Power Coal Co. Ltd

Example of detailed trading account for the half year ending 31st December 1913

Expenditure	Plas Power		Gatewen		Vron		Total		Receipts		Weight	Value	Total
Cost of getting:	118.571 tons	Cost per ton	92.215 tons	Cost per ton	34.122 tons	Cost per ton	244.908 tons	Cost per ton		Av. Price per ton			
To Labour costs	£	s/d	£	s/d		s/d	£	s/d	By shipping sales		Tons	£	£
Coal getting	17,934	3/0.3	15,835	3/5.2	6,231	3/7.8	40,000	3/3.2	Steam coal	11/7.4	58,878	34,134	
Driving in coal	769	1.56	1,156	3.01	105	0.74	2,031	1.99	Slack	6/6.2	1,348	439	
Haulage & hooking	8,348	1/4.9	4,481	11.66	1,529	10.76	14,358	1/2.1	By Railway sales		60.226		34,573
Shiftwork	10,477	1/9.21	8,578	1/10	2,055	1/2.5	21,110	1/8.7					
Deputies	480	0.97	343	0.89	278	1.96	1,101	1.08	Main 4ft & powell	11/8.3	93,184	54,479	
Pumping & filling water	841	1.7	892	2.32	135	0.95	1,868	1.83	Crank	13/6.6	6,889	4,668	
Driving in metal	1,781	3.6	556	1.45	210	1.47	2,547	2.5	Nuts	11/5.7	13,041	7,483	
Raising & ventilating	794	1.61	764	1.99	130	0.91	1,688	1.65	Slack	6/7.9	36.620	12.187	78,817
Banking & screening	1,549	3.14	1,494	3.89	551	3.87	3,594	3.52			149.734		
Surface labour	823	1.66	519	1.35	394	2.77	1,736	1.7	By local sales				
Mechanics	1,574	3.19	1,036	2.69	159	1.12	2,769	2.71	Main 4ft & powell	12/4.4	7,343	4,541	
Pump			258	0.67			258	0.25	Crank	13/7	2,828	1,921	
Fan alterations	20	0.04	57	0.15			77	0.08	Nuts	12/1.7	86	52	
Overwind preventers	6	0.01	11	0.03	1		18	0.02	Slack	8/11	674	300	6.814
Carried forward	45.396	7/7.89	35.980	7/9.6	11.778	6/10.8	93.154	7/7.3			10.931		

Expenditure	Plas Power		Gatewen		Vron		Total		Receipts		Weight	Value	Total
Cost of getting:	118,571 tons	Cost per ton	92,215 tons	Cost per ton	34122 tons	Cost per ton	244,908 tons	Cost per ton		Av. Price	Tons		
	£	s/d	£	s/d	£	s/d	£	s/d		s/d		£/s/d	£
Brought forward	45,396	7/7.89	35,980	7/9.6	11,778	6/10.8	93,154	7/7.3			10,931		
To Materials									Total sales	10/11	220,891		120,205
General stores	633	1.28	292	0.76	145	1.02	1,070		less selling charges & discounts	1.68			(1,548)
Water	89	0.18	9	0.02	29	0.21	127		Net sales	10/9			118,657
Timber	3,370	6.82	2,707	7.05	714	5.02	6,792						
Bricks, lime & sand	21	0.04	50	0.13			71						
Rails & Rail iron	132	0.27	152	0.4	42	0.3	326		By own consumption				
Iron, steel & castings	224	0.45	177	0.46	78	0.55	479		Coal & nuts	9/8.6	1,147	557	
Chains & wire rope	290	0.59	68	0.18	71	0.5	429		Slack from screens	5/11	21,519	6424	
Coal & slack	2,919	5.91	2,745	7.14	972	6.83	6,635		Pit slack	6/-	428	128	
Boilers	116	0.24					116				23,094		7,109
Pit tubs	81	0.16	57	0.15			138						
Pump			131	0.34			131		By Stock at 31 Dec.1913				
Fan alterations	6	0.01	21	0.05			27		Coal	12/-	539	325	
Overwind preventers	187	0.38	141	0.37	51		379		Nuts	11/6	14	8	
	8,068	1/4.3	6,550	1/5	2103	1/2.8	16,720	1/4.38	Slack	6/6	1,743	566	
To stables											2,296		899
Provender	361	0.73	320	0.83	113	0.8	794	0.78					
wages	225	0.45	184	0.48	45	0.31	454	0.44	Less stock at 30 June 1913				
Stores	98	0.2	90	0.24	22	0.16	210	0.21	Coal & nuts				
Depreciation	29	0.06	44	0.11	16	0.11	89	0.09	Slack		(1,373)		(616)
	713	1.44	638	1.66	196	1.38	1,547	1.52					
To Pumping	715	1.45					715	0.7	Total	10/4	244,908		126,049
Carried forward	54,892		43,169		14,076		112,137						126,049

Expenditure Cost of getting							244908 tons		Receipts	Av. Price per ton	Weight	Value	Total
							£	s/d		s/d		£	£
To Royalty & dead rent	2,586	5.24	2047	5.33	303	2.13	4,936	4.84					
	57,478	9/8.35	45,216	9/9.68	14,379	8/5.15	117,073			10/3.5			126,049
To general charges									By balance in wagon hire ac	4.49			4,574
Directors & officials						2372		2.32					
Surface rents & wayleave						280		0.27	Sundry credits viz:			233	
Rates & taxes						1455		1.43	On stores ac			13	246
Travelling expenses						41		0.04	On farm ac				
Telephone, Telegrams stationery etc						127		0.13					
Workmen's compensation ac						3003		2.94					
Incidental expenses						884		0.87					
State insurance						740		0.72					
Total cost							8,902	8.72					
							125,975	10/3.4					
To profit							4,894	4.8					
							130,869	10/8.2				10/8.2	130,869

Source: DD/PP/620

Appendix B
Extract from Broughton & Plas Power Coal Co. Ltd.minutes illustrating contract types and customers, May-September 1888
(the dates relate to the minute book entries)

