ECONOMIC CHANGES AND THE POPULATION OF COALFIELDS IN THE EARLY NINETEENTH CENTURY WITH SPECIFIC REFERENCE TO THE SOMERSET AND ST HELENS COALFIELDS

VOLUME 1

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Title: Economic changes and the population of coal-fields in the early nineteenth century with specific reference to the Somerset and St Helens coalfields

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Abstract: This study investigates how economic changes in two relatively discrete mining districts of Somerset and Lancashire may have influenced the kind of demographic changes occurring in them during the first half of the nineteenth century. Its purpose is to see if dimensions and characteristics of population change arose from changes in the livelihoods of the people at the time.

At this scale it is possible to take account of what was happening in the economy, especially mining. Because generalisations about miners do not exist, local economic changes would have affected the working conditions and standards of living of working class people such as miners.

It is achieved by using a variety of archival material to find out about the employment of miners and how they managed to make a living from mining; then using the age, sex and relationships of people listed by household in the census enumerators' books (CEBs) for 1851 to estimate some of the population's demographic characteristics. This is supplemented by other information from parish registers and all the mid-nineteenth century CEBs. Without more reliable parochial registration or any colliery labour records, though, inferences have to be hazardously drawn between

individuals' demographic characteristics and their livelihoods.

As a consequence, the first part of the thesis is concerned with the economy of the two areas. General trends in the number of jobs at collieries and in other industries, as well as coal production, were brought about by prevailing factors of production. What were the distinctions of working at collieries in these areas, and the rewards as well as the drawbacks of working at the pits arose from these trends. An examination of miners' family economies shows how their livelihoods may have affected their standards of living.

In the second half, ways in which these circumstances influenced population changes in these areas are looked at; how they affected population totals, movements of people and components of natural increase. A general relationship is indicated by the rises and falls of population, migration and natural increase at all scales that appear to be tied to characteristics of coal mining, not only its ups and downs, but also its scale and organisation. It becomes clear that mining influenced who was moving in and out. More young men were immigrants and native non-migrants because they found work at collieries. It also emerges that mining may have raised marital fertility because those who made a living down the pit were encouraged to marry younger wives and have more children. These could have been linked. Migration of the kind that was occurring in

these coalfields could have been a catalyst for rapid rates of population increase if the growth of mining brought about a youthful population and reinforced earlier ages of marriage for women.

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(1) Unless listed underneath table

(2) All % totals are subject to rounding errors

(3) Somerset and St Helens often just refer to the two coal-fields and not to the county and town respectively. They are qualified whenever there might be any confusion

ABBREVIATIONS

(in text and some tabulations)

Agr. Lab.	Agricultural Labourers
B/place	Birthplace
Build. Craft.	Building Craftsmen
CEBs	Census Enumerators' Books
Chil.	Children
Clfd.	Coalfield
Cum.	Cumulative
CWR	Child-Woman Ratio
DR	Dependency Ratio
ED	Enumeration District
Engl. & Wales	England and Wales
Gen. Lab.	General Labourers
H/hold	Household
Lanc.	Lancashire
Manuf. (Mod./Trad.)	Manufacturing Workers (modern/traditional)
MHS	Mean Household Size
OS	Ordnance Survey
SCC	Somersetshire Coal Canal
SMAM	Singulate Mean Age at Marriage
Som.	Somerset
SPSS	Statistical Package for the Social Sciences
St H	St Helens

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"And though with difficulty I am got hither, yet now I do not repent me of all the trouble I have been at to arrive where I am." John Bunyan, "The Pilgrim's Progress", (Penguin edition (1965) 370).

The achievement, if achievement it be, would not have been attained without considerable help and encouragement.

The collection of data was assisted, in particular, by the staff of the Somerset Record Office, Lancashire Record Office, St Helens Local History Library, Duchy of Cornwall Office and Warwickshire Record Office. The staff at the Sydney Jones Library at the University of Liverpool obtained many of the secondary sources not readily available, which limited me to only a single special trip to the Cambridge University Library. My three years at Liverpool were paid for by the Social Science Research Council, who in turn supported my travels, the purchase of microfilms of census enumerators' books and my attendance at several conferences where I had the chance to present some of the contents of the thesis at an early stage of their analysis.

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I have been kept on the rails by family, as well as friends and colleagues at Liverpool and lately at the London Borough of Ealing; persevering in the knowledge of their hopes and encouragement. To my early mentors at home and school in Somerset, and most of all my parents, not least my father whose practical contribution in drawing maps and diagrams remains unthanked, I have a debt of gratitude I cannot repay, nor words hope to convey; my thanks to them especially, all the same.

CHAPTER 1

INTRODUCTION

Parochial demographic studies often show that investigation of population changes at regional and national levels can be misleading.[1] By and large, the focus of historical demography is switching to studies at the community and household level. Recent investigations of demographic trends and their determinants at this scale, such as Levine's study of demographic changes in contrasting parishes in the eighteenth and nineteenth centuries, emphasise a complex relationship between population, economy and society in the past.[2]

It is generally accepted that local and even regional trends in population growth might be related to the expansion of domestic manufacturing industries, mining, and more wage labouring in agriculture in the seventeenth, eighteenth and nineteenth centuries throughout much of Western Europe.[3] Quite widespread, if gradual, changes in characteristics of work, the demand for labour, and the organisation of the workforce and its rewards, have been associated with this. They may have been responsible for changes in livelihoods and living conditions during this period. Detailed community studies which suggest that changes in branches of manufacturing and mining affected the way of life of the working population are the most

convincing evidence. In a few case studies some relationships between aspects of work and the families of the workers, such as their characteristics of marriage, fertility and leaving home, have been inferred.[4]

It is my intention to discover in what way economic changes in coal mining areas were related to broader aspects of social change, especially in the family, and how this affected population growth in them. The experience of similar studies suggest that it would be worthwhile to explore any relationships at a community as well as an aggregate level, i.e. the parish and the coalfield.[5] At the same time other matters can be investigated: the debate concerning the role of economic change in bringing about demographic changes, for example. In this respect, studying a specific economy and a group of workers should make it far easier to find out if demographic characteristics were dependent upon prevailing working conditions, technology and families' earnings. To this end, demographic changes in two coal mining districts in the first half of the nineteenth century are examined alongside their economic circumstances.

1.1 The Study Areas

The two coalfields are the Somerset coalfield and the St Helens coalfield.[6] (Figure 1.1,1.2) The Somerset coalfield is south of Bristol and Bath, cushioned against the northern edge of the Mendips. (Figure 1.3) It comprises the four southern basins of the Bristol coalfield; Pensford,

Paulton, Radstock and Nettlebridge.[7] The St Helens coalfield is about ten miles east of Liverpool equidistant from the Mersey to the south and Wigan to the north. (Figure 1.4) It is part of the South-west Lancashire coalfield and consists of worked areas around St Helens, Rainford and Prescot.[8] The size of the coalmining area in each district is roughly the same, about fifty square miles. In the first half of the nineteenth century both had growing populations and rapid increases in coal production. According to the principal histories, this was accompanied by some change in the structure of their economies. There were shrinking domestic manufacturing industries and increases in the scale of pits and size of the workforce employed in their mining industries. In common with other mining and industrial areas in the early nineteenth century these were areas also undergoing changes affecting jobs, standards of living, homes and families, although the process was not started or finished between 1800 and 1850.[9]

In other respects, though, they were quite dissimilar. The character of each area was very different and this extended to their mining industries. Bare outlines of their experiences suggest that there were disparities in the pace and direction of change underlying this. Somerset remained a rural coalfield. It had no towns and no heavy industries, even by the mid-nineteenth century. Many small mining concerns survived and production was only marginally extended between 1830 and 1860. Rapid exploitation was not encouraged. Mining conditions were

difficult and production costly. The amount of investment subsided as profits diminished when rival canals and then the railways steadily invaded the coalfield's monopoly market after 1830.

St Helens was a more productive mining area even in 1800. There were manufacturing industries in the coalfield which used coal, and a growing demand came from consumers in Cheshire and the Lower Mersey.[10] The new town of St Helens emerged as a distinctive industrial and commercial community at the terminus of the Sankey Canal which carried coal to the Cheshire saltfields and the Mersey. Most of the burgeoning heavy industries were located in the vicinity of the town. While domestic industries, such as nail making, watch assembly and textiles, suffered from trade depressions, coal production expanded to meet demands from salt producers, new industries such as glass and chemicals, and domestic consumers. In particular, between 1830 and 1860 plentiful and easily accessible coal measures were tapped around the town and to the east in Ashton, Haydock and Billinge.

1.2 Defining the Aims and Scope of the Study

Of particular significance to a demographic study of coalfields is that generalisations about miners should not disregard time or place. For this reason the focus is placed on work and the circumstances of families living in the Somerset and St Helens coalfields.

Neither Somerset or St Helens seem typical of early

nineteenth century coalfields if the histories of miners' trade unions are to be believed.[11] It is unfortunate that studies of coalfields in the nineteenth century are biased towards unions at the expense of the nature of work and its impact on the miner and his family.[12] Conditions in the coalfields of North-east England upon which many generalisations are based were probably the exception rather than the rule.[13] Yet studies of mining in the North-east of England by Cromar and Leister emphasise that the course of development and nature of work at pits there was influenced by local factors, as appears to have been so in Somerset and St Helens.[14] In view of evidence from local studies of mining by Campbell, Benson and Daunton of distinctive differences in social and economic characteristics of coalfields and mining communities as well, it is possible that differences in the circumstances of miners would arise from some variety in their working conditions.[15] Because this was happening to workers in other industries several historical demographers have argued that relationships between economic and demographic changes during this period are best sought at this scale.[16]

Most socio-economic studies, whether of towns, industries, areas or regions, show that economic changes in them in the eighteenth and nineteenth centuries, however revolutionary, were mostly gradual and localised.[17] Hence the experiences of Somerset and St Helens were not unusual. Most studies of industries in the Industrial Revolution suggest that because factors of production determining

change varied so greatly between places and firms, none were changing in any uniform way.[18] As a result, according to Rule and Samuel, generalisations about work in relation to the economy are not possible.[19]

It would certainly be fair to say that, in general, the timing of change in mining was uneven when studies of mining in Scotland, the East Midlands, the Forest of Dean and Pembrokeshire in the nineteenth century are compared.[20] There were contrasts within each coalfield as well as more pronounced differences between them. Variations were not merely a result of disparities in their stage of technological development. The diversity within an industry, however distinctive the activities of its workers, possibly makes it difficult to discuss the effects of work and livelihoods on the nature of society in them without delving into the working conditions. Daunton has recently remarked that studies of miners must begin "down the pit".[21] Abundant archives can be consulted to achieve this for a local study.

Further, demographic changes in the eighteenth and nineteenth centuries tended to be gradual. The most perceptible changes in fertility, nuptiality and households occurred at a small scale. Most of these can only be related to economic trends at a community level.[22] Anderson acknowledges this.[23] There are difficulties in understanding how there could have been relationships between population and economic changes in the Industrial Revolution if demographic characteristics are aggregated

over large areas or for large groups when a wide variety of changes were probably taking place within them. Only general relationships can be hypothesised from simultaneous trends in economic and demographic variables at a national and regional scale. For groups of workers, such as miners, relationships between work and demographic characteristics have in the main been derived by a similar method, so that average demographic characteristics of coalfields, such as high fertility in the late nineteenth century, have been related by Haines, Wrigley and Friedlander to general characteristics of mining.[24]

A study of miners at a community level can draw attention to explanations of population and economic relationships which indicate how work affected mining families and possibly demographic changes. Studying all miners and the mining economy in a specific area avoids some of the hazards of aggregate studies. There is the additional opportunity to test some of the hypotheses about miners' demographic characteristics which these have generated.

Some general studies allege that coalfields and the mining population had very distinctive demographic features.[25] The population in coalfields and the coal mining industry were both expanding rapidly in the nineteenth century. It has been argued that the industry at this time may have fostered early marriage and high fertility.[26] Because coalfields are fairly homogenous economic units, coal miners are perhaps too easily

aggregated within bounded areas, and it is often assumed that they have common characteristics of work and society. Whether distinctive demographic characteristics and a common course of population change can be counted among these remains untested. Friedlander, Hair and Wrigley had their doubts.[27] In the light of large disparities within coal mining and differences which existed between coalfields such as Somerset and St Helens, it would not appear to be likely.

1.3 An Outline of the Thesis

This is a demographic study of coal miners and mining communities in two contrasting districts. The demographic and social differences are considered at the scale of the coalfield and the parish against the changing and variable circumstances of the mining industry itself. In this way the mining economy provides the basis for any explanations. This is described in Figure 1.5. Appendix A and B contain descriptions of the sources used, the problems associated with their interpretation, and the procedures adopted for data collection. Individual and household data contained in the CEBs provide economic and demographic variables at a variety of scales. Extracting a number of variables for all households in relatively large areas clearly makes computer processing desirable. (Appendix A). Archival sources mainly about the mining industry are used to correlate these with the socio-economic background in the two areas in the early nineteenth century. (Appendix B).

The possible ways in which the mining economy might have affected demographic characteristics in each study area are gradually uncovered in Chapters 2-5. Chapters 2 and 3 first examine economic changes in both study areas in the early nineteenth century. Chapter 2 presents a detailed study of coal mining, in particular the changing opportunities it provided for employment in Somerset and around St Helens. From a variety of archival and secondary sources a summary of the changes in mining location and output serve to indicate trends in employment. Chapter 3 considers other employments, chiefly agriculture in Somerset and manufacturing industries in St Helens. Chapters 4 and 5 then describe the effect of these economic changes. This first consists of an evaluation of the structure of the local mining economy and its impact on the livelihood and standard of living of the working population, especially miners. In Chapter 5 this is extended to an examination of the family and household economies in each area using the CEBs. Particular emphasis is laid on the coal miners' family economies in contrast to other workers. Work down the pits affected the configuration of their family economies. Differences in the family economies of miners in each study area reflected variation in the organisation and conditions of their work.

Chapters 6-10 consider some of the demographic changes that were occurring in the study areas mainly from an analysis of the 1851 census. Chapter 6 describes the overall changes in the distribution of population, the

rates of population change and its components. An examination of their relationship with economic trends at this stage poses many problems which the subsequent chapters try to resolve. In Chapter 7 an attempt is made to exploit the birthplace information in the CEBs to discover any relation between population change, migration and mining. In Chapter 8 there is an analysis of the age, sex and status of the coalfields' population to assess the relative role of migration and natural increase. In Chapter 9 the extent of marriage, ages at marriage and marital fertility are estimated from the census data as a substitute for vital rates in an attempt to quantify the possible effects of mining on natural increase. Finally, Chapter 10 examines living arrangements to draw out any possible correlation between fertility and marriage and the family economy.