2 May 1888					
Purchasers name	**Quantity-tons**	**Price for coal & wagon s. d**	**Period of contract**	**20 cwt or 21 cwt**	**Terms**
LNWR	30,000	5/7		21	
Birmingham Corporation	50,000	8/11		21	
G Dunlop & son	500	6/- summer/ 6/3 winter		20	2½ %
	80,500				
13 June 1888 "for delivery in our wagons"					
Newport Pagnall Gas Co.	500	6/9 -7/-	30 June 1889	20	
Stroud Gas Co	2,000	6/6	do	do	
John Truscott	200	6/9	do	do	
A Cannon	100	7/-	do	do	
West Bromwich Corporation	4,000	6/3	30 June 1890	do	
Rugby Gas Co.	500	6/4	30 June 1889	21	
Cricklade Gas Co.	100	7/6	do	do	
Swindon Gas & Coke Co.	700	7/-	do	20	
Tetbury Gas & Coke Co.	300	7/2	do	do	
Swindon New Gas Co.	1,200	7/-	do	do	
	9,600		do		
"for delivery in customers' wagons"			do		
Underwood & son	500-1000	5/9	31 March 1889	20	
Northampton Gas Co	12,000	6/5	30 June 1890	do	
Worcester Gas Co.	2,000	6/-	30 June 1889	do	
Radford & Co.	5,000	5/6	do	do	
	20,000				

11 July 1888 "for delivery in our own wagons":

Purchasers name	**Quantity**	**Price for coal & wagon s. d**	**Period of delivery**	**20 cwt or 21 cwt**	**Terms**
Charles Jones & son	200	6/9	To 30 June 1889	20	2½ %
Ledbury Gas Co.	140	6/8	do	20	nett
Marlborough Gas Co.	1,000	7/0	do	20	do
Taunton Gas Co.	1,500	6/6	do	20	do
Lloyd & Lloyd	500	6/4	do	21	do
High Wycombe Gas Co.	600	6/7	do	20	do
Betws y Coed Gas Co.	100	6/8	do	20	do
Leominster Gas Co.	1,300	6/6	do	20	do
Whitchurch Gas Co.	1,250	6/4	do	20	do
Mary Evans	225	7/0	do	20	2½ %
Peter Wooler	200	6/8	do	20	2½ %
Henry Roberts	100	7/0	do	20	2½ %
Frank Povey	100	7/3	do	20	2½ %
Thomas Chetwood	150	7/3	do	20	2½ %
Llanfyllin Coal & Lime Co.	150	7/3	do	20	2½ %
JD Roberts	100	7/0	do	20	2½ %
Builth Gas Works	200	6/6	do	20	nett
James Tomlins	400	6/8	do	20	2½ %
	8,215				

11 July 1888 "for delivery in customers' wagons":

Jones & Wynne	4,000	6/3	30 June 1889	20	2½ %
A D Howell	100	6/6	do	20	2½ %
Maurice Thomas	100	6/5	do	20	2½ %
W Gilman	250	6/9	do	20	2½ %
John Price & Co.	500	6/3 - 6/9	do	20	2½ %
Jonathan Oldfield & Co.	4,500	6/3	do	20	2½ %
CR Cowap & Co.	500	6/5	do	20	2½ %
James Rigby & Co. Chester	2,000	6/5	do	20	2½ %
Radford & Co.	900	6/0	do	20	2½ %
GWR	10,400	6/3	15 July 1889	20	Nett
John Walker & Co	100	6/5	30 June 1889	20	2½ %
Charles Bowen & son	100	6/6	do	20	2½ %
R Pugh	100	6/6	do	20	2½ %
Hugh Lumler	100	6/6	do	20	2½ %
Edward Jones, Corwen	100	6/21	do	20	2½ %
W Roberts	500	6/5	do	20	2½ %
Thomas Evans	250	6/3	do	20	2½ %
Samuel Powell	150	6/3	do	20	2½ %
CJ Huxley & Co.	350	6/9-7/6	do	20	2½ %
Coward & Co.	100	7/4	do		2½ %
Wolverhampton Gas Co.	6,000	5/6	do		nett
	31,100				

5 September 1888 "for delivery in our wagons"					
Wellinborough Gas Light Co.	2,500	6/8	30.June 1890	21	Nett
Ratcliff & sons, Birmingham	250	6/4	30 June 1889	20	do
Cirencester Gas Co.	500	6/6	do	do	do
Bilston Gas Co.	2,000	6/1	30 Sept 1889	do	do
S Cann, Birkenhead	200	6/9	30 June 1890	do	2½ %
Beaconsfield Gas Co.	150	6/5	do	do	do
Gloucester Gas Co.	3,000	6/2	30 June 1891	do	do
Smethwick gas Co.	7,000	6/4	31 Dec 1889	21	do
Bloxham Gas Co.	100	6/11	30 June 1889	20	do
WC Arkell, Fairford Gas Works	130	6/6	do	do	do
Princes Risborough Gas Co.	150	6/9	do	do	do
Dursley Gas Co.	300	7/-	do	do	do
Sharpness New Docks Co	200	7/-	do	do	do
J Lane, Saltney	600	6/11	do	do	do
Farringdon Gas Co.	450	7/-	do	do	Nett
F Chubb, Aberystwyth	1,500	6/7	30 Sept 1889	do	1¼ %
	19,030				
5 September 1888- " for delivery in customers' wagons"					
F Chubb, Hereford	15,000	6/-	30 June 1891	20	1¼ %
A Boulton & Co., Church Stretton	170	6/-	30 June 1889	do	2½ %
T Parry & Co., Mold	1,200	6/2 - 6/9	do	do	do
	16,370				

Appendix C: Details of all the collieries of Denbighshire in existence after 1850, showing whether colliery being worked in 1854, 1870, 1901 and 1910

Collieries in existence in Denbighshire 1854 – 1914						
Colliery	**Year sunk**	**1854**	**1870**	**1888**	**1900**	**1914**
Aberderyn, Ponkey; constituted 2 old pit shafts, owned by Thomas Williams & Co in 1854.		☯				
Abernant, a clay pit in Ruabon where coal raised as an ancillary to main occupation of making of terra cotta. 1894-1914 was owned by Messrs JC Edwards (Ruabon) Ltd.					☯	
Acrefair, a clay pit where coal was raised as part of main operation to get fireclay. 1888 owned by New British Iron Co. Not worked 1889-1899.1901-1914 owned and worked by JC Edwards as part of terra cotta works.				☯	☯	
Afoneitha, Ruabon owned in 1854 by R Williams, W Hughes & John Lloyd, and in 1870 by R Williams & Co. Not listed from 1888 in the *List of Mines*.		☯	☯			
Bersham, owned by Barnes family of Liverpool. In 1911 it was bought by the Broughton & Plas Power Collieries Co. Ltd.	1870			☯	☯	☯
Black Lane, opened 1898 by E Cunnah, owned by R Williamson in 1904, thereafter by E Cunnah again.					☯	☯
Black Park, Chirk, one of oldest mines in north Wales; owned in 1854 by Representatives of TE Ward; 1877 owned by the Black Park Colliery Co. Ltd; Mr James Darlington, Chairman of NWCOA was a director. Still owned by this company in 1914.	pre 1653	☯	☯	☯	☯	☯
Broughton Hall or Old Broughton, sunk by Messrs Pierce & Gough who failed in 1853. In 1855 bought by H Robertson & Darby brothers who formed the Old Broughton Coal Co. Used as a pumping pit until 1893.			☯			
Brymbo, made up of numerous pits, owned by Wilkinson family in late 18th century/ early 19th century. Later owned by Robert Roy who in 1842 joined forces with Henry Robertson, W Betts & AM Ross to form Brymbo Mineral & Railway Co. 1888 onwards owned by Brymbo Co. (Includes **Bye** pit)	pre 1620	☯	☯	☯	☯	☯
Brynkinallt, Chirk, sunk by Mr Bakewell; in 1893 it was purchased by WY Craig and sons; still owned and run by them in 1914.	1870-71		☯	☯	☯	☯
Brynmally, Broughton, Wrexham; started by Charles Roe & James Venables. 1849 bought by T Clayton and owned by him until 1896 when the Brynmally Colliery Co. Ltd formed; this company was still running the pit in 1914.	1770	☯	☯	☯	☯	☯
Bryn y Felin, Ruabon; owned in 1854 by Daniel Owen & Sons. No mention of this pit in *List of Mines* 1888 -1914.		☯				
Bryn yr Owen, owned in 1854 by John Taylor & Sons. Managed 1850-1867 by Henry Dennis; closed around 1880.	c. 1715	☯	☯			
Caello level, worked by the Brymbo Co. 1893-1894.	1893					
Christionydd, two collieries of this name in 1854, one owned by TE Ward and one by E Morris. No mention in *List of Mines* 1888-1914.		☯	☯			
Cefn y Bedd,owned by Cefn y Bedd Colliery Co. Ltd.	1913					☯

Colliery	Year sunk	1854	1870	1888	1900	1914
Coedpoeth, also known as **Grosvenor.** Coal worked here since 17th century but 'new' colliery owned by W Lowe; in 1881 it was owned by New Grosvenor Colliery Co. Ltd. and in 1883 it was taken over by Brymbo Steel Co for use in its own works.		☯	☯			
Copé, owned by JC Edwards, worked as part of terra cotta works, closed in 1889				☯		
Delph, Acrefair a clay pit where coal was raised as part of main operation to get fireclay. Owned 1888- 1914 by Mr H Wyndham				☯	☯	
Dolydd, Llangollen, owned in 1854 by the Dolydd Co. Not listed in list of mines 1888-1914.		☯				
Erwlwyd, owned by Ruabon Glazed Brick & Fireclay. Ltd., its main function was to access the underclay for use in the Pant Brickworks. From 1904 owned by Ruabon Coal & Coke Co. Ltd.				☯	☯	☯
Ffos y Go, nr Ffrwd, Wrexham, owned by T Clayton in 1854. Not working 1888-1901. Worked 1901-1903 by Miss M Corkling; from 1904 was owned by Ffosygo Colliery Colliery Co. Ltd.	1849	☯	☯			☯
Ffrith or Glascoed, Brymbo; worked 1870-72. Reopened 1900 by Ffrith Coal & Fireclay Co. Ltd; worked until 1905. Also listed (as Glascoed) in 1913 and 1914.			☯		☯	☯
Ffrwd, Wrexham; worked until 1815 by Richard Kirk owned in 1854 by Ffrwd Iron Co., bought by James Sparrow in 1855, still owned by J Sparrow & Sons in 1904 when it was closed.	pre 1815	☯	☯	☯	☯	
Gardden Lodge, Ruabon; owned in 1854 by G Walmesley and in 1870 by the Gardden Lodge Colliery Co. By 1888 it was owned by Ruabon Glazed Brick & Terra Cotta Co. Ltd who worked it until 1893 when it was closed		☯	☯			
Gatewen, Wrexham; owned by Broughton Coal Co, later by Broughton & Plas Power Coal Co. Ltd.	1875 - 1877			☯	☯	☯
Grango, owned by E Griffiths in 1888, not listed after 1889				☯		
Gresford, Acton Grange, Wrexham. Owned by United, Westminster & Wrexham Collieries Ltd.	1908 - 1911					☯
Groes, Ruabon owned by Jonathan Davis & Co in 1854.		☯				
Gwersyllt. Sunk by T Clayton. In 1887 was taken over by Westminster, Brymbo Coal & Coke Co. Ltd.	1862 - 1869				☯	
Hafod (y bwch), originally known as **Ruabon New Colliery,** Johnstown. Sunk by Ruabon Coal Co Ltd and later owned by Ruabon Coal & Coke Co. Ltd.	1863 - 1866	☯	☯	☯	☯*2	☯
Llay Hall, Cefn y Bedd, sunk by Llay Hall Coal Iron & Fireclay Co Ltd.; this company went into liquidation in 1885 and colliery was subsequently run as a sole trader by ES Clarke and from 1901 by the Executors of his estate.	1873 - 1877				☯	☯
Llay Hall Drift; sunk and worked by ES Clarke 1896-1899.	1896					
Llay Main, Llay; sinking started in 1914. Owned by joint venture between Hickleton Main Colliery Co. Ltd., Thurscoe, Yorkshire, and Messrs Rea, coal exporters, Liverpool.	1914 - 1917					☯