The discussion is illustrated by tables and maps which summarise a portion of the data that was collected. Because of space, the actual counts and frequencies are often excluded in favour of descriptive statistics. While in places the analysis could have been extended, using inferential statistics to substantiate the argument, I was loth to do so where differences and similarities are obvious. However, non-parametric tests and correlation coefficients are generally used to test hypotheses from small samples and before applying the most suitable statistical test frequency distributions often have to be adjusted.[28] Since only a small amount of the data is included and discussed in the thesis the full data set collected from the CEBs (as described in Appendix A) is now deposited at the ESRC Data Archive at the University of Essex.[29]

Chapter Notes

1 M Anderson Approaches to the history of the family 1500-1914(1980) 14,18-21; E A Wrigley Population in history (1969) 154

2 D Levine Family formation in an age of nascent capitalism (1977)

3 Wrigley (1969) 159-164; Anderson (1980) 76; R A Butlin The transformation of rural England (1982) 26

4 Levine (1977); R Burr-Litchfield The family and the mill : Cotton millwork, family work patterns and fertility in mid-Victorian Stockport in A S Wohl ed. The Victorian family (1978) 180-195; L A Tilly The family wage economy of a French textile city: Roubaix, 1872-1906 Journal of Family History 4 (1979) 381-394; M R Haines Fertility and occupation:population patterns in industrialisation (1979)

5 D E C Eversley Population history and local history in E A Wrigley ed. An introduction to English historical demography (1966) 22; D Gaunt Pre-industrial economy and population structure Scandinavian Journal of History 2 (1977) 183, 186-195

6 The main studies of each area are C G Down and A J Warrington The history of the Somerset Coalfield (1972); R Atthill Old Mendip (1964); R Atthill ed. Mendip:a new study (1976); T C Barker and J R Harris A Merseyside town in the Industrial Revolution (1954); J Langton Geographical change and Industrial Revolution: coal mining in South-West Lancashire 1590-1799 (1979)

7 As defined by Down and Warrington (1972) 1. The division of parishes and collieries between each basin is shown in Figure 2.1. M Havinden The Somerset landscape (1981) 222-226 has a brief description of the coalfield and its development albeit with some of the errors made in the principal studies

8 As defined by Langton (1979) Figure 55 250. The division of parishes and collieries between each basin is shown in Figure 2.11

9 R Samuel Mineral workers in Miners, quarrymen and saltworkers (1977) 8-10

10 T C Barker Lancashire coal, Cheshire salt and the rise of Liverpool Transactions, Lancashire and Cheshire Historical Society 103 (1951) 83-101

11 The biased impression which these sometimes give has been mentioned in two reviews of mining history; J E Williams Labour in the coalfields: a critical bibliography Bulletin of the Society for the Study of Labour History 4 (1962) 24-32; R G Neville and J Benson Labour in the coalfields II idem 31 (1975) 45-59

12 M J Daunton Down the pit: work in the Great Northern and South Wales coalfields 1870-1914 Economic History Review 2nd series 34 (1981) 596

13 S G Checkland The rise of industrial society in England 1815-1885 (1964) 157

14 P Cromar The coal industry on Tyneside 1771-1800: oligarchy and spatial change Economic Geography 53 (1977) 79-94; I Leister The sea coal mine and the Durham miner University of Durham Geography Department Occasional Publication (New Series) No 5 (1975) 14

15 A Campbell Honourable men and degraded slaves: a comparative study of Trade Unionism in two Lanarkshire mining communities c.1830-1874 in R Harrison ed. Independent Collier (1978) 75-113; J Benson British coal miners in the nineteenth century: a social history (1980); Daunton (1981)

16 R S Schofield Historical demography: some possibilities and some limitations Transactions of the Royal Historical Society 5th series 21 (1971) 127; M Anderson Some problems in the use of census type material for the study of family and kinship systems in J Sundin and E Soderland ed. Time, Space and Man (1979)

17 R Samuel The workshop of the world: steam power and hand technology in mid-Victorian Britain History Workshop Journal 3 (1977) 6-72; D Gregory The process of industrial change, 1730-1900, in R A Dodgshon and R A Butlin ed. An historical geography of England and Wales (1978) 293

18 D Bythell The sweated trades: outwork in nineteenth century Britain (1978) 12-13; J E Vance Housing the worker: determinative and contingent ties in nineteenth century Birmingham Economic Geography 43 (1967) 95-127; R Q Gray The aristocracy of labour in nineteenth century Britain c.1850-1914 (1981)

19 J Rule The experience of labour in eighteenth century industry (1981) Chapter 1; Samuel The workshop of the world (1977) 10-13

20 For example, A R Griffin Mining in the East Midlands 1550-1947 (1971); B F Duckham A history of the Scottish coal industry vol.1 1700-1815 (1970); C Fisher Custom, work and market capitalism: the Forest of Dean colliers 1788-1888 (1981); G Edwards The coal industry in Pembrokeshire Field Studies 1 (1963) 33-64

21 Daunton (1981) 597 but see also R Harrison Introduction in Harrison ed. (1978) and E P Thompson On history, sociology and historical relevance British Journal of Sociology 27 (1976) 397

22 Examples are Levine (1977) who has done this at a parochial level after carrying out several reconstitutions and S Jackson Population and change: a study of the spatial variation in population growth in North-East Somerset and West Wiltshire, 1701-1800, PhD Liverpool (1979) who has attempted to do this with aggregated totals of births, deaths and marriages.

23 Anderson (1980) 32-33

24 E A Wrigley Industrial growth and population change (1961); M R Haines (1979) but specifically an earlier paper M R Haines Fertility, nuptiality and occupation; a study of coal mining populations and regions in England and Wales in the mid-nineteenth century Journal of Interdisciplinary History 8 (1977) 245-280; D Friedlander Demographic patterns and socio-economic characteristics of the coal mining population in England and Wales in the nineteenth century Economic Development and Cultural Change 22 (1973) 39-51

25 These are derived from contemporary comments in the main, for instance in A Redford Labour migration in England 1800-1850 (1926) 50

26 Haines (1979) 37 argued that this was so largely because the wives of miners married earlier

27 Wrigley (1961) 3; Friedlander (1973) 50; P E H Hair The social history of British coal miners, 1800-1845, D.Phil Oxford (1955) 51,88,253

28 S Siegel Non-parametric statistics for the behavioural sciences (1956) 1 which states that inferential statistics is the concern with "how to draw conclusions about a large number of events on the basis of observations of a portion of them", although it is not incorrect to assume that populations are samples drawn from a larger population, R Hammond and P McCullagh Quantitative techniques in geography (1974) 136-137

29 The file is described as "Occupation and family in the Somerset coalfield and St Helens 1851" and is fully documented

CHAPTER 2

THE AMOUNT OF WORK AT COLLIERIES

Studies of workers in a wide variety of trades and towns show that the livelihoods of working people in the early nineteenth century were affected principally by relative changes in demands for different kinds of labour.[1] The numbers employed in day wage labouring jobs in factories, fields, mines, workshops and homes increased. The numbers who were self-employed in handicraft trades and on the land were in relative decline. In day wage labouring jobs people's livelihoods depended very much on the demand for the goods they were producing. If this fell, as in handloom weaving and nail making in the early nineteenth century, a demand for workers in these trades diminished and so did their rates of pay.[2] They rose, however, when a shortage of workers occurred. These effects of labour demand and supply were exacerbated during the nineteenth century because more people became dependent on waged work for their living.[3] Miners were nearly all wage workers by the early nineteenth century, although there was considerable variety in the way they were paid.[4] Consequently, the experiences of miners in Somerset and St Helens could be affected by the amount of work at the collieries. Changes in numbers employed in different industries in the nineteenth century are one indication of variations in demand.

Trends in the number, production and scale of collieries suggest that employment for miners expanded in all coalfields c.1800-1850.[5] The pace varied. In most coalfields there was lateral and vertical extension of mining. In some coalfields production began in new areas such as East Durham, Nottinghamshire and Cannock. In others such as Tyneside mining reached deeper measures. Much of the expansion of output was achieved by an increase in the amount of labour employed and the number of pits being worked rather than greater labour productivity. It is generally believed that the scale of collieries was increased to counter rising costs of production and not to save labour.[6] Large collieries with over 150 men and producing over 50,000 tons were exceptional even by the mid-nineteenth century.[7] They were only common in Northumberland and Durham where mines had been producing coal on a relatively larger scale at the turn of the century.[8] Most collieries still tended to be low fixed capital, multiple outcrop workings that had to recruit more labour to boost production.

It is unfortunate that surrogate measures of employment at the collieries in Somerset and St Helens have to suffice. No statistics of employment were collected nationally before 1841, nor were there any surveys of employment in mines that are comparable with investigations of textile factories. However, by tracing the volume, scale and pattern of colliery employment in both areas an impression of the number of men employed at

collieries, if not an exact measure, can be arrived at.[9] In his study of mining in South-west Lancashire, Langton has shown that by plotting the location of collieries and estimating their size, it is possible to outline the course of changes in the amount and location of work in a coalfield.[10] Similar methods had to be used here, of which there is a fuller discussion in Appendix B.

Several distinctive changes in the distribution and scale of mining in both areas affected employment. Production increased, new areas and seams were mined, and more miners were employed in both coalfields during the first half of the nineteenth century. The rate and timing of these changes was not the same everywhere. In Somerset expansion was not as great as in St Helens, growing about threefold in Somerset but at least fivefold in St Helens, so that rising coal production was not marked by such a large increase in the number of jobs. The expansion of employment at the mines in Somerset almost ceased just as it began to increase most rapidly in St Helens. Within both coalfields more coal was being raised from the concealed, deeper measures by the middle of the century. More new pits and additional miners were located in these areas; the Radstock Basin in Somerset and the Blackbrook district of the St Helens coalfield. The newer collieries tended to be larger. Districts with fewer, shallower seams were worked out earlier in Somerset than in St Helens, so that the distribution of coal being produced moved in a variety of ways; falling in Nettlebridge and rising in Radstock, for example.

What follows describes in more detail what developments took place in mining in each study area and how the number and distribution of jobs was affected.

2.1 Employment at Collieries in Somerset

At the same time as the number of collieries fell in Somerset, the scale and output of collieries grew so that the amount of work for miners increased. Although continuing to expand throughout the first half of the nineteenth century, coal production and jobs in mining increased most of all in the first three decades. As more pits were sunk and more pits survived in the concealed part of the coalfield, principally around Radstock, output and jobs rose at a higher rate in the districts north and east of the earlier worked areas over exposed measures, especially during the second quarter of the century.

2.1.1 The Number and Location of Collieries

The total number of collieries in Somerset did not increase in the early nineteenth century. (Table 2.1). A fairly constant number worked between 1805 and 1840, about thirty-six, because closures were balanced by new collieries coming into production (Table 2.2), although the number fell slightly thereafter. However, the number of collieries working in the concealed part of the coalfield increased as they did in other coalfields in the nineteenth century.[11] In the Radstock Basin lying to the east and north of the exposed measures, the number of collieries doubled between 1815 and 1850. In earlier worked areas of the coalfield,

particularly Nettlebridge, the number of collieries declined. This was sufficient to increase the proportion of collieries in Radstock from about 17% to over 40% from 1800 to 1860. The proportion in Nettlebridge diminished correspondingly from about 30% to under 15%. (Figure 2.2)

Figures 3a-c show a gradual dispersal of mining ventures from around the exposed measures. This had begun before 1800 but gained momentum with the opening of the canal and tramway links which must have favoured the newly worked areas most of all. At the turn of the century the collieries were still largely clustered around the two exposed areas of coal measures; along the narrow outcrops of the Lower Series on Mendip and the Upper Series in the vicinity of Paulton, High Littleton, Clutton and Stanton Drew. (see Figure 2.20). Relatively few were located over concealed measures and these were mainly strung along the Lower Cam and Wellow Brook valleys.[12] By 1830 the clustering near to the exposed measures was far less intense. There were fewer pits in the High Littleton-Paulton and Coleford-Stratton Common areas, and distinctly more in and around Radstock. New sinkings had occurred further east in Writhlington and Shoscombe since 1800 for the first time. In 1860 collieries on the concealed portions of the coalfields predominated. More collieries were located in and around Radstock. Relatively few collieries in the earlier worked areas remained, especially west of Timsbury and around Coleford.

It is evident from Table 2.2 and Figures 2.4 and 2.5

that more new sinkings were made in the Radstock area while more closures than openings of collieries occurred elsewhere. Very few pits closed in the Radstock area and far more opened. By contrast, in Nettlebridge very few new sinkings were made until the late 1850's while most ceased production some time before then; and in Paulton many older pits were replaced up to 1840 but it seldom happened in the next two decades.

Only a handful of collieries worked throughout the period. (Figure 2.4)[13] No pits worked continuously from 1800 to 1860 in Nettlebridge or Pensford. In other coalfields longevity increased with scale and depth in the nineteenth century. By the standard of the early nineteenth century, collieries in Somerset, especially those in the Radstock Basin, were long-lived and the area had collieries that enjoyed an unusually high degree of continuity, many working longer than was usual in County Durham.[14] Pensford's collieries remained little more than ephemeral, scavenging enterprises up to the middle of the century.

2.1.2 Production

Between the late eighteenth century and the mid-nineteenth century the average size of collieries in the coalfields increased quite markedly from about 4,000 tons per annum to 15,000 tons. An expansion occurred first of all between about 1800 and 1820. (Table 2.3) After 1845 the output at a few collieries increased again. Even though

Somerset's collieries were small when compared with most other coalfields', they raised a large amount from single shafts.[15]

Not all collieries in the coalfield experienced these changes. Collieries in the Radstock Basin were on average producing more than collieries in other basins, particularly Nettlebridge. In the years before the canal opened, Billingsley claimed that the Mendip pits were worked at a smaller scale.[16] Technological improvements, including steam winding, facilitated a rapid increase in output at some pits at the turn of the century. This occurred largely in the Paulton and Radstock districts.[17] The disparity appears to have persisted after the canal opened. (Figures 2.6 a-d) Between 1815 and 1830 new collieries on Duchy land at Welton and Clandown probably produced well over 15,000 tons each.[18] These were far larger than older mines raising coal at Stratton and Clutton.[19] Clandown in particular had a large output for an early nineteenth-century colliery with one shaft. It confirms Buckland and Conybeare's observation that this very deep pit (over 1,000 feet) produced a remarkable 60-100 tons a day.[20] Most of the other collieries in Paulton and Radstock soon matched the levels of production at Welton in the 1830's and 1840's, if not earlier.[21] The majority of these were capable of producing 9,000-12,000 tons per annum. In Nettlebridge only New Rock was possibly of a comparable size, and not until about 1850 did some of these collieries undergo a considerable increase in production again.[22] The six

collieries at Radstock produced about 55,000 tons per annum in the late 1840's and 70,000 tons in the early 1850's.[23] Over 100,000 tons were raised at the beginning of the next decade, and from just four pits. Production at collieries in the Paulton Basin was not expanding. At some, such as Fry's Bottom and Greyfield in Clutton, production tended to fall.[24]

It is obvious from this that trends in coal production in the coalfield were probably uneven in the early nineteenth century. This is not an unusual feature of mining development.[25] The Radstock Basin experienced a growth of output in excess of the other areas, so that by the mid-nineteenth century its collieries raised a greater proportion of production than their numbers alone might have suggested. A few of them - Ludlows, Tyning and Middle Pit - would have been large by comparison with single pits working in other coalfields in the 1850's.[26]

From a series of estimates of total production in Table 2.4 it would appear that there was a continuous expansion of production in the coalfield as a whole, but not at a rate as rapid as in the North-east of England and Lancashire.[27] Canal movements increased rapidly, particularly between 1810 and 1830.[28] The amount of coal carried along the Kennet and Avon eastwards doubled between 1815 and 1830. However, estimates based on quotas imposed by the Coal-Owners Association together with the standstill in canal sales indicate a relatively slower increase in production after the early 1830's. In some

years, for example 1835-6, there was probably a decline, and production in the early 1840's was probably hardly any greater. But there is no doubt that by the late 1840's and early 1850's production was rising quite sharply again, (Figure 2.7), although contemporaries remarked that only the Radstock collieries run by the Waldegraves were fortunate enough to be revitalised because of the mineral railway that was opened in 1854.[29]

At the turn of the century the Paulton Basin probably produced about half of the coalfield's output, roughly 85,000 tons, with perhaps 40,000 tons raised in Nettlebridge, 35,000 tons in Radstock and 15,000 tons in Pensford.[30] Coal production only really expanded in Radstock and Paulton between 1800 and 1830. Undoubtedly, the most considerable increase took place in Radstock. By the late 1830's more coal was probably being produced in Radstock than Paulton. While production possibly doubled in the latter, 1800-1860, it may have increased eightfold in the former, particularly between 1815 and 1835 and 1845 and 1860.