Colliery	Year sunk	1854	1870	1888	1900	1914
Mill, Christionydd; owned in 1854 by RCM Wright. Not included in List of Mines 1888-1914.		☯				
Minera, two old shafts in Minera. Not in *List of Mines* 1888-1914.			☯			
Mountain level, owned 1899-1902 by E Griffiths & Co.; not worked after 1902.					☯	
New Broughton, sunk by T Clayton and owned by him until 1900; purchased by Mitchell & Butler of Birmingham who ran it as the New Broughton Colliery Co. Ltd. Abandoned 1911, although listed as a pumping pit in 1912. Not listed after this date.	1883			☯	☯	
Old Furnace Rock, owned by Ruabon Brick & Terra Cotta Co. Ltd., listed 1900-1901; not listed thereafter.					☯	
Pant, Pentre Christionydd; owned in 1854 by RCM Wright. Not included in *List of Mines* 1888-1914.		☯				
Penbedw, owned by HR Bowers 1888-1910; listed with no employees 1911-1912, not listed thereafter				☯	☯	
Pendwll, listed 1888-1893, owned by T Clayton.				☯		
Penrhos, owned by Brymbo Co., listed 1888-1892.				☯		
Pentre Bychan, owned in 1854 by Gomer Roberts & Co. Not included in *List of Mines* 1888-1914.		☯				
Pentre Mawr; owned in 1854 by Daniel Owen. Not included in List of Mines 1888-1914.		☯				
Pentre Saeson, Brymbo; was working in 1863, but in liquidation in 1871.		☯	☯			
Pentre Vron, listed 1894- 1897, owned by Jones & Williams.						
Plas Isa; owned in 1854 by Samuel Giller and in 1870 by the Plas Isa Coal Co. Not included in *List of Mines* 1888-1914.	pre 1820	☯	☯			
Plas Kynaston, Ruabon; owned in 1854 by TE Ward; coal production ceased in 1897; thereafter it was used as a pumping station for the Wynnstay colliery.		☯	☯	☯	☯	☯
Plas Power, sunk by Old Broughton Coal Co; taken over by Broughton & Plas Power Coal Co. Ltd in 1881.	1875 - 1877			☯	☯	☯
Ponkey, listed 1895-1896, owned by William Hughes.						
Rhos, a clay pit owned by JC Edwards (Ruabon) Ltd.					☯	☯
Ruabon or Brandie Pits listed as being owned in 1854 by New British Iron Co.- coal raised for own use.	Pre 1800	☯	☯	☯		
Smelt, Brymbo; coal raised alongside fireclay.				☯	☯	☯
Southsea, owned in 1812 by Richard Kirk. In 1854 was owned by Southsea Co., and in 1855 was bought by Old Broughton Coal Co. (Henry Robertson, WH & CE Darby). Not included in List of Mines 1888-1914.	pre 1812	☯				
Street Elas or Las, listed 1889-1893, owned by Ruabon Glazed Brick & Fireclay Ltd.						
Talwrn, owned by Mr JR Burton from 1844 to 1870s, and later by Vron Colliery Co. Ltd. Listed as Old Talwrn from 1905. Abandoned 1911.		☯	☯	☯	☯	
Trefachan, owned by C Valentine, listed 1888-1893.				☯		

Colliery	Year sunk	1854	1870	1888	1900	1914
Trefynant, a clay pit owned by JC Edwards (Ruabon) Ltd. Abandoned 1912 but listed. Not listed 1913 onwards.				☯	☯	
Trevor, or Garth, a clay pit owned by JC Edwards (Ruabon) Ltd.					☯	☯
Vauxhall, originally known as Kenyon colliery; sunk by RCM Wright. Owned from 1871 by Vauxhall Colliery Co. Ltd.	1857			☯	☯	☯
Vron; in 1850 was owned by Messrs Maurice & Lowe. By 1872 was owned by a company which went into liquidation in 1882. In 1884 the Vron Colliery Ltd. was formed and in 1907 the colliery was purchased by the Broughton & Plas Power Coal Co. Ltd.	1806	☯	☯	☯	☯	☯
Vron Tunnel, owned by Vron Brick Co., listed from 1906; abandoned in 1912, not listed thereafter.						
Westminster, Moss, Wrexham; owned in 1854 by Brymbo Co. - a partnership between R Roy, H Robertson et al. The partnership split in 1856 and Ruabon Coal Co. was created. The colliery was later owned by the Westminster, Brymbo Coal & Coke Co. Ltd.	1846	☯	☯	☯	☯*2	☯
Wrexham & Acton, Rhosddu; owned by Wrexham Colliery Co. Ltd. and then Wrexham & Acton Collieries Co Ltd	1869 - 1871		☯	☯	☯*2	☯*2
Wynn Hall, Penycae, owned by W Kendrick in 1854. Not included in *List of Mines* 1888-1914.		☯				
Wynnstay, sunk by New British Iron Co. and owned by them until 1866. when taken over by Wynnstay Collieries Ltd.	1856		☯	☯	☯*2	☯
Total number of collieries		26	22	28	38	26

Key:

*2 – these were listed as two collieries in the *List of Mines*

(Sources:

1854 Hunt's *Mineral Statistics* D/GR/1545

1870 Hunt's *Mineral Statistics* D/GR/1563

1888, 1900 & 1914 *List of Mines* BL/BS/27/1)