2.1.3 The Number of Miners

By and large the distribution and number of miners in the coalfield moved in a similar way, suggesting that crude estimates of numbers of miners are a fairly accurate summary of employment in the coalfield during parts of the early nineteenth century.[31] The proportion and size of the workforce in the Radstock area increased over the

entire period. (Figure 2.8) In Paulton, Pensford and Nettlebridge the number of miners fell after 1841 at the same time as production began to decline. At a parochial scale employment at the mines expanded and diminished often at the same pace and in the same direction as changes in the production and location of coalworks. (Figure 2.9)

On the whole, the annual average of baptisms where a miner was the father increased in line with production until the early 1830's. (Table 2.5) The average fell slightly in the 1830's at the same time as production was becalmed.[32] The rate of increase in this period is high compared with 1841-61 when there was hardly any increase from 1841 to 1851. Table 2.5 also indicates that although all parts of the coalfield experienced an increase in the number of miners between about 1815 and 1824, only in the Radstock Basin did the number of colliers increase in the 1830's and significantly between 1841 and 1861 as well. In the Paulton Basin after 1830 the number of miners only increased east of Paulton in the Lower Cam valley.

In all likelihood the high growth of the number of colliers in the Radstock Basin depicted in Figure 2.10 can be associated with the location of new sinkings and an increasing scale of production at its collieries (particularly Clandown, Welton Hill, Lower Writhlington, Huish and Wellsway) in the 1820's and 1830's, and the Radstock collieries c.1850. By contrast, closures in the Paulton

Basin, especially in Paulton and Clutton, seem to have reduced the number of miners in the 1840's and 1850's.[33] There was a similar reaction in Nettlebridge after the early 1820's, especially around Coleford. Several new pits in the late 1850's did boost the size of the workforce in this area after 1851. A diminishing workforce accompanied the closure of the main colliery at Bishops' Sutton in the Pensford Basin. Consequently, changes in opportunities for work in the pits were uneven within the coalfield. Up to the 1830's the workforce expanded in nearly all parts of the coalfield. Larger increases occurred in parishes around Radstock, but also in Chew Magna and Stratton for example.[34] In the Coleford area, though, only two collieries remained open in the 1830's whereas there were at least five at the turn of the century. (Figure 2.3) In Holcombe the number possibly fell.[35] Then, between 1841 and 1861 the number of parishes with an expanding number of miners diminished sharply. The workforce only expanded considerably in the Radstock area; at Radstock, Midsomer Norton, Writhlington, Shoscombe and Dunkerton where new collieries began working. Elsewhere there was a relative decline. In most parishes of the Paulton, Pensford and Nettlebridge districts, which could be described as the older worked areas of the coalfield, employment at the mines was shrinking. The number of miners diminished (at varying stages following the rundown and closure of their principal collieries) in Clutton and Paulton in the west, and the main mining parishes on Mendip: Holcombe, Coleford and Ashwick, which had been the

main centres of Somerset's coal mining before 1800.

2.2 Employment at the Collieries in St Helens

An examination of similar evidence for mining in St Helens in the early nineteenth century shows that production and employment expanded at a higher rate than in Somerset, especially from 1830. During this period mining extended further north and east into areas of the coalfield not previously worked to any great extent. Although collieries were fairly shallow compared with those in Somerset and the enterprises consisted of numerous pits working at the same time, the collieries produced more coal than in Somerset even if the individual pits did not.[36] In the early decades of the nineteenth century several collieries were probably capable of raising about 30,000 tons per annum. Quite a few produced over 60,000 tons by the middle of the century. Only the Radstock Collieries as a company could match this in Somerset. (Table 2.7) However, like the collieries of Somerset and the Forest of Dean as well, small producers were still more numerous if declining in total, and employment increased most of all along with production at a few collieries and only some locations.[37]

2.2.1 The Number and Location of Collieries

It is plain from Figure 2.12 that the worked area of the St Helens coalfield expanded during the first half of the nineteenth century to fill the gaps between St Helens and other worked areas of the South-west Lancashire coalfield,

Prescot in the west and Orrell and Wigan to the north. The number of collieries in the area virtually doubled between 1800 and 1860. (Table 2.8) This may have been an impressive rate of expansion compared with that in Somerset, but it was achieved in fifteen years on Tyneside between 1830 and 1844.[38] After a burst of sinking between 1800 and 1805 more closures than openings of collieries followed until the 1820's. However, after 1825 there was a steady increase.

As in Somerset the rate and amount of change varied within the coalfield. (Table 2.9) All of the new collieries, 1800-1805, were located in Hardshaw. However, not all of the subsequent closures occurred in this district. Nevertheless, there was no more addition to the total in Hardshaw until the 1830's. In Whiston several new collieries appeared in the 1820's.[39] But in the west the number of collieries diminished after 1830. Most new collieries were further east, 1825-1860, in Parr, Billinge, and later Ashton and Rainford.

Figures 2.12 a-c illustrate the shifting pattern of exploitation. In 1800 the working colliery sites were largely clustered in two distinct areas, south of Prescot and strung along the St Helens end of the Sankey Canal. But by 1830 both nuclei had spread out, and by 1860 nearly dispersed. First of all, there was some dispersal from the Sankey Canal. New collieries were located in Sutton, Windle, Eccleston and Ashton. Later, mining extended north and east into Billinge, Rainford, and to the northern

edge of Ashton, while fewer remained in Sutton, Whiston and Windle.

A positive balance of openings over closures in each decade except 1810-1820 conceals a high turnover. (Table 2.9) In the first few decades it was probably higher than in Somerset. Certainly, in the earlier decades of the nineteenth century there were more ephemeral collieries in St Helens.[40] This could have arisen from the relative ease of opening a colliery and finding abundant coal.[41] No pits lasted anything near the lifetime of those in Somerset. However, more collieries worked continuously throughout the period, 45%, and the duration of working improved by the middle of the century, especially in Hardshaw. (Figure 2.13) Indeed, most of the rash of closures 1810-20 were of small collieries clustered around St Helens which had opened among the spate of new collieries sunk in the previous decade. (Figures 2.14a-b) In the Blackbrook area collieries were more stable, particularly those in Haydock and Parr serving the Sankey canal trade.[42]

2.2.2 Production

For employment the most significant trends in the coalfield are possibly those associated not with the number of collieries but with their size. In St Helens the number of fairly large collieries producing over 15,000 tons increased in the first few decades of the century. Figure 2.15a shows about eight collieries larger than any

in Somerset at the same date. In addition to the old Ravenhead colliery, several newer collieries (Gerard's Bridge, Rushy Park and Sutton around St Helens itself and Pewfall and Haydock to the east) were in this category as well. No colliery around St Helens, though, approached the size of collieries in the North-east of England until later in the century. In the 1840's several very large collieries emerged. Collieries in Haydock, Ashton, Billinge, Parr and Sutton dwarfed most of the others.[43] At these, individual pits were probably capable of producing over 20,000 tons per annum, like the Radstock collieries.[44] In 1830 the average pit size in Sutton (5,000 tons) was smaller than in Somerset.[45] Many of the others were similar in size to the bulk of those in Somerset. Most of these were located around St Helens and Prescot. In addition there were quite a lot of small operations continuing to raise coal alongside the giants.[46] But, compared with the first few decades of the century there were significantly fewer of these by the 1850's.[47] (Table 2.7)

These changes underlie a fundamental redistribution of production and a rapid increase, particularly after the 1820's. (Table 2.10) Langton estimated that 300,000 tons per annum was produced c.1800 in this area of which two-thirds was raised in the Hardshaw and Blackbrook districts.[48] Later estimates of production would concur with the increasing number and scale of collieries. The momentum of expansion picked up pace after 1830 and production

doubled at least in the next twenty years.[49] Much of this increase was raised from the new collieries in the east and north and from the few large operators which overshadowed the cluster of small collieries around St Helens and Whiston. For example, there is no evidence of any growth of total production in Windle after the 1820's nor in the Whiston area.[50]

2.2.3 The Number of Jobs

If the number of miners is equated with production, the statistical evidence in Tables 2.11 and 2.12 does show that while production in Whiston shrank from the 1830's, it increased in leaps and bounds elsewhere in the coalfield.[51] It possibly doubled, 1851-61, in the eastern and north-eastern townships of the coalfield. These had a proportion of the workforce that was greater than their share of collieries. It implies that coalworks may have been larger in the newly worked area of the coalfield, as they were around Radstock in the Somerset coalfield.

The salient features coincide with the general outline of events drawn from the changing location and number of collieries. When the annual average number of fathers who are recorded as colliers in the coalfield for 1813-19 are compared with those in the 1790's it is apparent that there was some expansion after the turn of the century, particularly in the immediate locality of St Helens.[52] (Figure 2.16) No rapid increase occurred again until the late 1820's and early 1830's when the averages rose further

east, in Parr, then in Haydock and Ashton, although also in Eccleston.[53] (Table 2.11)

Colliery closures in Windle, the western portion of Eccleston, Prescot and Whiston left their mark in the next few decades (Figure 2.17), so that whereas the Whiston area's share of fathers who were miners was one-quarter, 1825-29, it was only one in thirteen of the household heads in 1861. (Table 2.12) The relative importance of the Hardshaw district also diminished even though the number of miners in Sutton and Hardshaw continued to increase, 1841-61. Relatively larger increases in the numbers of miners in Parr, Haydock and Ashton followed the opening of new collieries and the expansion of several existing concerns. But the number of miners on the northern fringe in Billinge and Rainford increased more sharply since there had been no mining for over twenty-five years in Rainford, and probably none before about 1835 in Billinge.[54]

It may be dangerous to draw too much from a comparison of changes in the number of miners in each coalfield from these sources. However, it seems obvious that the Somerset coalfield had a larger workforce to produce much less coal. Somerset had about the same number of miners as St Helens in the early 1850's yet they were only producing about half the amount of coal as miners in St Helens.[55] Different phases of growth in the number of mining jobs in each area are also clear. In Somerset the boom came in the years following Waterloo and soon faded away. In St Helens there was no comparable increase until

about 1830, after which the coalfield's employment grew at a far greater rate than at any time in Somerset, especially between 1841 and 1861. In both areas, however, districts where abundant seams near the surface had been worked out did not experience an equivalent growth of work in mining during this period.

2.3 Coal Mining and Trends in Employment

Changes and variations in numbers employed at collieries are among the consequences of variation in the development of the mining industry. The demand for miners in each coalfield appears to have varied because of disparities in the opening of new mines and the growth of production. Hence, reasons for the existence of coal mining determined employment. On a much larger scale Nef discussed how the economics of coal production could explain some of the experiences of the industry and its workers.[56] Others also suggest that the performance of a coalfield and its prospects of employment are affected not only by the disposition of coal measures but by other factors of production.[57] These include the markets they serve, the attraction of capital, the amount of investment, and the applicability of techniques to improve production and transport coal, to lower costs and improve profitability.

The factors probably affecting the number of jobs in collieries and the fortunes of mining outlined in the first half of this Chapter are shown in Table 2.13. Disparities in the development and location of mining in the nineteenth

century have often been described in terms of a rational response among producers to offset the exhaustion of coal resources and increased costs.[58] The sequence of changes in Somerset and St Helens could be explained superficially in this way. For example, the easily accessible measures were becoming exhausted between 1800 and 1820 in Somerset and 1830 and 1850 in St Helens. Technological innovations in transport and mine work made previously less accessible coal cheaper and easier to exploit in spite of their depth. Deeper working occurred first of all in the vicinity of canals and later railways in both areas. But cost minimisation was not a primary concern of producers according to Langton.[59] He argued that reactions by colliery operators would have been based on relative costs and profit potential.[60] Because coal-fields still had an imperfect, highly localised monopoly market in the early nineteenth century, relatively high cost producers such as the collieries in Somerset could be protected and could make profits.[61] Langton and Hay both suggest that changes in factors which determine production costs (supply) and prices (demand) can be independently assessed since these reflect changes in circumstances which faced producers.[62] For Somerset and St Helens an examination of the role of the market (accessibility and costs of distribution, demand) and then production costs (getting the coal, investment and royalties) highlights, as they did for Langton, how and why employment for miners in each area varied so greatly.

2.4 Coal Mining in Somerset

2.4.1 Getting the Coal to Market

The Somerset coalfield's growth, prosperity and survival rested on preservation of its monopoly control over an external market. In Cumbria Harris found that the struggle for control was tied to transport development.[63] The same could be said for Somerset. (Figure 2.18) The Somerset-shire Coal Canal (SCC) gave Somerset coal producers an advantageous thrust for a while. The penetration of railways from the Midlands by the 1840's took this away. Unequal access to the canal and later the railway probably contributed to the uneven growth of coal production and jobs within the coalfield.

Initially the turnpike improvements probably gave some advantage to colliery developments near to Bath and Frome, such as High Littleton, Paulton and Coleford, in the late eighteenth century.[64] These were the main centres of mining c.1800 and their production was possibly limited by the small size of this market. Development could have been inhibited in the heavily dissected Cam and Wellow Brook valleys without major road works.[65] The canal and associated tramway developments of the first two decades of the nineteenth century altered this. Most pitheads in the Cam and Wellow Brook valleys were eventually linked to a wider network of consumers in Wiltshire, Berkshire and Oxfordshire.[66] More significantly, the canal delivered coal from Somerset which was cheaper than seaborne coal in

Bath and the Upper Thames Basin.[67]

In spite of suffering from early problems the SCC is generally considered to be one of the main causes of a change in the course of development in the early nineteenth century.[68] Of the two canals mooted in the mid-1790's only the branch of the SCC from Midford to Paulton ever fully operated effectively. A wagonway eventually replaced the canal dug from Twinhoe to Radstock in 1815. This network excluded all the collieries in Nettlebridge and Pensford although collieries in Paulton and Radstock needed wagonways to obtain any of the benefits.[69] By 1807 most Paulton collieries were connected and after 1815 all but Huish in Radstock had a tramway.[70] The Clutton and Farrington collieries were never joined to the canal. It is probably no coincidence that the earliest increase in production occurred in the Lower Cam valley, viz. at Timsbury, Paulton and Camerton, and the larger and newer collieries after 1815 were situated mostly in the Wellow Brook valley, viz. Welton, Radstock and Writhlington. At the same time as production around Radstock began to increase steeply many more of the collieries serving only a landsale market closed or maintained a lower rate of production. There were few new ventures in Nettlebridge which were successful once the canal could take coal from Paulton and Radstock to part of their market around Frome.[71]

As in Shropshire, coal carried by railways from other areas gradually broke into the coalfield's canal sales

market in the 1840's.[72] The collieries selling coal from the canal were then having to compete with coal from South Wales and the Midlands which was considerably cheaper.[73] The contest was 'unfair'.[74] From 1845 numerous coal works throughout the Paulton and Radstock districts complained of this and attributed their plight to the lack of a railway.[75] The first rail connection between the coalfield and the emerging national network from Radstock to Frome initially provided only the Radstock collieries with an outlet. It is perhaps not surprising that production expanded at Radstock once they were able to send coal more cheaply into their neighbours' markets and new areas such as South Wiltshire.[76] At the same time, in spite of efforts to overcome their disadvantage, many of the larger collieries in Welton as well as Camerton, Timsbury and Paulton languished.[77] New sinkings at Babington and later Mells probably occurred as a result of the railway and reversed a downward trend in Nettlebridge.[78]

2.4.2 The Market for Somerset's Coal

The importance of access to roads, canals and railways on the location of collieries and their profitability possibly reflects a small internal demand for coal.[79] The size and structure of Somerset's market for coal possibly limited production and development.[80] Unlike coalmining areas such as Shropshire or South Staffordshire, Somerset depended entirely on export to expand its production. Some inland coalfields grew without any significant change in the

size of their market, although as in Somerset production increased once canals or railways improved access to a larger population and range of consumers. The Somerset coalfield's consumers were mainly domestic, so that production largely grew because the canal increased the number who could afford to buy Somerset's coal. (Figure 2.19)

Because the collieries relied heavily on small sales to domestic users through canal distributors and coal hauliers, the market was insecure and seasonal.[82] It may not have encouraged a rise in production after the 1820's especially in the landsale areas. By then most towns served by the coalfield such as Bradford, Frome, Shepton Mallet and even Bath had stable populations.[83] The potential market in rural Wiltshire and Berkshire may have been small principally because coal was so expensive.[84] At the extremities of the market in Reading and Oxford, Somerset coal had a slight price advantage over sea coal.[85] Landsales of Somerset coal could not compete with sea coal in Bristol, so that it is not surprising that the collieries in Pensford and Clutton did not increase their production markedly.[86]

In addition, industrial users were small, and also scattered. The coalfield did not have any large users of coal in Bristol. In Bath, the main market, industries were chiefly artisan workshops.[87] The gas companies in Bath and later the Wiltshire towns became some of the largest consumers.[88] A few steam-powered textile mills in the Avon, Frome and Wylye valleys used Somerset coal.