	1894			1895			1896			1897			1898			1899		
	u/g	Above	Total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total
Abernant (c)	7	3	10	7	2	9	8	3	11	8	3	11	8	3	11	8	3	11
Bersham *2	638	93	731	631	88	719	627	84	711	618	86	704	570	86	656	609	87	696
Black Lane									0				10	3	13	18	9	27
Black Park	441	58	499	148	22	170	410	50	460	426	58	484	411	59	470	397	63	460
Brymbo- Bye	188	26	214	148	22	170	157	28	185	116	22	138	97	23	120	110	23	133
Brynkinallt	196	43	239	344	77	421	381	78	459	358	69	427	383	78	461	386	74	460
Brynmally	202	36	238	200	36	236	210	45	255	215	37	252	222	32	254	233	37	270
Caello Level	6	1	7															
Delph (c)	15	3	18	19	3	22	18	3	21	18	3	21	23	4	27	23	4	27
Erwlwyd (c)	25	7	32	22	6	28	26	6	32	26	6	32	30	7	37	30	7	37
Ffrwd	222	50	272	237	24	261	220	26	246	201	26	227	140	21	161	152	46	198
Gatewen	443	96	539	448	96	544	427	95	522	479	97	576	562	97	659	575	110	685
Gwersyllt	194	36	230	177	35	212			0			0						0
Hafod *2	1,012	255	1,267	1,053	278	1,331	996	270	1,266	1,001	259	1,260	1,016	265	1,281	1,029	267	1,296
Llay Hall	346	91	437	381	107	488	276	84	360	330	85	415	349	96	445	337	89	426
Llay Hall Drift							5	2	7	5	11	16	4	2	6	4	2	6
Mountain level																2	1	3
New Broughton	242	38	280	246	32	278	223	33	256	232	39	271	150	30	180	169	31	200
Penbedw	16	5	21	15	5	20	14	5	19	15	5	20	13	5	18	12	5	17
Ponkey	2	2	4	2	2	4												
Plas Kynaston	166	48	214	148	41	189	143	37	180	122	35	157	0	4	4	0	4	4
Plas Power	711	130	841	736	129	865	734	138	872	723	141	864	850	167	1017	767	185	952
Pentre Vram	3	2	5	3	2	5	3	2	5	3	2	5						
Rhos (c)	15	5	20	19	5	24	19	4	23	20	4	24	19	4	23	22	4	26
Smelt (c)	6	1	7	3	1	4	10	2	12	10	2	12	12	2	14	11	2	13
Talwrn	82	17	99	78	24	102	26	9	35	40	9	49	52	13	65	63	16	79
Trefynant (c)	11	4	15	12	3	15	12	3	15	14	4	18	14	3	17	14	3	17
Trevor – Garth (c)													4	1	5	4	1	5
Vauxhall	328	66	394	344	64	408	361	64	425	362	71	433	339	67	406	351	76	427
Vron	172	68	240	182	63	245	198	68	266	161	65	226	190	59	249	224	87	311
Westminster *2	663	168	831	574	157	731	655	155	810	659	139	798	672	149	821	842	175	1017
Wrexham *2	621	111	732	637	114	751	528	106	634	608	99	707	601	109	710	623	136	759
Wynnstay *2	740	171	911	649	144	793	660	153	813	734	150	884	796	165	961	794	165	959
Total employees	7,713	1,634	9,347	7,751	1,615	9,365	7,347	1,553	8,900	7,504	1,527	9,031	7,537	1,554	9,091	7,809	1,712	9,521
Total Collieries	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	35	35	35
Average per colliery	227	48	275	235	49	284	223	47	270	227	46	273	228	47	275	223	49	272
Employed in clay pits			102			102			114			118			134			136
No. of clay pits			6			6			6			6			7			7

Key: *2 – listed as 2 collieries in the *List of Mines* until 1906; from 1907 listed as single collieries
(c) – clay pits that raised coal only as part of the clay getting process

Note: Those collieries that have a 0 as the total number of employees have been included as a colliery by the *List of Mines* and must be included when calculating the total number of collieries for that year.

	1900			1901			1902			1903			1904			1905		
	u/g	Above	total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total
Abernant (c)	8	3	11	10	3	13	8	3	11	12	3	15	13	4	17	14	4	18
Acrefair (c)	6	5	11	9	6	15	10	7	17	8	3	11	9	3	12	10	3	13
Bersham *2 (1907)	638	91	729	675	94	769	650	98	748	667	92	759	633	91	724	656	93	749
Black Lane	16	5	21	15	5	20	15	5	20	0	0	0	9	4	13	19	6	25
Black Park	397	63	460	411	64	475	468	67	535	512	70	582	512	67	579	506	63	569
Brymbo- Bye	130	24	154	108	23	131	146	25	171	117	32	149	165	26	191	181	31	212
Brynkinallt	404	73	477	412	91	503	405	103	508	424	96	520	438	93	531	482	90	572
Brynmally	152	34	186	185	37	222	201	40	241	219	42	261	200	38	238	207	38	245
Delph (c)	21	3	24	23	3	26	25	3	28	21	3	24	21	3	24	16	3	19
Erwlwyd (c)	30	8	38	28	6	34	30	9	39	28	6	34	29	5	34	26	7	33
Ffos y Go				6	2	8	17	7	24	12	12	24	12	9	21	23	8	31
Ffrith	38	17	55	82	18	100	60	6	66	38	6	44	8	5	13	3	3	6
Ffrwd	220	24	244	241	24	265	220	24	244	109	18	127	100	30	130	0	0	0
Gatewen	564	110	674	557	133	690	570	132	702	624	117	741	634	110	744	626	149	775
Gwersyllt			0	181	40	221	194	40	234	133	0	133	144	0	144			0
Hafod *2 (1913)	1,029	279	1,308	1,079	312	1,391	1,221	360	1,581	1,139	329	1,468	1,193	342	1,535	1,209	344	1,553
Llay Hall	331	80	411	374	86	460	384	81	465	426	88	514	492	90	582	439	94	533
Mountain level	2	2	4	3	2	5	2	1	3			0			0			0
New Broughton	233	37	270	310	43	353	250	30	280	262	29	291	245	32	277	177	25	202
Old Furnace Rock (c)	7	1	8	6	2	8			0			0			0			0
Penbedw	10	5	15	12	5	17	13	5	18	12	5	17	7	3	10	10	7	17
Plas Kynaston	5	7	12	1	4	5	0	9	9	0	4	4	0	4	4	0	6	6
Plas Power	842	206	1,048	877	222	1,099	875	225	1,100	853	143	996	884	171	1,055	863	190	1,053
Rhos (c)	19	5	24	22	4	26	22	4	26	23	4	27	23	4	27	21	4	25
Smelt (c)	12	2	14	12	2	14	19	2	21	17	2	19	11	2	13	13	2	15
Talwrn	96	10	106	105	14	119	97	17	114	87	16	103	4	4	8	10	5	15
Trefynant (c)	17	3	20	17	3	20	19	3	22	11	2	13	11	2	13	10	2	12
Trevor – Garth (c)	4	25	29	6	8	14	6	2	8	5	4	9	5	1	6	6	1	7
Vauxhall	360	69	429	353	76	429	386	76	462	395	78	473	409	84	493	405	88	493
Vron	163	87	250	165	80	245	222	73	295	242	77	319			0			0
Westminster *2 (1913)	839	216	1,055	690	185	875	787	195	982	890	225	1,115	774	216	990	590	239	829
Wrexham*2 (1913)	618	129	747	721	134	855	707	149	856	733	138	871	712	156	868	686	142	828
Wynnstay *2 (1907)	786	165	951	866	167	1033	832	143	975	903	188	1091	903	160	1063	820	168	988
Total employees	7,997	1,788	9,785	8,562	1,898	10,460	8,861	1,944	10,805	8,922	1,832	10,754	8,600	1,759	10,359	8,191	1,815	10,006
Total Collieries	37	37	37	38	38	38	37	37	37	35	35	35	35	35	35	33	33	33
Average per colliery	216	48	264	225	50	275	240	52	290	254	53	307	245	50	295	248	55	303
Employed in clay pits			171			162			172			152			146			142
No. of clay pits			8			8			8			8			8			8

Key: *2 – listed as 2 collieries in the *List of Mines* until 1906; from 1907 listed as single collieries
*2 (1913) – listed as 2 collieries in the *List of Moines* until 1912; from 1913 listed as single collieries
(c) – clay pits that raised coal only as part of the clay getting process

Note: Those collieries that have a 0 as the total number of employees have been included as a colliery by the *List of Mines* and must be included when calculating the total number of collieries for that year.

	1906			1907			1908			1909			1910			1911		
	u/g	Above	total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total	u/g	above	total
Abernant (c)	9	3	12	16	4	20	9	3	12	9	3	12	9	3	12	9	3	12
Acrefair (c)	8	3	11	8	3	11	8	2	10	8	3	11	9	3	12			
Bersham *2 (1907)	754	95	849	685	100	785	745	103	848	733	105	838	703	97	800	773	110	883
Black Lane	48	10	58	25	6	31	46	10	56	47	11	58	52	9	61	60	12	72
Black Park	454	76	530	467	80	547	429	74	503	399	81	480	416	69	485	452	78	530
Brymbo- Bye	38	13	51	1	1	2	56	15	71	106	25	131	153	31	184	151	30	181
Brynkinallt	549	113	662	528	94	622	549	129	678	567	126	693	570	130	700	628	142	770
Brynmally	200	37	237	157	37	194	238	58	296	290	58	348	307	67	374	346	63	409
Cefn y Bedd									0			0			0			0
Delph (c)	20	5	25	22	3	25	25	5	30	25	5	30	20	5	25	25	5	30
Erwlwyd (c)	14	3	17	26	6	32	16	3	19	12	3	15	13	3	16	14	4	18
Ffos y Go	73	14	87	50	11	61	66	9	75	42	13	55	40	9	49	70	13	83
Gatewen	677	131	808	655	120	775	695	108	803	647	133	780	736	130	866	638	133	771
Gresford										101	98	199	129	98	227	131	116	247
Gwersyllt	244	0	244	217	0	217	266	0	266	254		254	350		350	297		297
Hafod *2 (1913)	1,249	319	1,568	1,192	320	1,512	1,330	326	1,656	1,369	364	1,733	1,460	364	1,824	1,449	351	1,800
Llay Hall	351	78	429	425	85	510	374	72	446	382	76	458	427	96	523	428	86	514
New Broughton	228	47	275	184	33	217	270	58	328	285	54	339	182	39	221	18	11	29
Penbedw	4	3	7	13	7	20	4	3	7	5	3	8	4	3	7			0
Plas Kynaston	0	8	8	0	7	7	0	9	9	0	7	7	0	5	5	0	5	5
Plas Power	941	216	1,157	918	196	1,114	932	189	1,121	915	184	1,099	917	202	1,119	919	188	1,107
Rhos (c)	25	4	29	25	4	29	30	4	34	30	4	34	24	4	28	25	4	29
Smelt (c)	23	3	26	19	3	22	24	3	27	18	2	20	17	2	19	20	3	23
Talwrn	6	3	9	13	3	16	10	3	13	8	3	11	6	3	9			0
Trefynant (c)	2	1	3	10	2	12	2	1	3	6	2	8	8	2	10	8	2	10
Trevor – Garth (c)	5	1	6	5	1	6	6	4	10	4	2	6	4	2	6	4	2	6
Vauxhall	375	87	462	394	86	480	366	87	453	279	75	354	291	76	367	332	73	405
Vron				163	43	206	178	44	222	186	48	234	226	53	279	247	51	298
Vron Tunnel	27	6	33	8	1	9	44	9	53	54	10	64	60	11	71	55	7	62
Westminster *2 (1913)	798	247	1,045	834	229	1,063	739	224	963	755	225	980	616	196	812	702	193	895
Wrexham *2 (1913)	742	143	885	691	140	831	828	150	978	862	156	1,018	806	158	964	848	160	1,008
Wynnstay *2 (1907)	1,020	186	1,206	972	176	1,148	1,080	230	1,310	1,020	217	1,237	1,030	218	1,248	1,217	223	1,440
Total employees	8,884	1,855	10,739	8,723	1,801	10,524	9,365	1,935	11,300	9,418	2,096	11,514	9,585	2,088	11,673	9,866	2,068	11,934
Total Collieries	34	34	34	33	33	33	35	35	35	35	35	35	35	35	35	34	34	34
Average per colliery	261	55	316	264	55	319	268	55	323	269	60	329	274	60	334	290	61	351
Employed in clay pits			129			157			145			136			128			128
No. of clay pits			8			8			8			8			8			7