Tann estimated that 20,000 tons were probably consumed by them c.1825 compared with about 2,000 tons fifteen years earlier.[89] Even so, the industry was not installing steam powered machinery very rapidly to all processes. With more efficient use of coal and little expansion in the size of the industry demand probably did not rise.[90] Other industrial users such as limekilns, breweries, brick and paper works made use of cheaper small coal.[91] Until the Westbury Iron Company restarted coal production at Newbury c.1855 to provide coal for its smelters, only collieries at Vobster and Bishops' Sutton supplied industrial users directly.[92]

2.4.3 Producing the Coal

According to Hay, limited opportunities for expanding coal mining would exaggerate the effect of differential production costs on output and employment.[93] For coalfields competing in the same market, such as the Bristol and Somerset coalfields trying to supply coal to Bath, relative costs would resolve the issue. Within a coalfield the costs of transport in the price would be approximately the same, particularly for all those connected to a short canal like the SCC. The experiences of other industries at the time also suggest that once demand is quenched, relative costs of production have a greater effect on levels of employment as employers are eliminated by price competition.[94] In Somerset, production capacity and cost were influenced by several factors. As other studies have

found, these are the disposition of coal resources, working technology, capital available and invested, and the control of mineral resources. (Table 2.13)

On the whole, Somerset collieries had relatively high costs of production. These made it difficult for most collieries to compete with producers in other coalfields, but especially collieries without access to the canal or equipment which reduced unit costs. In the early nineteenth century natural defences restricted the level of competition. However, even though demand possibly outstripped supply at times, the threat posed by rivals was not far away.[95] Many collieries had no alternative but to use new methods of production to increase the supply of coal and reduce their costs of production if they were to survive. Without investors from industry or adequate investment from mining profits, most of Somerset's collieries in the mid-nineteenth century were not able to compete so successfully. Where capital investment was available, as at Radstock, production could be stimulated, in spite of the inherent difficulties, and the chances of providing employment increased.

It is obvious that coal measures could primarily influence the location and lifespan of collieries in Somerset, as elsewhere. Fisher has accused many economic historians who have studied coal mining of 'geological determinism' although Wrigley felt that these factors may be underestimated.[96] In Somerset, geological conditions imposed restrictions on the extent of coal working.[97]

These were not just vertical and horizontal limits to production. Unlike most coal mining areas, the coal measures are only exposed over a relatively small area. (Figure 2.20) The most accessible Upper Series measures dip beneath a thickness of Oolitic Beds. On Mendip the Upper Series lie below the Lower Series at a depth of at least 300 feet. Consequently coal was not easy to extract. Deep valleys aided access. However, there was no mining on the valley floors in Radstock and Camerton until the 1760's. At Radstock the first coal measures are only reached at about 400 feet, compared with less than 200 feet in Paulton, Welton and Bishops' Sutton. Undoubtedly, the great depth of coal compared with other coalfields may have hindered progress because of the extra costs involved pumping out water and lifting coal from the pit bottom. Nonetheless, at the turn of the century mining at over 500 feet was not unexceptional in the Paulton and Radstock districts.

New collieries were sunk to mine concealed measures throughout the coalfield once exposed coal measures were exhausted.[98] But it appears that this occurred more frequently where the exposed measures could no longer meet demand. Collieries at Timsbury and Radstock exceeded depths reached on Tyneside, c.1800-1820. At about 900 feet (1810) these are usually considered to have been the deepest workings in the country.[99] But there is no evidence that a Tyneside colliery was deeper until the 1820's and 1830's.[100] For example, Old Pit at Radstock

brought up coal 1,074 feet in the 1790's[101] At 1,200 feet Clandown was possibly the deepest colliery in Britain c.1820. In most other coalfields the greatest depths were hardly 500 feet.[102] As in Tyneside, Cumbria and Midlothian, deeper coal mining was stimulated by exhaustion as well as a latent demand. Old collieries in Somerset were eventually faced by either digging deeper or closing. Mining in Clutton, Radford, Bishops' Sutton and Stratton survived by finding deeper seams worth mining, but none of the collieries in High Littleton found any.[103]

Fortunately drainage does not seem to have been a problem. A few collieries, such as Dunkerton, closed permanently and temporarily because of flooding from old workings; Middle Pit, Farrington and Hayeswood, for instance.[104] Unfortunately, good quality coal was not always found nor plentiful seams. Some collieries closed because of the poor quality of their coal; Shoscombe in 1834.[105] In addition, coal working was not made easy by thin seams, invariably under twenty inches, and convolutions and faults in the measures being mined.[106] Unit costs, especially of labour, were increased since these conditions required more inclines and branches and produced more waste.

"Under these circumstances", observed Buckland and Conybeare, "that the seams should be worked with profit must be attributed chiefly to the highly improved machinery introduced into this district".[107] To surmount huge

difficulties and relatively higher costs of production some Somerset producers were able to challenge their rivals by expanding the scale of production and adopting some of the latest technology to lower the costs of working at great depth. By contrast it is likely that primitive working methods continued for longer in areas such as South Wales and South Staffordshire where there was less pressure to reduce costs by these means to maintain and obtain profits.[108]

In Somerset all mining in the early nineteenth century was carried out by single shafts. In other mining districts shafts were not universal and in most coalfields, Tyneside and Cumbria being exceptions, collieries generally consisted of a large number of shallow shaft and adit pits.[109] The longer duration of some colliery sites in Somerset may reflect higher investment in sinking shafts and subsequent branching rather than continuous sinking to work a lease.[110] At all the larger and deeper collieries steam pumping facilitated drainage from the 1760's.[111] Small workings in Nettlebridge and Pensford used pump wheels and buckets well into the nineteenth century in spite of depths of over 500 feet.[112] The deepest needed several pumps and these consumed a high proportion of the output, possibly as much as 15%.[113]

By bringing a large amount of coal to a common point for hoisting a great distance, investment to improve shaft winding was probably wise.[114] In 1792 soon after steam winding was adopted in the North-east, several colleries

in Somerset followed suit. This occurred in other coalfields but principally where it was more efficient than horse power to raise larger amounts of coal.[115] Steam winding in Somerset improved productivity and profits from working coal at these great depths.[116] Production and employment probably gained more from this than any other innovation in the first decades of the nineteenth century. According to Buckland and Coneybeare and other reports, new machinery allowed collieries in Radstock, Welton, Camerton and Timsbury initially to expand production to about fifty tons a day by the 1820's.

Only slower advances were made in improving the efficiency of underground haulage. In the North-east wheeled hudges, tracks, iron tubs on runners and larger containers were common by the time the Mining Commissioners reported in 1842.[117] There are scant references to any of these in Somerset until after the mid-nineteenth century.[118] There were some exceptions such as Camerton.[119] In general, demand may not have encouraged a further increase in pit capacity which these changes might have permitted. However, the narrowness and unevenness of seams throughout the coalfield may have been a hindrance.[120] Eventually at Radstock, Welton Hill and Clandown in the late 1840's and 1850's, some changes occurred which resulted in an increase of production because these methods improved speed and efficiency.[121] The shafts at these collieries were widened, lined with bricks and installed with cages and guides. Shafts in general were very narrow at $4\frac{1}{2}$ feet and this would have restricted winding capacity. A hooker

system of lifting men and coal was dangerous and also meant that more coal was broken.[122] Possibly as a result of this and the railway, the Radstock collieries had a competitive edge over older collieries in Paulton, Clutton and even Clandown in the 1850's[123] These did not expand their workforces whereas Radstock did. Furthermore, the lessees at quite a few collieries complained about their lack of profit from working distant coal measures. At Radstock underground improvements such as self-acting inclines and pony haulage reduced these costs. Two up-shafts were closed in 1854 but rationalisation resulted in redeployment rather than redundancy.

Inevitably capital investment played a part in determining the level of technology, employment and production at mines.[124] Many pits in Somerset did not repay the investments made, but employment was provided nonetheless because profits supplied an incentive and some of the cash for investment, as in other coalfields.[125] However, when profits dried up, Somerset's coal mining industry was possibly the loser. Most new investment depended on profits earned from mining. In Somerset the most common form of funding for refitting and sinking in the early nineteenth century was privately organised by the groups of men and women who were shareholders. At Writhlington, for example, the money came from their other concerns or out of the dividends from their shares in the collieries.[126] Regular profits were a boon. Most share-holders in Somerset, as in South Wales or Shropshire, were

local businessmen, landowners and colliery proprietors often with interests in a number of separate mines. Despite low profits from most collieries at any time in the coalfield's history, the risk of sustaining losses and the greater costs involved in working deeper coal, there is no evidence of a shortage of speculators.[127] They may not have been the right ones. Nor did investors and small partnerships give up their struggles easily. Many depressed works such as Nettlebridge and Farrington changed hands as going concerns or were temporarily saved from bankruptcy through the 'generosity' of landowners.[128] However, the impression is that investment was increasingly derived from the profits of company shareholders and landowners after the 1820's. When profits declined and accrued by mid-century at relatively few collieries, probably only Radstock, Welton and Writhlington, a lack of capital at all but these may explain why there were few attempts to modernise and increase production.[129]

A vicious circle of technological problems, high costs, reduced sales and losses troubled pits in Paulton, Clutton, Timsbury and eventually Camerton and Welton.[130] If the problems faced by the Duchy's lessees at Stratton are any guide, the same factors may have inhibited production and development in Nettlebridge and Pensford for a lot longer. By contrast the potential profit attracted an amalgam of local and outside interests involved in the Westbury Iron Ore Company to sink several pits in Babington c.1855.[131] No small coal master achieved much success. A few

persevered, particularly in Bishops' Sutton, but there was not much chance to prosper without heavy investment, which only the Waldegraves had proved by 1860.

Two other factors, which have escaped attention so far, affected profit; the control of competition and the control over the mineral resources exercised by landowners.[132] I would agree with Richards who wrote:[133]

> " On occasion there may have been truth in the remark of a Staffordshire coal owner that 'contiguous collieries must by force of circumstances be rivals and enemies' but the local experience usually gave the opposite impression"

In Somerset a limitation of production probably stifled competition between the collieries who were the principal suppliers of the SCC's markets. It allowed many of them to survive the effects of falls in demand. Collieries outside the cartel in Nettlebridge closed down more frequently. Ostensibly, it was a traders' association as in the Erewash valley.[134] However, the Somerset Coal Owners' Association affected the pattern of production, like others in Derbyshire and the North-east of England.[135]

A vend limitation manipulated profits at some collieries in Somerset for quite long periods. All the colliery proprietors in the Paulton and Radstock districts belonged to the Somerset Coal Owners Association. It had been in existence at least in the 1790's and it probably remained a formal grouping at different times throughout much of the nineteenth century.[136] In Somerset their

advantage and success in controlling output and price in the early nineteenth century arose from their stranglehold over the canal and from having a virtual monopoly in the market it reached until the 1830's.[137] The same circumstances existed at times in North-east England in the eighteenth century.[138] In the 1830's they introduced measures to counter falls in demand and control production levels.[139] Because shareholders had interests in a variety of pits, a limitation adhered to by all of them offered a means to protect all of their investments. Apart from maintaining profits they avoided fiercer internal competition which might have caused closures. These fears were well founded. Once Camerton and then Radstock broke from the agreement and embarked on higher production to reduce costs, older pits such as Paulton Ham and Hill, Radford and Grove reduced their production and eventually closed.[140] The same process which led to insolvency had probably brought the end of mining in most of Nettlebridge in the previous thirty years. Although the quota system encouraged some large companies to open new collieries such as Shoscombe and Wellsway to increase their share and then transfer production when the allocation fell, the strength of the Vend did little to encourage any small independent landsale collieries.[141]

By another means the land and mineral owners in the coalfield affected company power and profits.[142] On the surface they influenced the extent, duration and location of coal working. Leases restricted the amount of land

that could be worked and the length of working. The larger landowners included terms laying down the phases and methods of exploitation. The large lessors like the Duchy of Cornwall were able to force the operators to work difficult measures during the term of a lease and prohibit reckless activity which might have left them with a great deal of ungettable coal left underground.[143] This affected the lessees' profits. At Radstock and Camerton some dissatisfaction with the lessees probably encouraged the Waldegraves and Jarretts, respectively, to take over the working of their collieries when the leases expired.[144] They feared a reduced freeshare.

The working profits of all leased collieries were reduced by the exaction of an extremely high freeshare and outstroke rent. The Duchy, for example, obtained one-eighth from Old Welton until 1867 for coal mined at over 1,000 feet, by which time less fortunate landowners such as the Earl of Warwick had settled for one-fifteenth or one-twentieth.[145] By refusing to accept a lower freeshare for coal from thin seams many jobs may have been lost.[146] In South Wales one-twenty-fourth and one-fortieth was common at much less deep collieries, and it was usually one-twentieth in Durham in the early nineteenth century.[147] However, only the large landowners managed to achieve any influence. Christ Church, Oxford, had difficulty maintaining a regular income because it was unable to wield enough power over any single lessee which mined its coal.[148]

Nonetheless, by whittling away the profits of the principal investors in Somerset's coal mines, the growth of production and productivity may have been restricted. More often than not the Jarretts, Waldegraves and the Duchy were the only beneficiaries of the coal mined in Somerset.[149] Undoubtedly jobs at the collieries in Somerset, as elsewhere, depended on the profit and loss account. At the closure of Fry's Bottom and Old Greyfield in 1823 the coal agent, Joseph Cook, wrote in the sales and freeshare ledger "Here ends the profits and pains of more than half a century."[150]

2.5 Coal Mining in St Helens

2.5.1 Getting the Coal to Market

The same factors influenced mining in the St Helens area in different ways. Obvious differences between the two coalfields, such as relatively thick, easily accessible seams in St Helens and an expanding local industrial market from the 1820's, go a long way to accounting for many differences and explain why some similarities existed in the development of their mining industries. Events and experiences in St Helens are best explained by several significant differences. It had a market which was expanding, especially after 1840, and it had a lot more manufacturing. The coalfield maintained modern and effective means of transport to evacuate coal cheaply and profitably. There were ample amounts of coal at relatively shallow depths and

at no great distance. Less productive measures of the same variety were not mined. Fortunately, there was competition from other coal producing areas, in addition to competition between producers in the coalfield, which possibly encouraged modernisation and investment. By contrast to Somerset the potential for profit and the availability of capital from mining and industry were a positive inducement.

Langton found that transport links between the St Helens' collieries and potential customers underpinned the coalfield's performance.[151] It remained true in the nineteenth century.[152] (Figure 2.21) Consequently, relatively lower prices for coal than in Somerset may have stimulated greater demand. In spite of improved access to the market by competitors during the eighteenth and nineteenth centuries, the Sankey canal and then the railways reduced costs sufficiently for St Helens' prices to undercut them.[153] For example, production in St Helens grew at the same time as it stagnated around Worsley.[154] It did not fall back after the 1830's even though transport developments such as railways brought producers into conflict with competitors from a larger area.

Differential access to the market affected producers, as in Somerset, inhibiting development where collieries could not sell coal as cheaply as others. In the eighteenth century the Sankey canal allowed some producers in the Hardshaw and Blackbrook areas of the coalfield to sell coal

down the Mersey and to the brineworks in Cheshire.[155] Turnpikes had allowed collieries in Whiston to develop a landsale trade of coal to the burgeoning Liverpool market.[156] In the early nineteenth century wagonways gave more collieries a link to the canal and access to these external markets. Production probably grew at collieries in Sutton, Ashton and Haydock, as in Radstock, as a result. Meanwhile, the cost of land carriage prohibited development in areas at a distance from the canal such as Rainford until the 1850's.[157] It may well have restricted mining in Eccleston and Windle as well.[158] Certainly the collieries most vulnerable to closure were those not connected to the canal. Even in the mid-nineteenth century collieries at greater distances in Ashton and Billinge depended on private railroads to take their coal away.[159] By then, however, the links were mainly to railways although the Sankey and trade down the Mersey and Weaver remained very important.

Initially, the St Helens and Runcorn Gap Railway allowed the movement of coal to the Mersey to increase. It did not supersede the canal but possibly strengthened the position of producers in Hardshaw during the 1830's.[160] Only a few collieries joined up with it while additional collieries to the north were linked to the canal. In the course of the 1830's seven large collieries made a connection following Broad Oak in 1832. No new collieries did so although Blackleyhurst was connected by a long

tramway to the Blackbrook branch of the canal.[161] The Liverpool and Manchester Railway had less impact. Production around Whiston may have been boosted to begin with. However, it is just as likely that it brought in coal from further afield to the Liverpool market.[162] Only in the 1850's did railway extensions from St Helens into Parr, Haydock and Ashton, and from Wigan into Rainford, possibly encourage new mining activity.[163] Employment in these areas apparently grew rapidly while it was relatively stable in parts of the coalfield such as Windle and Eccleston which were still dependent on land sales.

2.5.2 The Market for St Helens Coal

The consumption of coal increased sharply in St Helens' markets. Consequently, mining expanded throughout the coalfield, and not surprisingly at a much faster rate than in Somerset. Sales outside the coalfield were important, but unlike Somerset some collieries supplied local consumers. For both markets, however, transport facilities such as the canal and railways were necessary if collieries were to have some flexibility and lower costs.[164] (Figure 2.22) As a result, more development probably occurred around the canal and later near the railways, as in Somerset, since collieries in these areas were in the best position to supply a wider range of customers.[165]

Domestic coal consumption must have increased by a

large amount in the area. Population growth in South Lancashire was remarkably high compared with North-east Somerset and Wiltshire. No doubt a lower price for coal and lower transport costs enabled more people to afford it. By the 1840's sales from the Sankey collieries went further afield, beyond Liverpool to Ireland and North Wales.[166] Demand from industry probably stimulated a more remarkable growth of production. Only collieries around St Helens and those selling their coal via the canal could supply this market. Consequently, landsale collieries at some distance from St Helens, especially around Prescot, had little cause to increase their production.

Brineworks in Cheshire, glass factories in St Helens and Warrington, and soap boilers in Liverpool, it has been claimed, established eighteenth century mining around the terminus of the canal.[167] A cluster of collieries around St Helens served this market. In St Helens and at Widnes and Runcorn in the Lower Mersey valley a wider range of less precarious coal-using industries grew. The salt industry continued to be important but consumption in chemicals, glass and metal gradually became relatively more important.[168] As the collieries in the east linked to the Mersey by the Sankey and later the railway retained a monopoly over the supply of coal to them, their fortunes became tied to the success of these industries.

By contrast with the salt and Liverpool markets, the

smaller local industrial market did not have a very stable demand for coal until later in the nineteenth century. A high level of demand for short periods probably allowed high cost producers such as landsale collieries in Whiston, Eccleston and Rainford to survive in the early nineteenth century. Demand up to 1815 may have led to the sinking of a plethora of new coal mines in Hardshaw 1800-1810; many of these were short-lived.[169] Production of glass fell after the Napoleonic War not to rise again until the 1830's.[170] Both the copper works closed. Several collieries near St Helens closed at much the same time, and there is little evidence of an extension of mining during this period.[171] Once industrial demand perked up in the second and third quarters of the nineteenth century, mining in Hardshaw and Blackbrook suffered no further setback. It was fortunate that the synthetic chemical and glass industries did not endure severe cyclical depressions like iron and textile industries, although some closures in Sutton in the early 1840's could be attributed to problems at the glassworks.[172] On the whole, new glass, copper and chemical works were established in St Helens and their production processes used large amounts of coal.[173] Collieries nearby held a competitive advantage. With bulk handling facilities coal could be taken to them over short distances but this still limited supply to collieries in the townships of Parr, Haydock, Billinge and Ashton in the coalfield, barring coal from Wigan, Leigh and Bolton, or even Whiston and Rainford.

2.5.3 Producing Coal in St Helens

Limitations to the growth of production imposed by geology, capital and technology were not too severe. In general, abundant, shallow reserves of coal and high levels of profit were a boon. There were constraints. Some colliery owners, who went bankrupt possibly because they were sustaining losses or whose coal leases were exhausted, discovered this. But profit, equipment and coal seams were not the overriding factors that they were in Somerset nor did they bring about obvious disparities within the coalfield. Differences were probably not so exaggerated at this stage of development in St Helens when demand was high because the price of coal usually guaranteed profits. Costs of production were generally still very low.

The seams in the coalfield were rarely found to be less than three feet thick.[174] In South-west Lancashire, as in Durham, it was said that paltry seams of about three feet, which did not exist in Somerset, were never worked in the early nineteenth century.[175] They did vary in quality and thickness and, of course, depth. However, there was a demand for all types of coal in the local industries and homes. According to Gascoigne, a St Helens landowner, their proximity to the surface rather than their quality would have been more important.[176]

Coal measures outcrop throughout the worked area but generally dip southwards and eastwards. As a consequence, the top seams east of Hardshaw were largely present only

at greater depths to the south and east. A fault between Prescot and St Helens meant that most of the top seams in the former were not found at depth under St Helens. Then immediately to the north and west of St Helens, in Windle and Eccleston and on the western edge of the coalfield, there were fewer seams below 300 feet. It is not surprising to find that in this area a relative decline in production took place during the nineteenth century, which also occurred in parts of Somerset.[177] Around St Helens collieries in Windle, Hardshaw and Sutton still worked coal within a few hundred feet of the surface during the first years of the century.[178] In longer worked areas, such as Tarbock and Haydock, new pits began to work deeper seams.[179] At about 300-400 feet these were shallow compared with all but the oldest and smallest of Somerset's operations. Unlike Somerset shallow working continued in the coalfield. Small collieries in long worked areas such as Green Lane worked out a few remaining areas of shallow deposits in the 1840's and 1850's,[181] but large collieries were sustained by going much deeper during the course of the century. Most of the collieries in Parr, Haydock and Ashton began to mine the measures that outcrop to the north and west in the 1840's.[182] These were often exhausted at shallower levels and collieries that mined them, Rushy Park, St Helens and Burtonhead for instance, were closing down.[183] Relative to the depth of collieries in Somerset none had to go down very far to reach coal. By the 1820's Ashton Green, for example, was working coal at a depth of 570 feet,

and in the 1840's all the collieries in Parr were exploiting the Rushy Park seam at 800 feet.[184] Collieries which survived from the early decades of the century to 1850 around St Helens sunk shafts to new levels as much as 900 feet down.[185] Gerard's Bridge and Ravenhead were exceptional because they had a large number of seams as well as leases from several landowners. To achieve these changes and increase the supply of coal from pits and collieries there were changes in the means of getting the coal.

In the early nineteenth century there is little evidence of sophistication compared with Somerset. Continuous pit sinking every few hundred yards was the norm.[186] Steam pumping had been installed at most collieries but not steam winding.[187] Demand rather than depth did eventually encourage its use. But because shafts were fairly short and much wider than the much deeper pits in Somerset, up to 100 tons a day could be raised by hand winding and whimsey if the colliery was less than about 250 feet deep.[198] Whereas collieries such as the Earl of Derby's at Rainford only needed a whimsey, engines were being used at large collieries working coal at similar depths.[189]

Technological improvements in the movement of coal underground were being introduced at a pace that was not far behind that of the North-east of England. Where the distances from the face were lengthened underground, haulage on iron rails and steam powered inclines began to

replace dragging.[190] These methods were used at Ashton's Green in the 1820's and certainly at other large collieries in St Helens, including Gerard's Bridge, Rushy Park and Haydock by 1842.[191] Judging by the development at Haydock and Sankey Brook, they made it possible for large collieries to expand and continue working. These collieries were able to take up leases for coal remaining at greater depths under seams formerly worked by smaller collieries such as Smithfield and Barton's Bank.[192] By no means all the collieries were modernised. Brick-lined shafts with guides to accelerate the uptake of coal and allow efficient riddling to be undertaken at the surface by women were also confined to the larger collieries to the east of St Helens.[193] Whyte discovered, however, that very few collieries had altered their method of coal getting to increase the maximum output from a lease. Wide work, which was probably a long wall method that did not leave pillars of coal, was practised at Cowley Hill and Union in the 1840's.[194] It did not become common. Nonetheless there is no doubt that investment in sinking and plant, as in Somerset, increased productivity against rising costs and improved stability for some collieries and in some parts of the coalfield.

The competitive edge to mining in the coalfield and the growth of employment in St Helens and to the east owed much to the activities of investors and landowners. Investment in the area gained from some vertical integration of industrial and mining capital.[195] The use of coal

in salt works and other industrial processes encouraged some manufacturers to put money into mining. In the late eighteenth and nineteenth centuries production along the Sankey, in particular, was boosted by the intervention of local industrialists and others who consumed coal in Liverpool and Cheshire, such as Bourne, Greenall and Claughton.[196] Close linkages may have insured large scale production and investment against some of the swings in demand which occurred in early nineteenth century markets. However, collieries closed when these businesses collapsed, for example Garswood and Cropper's Hill.[197] Large scale production in the nineteenth century was more likely to be funded entirely from the profits made by coal proprietors and shareholders from mining; Bromilow, Eccles and Stocks having their counterparts in Somerset. In several cases, however, the active interest of the second generation of colliery proprietors waned. Barker and Harris remarked that William Pilkington was the only new industrialist to begin his involvement in mining after the 1840's.[198] St Helens and Liverpool businessmen continued to invest in mining, when in Somerset there was no evidence that industrialists from Bristol or Bath invested capital.

Without exception large landowners no longer played any active role.[199] First Eccleston and Gerard and then, in the 1830's and 1840's Derby, Sefton and Legh, gave up mining some of their extensive mineral rights themselves.[200] They followed Bold and Hughes in Sutton, for example, in letting large coalworks mine extensive areas under their

properties.[201] To keep a colliery operating the lessee needed some security of tenure and a large area of coal. In Hardshaw this may have been prohibited by a large number of landowners leasing to numerous undertakings.[202] In Parr several operators, particularly the lessees at Sankey Brook, gradually accumulated leases to work larger areas. By contrast, in Windle Moss, Ashton, Haydock and Golborne, the Gerards and Leghs with their large estates could limit the number of mines more effectively. Collieries on their land, such as Gerard's Bridge, Rushy Park, Blackbrook, Haydock and Pewfall, tended to be relatively large. Short leases and restrictions within them on getting coal beyond certain depths and from un-named seams may have held back investment and caused some of the operational instability. It does, however, reflect careful husbanding of their coal in what could be a volatile market. Like their Somerset counterparts they wanted to ensure a regular income over a longer period and the extraction of most of the coal under their land. Many disputes centred on the profligate exploitation of coal by lessees.[203] Unlike Somerset, demands by the landowners could not have been seriously excessive. They obtained minimum rents in lieu of annual royalties and these seem to have been carefully calculated.[204] Unfortunately, there is no evidence of the amount of profit earned, especially in the middle of the century.

In a more difficult period, the 1820's and 1830's, Barker and Harris drew attention to the existence of the

Sankey Brook Owners Association.[205] This operated at the turn of the century as well. During each period it tried to keep up the price of coal. Its demise may have precipitated several closures in Hardshaw in the 1810's and Sutton and Parr in the late 1830's, just as in Paulton in the 1850's. Because the canal depended largely on coal for its revenue, the Association could effectively determine its charges. In 1819 and 1844 the owners also closed ranks to break two large and crippling strikes.[206] In general, however, the Association probably did not affect employment to the same extent as its counterpart in Somerset. Threats to their market and profits were widespread, from Wigan, Worsley and North Wales; but at this time they were not dangerous because collieries in St Helens had numerous advantages, especially the Sankey producers. In spite of vicissitudes such as losses, closures and strikes, the major colliery owners were probably not hampered in realising profits from their investment, raising production and providing more jobs because of rising demand.

2.6 Concluding Remarks

It is clear that as the location of collieries, their output and scale changed so did the number of jobs for miners. Coal production, collieries and the number of jobs down the pit grew at a faster rate in St Helens than in Somerset in the first half of the century, but trends varied considerably. In Somerset the number of jobs

increased most of all in the first few decades. In St Helens, after a steady but not spectacular increase in the amount of work until 1830, a rapid rise occurred. In both coalfields more coal was being produced from concealed and deeper measures where, in general, larger pits got the coal than in the earlier worked areas. By the middle of the century more of the coal produced, and more of the pits and additional jobs in mining, were located in the Radstock Basin in Somerset and in the Blackbrook district east and north of St Helens itself. The workforce dwindled in Nettlebridge after 1820, in Whiston from about 1850, as production levelled out and as new collieries were no longer sunk in sufficient numbers to replace those that were closed down.

The diversity of the industry's development as it affected jobs owed much to local conditions in the two coalfields. Factors such as the depth and thickness of seams, speculation and enterprise on the part of coal proprietors like Richard Evans at Haydock or the Waldegraves at Radstock,[207] the profits exacted by landowners, access to larger markets afforded by roads, canals and later railways determined where jobs were and how many men were wanted. It seems as if disparities in rates of growth can be attributed to the coalfields' particular markets, productivity, prices for coal, capital, and control over competition. Yet differences were essentially the outcome of changes in demand outside each coalfield.[208] The performance of coalfields and collieries in different

areas, and as a consequence the number of jobs, were influenced by circumstances largely beyond the control of people in the coalfield. Although competition was a stimulus in both areas, it eventually retarded the growth of jobs in Somerset, for example, as the favourable but precarious position of the early decades of the nineteenth century was whittled away as other coalfields penetrated its market with cheaper coal.

The livelihoods of miners may have varied because of the diversity in the industry. If the development of mining left its mark on the scale of pits, the number of jobs and the ups and downs of production, for example, miners' wages and the organisation of their work at the pits may have been different.[209] The effects which mining development may have had on work and the experiences of employment in coal mining are explored in Chapter 4.