Key: *2 (1907) – listed as 2 collieres in the *List of Mines* until 1906; from 1907 listed as single collieries
*2 (1913) – listed as 2 collieries in the *List of Moines* until 1912; from 1913 listed as single collieries
(c) – clay pits that raised coal only as part of the clay getting process

Note: Those collieries that have a 0 as the total number of employees have been included as a colliery by the *List of Mines* and must be included when calculating the total number of collieries for that year

	1912			1913			1914		
	u/g	Above	total	u/g	above	total	u/g	above	total
Abernant (c)	9	3	12						
Bersham *2 (1907)	817	112	929	834	112	946	862	117	979
Black Lane	52	10	62	45	7	52	79	10	89
Black Park	444	79	523	440	75	515	460	86	546
Brymbo- Bye	168	35	203	155	32	187	153	32	185
Brynkinallt	681	150	831	742	164	906	741	189	930
Brynmally	432	82	514	346	84	430	421	79	500
Cefn y Bedd			0	12	9	21	25	18	43
Delph (c)	29	6	35	29	5	34	29	5	34
Erwlwyd (c)	11	3	14	13	3	16	14	3	17
Ffos y Go	74	15	89	74	11	85	85	11	96
Ffrith				67	24	91	83	23	106
Gatewen	613	130	743	641	118	759	696	120	816
Gresford	375	126	501	626	210	836	689	210	899
Gwersyllt	319		319	315		315	306		306
Hafod *2 (1913)	1,439	351	1,790	1,448	343	1,791	1,561	361	1,922
Llay Hall	386	101	487	350	100	450	340	98	438
New Broughton	9	8	17						
Penbedw			0						
Plas Kynaston	2	9	11	2	5	7	0	5	5
Plas Power	908	204	1,112	900	169	1,069	901	163	1,064
Rhos (c)	30	6	36	22	4	26	22	4	26
Smelt (c)	23	3	26	25	3	28	28	3	31
Trevor –Garth (c)	5	2	7	5	2	7	5	1	6
Vauxhall	322	78	400	305	81	386	313	82	395
Vron	261	61	322	267	66	333	268	62	330
Vron Tunnel	55	7	62						
Westminster *2 (1913)	712	225	937	694	196	890	663	219	882
Wrexham *2 (1913)	848	145	993	834	164	998	813	163	976
Wynnstay *2 (1907)	1,189	230	1,419	1,158	241	1,399	1,127	234	1,361
Total employees	10,158	2,174	12,332	10,349	2,228	12,577	10,684	2,298	12,982
Total Collieries	32	32	32	26	26	26	26	26	26
Average per colliery	317	68	385	398	86	484	411	88	499
Employed in clay pits			118			111			114
No. of clay pits			5			5			5

Key: *2 (1907) – listed as 2 collieres in the *List of Mines* until 1906; from 1907 listed as single collieries
*2 (1913) – listed as 2 collieries in the *List of Moines* until 1912; from 1913 listed as single collieries
(c) – clay pits that raised coal only as part of the clay getting process

Note: Those collieries that have a 0 as the total number of employees have been included as a colliery by the *List of Mines* and must be included when calculating the total number of collieries for that year.

Appendix E: Details of the 'Cinder hill Riots'

By 1830, some of the ideas advocated by the 'FACU had begun to filter through to Denbighshire. The birthplace of the union had been in Lancashire, a place to which the miners of north Wales migrated when employment was scarce (Rogers, 1928, III: 221). The union found north Wales, and especially Flintshire, quite open to its views; the major reason for this being the fact that wages in north Wales "remained exceptionally low", possibly no more than eight to nine shillings a week (Rogers, 1928, II: 221). With this as a backdrop, in December 1830, some colliers in Hawarden went on strike demanding three shillings per shift for the most skilled miners. They were determined to bring out the miners of Flintshire and Denbighshire, the first time an attempt had been made to organise a strike on more than a strictly local level. The miners determined to march to other collieries in Flintshire and then on to Denbighshire to stop them working (Rogers, 1928, III: 223). The men were not averse to using intimidation and not surprisingly met with great success as they 'swore in' miners to support their cause.

Again, not surprisingly, such events frightened the coalowners who demanded that the troops be mustered to quell the 'disturbance'. In a letter to Thomas Fitzhugh, owner of Plas Power Hall, dated 26 December 1830 (cited by Rogers, 1928, II: 224), W Eyton of Leeswood, "a prominent landowner and colliery proprietor", demanded that "he send directly to Sir Watkin, and come what may, get a force together to stop this outbreak [because]... if we cannot get military assistance it will all be mob law directly". The militia were mobilised, and the Flintshire miners were confronted in Rhos on 28 December; they showed no signs of disorder and, when asked, told Sir Watkin Williams Wynn that all they wanted was an increase in wages (Rogers, III: 225). Sir Watkin tried hard to disperse the miners, but when they refused he ordered the arrest of three of the leaders, who were locked in a farmhouse. These three men were soon 'liberated' by the miners who went en masse to Cinder Hill, situated between Rhos and Ruabon, where Sir Watkin was reduced to reading the Riot Act, but the men

again refused to disperse. The miners and soldiers were becoming increasingly restive, and when the miners began to pelt them with stones, the soldiers charged the hill and captured a single man, who was promptly released by Sir Watkin (Rogers, 1928, III: 226-7).