Chapter Notes

1 For example, G Stedman Jones Outcast London (1971); J W Scott The glassworkers of Carmaux (1974); M Rowlands Masters and men in the West Midland metalware trades before the Industrial Revolution (1975); J Foster Class struggle and the Industrial Revolution (1974)

2 D Bythell The sweated trades : outwork in nineteenth century Britain (1978) 36; E Hopkins Working conditions in Victorian Stourbridge International Review of Social History 19 (1974) 423; J Treble Urban poverty in Britain 1830-1914 (1979) 55-80

3 J Rule The experience of labour in eighteenth century industry (1980) 30-1

4 Rule (1980) 61; J Benson British coal miners in the nineteenth century (1980) 64

5 Benson (1980) 9-16; S Pollard A new estimate of British coal production Economic History Review 2nd series 33 (1980) 219

6 R Samuel The workshop of the world History Workshop Journal 3 (1977) 21 and C P Griffin Technological change in the Leicestershire and South Derbyshire coalfield before c.1850 Industrial Archaeology Review 3 (1978) 65 draw attention to this

7 A J Taylor The coal industry in R Church ed. The dynamics of Victorian business (1980) 52, although a few collieries were this large in many coalfields before this; J H G Lebon The development of the Ayrshire coalfield Scottish Geographical Magazine 46 (1933) 139-141; O Wood The collieries of J C Curwen Transactions, Cumberland and Westmoreland Antiquarian and Archaeological Society New Series 71 (1971) 211

8 P Cromar Spatial change and economic organisation : the Tyneside Coal Industry 1751-1770 Geoforum 10 (1979) 45; I Leister The sea coal mine and the Durham miner University of Durham Geography Department Occasional Paper New Series 5 (1975) 10-12; J U Nef The rise of the British coal industry Volume 1 (1932) 25, 361-2; Taylor (1980) 52-3; Pollard (1980) 222

9 There is a fuller discussion of the sources used in Appendix B

10 J Langton Geographical change and Industrial Revolution : coal mining in South-West Lancashire, 1590-1799 (1979) 13

11 Durham, The East Midlands and later Staffordshire, South Wales and South Yorkshire; J T Coppock The changing face of England 1850-circa 1900 in H C Darby ed. A new historical geography of England after 1600 (1976) 300-301; J H Morris and L J Williams The South Wales coal industry (1958) 4-5; W A Moyes Mostly mining (1969) 67; A R Griffin Mining in the East Midlands 1550-1947 (1971) 97;

B L C Johnson and M J Wise The Black country 1800-1950 in R H Kinvig et al ed. Birmingham and its regional setting (1950) 234

12 There was no mining in these areas until the 1760's

13 To which can be added collieries that worked discontinuously because new pits were sunk nearby viz. Hippisley's Stratton Common colliery, Vobster, Welton Hill, Clutton (Fry's Bottom) and Dowling's Bishops Sutton colliery

14 T Ashton and J Sykes The coal industry of the eighteenth century (1964) 11; Nef (1932) Volume 1 359, 369. Leister (1975) 14 believed that sea coal mines had a life cycle of 20-30 years in the early nineteenth century

15 R Hunt ed. Mineral statistics of the United Kingdom (1854-). In 1855 the average production at collieries in the South-Western coalfields was 16,257 tons, larger than in Derbyshire, Warwickshire and Staffordshire but well below East Glamorgan and Gwent (35,486), Northamptonshire (40,470), Cumbria (35,192) and the North East of England (56,525), Hunt (1855) 60-2. See also A J Taylor The Wigan coalfield 1851 Transactions, Lancashire and Cheshire Historical Society 106 (1954) 118-119; Morris and Williams (1958) 134-6; J L Wharton Statistics of collieries in Durham Journal of the Statistical Society 1 (1839) 380-382; Wood (1971) 209 and Leister (1975) 14 indicate that production from single shafts was usually smaller than in Somerset

16 J Billingsley General view of the agriculture of the county of Somerset (1794) 31

17 M Doughty Samborne Palmer's diary : technological innovation by a Somerset coal mine owner Industrial Archaeology Review 3 (1978) 25-26. There are other references in R K Bluhm The Somerset coalfield 1790-1820 in R K Bluhm ed. A second North Somerset miscellany (1971) 57; J A Bulley The Development of the coal industry in the Radstock area of Somerset from earliest times to 1830 MA London (1952) 37-8, 169-171; G C Greenwell and J McMurtrie On the Radstock portion of the Somerset coalfield (1864) 8-9

18 DCO T4 Somerset collieries : Miscellaneous correspondence Box 1; DCO T5 Somerset collieries : Docketed correspondence : Clandown

19 DCO T5 Somerset collieries Docketed correspondence : Nettlebridge Bundle 1; WarRO CR/1886 442,454,455

20 W Buckland and W D Conybeare Observations on the South Western coal district of England Transactions, Geological Society 2nd series (1824) 263

21 SRO DD/WG 37 and SH/NCB BP/16/160 contain information about the Somerset Coal Owners' Association's scale of tales

22 SRO DD/BT 6/20

23 SRO DD/SH 74/17/1-4, 74/26; SRO DD/WG 20,36,37

24 WarRO CR/1886 441; WarRO TN/599,600

25 This also occurred in Shropshire and South Wales, for example; Morris and Williams (1958) 97-99; B S Trinder The Industrial Revolution in Shropshire (1973) 247

26 SH/NCB BP/3/3; SH/NCB BP/3/31. When compared with collieries described in C P Griffin, Robert Harrison and the Barber Walker Company Transactions, Thoroton Society 82 (1978) 51 and E D Lewis The Cymer (Rhondda) explosion 1856 Transactions, Honourable Society of Cymmrodon (1976) 128

27 Pollard (1980) 229; Benson (1980) 9-16

28 C Hadfield The canals of Southern England (1955) 170-171. Additional figures are in K Clew The Somersetshire coal canal and railways (1970) 82,99 and J F Davis The Forest of Dean and Bristol-Somerset coalfields:a comparable study in industrial geography during the 19th and 20th centuries PhD London (1959) Table A1

29 These remarks were made in a railway prospectus in 1856 WarRO CR/1886 736/4

30 From Billingsley (1794) 31-2 and estimates of individual collieries' production

31 The relationship could have been distorted by the settlement pattern and the distance the miner was prepared to walk to work. The comparability and reliability of this evidence is discussed in Appendix A. Table A4 lists the parishes and tythings in each district

32 This may have been a product of increasing under-registration.

33 For example, Radford, Hayeswood and Temple Cloud

34 In Chew Magna Robert Dowling had taken over all the pits, W J Williams Coalmining in Bishops' Sutton (1976) 9. In Downside New Rock opened and Barlake's production was probably over 5,000 tons, DCO T5 Docketed Correspondence:Nettlebridge Bundle 1

35 In addition to the closure of Holcombe colliery c.1820, SRO D/P/holc 13/2/1, Edford Marsh had also ended production by 1824, SRO D/P/st.s.mi 4/2/1

36 In South-West Lancashire Langton found that 2,500 tons was about the average production from a pit at the end of the eighteenth century, Langton (1979) 100

37 C Fisher Custom, work and market capitalism (1981) 59

38 D J Rowe The economy of the North-East in the nineteenth century (1973) 8

39 These were in Huyton, Prescot and Eccleston

40 Mainly collieries in Hardshaw such as Hill's, Quaker and Moor Flat, LRO QDT/West Derby

41 As in Staffordshire, A J Taylor The sub-contract system in the British coal industry in L S Pressnell ed. Studies in the Industrial Revolution (1960) 217

42 It is likely that a more accurate tally of collieries from 1790 to 1820 can be obtained from the land tax returns for Hardshaw, Sutton and Eccleston than Parr, Haydock and Ashton

43 If the Haigh Colliery List of 1851 is to be believed, Taylor (1954) 121-4. It is supported by BPP 1842 xvii 194-6; and JRL Legh Mss T/D/5 and the Parr Poor Rate Books 1840-7 StHLocHistLib

44 For example, Haydock and Pewfall on the Haigh Colliery list or Pemberton to the north, D Anderson Blundell's Collieries:the progress of the business Transactions, Lancashire and Cheshire Historical Society 116 (1964) 113

45 LRO QDT/West Derby, Sutton 1831

46 Such as Green Lane, PA WH 1; Parr Stocks, Stanley and Smithfield, Parr Poor Rate Books 1840-7

47 None like the Earl of Derby's Rainford, Eccleston and Whiston collieries remained, LRO DDK Knowsley Accounts, Rainford Accounts

48 Langton (1979) 154

49 According to Barker the canal carried 85,000 tons to the Mersey in 1800 and only 100,000 tons in 1817, T C Barker The economic and social history of St Helens 1830-1900 PhD Manchester (1951a) 195. In the 1830's the railways began to carry increasing amounts of coal, 120,000 tons by 1836, T C Barker and J R Harris A Merseyside town in the Industrial Revolution, St Helens 1750-1900 (1954) 196

50 In Windle the number of hewers entered in the land tax returns in 1825 was 64 but only 52 were entered in the 1848 poor rate book, StHLocHistLib

51 These should produce a more accurate picture of change in employment at the mines than the number and size of collieries according to Langton (1979) 158. The townships in each district are as follows:-

Whiston - Whiston, Tarbock, Prescot
Hardshaw - Sutton, Windle, Eccleston
Blackbrook East - Parr, Haydock and Newton
North-East - Ashton, Rainford and Billinge

52 Langton (1979) 155-7, but unlike the 1790's there are no missing baptismal registers

53 In Eccleston production at Gillars Green rose in the 1830's LRO QDT/West Derby, Eccleston; BPP 1842 xvii 194-6

54 Collieries worked spasmodically in Rainford until 1813 LRO QDT/West Derby, Rainford. The Rainford rate assessment book for 1838 indicates that a colliery had opened at some stage in the 1830's that was leased to Bromilow and Foster from the Earl of Derby, LRO PR/2514

55 According to Langton there was a remarkably high level of productivity in South-West Lancashire, although if hewers only cut the coal this could probably have been achieved, Langton (1979) 151-153. Duckham has estimated that 600 tons per hewer in a year may have been about the maximum in Scotland in the early nineteenth century, B F Duckham A history of the Scottish Coal Industry Volume 1 (1970) 275

56 Nef (1932) volume 1 347-448

57 Fisher (1981) x; J Hassan The coal industry and the transport revolution in the Lothians, 1780-1880 Transport History 11 (1980) 208; Morris and Williams (1958) 78-80

58 Most descriptions follow this model of exploitation; for example, M G A Wilson Changing patterns of pit location on the New South Wales coalfield Annals of the Association of American Geographers 58 (1968) 79, R Goodwin Some physical and social factors in the evolution of a mining landscape:a study in the eastern area of the Fife coalfield Scottish Geographical Magazine 75 (1959) 3-7

59 Langton (1979) 28-9

60 Nef asserted this in 1932, Nef (1932) volume 1 Part IV

61 Langton (1979) 25; E A Wrigley Industrial growth and population change (1961) 8

62 Langton idem. A M Hay A simple location theory for mining activity Geography 61 (1976) 65-7

63 A Harris The Tindale Fell wagonway Transactions, Cumberland and Westmoreland Antiquarian and Archaeological Society New Series 72 (1972) 244. It was equally so in Midlothian, Hassan (1980) 208,214

64 J A Bulley 'To Mendip for coal' Part 1 Proceedings, Somerset Archaeological and Natural History Society 97 (1952b) 60,65; Billingsley (1794) 31-2; Rev. J Skinner H Coombs and A N Bax ed. Journal of a Somerset Rector (1930) 74; idem H Coombs and P Coombs ed. (1971) 55,64. Other studies have found that improved roads boosted production when the coal could be taken to urban centres or waterways: A W A White A Warwickshire colliery during the Industrial Revolution Warwickshire History 2 (1973) 4; G S Hudson The Aberford Railway and the history of the Garforth collieries (1971) 38; C P Griffin Transport change and the development of the Leicestershire coalfield in the canal age:a reinterpretation Journal of Transport History New Series 4 (1978) 233

65 For example, difficult access was mentioned at Shoscombe, WRO 515/72/2; and Welton Hill, DCO T5 Docketed Correspondence, Somerset collieries, Generally. In spite of plans for turnpike improvements these probably never materialised, R Atthill Old Mendip (1964) 115

66 The history of the canals is surveyed in Hadfield (1955) 141-171 and more particularly in Clew (1970) and K Clew The Dorset and Somerset Canal (1971)

67 Clew (1970) 49; Page's evidence to the Select Committee on the Coal Trade, BPP 1830 viii 291-4

68 This coincides with the advantages which canals conferred on other mining districts at the same time; C P Griffin (1978) 227-9; B Coates The geography of the industrialisation and urbanisation of South Yorkshire in S Pollard and C Holmes ed. Essays in the economic and social history of South Yorkshire (1976) 18; E Grant Coal, canals and competition:a study of the relationship between the Oxford and Coventry canals and the Warwickshire coalfield in E Grant and P Newby ed. Landscape and industry (1982) In turn, the canal yielded a high dividend for its shareholders compared with others in Southern England; R K Bluhm The Radstock branch of the Somerset coal canal Industrial Archaeology 3 (1966) 247-248

69 Tramroads were vital feeders to canals and rivers in most coalfields from the mid-eighteenth century; P Cromar The coal industry on Tyneside 1771-1800 Economic Geography 53 (1977) 79-94; E D Lewis The Rhondda valleys (1959) 105; W Rimmer Middleton colliery near Leeds 1770-1830 Yorkshire Bulletin of Economic and Social Research 7 (1955) 41-57. According to Duckham (1970) 209-210 they were not so extensively developed in Scotland

70 Clew (1970) 67-8 which is based on Rennie's map,1814, BathRefLib S386 Map 444

71 They preserved a monopoly of trade to the south although in 1830 the Radstock Trust was linked to the Bruton Trust by a new turnpike, SRO D/T Survey of Turnpike Trusts. Horner of Mells expressed fears of a further loss of trade, SRO DD/DN 290

72 Trinder (1973) 255; T W Birch The development and decline of the Coalbrookdale coalfield Geography 19 (1934) 122

73 The railways boosted production in these areas after the 1840's, Morris and Williams (1958) 4

74 According to comments made by the Radstock colliery manager, SRO DD/SH 74/20, 74/27. On the one hand the GWR refused to assist any Somerset collieries by giving them preferential rates and yet gave them to producers in north-east Wales who could then undercut Somerset producers' prices in Central Southern England

75 WarRO CR/1886 736/4, 736/7; SRO DD/RM 21

76 Radstock coal was sold at only 12/6 a ton in Oxford in 1854, SRO DD/SH 74/22 compared with 26-28/- in 1830, BPP 1830 viii 291. New destinations for Radstock coal included Salisbury, SRO DD/SH 74/20/1-3 and most of South Wiltshire and Somerset, B D Ferriman An historical geography of coal mining in the Radstock Basin MSc Bristol (1978) 161

77 For example, Timsbury Collieries' plans for coal wharves at stations, Bulley (1952b) 61, and the plans for a mineral railway, WarRO CR/1886 736/4

78 Discussed more fully in C G Down and A J Warrington The Newbury Railway (1979) 3-7

79 This is evident in the North-East in the eighteenth century, Cromar (1977) 79 and also in Fife, G Wilson Industrial coal markets in Fife 1760-1860 Scottish Geographical Magazine 96 (1980) 83-90

80 Developments in other coalfields followed expansion in the markets for their coal, N Buxton The economic development of the British coal industry (1978) 53-56. Examples are G Mee Aristocratic enterprise (1975) 27; M Symons Coal mining in the Llanelli area Volume 1 (1979) 18

81 Trinder (1973) 14,15

82 For example, Shoscombe, WRO 515/71; Camerton, SRO DD/BR/tsk 16; and Clutton, WarRO CR/1886 442

83 R S Neale Bath:a social history (1981) 44-45,266-7,430

84 In the canal sales area of the Somerset coalfield it was hardly 0.3 tons per head in 1830 compared with 0.69 tons in the London area, Pollard (1980) 217. In the

1820's coal was still over 20/- per ton in Bath, Bluhm (1971) 56, and in Frome as well, J de L Mann The cloth industry in the West of England 1640-1880 (1971) 155

85 BPP 1830 viii 291

86 Bulley (1952b) 53, which was similar to the circumstances of collieries on the fringes of Edinburgh unable to compete in the city with sea coal, Hassan (1978) 217

87 R S Neale The industries of the city of Bath in the first half of the nineteenth century Proceedings, Somerset Archaeological and Natural History Society 108 (1964) 133,139-142

88 SRO DD/BR/tsk 16

89 J Tann The employment of power in the West of England wool textile industry 1790-1840 in N B Harte and K G Ponting ed. Textile history and economic history (1973) 218

90 idem 199,207,218; Mann (1971) 130-131,162,168,178

91 Bulley (1952b) 61-62

92 These were respectively the edge tool works at Mells, R Atthill (1964) 68-69 and the lead waste refineries at Charterhouse, R Atthill ed. Mendip:a new study (1976) 148

93 Hay (1976) 66

94 This might explain why some textile producing areas declined, or why the glass industry contracted in the north-east of England D Gregory Regional transformation and Industrial Revolution (1982) 217

95 BPP 1810 iv 72; CCO 87/127,128,146; andDCO T4 miscellaneous correspondence, Somerset collieries, contain references to these fears in 1810 and the mid 1820's

96 Fisher (1981) x; Wrigley (1961) 31-33,36-37. Wrigley believed that they were important because they brought about differences in labour costs, idem 54

97 G C Greenwell and his successor as mining engineer at Radstock, J McMurtrie, drew attention to these in a series of articles for geological and mining journals

98 This occurred in Nettlebridge as well as in Radstock and Camerton, DCO T5 Somerset collieries, coal mine accounts

99 A Burton The miners (1976) 56 and Leister (1975) 10-12 refer to Tyneside collieries at about 900 feet. None of the landsale collieries exceeded 350 feet. Ashton and Sykes (1964) 10, and Atkinson mentions a colliery near Sheffield of 900 feet in 1810, F Atkinson Mining, quarrying and refractories in D L Linton ed. Sheffield and its region (1956) 146

100 Monkwearmouth for example, G Patterson ed. Monkwearmouth Colliery 1851 (1978) 9

101 Doughty (1978) 17

102 As in South Wales, Scotland and Derbyshire, Morris and Williams (1958) 50-54; Symons (1979) 145; Duckham (1970) 61; J Lindsay The Butterley coal and iron works 1792-1816 Derbyshire Archaeological Journal 85

(1965) 39; Lewis (1959) 36,45; although depths of 1,000 feet or more were more common by the middle of the century even though the deepest in South Wales still only reached down to 690 feet, Johnson and Wise (1950) 234

103 Clutton, WarRO CR/1886 454; Radford, DCO T5 Somerset collieries, Docketed Correspondence, Generally 1845-58; Bishops' Sutton, Williams (1976) 6; Stratton, DCO T4 Somerset Collieries, Miscellaneous Correspondence. Collieries sunk in High Littleton and Farmborough in the 1820's and 1830's had a singular lack of success, SRO DD/PO 34,36; Buckland and Conybeare (1824) 278

104 Quoted from S W Brice in Bulley (1952a) 72 and in J Prestwich Report on the quantities of coal wrought and unwrought in the coalfields of Somerset and parts of Gloucestershire in Report of the Commissioners on the Coal Trade BPP 1871 xviii 42. The flooding at Middle Pit is mentioned in CCO 87/138

105 WRO 515/72/2. Nettlebridge did also, DCO T5 Docketed Correspondence, Nettlebridge

106 These are given in more detail by Prestwich (1871) 40-43; F H G Flower Coal mining in Somerset (1970) 19-20; J Anstie The coalfields of Gloucestershire and Somersetshire and their resources (1873) 101; and in numerous colliery surveys of the Duchy collieries in 1845, DCO T5 Somerset Collieries, Docketed Correspondence, Generally, Bundle 1

107 Buckland and Conybeare (1824) 263

108 Pollard (1980) 222. These explanations used by Morris and Williams (1958) 50, Taylor (1960) and for Midlothian by Hassan (1980) 216-217, an area similar to Somerset that was suffering from the infiltration of competitors' coal into its market

109 Duckham (1970) 45; Ashton and Sykes (1964) 6-10; A R Griffin Thomas North:mining entrepreneur Transactions, Thoroton Society 76 (1972) 65

110 Most collieries employed a crew of branchers rather than contract workers who were common in other coalfields. Branching kept Clutton going in 1822, WarRO CR/1886 454

111 C G Down and A J Warrington The history of the Somerset coalfield (1972) 45; Bulley (1952a) 72-74

112 For example, at the abortive Strap colliery in 1842, DCO T5 Somerset Collieries Docketed Correspondence, Nettlebridge

113 DCO T5 Somerset Collieries, Docketed Correspondence, Welton Hill Colliery, Bundle 1; CCO 88/163

114 Duckham (1970) 95-97 believed this to be so

115 Idem 105,111; Lindsay (1965) 39; Ashton and Sykes (1964) 56

116 Doughty (1978) 21 reported that collieries required it to lift about 30 tons a day 500 feet, and the technique was probably more commonly used at deep collieries, O Wood (1971) 213; Hudson (1971) 56; Griffin (1978) 68

117 Many of these were common by the end of the eighteenth century, Ashton and Sykes (1964) 62-63,65-68

118 Bulley (1952a) 75; Greenwell and McMurtrie (1864) 7, in spite of long distances
119 BPP 1810 iv 76
120 Flower (1970) 14. Labour costs would have been raised by these problems
121 Radstock, SRO DD/SH 74/17/3 'The Shirburnian' (1869) 154-157; New Welton, Greenwell and McMurtrie (1964) 9; Clandown, DCO T5 Somerset Collieries, Docketed Correspondence, Clandown
122 Mackworth's reports as Mining Inspector testify to this and the continuation of some very primitive works
123 The Countess of Waldegrave's agent, Ashman, mentioned this, SRO DD/SH 74/17/1. Bulley refers to the other side of the story, Bulley (1952a) 77. I have not been able to trace the whereabouts of the Timsbury Minute Books, the source of this evidence
124 Nef (1932) volume 2, 3-134
125 For example, in South Wales, R Walters Capital formation in the South Wales coal industry 1840-1914 Welsh History Review 10 (1980) 71,76; and Shropshire, Trinder (1973) 91
126 SRO DD/FS 16; BU DM/106 180
127 Billingsley (1794) 31 mentioned this even though in 1798 he became an investor. Duckham (1970) 96 felt that reports of low profits by lessees may be exaggerated
128 Landowners may have believed that they were doing the lessees a favour but the collieries increased the value and income from their land - rents for farms, gardens, cottages and sales of timber, farm produce and hay
129 There were large and consistent profits made at Radstock, SRO DD/WG 37; Welton, BU DM/106 180; Writhlington SRO DD/FS 36; but as at Camerton, SRO DD/BR/tsk 18, they diminished at Welton
130 In the 1850's there are constant references to problems at the Duchy's collieries, DCO T5 Somerset Collieries, Docketed Correspondence, and the Earl of Warwick's at Clutton, WarRO CR/1886 736/7
131 Down and Warrington (1979) 1. Steeds and Evans who had interests in metal working also flirted with other ventures
132 In his study of coal mining in north-eastern England in the eighteenth century Cromar stressed their importance, Cromar (1977) 92
133 E Richards The industrial face of a great estate: Trentham and Lilleshall 1780-1860 Economic History Review 2nd Series 27 (1974) 41
134 A R Griffin and C P Griffin The rise of coalowners' associations in the East Midlands in the nineteenth century Renaissance and Modern Studies 17 (1973) 103
135 A J Taylor Combination in the mid-nineteenth century coal industry Transactions, Royal Historical Society 5th Series 3 (1953) 23-39
136 Apart from a few surviving records from the 1830's and 1840's, SRO DD/WG 37 and SH/NCB BP/16/150 there are references to the Association at other times in newspapers; canal records, Clew (1970) 84; and accounts, SRO DD/FS 35

137 For example, in the 1830's the Association secured drawbacks, Hadfield (1955) 159-163
138 Cromar (1979) 47-48
139 SH/NCB BP/16/150
140 SRO DD/WG 20; DCO T5 Docketed Correspondence, Somerset Collieries, Generally. SRO DD/SH 74/17/1 provide evidence of Radstock's eventual departure. Radford for one, however, possible depended on it for survival, CCO 87/294, 88/163
141 WRO 515/72/2. Bulley referred to an attempt by the Timsbury proprietors to do likewise in 1843, Bulley (1952a) 77
142 Differences in ownership have been discussed by J T Ward Landowners and mining in J T Ward and R G Wilson ed. Land and industry (1971) 63-116; A R Griffin The British coal mining industry:retrospect and prospect (1977) 47-54
143 To achieve this they had to keep a watchful eye, DCO T5 Docketed Correspondence, Somerset Collieries, Generally
144 SRO DD/BR/tsk 19
145 DCO T5 Docketed Correspondence, Old Welton, Bundle 1; WarRO CR/1886 736/7. $\frac{1}{8}$ was not unusual in the eighteenth century, Ashton and Sykes (1964) 188
146 At Camerton the Jarretts rejected an offer of 1/12 for thin seams in 1843, Bulley (1952a) 48
147 Morris and Williams (1958) 117. Comparibility is difficult, though, because of different customs
148 CCO 87/159
149 When the profits they received, the freeshares, are compared with those of the lessees
150 WarRO CR/1886 454
151 Langton (1979) 183-187
152 Barker and Harris (1954) 190
153 R Challinor The Lancashire and Cheshire miners (1972) 13-15
154 F C Mather After the Canal Duke (1970) 305
155 T C Barker Lancashire coal, Cheshire salt and the rise of Liverpool Transactions, Lancashire and Cheshire Historical Society 103 (1951b) 83-101
156 Langton (1979) 174-175, although much coal used in Liverpool arrived by sea and by the Leeds and Liverpool canal from the Wigan area
157 Plans for a wagonway between Whiston and the Mersey were not executed, LRO DDM/4/23. The cost of carrying coal from Rainford to Blackbrook was prohibitive LRO DDK/1822/69
158 This is mentioned in the British Plate Glass Company's records; PA leases 1853, PA BPG7 Minute Drafts 1844
159 LRO DDGe (E) 899, 914
160 Barker and Harris (1954) 188; Minutes of the St Helens and Runcorn Gap Railway Act 1830, StHLocHistLib
161 LRO DD Ge(E) 899
162 Just as the canal threatened the Warwickshire coalfield's landsales to Coventry, for example, White (1973) 5

163 Barker and Harris (1954) 327-328, 332-333
164 Langton (1979) 176,179; Barker and Harris (1954) 193-195
165 While collieries not connected had to rely on carts and local landsales, LRO DDK /1816/103
166 Barker and Harris (1954) 193-194. Laird wrote that the export trade from Liverpool was minimal compared with the north-east of England but recorded that good coal came from Blackbrook and Laffack for export to Ireland, W Laird The export coal trade of Liverpool (1850) 6, 25-26
167 Barker (1951b) 96-99; Barker and Harris (1954) 69
168 Increases in trade along the Weaver were not spectacular, Barker and Harris (1954) 193 compared with the growth of coal used in glass and chemical manufacturing, K Warren Chemical foundations: the alkali industry in Britain to 1926 (1980) 78; T C Barker The glassmakers (1977) Chapter 4
169 There were higher prices until about 1815, Barker and Harris (1954) 69,73. Prices of coal paid at Knowsley Hall rose to a peak about 1810-11, LRO DDK /1827/69,73
170 PA BPG 5/1. There are fuller details in T C Barker et al. The origins of the synthetic alkali industry in Britain Economica 23 (1956) 158-171; J R Harris Economic and social development in St Helens during the latter half of the eighteenth century MA Manchester (1950) 90
171 For example, Croppers Hill and Albion closed and were not sold at auction, Taylor deeds, StHLocHistLib; Greenall and Churton's Hardshaw colliery closed, J N Slater A Brewer's tale (1980) 60; and St Helens colliery was closed 1811-15 and sold, LRO QDT/West Derby, Sutton
172 Mather (1970) 305-309 attributed Worsley's problems to the depression in the textile trade. In South Wales any depression in iron smelting severely affected production at many collieries, E W Evans The miners of South Wales (1961) 35. Closures in St Helens are mentioned in Barker and Harris (1954) 220
173 Matthews stated that the new synthetic alkali process required four tons of coal per ton of salt used, M H Matthews The geography of the early synthetic alkali industry in Great Britain Scottish Geographical Magazine 96 (1980) 31. Based on some figures in Barker (1977) 53,112, Pilkingtons alone would have used about 8,000 tons of coal in 1836 but possibly nearer 30,000 tons in 1850. By this time both Ravenhead and the newer Union Plate Glassworks were consuming 20,000 tons apiece, Barker and Harris (1954) 199
174 Langton (1979) 189-190. R Whyte's notebook contains information about the disposition of coal in the area PA WH1
175 A J Heesom The northern coal owners and the opposition to the Coal Mines Act of 1842. International Review of Social History 25 (1980) 249
176 Barker and Harris (1954) 197

177 These changes also took place in Salop, Leicestershire and Derbyshire; T J Chandler Communications and a coalfield:a study in the Leicestershire and South Derbyshire coalfield Transactions, Institute of British Geographers 23 (1957) 163-173

178 Langton (1979) 190. In the nineteenth century there are many examples in the leases of the Gerards mineral resources, LRO DDGe(M)/841, and also in Whyte's notebook, PA WH 1 and in the Willis papers, LRO DDWi/Whiston mines box

179 LRO DDM/4/21; Langton (1979) 190

180 PA WH 1 and LRO DDGe(E)/1633

181 This is indicated by the first leases to mine coal in new areas such as LRO DDCs/35/25; StHLocHistLib M/A/7

182 These were being mined in the 1820's and 1830's east of St Helens, LRO DDCs/45/40, 12/94; but in the 1840's and 1850's further east in Ashton and Parr, LRO DDGe(E)/771,897

183 By 1837 at Rushy Park, LRO DDGe(E)/855

184 Barker and Harris (1954) 198; LRO DDCs/21/5

185 PA WH 1; StHLocHistLib M/C/1; LRO DDGe(M)/899. At Blackleyhurst coal was mined down to a limit of 230 yards by 1860. These were some of the deepest mines in Lancashire, O Ashmore Industrial archaeology of Lancashire (1969) 101

186 Whyte described this in his notebook when it took him only six weeks to start production from 30-35 yards deep pit at Green Lane, PA WH 1. Large collieries such as Haydock sustained production by a similar method even if the depths were much greater. Rapid sinking was taking place in Haydock even in the 1850's, The romance of coal (1924) 11. The practice at Pemberton in the 1820's is described in D Anderson Blundells' collieries, technological developments 1796-1966 Transactions, Lancashire and Cheshire Historical Society 119 (1967) 118

187 J R Harris The early steam engine on Merseyside Transactions, Lancashire and Cheshire Historical Society 106 (1954) 113

188 According to Anderson (1967) 152 and calculations by two mine operators; at Tarbock, LRO DDM 4/21; and at Rainford, LRO DDK/1822/61

189 D Anderson The Orrell coalfield, 1740-1850 (1975) 196

190 They were needed for distances of over 100 yards, JRL Legh Mss E/L/5; J Dickinson Statistics of the collieries of Lancashire, Cheshire and North Wales Memoirs, Literary and Philosophical Society of Manchester 2nd Series 12 (1855) 72

191 Anderson (1975) 196; Barker and Harris (1954) 95, 201,271; BPP 1842 xvii 152,229-230; St HLocHistLib M/W/83; Dickinson idem. Developments were in advance of other parts of the Lancashire coalfield such as Bolton, BPP 1842 xvii 168-170; and Worsley, Mather (1970) 326

192 BCO Package 344

193 PA WH 1

194 ibid

195 Barker (1951b) 93; Harris (1950) 66,70-72; Langton (1979) 220
196 Barker (1951b) 97-98
197 Barker (1951a) 12-13
198 idem 250-251. Pilkington's interest was stimulated in 1844 by the threat of a strike to his coal supplies, LRO DDCs/45/47
199 A trend identified earlier by J Langton Landowners and the development of coal mining in South-west Lancashire, 1590-1799 in H S A Fox and R A Butlin ed. Change in the countryside (1979) 138-139
200 Eccleston leased his coal in Sutton to Bournes and Robinson chiefly, Gerard to Eccles and Stock in Ashton (1802), Derby to Bromilow and Sothern in Rainford (1830's) and Legh to Evans and Turner (1833). Derby had accrued few profits for his endeavours, LRO DDK/2020/43-48,53-55 and 1816/60,68
201 StHLocHistLib SH/14,22,25,26; J R Harris The Hughes papers; Lancashire social life, 1780-1825 Transactions, Lancashire and Cheshire Historical Society 103 (1951) 114-115
202 LRO QDT/West Derby, Windle. Leases exist for very small areas of coal and numerous landowners; for instance, StHLocHistLib, St Helens Independent chapel, 11; LRO DDCs/45/30
203 In Whiston, KCC 74/E and in Haydock, JRL Legh Mss T/D/5, for example
204 BCO Package 198
205 Barker and Harris (1954) 69,194; Barker (1977) 185
206 Harris (1951) 122; Barker and Harris (1954) 267, and also idem 264-266,276
207 JRL Legh Mss T/D/5
208 D Gregory The process of industrial change 1730-1900 in R A Dodgshon and R A Butlin ed. An historical geography of England and Wales (1978) 300-301,306
209 Stedman Jones (1971) and Scott (1974) demonstrate the effect of industrialisation on the working population in particular areas

CHAPTER 3

THE AMOUNT OF WORK IN OTHER EMPLOYMENTS

As the supply of labour to collieries must have also influenced labour productivity and the technology used at pits, the number of jobs in other kinds of work should have affected the livelihood of miners and their wages.[1] If the East End of London labour market is any guide, competition for labour would affect the number of workers in any industry and what pay they would get.[2] As mining was not the only industry recruiting or laying off men, trends in other occupations would have determined whether enough workers could be obtained to work at the pits; whether jobs in mining were taken by outsiders; whether wages rose when there was a shortage of labour; and whether wages fell when supply outweighed demand. In addition, if Bythell's explanation of sweated trades can be extended, cheap labour was a factor that discouraged modernisation in many manufacturing industries.[3] Trades such as nail making only persisted as cottage industries because of a supply of abundant, cheap labour.[4] A surplus of labour might have retarded the capital investment in Somerset's collieries.[5] Conversely, a shortage of men in St Helens' might have hastened the installation of underground labour saving methods, such as

rail haulage and steam winding from relatively shallow depths, and postponed more labour intensive deep mining. In the Somerset coalfield, labour may not have been in desperately short supply when men were needed to boost coal production, for the numbers employed in agriculture and manufacturing declined.[6] Consequently, wages from mining may not have risen greatly and proprietors did not invest in labour saving innovations. In the St Helens coalfield, as the total numbers employed in manufacturing grew slightly, but grew rapidly in some industries such as the glassworks while declining in domestic industries such as weaving and watchmaking, a shortage of labour may have arisen at times. Wages for coal miners would have improved, although they may have been paid out of higher productivity than in Somerset. The demise of industries that could not pay comparable wages, such as weaving, watchmaking and nailmaking, may have followed.