One of the main grievances of the men at this time, in addition to their demand for higher wages, was the 'Tommy' shop at Acrefair, where "conditions for the workers..... were probably worse than in any other district of the coalfield" (Rogers, 1928, III; 227). This truck shop was operated by the British Iron Company, whose agent, Mr Wood, refused, despite public protests, to have it closed. At a meeting between owners and men held on 30 December 1830, the owners refused to concede any of the men's demands, and in the ensuing fracas Mr Wood was struck and captured; he eventually escaped, "disguised in a petticoat, a cloak and an old white straw hat" (Rogers, 1928, II: 230). Over the next couple of days, discussions, mediated by Sir Watkin, took place and the masters conceded 3s per day for the cutters; this was viewed as a great victory, especially as the Acrefair tommy shop was also closed (Rogers, 1928, III: 233).

Wrexham and Acton Collieries.

MAIN COAL.

			s.	d.
	North Side.			
1	Getting Coal	per ton	1	6¼
2	Slack	,,	0	6½
3	Pillars Coal	,,	1	7
4	Pillars Driving	per yd.	4	6¼
	South Side.			
5	Getting Coal	per ton	1	6¼
6	Slack	,,	0	6½
7	Pillars Coal	,,	1	7
8	Driving nine feet roads	per yd.	5	0¾
9	Driving seven feet roads	,,	4	9½
10	Ripping Bind Coal if blown down without cutting	,,	0	6½
11	Ripping Bind Coal if cut one side and arched	,,	1	1
12	Taking Side Coal on Road	,,	1	1½
13	Rounding Pillars for first five yards	,,	4	5¼
14	Opening or re-opening Wickets when down 6yds. on each side of road with a limit of 12 yards	,,	1	7¾
15	For crossing old roads, thrillings, &c., thickness of Coal only	,,	4	5¼

			s.	d.
16	Extras to be agreed upon between the Contractor and the Manager.			
17	Pulling Props out in working place when finished	each	0	2¾

BRASSEY SEAM.

			s.	d.
1	Getting Coal. From a few inches under to a few inches over four feet thick	per ton	1	11½
2	Getting Coal. Where the Coal is about three feet thick or under, and the Coal has to be loaded on a trolley and brought out of the Wickets into the gateway or road-end, and refilled into the tubs	,,	2	2½
3	Slack	,,	0	6½
4	Driving	per yd.	4	5
5	Ripping tops to iron stone	,,	4	5
6	Ripping up to the Ironstone next to the lash	,,	4	5
7	Extra Ripping	per inch	0	1
8	First Ripping (to first lash or about 18 ins.)	per yd.	2	2½
9	Manholes (One Yard)	,,	4	5
10	Opening or re-opening Wickets when down six yards on each side of road with a limit of 12 yards	,,	1	7¾
11	Timbering, 9 feet	per pair	1	4½
12	Do., 7 feet	,,	1	4½
13	Pulling Props out in working place when finished	each	0	2¾

CRANK COAL.

			s.	d.
1	Getting Coal (new system)	per ton	3	7½
2	Getting Coal (old system)	,,	4	1
3	Slack	,,	0	6½
4	Timbering	per pair	1	4½
5	Ripping Tops (Main Roads)	per yard	4	5
6	Ripping Tops (Branch Roads)	,,	2	2½

POWELL SEAM.

			s.	d.
1	Getting Coal, filling through with shovel	per ton	2	2
2	Driving	per yd.	4	5
3	Ripping Tops (Main Roads)	,,	4	5
4	Ripping Tops (Branch Roads)	,,	2	2½

THE FOLLOWING PRICES FOR ALL SEAMS.

			s.	d.
1	Timbering	per pair	1	4½
2	Setting or removing props on road	each	0	2¾
3	Changing bar leg (*i.e.*, taking old one out and putting new one in)	,,	0	5½
4	Stretchers	,,	0	9¾
5	Drawing timber out when working places are finished	,,	0	2¾
6	Raising rails, single road, when place is finished	per yd.	0	0¾
7	Filling dirt	per tub	0	2¾
8	Emptying dirt	,,	0	2¾
9	Road cutting (double road)	per inch	0	2·07
10	Road cutting (three rails)	,,	0	2·07
11	Road Cutting (single road)	,,	0	1½
12	Distance waggoning, 25 yards.			

13 For each additional 10 yards or fractional part thereof, one penny per ton extra.

14 Fillers working in hard or difficult places, or when taken out of their places to work for the Company, to be paid at current rates, as per the basis of 1888.

15 Blocking or Wedging Coal; Setting Chocks under extraordinary circumstances; Fast end when required; or any other extra labour not inserted in Price List, for which consideration has been previously paid, subject to contract.

It is agreed that the following shall be the minimum standard rates of wages at the Wrexham and Acton Collieries :—

(1) For Colliers working in hard or difficult places 4/- per day.

(2) A Collier taken out of his place to work for the Company, 4/- per day (but for clearing obstructions to his own place, he shall receive the daytlers rate at present in vogue at the Colliery).

(3) For Timbermen and Metalmen, 4/- per day.

(4) For experienced byemen who have been employed not less than 2 years underground 3/4 per day.

(5) For boys starting to work between 13 and 16 years of age, 1/4 per day. For boys starting at 16 years of age and upwards, 1/8 per day.

All the above rates are subject to the ruling percentages.

Boys to receive a nett advance of 2d. per day every six months until they reach a wage equal to 2/4 per day, plus the current percentages.

The advances to boys to be made from the first making-up day in March and the first making-up day in September in each year.

The Price List to come into operation on the first January, 1908.

Signed on behalf of the Wrexham and Acton Collieries Company,

H. Dyke Dennis
S. J. Ellis
John Newton.

Signed on behalf of the Workmen.

George Davies
Robert Jones
Edward John Williams
John Jenkin Evans
John Hughes, *Secretary*
Edward Hughes, *Miners' Agent.*