3.1 Other Industries in Somerset

3.1.1 Farming

Agriculture was predominantly pastoral and not very labour intensive.[7] Dairying was of growing importance in the Cam and Chew valleys. Markets for milk, butter and, especially, cheese had expanded.[8] In an area stretching from Radstock and Camerton towards the Frome Valley many farms specialised in sheep fattening. (Figure 3.1) On Mendip, cattle and sheep were reared.[9] Consequently, probably less than a quarter of the land was under

cultivation. (Table 3.1)[10]

More arable farming would have increased the number of jobs on farms rather more than the intensification of dairying that did occur without the introduction of new fodder crops.[11] Since improvements of pasture and crop rotations could not be achieved without marling and liming, they may not have been carried out if labour was not available.[12] Hay was the main crop rather than sown grasses, roots or cereals, and this did not alter.[13] In the mid-nineteenth century Acland found little evidence of investment in improving crops or pasture on the farms in the area.[14] On Mendip there had been some extension of arable cultivation, but the land was only ploughed to grow catch crops that required no preparation or soil improvements by farmers, and hence little additional labour.[15] Commercial crops such as woad and teasles were no longer grown.[16] There is some evidence that several landowners may have developed their plantations, however, to meet the local demand for pit props.[17]

Farming provided a livelihood for a large number of people in the Somerset coalfield, employing about half as many men as mining in the early part of the century, but only about a third by the middle.[18] The majority of these were full-time labourers and not farmers or small-holders. Table 3.2 shows that numbers of agricultural workers did not increase as much as miners while the number of farmers remained fairly stable. The number of

labourers was only rising from Waterloo until the early 1820's. A fall occurred between 1841 and 1861 when the figures are a little more accurate.

Differences in the labour employed on farms are evident from the broad differences in farm sizes and the employment of labourers on farms in the coalfield. (Figure 3.2,3.3) Eastern parishes of the coalfield tended to have larger farms (over 125 acres). Their farms also had more agricultural workers employed as farming hands than areas which had more dairy farming and pasture.[19] But they employed fewer labourers on the land, only one labourer for every ninety acres or more compared with under fifty acres on Mendip and in the Cam and Chew valleys. Labourers, though, increased in number in parts of the coalfield in which mining was expanding in the 1820's and 1830's.[20] (Table 3.2)

3.1.2 Manufacturing

Most manufacturing workers were involved in making goods to meet local demand.[21] Most parishes had an assortment of handicraft workers; blacksmiths, sawyers, shoemakers and bakers, as well as other specialists such as coopers, ropemakers and wheelwrights, some of whom would have worked in the workshops, sawing mills and smithies of collieries.[22] Such a wide variety of specialists was not unusual in rural areas by this time, and a relatively prosperous mining economy which had a large number of consumers and needs for pit props, ropes, bricks and tallow

would have increased the demand for many of these trades and services. (Table 3.3)[23] By contrast, very few workers were still engaged in once significant local manufacturing industries; cloth, handknitting of stockings, paper and agricultural implements. Before 1800 these had flourished principally in the Nettlebridge and Chew valleys.

Textile work was concentrated in Nettlebridge. In the early part of the century there were several combing, fulling and dyeing mills in Holcombe and Mells.[24] The cloth trade soon fell away and these closed. At the same time, weaving contracted as a cottage occupation not least because spinning became concentrated at mills in the Avon and Frome valleys.[25] However, in the early decades of the century handknitting was a more important occupation, especially for women, in Nettlebridge. It was the only textile work that survived until the middle of the century. However, these jobs also diminished in number. With a gradual decline in demand for stockings many Shepton clothiers who controlled the amount of outwork went bankrupt.[26] In 1861 there was only one hosier left in the area, whereas there had been nine in Ashwick alone in 1815.[27]

The hand-made paper industry suffered much the same fate. Mills in Stoke Lane and Chew Magna closed by 1840. (Figure 3.4)[28] An edge tool iron industry in Nettlebridge continued and the number of workers at Fussell's

works at Mells expanded up to the mid-century.[29] They produced tools such as scythes and reaping hooks as well as rakes at their six separate works in the vicinity of Mells. In spite of a long history of iron founding in Nettlebridge, only one foundry was established in the coalfield, at Paulton. Evans' brass and iron foundry supplied machinery for the local collieries.[30] The small copper foundry at Pensford was the only vestige of metal working once linked to the extensive 'mines of Mendip'.[31]

In all, the number of manufacturing workers increased between about 1815 and the 1830's but fell between 1851 and 1861. (Table 3.4) Although several occupations such as weaving and combing vanished, for much of the time manufacturing workers were only just outnumbered by miners in Nettlebridge. More of them were edge tool workers by the middle of the century. In the rest of the coalfield there were considerably more men in service trades such as brewing, boot and shoe making, and blacksmithying. A larger number of these men lived in the parishes with bigger workforces at the collieries.

3.2 Other Industries in St Helens

During the nineteenth century, manufacturing jobs increased in number in the St Helens coalfield but the trend varied a great deal between industries. Large employers of manufacturing workers, such as the glass factories and chemical works, as well as many consumer industries, were mainly started in and around St Helens itself. As a consequence, jobs in manufacturing gradually became less

dispersed than earlier in the century. (Figure 3.5)[32] In processing industries, such as the production of glass and synthetic alkali, the jobs became concentrated at a few sites as production increased. Many workshop industries whose workers were spread about the countryside declined. Watchmaking, weaving and nailmaking were all depleted by the 1850's, so that far fewer manufacturing workers remained in the rural townships of the coalfield such as Rainford and Whiston in addition to Prescot, a town with a long tradition of manufacturing.[33] At the same time, numbers employed at the glass and metal foundries in the town of St Helens increased as rapidly as at the collieries.[34]

3.2.1 Large-scale Industrial Processes

In Lancashire, St Helens and Warrington were the centres of the glass industry's expansion in the nineteenth century.[35] All four branches of the glass making industry were represented in the area: plate, crown, flint and bottle. The plate, and later the crown glass factories, were far larger.

Rolled plate glass casting began at Ravenhead in 1776. By eighteenth-century standards the factory was massive but the works only attained their full potential after 1798.[36] After difficulties in the 1820's were overcome, the works employed 300 people. Capacity tripled between 1838 and 1860 and the workforce rose to over 500.[37] At the same time two new plate glass works were established in St Helens: the Union Plate Glass

Company at Pocket Nook in 1837, and the Manchester and Liverpool Glass Company at Sutton Oak. Despite teething problems, both eventually operated at capacity in the 1850's and the former had a workforce about the same size as at Ravenhead.[38]

Production of crown glass began in 1792.[39] The market grew but there was considerably more competition between firms for this trade than in plate glass. A second works was established in 1826, one of the partners being William Pilkington. After an unsteady start, the Pilkington works expanded production in the early 1830's and again in the 1850's.[40] An initial workforce of about 40 grew to 500 in the 1840's and stood at 1,350 in 1854.[41] By this time Pilkingtons' owned both of the other crown glass factories in the area.

Though mainly small by comparison with the plate and crown glass factories, there were more flint and bottle glass making companies. Of the flint glassware factories, only Bishop's in Parr survived until 1860.[42] In 1861 it employed 115 labourers.[43] The number of bottle glassworks proliferated in the 1840's and 1850's.[44] In spite of quite frequent changes of ownership, several that had been founded in the late eighteenth century and some of the newer works were still working in 1860. But none probably had more than 100 employees.

All the chemical works opened after 1829.[45] There had been a few largely unsuccessful soap boilers and vitriol

makers before this around Prescot and St Helens when the industry was concentrated in Liverpool. (Figure 3.5a) However, in 1829 Muspratt and Gamble began alkali production at a new factory at Gerard's Bridge. Muspratt departed and set up a rival concern at Newton in 1830. In 1836 Gamble in partnership with Crosfield, a Warrington chemical manufacturer, started another venture producing bleach, also at Gerard's Bridge. These were fairly successful, and Gamble claimed to employ 240 men in 1861.[46] About six other chemical works opened over the same period.[47] None of these were as large, and apart from the Parr alkali works they did not maintain a steady level of production or employment.[48]

In addition, jobs in engineering, metal refining and engine making had expanded from a tradition of metal-working crafts in South Lancashire.[49] In St Helens and Ashton, though, two large copper refineries employed far more men than the small foundries. However, both closed in 1815.[50] The Ravenhead works did not reopen until the 1830's and a new refinery was established at Sutton Oak soon afterwards.[51] The latter expanded its capacity in the 1850's. At the same time the number of small foundries in St Helens increased.[52] Several of these made plant and equipment for collieries and other industries. Engines were made at the Vulcan Foundry in Newton, and this later became a large employer.[52]

3.2.2 Domestic and Workshop Manufacturing

By contrast to these manufacturing industries which tended

to concentrate employment, a wide range of industries provided jobs in all of the townships in the coalfield. These were by no means vestiges of cottage industries. Employment in homes and workshops making watches, clay pipes and nails for example, was as important as mining in some townships throughout most of the early nineteenth century.

In terms of employment highly specialised metal working manufacturing industries such as nail, lock, hinge, file and watch tool and part making were probably more important than the large-scale metal foundries. (Table 3.5) Nail making expanded after 1800 and employment in this trade increased in Billinge, Ashton and Windle at least from 1815 until the mid-1830's.[54] It remained a workshop industry and contracted in the middle of the century partly because of competition from mass producers.

Watchmaking was also chiefly a workshop trade although watch assembly was often carried out at a master's premises.[55] Families were specialist outworkers involved in a particular stage of the chain of production, such as making tools, pinions, hands, wheels, springs or cases.[56] Most of the masters lived in Prescot and Liverpool and consequently most employment was in Prescot and the surrounding townships, just as the nail, bolt and hinge workers lived in and around Ashton. (Figure 3.6) After the 1820's there was little expansion in production, foreign producers taking better advantage of the growing

popular market for watches than the watchmakers of Lancashire.[57]

Employment in textile trades did not fare as well. As in the rest of Lancashire most of the production that remained in the middle of the century took place in factories.[58] In 1800 there were already factories carrying out cotton spinning in Ashton and Eccleston, although the weavers were still mostly working in their homes.[59] From the 1820's factories slowly made them redundant. Unfortunately, not many of these factories survived in the coalfield. Sail cloth which was a local speciality did not have a growing market. The factories in Eccleston and Prescot had all closed by the 1840's.[60] As a consequence, occupations in the textile trades were never as significant in the St Helens area as around other towns on the Lancashire coalfield, such as Wigan and Bolton.[61]

Table 3.6 shows differences in all these trends. At the end of the Napoleonic Wars most manufacturing occupations were in domestic industries. These were chiefly in textiles, watchmaking and the production of nails, hinges and bolts. Some of the textile workers would have worked in spinning shops, but most of them were weavers working in their homes. Only a few men worked at the pot banks, breweries and glass factories. With the exception of the textile workers, the numbers in the domestic manufacturing occupations increased up to the 1830's. In the early 1830's there were still relatively

few men employed at the first copper and chemical works and the glass factories.

Since these occupations could only be followed by men living in close proximity to the factories, employment in manufacturing gradually became more concentrated in St Helens itself. The numbers employed at the glass and metal foundries grew more than threefold from 1841-61. (Table 3.5) By comparison, in the area as a whole jobs in the domestic industries remained little changed. In St Helens itself they declined. By 1851 there were hardly any textile workers left, and chemical workers outnumbered watchmakers. In other townships in the coalfield where jobs in domestic manufacturing dwindled there was no compensatory increase in the number employed in alternative manufacturing jobs. For example, the number of textile workers diminished in Ashton, Haydock and Newton at the same time as the number of metal workers. New manufacturing industries only provided a lot of jobs in Newton. (Figure 3.6) By forcing up relative wage levels for miners, the decline of nail production and textiles could have occurred because of the expansion of the collieries in the Blackbrook area. Watchmaking may have lingered in and around Prescot because the collieries did not increase production very much.

3.3 Occupational Structures in Somerset and St Helens

Occupational structures show that mining was only one of many ways of earning a living.[63] It was the main

occupation in Somerset and St Helens, but in the latter it was not the main type of work. Where mining was a novelty and employment in either manufacturing or agriculture declined or remained stable, mining may have become important at their expense. By and large, occupational structures were not altered very greatly in either area. Mining grew a little in importance but not to the same extent as in coalfields where mining invaded sparsely populated agricultural areas. Farming became a less significant livelihood yet it remained the main occupation after mining in the Somerset coalfield. As some manufacturing industries declined at the same time as others grew, mining did not make up any ground on manufacturing in St Helens. However, mining, manufacturing and services grew slightly at the expense of agricultural occupations.

In Somerset, the occupational structure bore the dominant imprint of mining. (Table 3.7)[64] At over half of baptisms the father was a miner and over 40% of household heads were miners at each census 1841-61. Table 3.7 emphasises the relative decline of agricultural work as the number of jobs did not grow at the same pace as other kinds of work. Without the metal industries common to most mining areas the coalfield had relatively few men in manufacturing occupations.[65] But the proportion of men who worked in manufacturing and building trades increased. Occupations in retailing, industrial trades and other services may have grown more markedly than in agriculture

because of mining. (Table 3.8)

In St Helens, manufacturing occupations were a far larger component of the occupational structure. (Table 3.9) In spite of the decline of jobs such as nailmaking, the proportion in manufacturing increased because of more jobs in factories and artisan trades, so that the coalfield had a similar occupational structure to the earliest mining areas in South Wales and Tyneside.[66] To a far greater extent than in the Somerset coalfield agricultural occupations became insignificant. Also in contrast to Somerset, the growing importance of St Helens itself as a commercial centre was marked by an expanding sector of the workforce occupied in dealing, general labouring and providing specialised services. (Table 3.10)[67] By the middle of the century these ranged from solicitors to bone dealers and stationers.

Contrary to some popular opinion in neither area did miners live in communities where everyone was involved in the getting and carrying of coal.[68] Parishes and townships with over 40% of the men down the pits were plentiful, especially in Somerset, but agriculture or manufacturing were nearly always important employers. In the Paulton and Radstock Basins agriculture and manufacturing each employed about 10-15% of the men. Clandown and, by 1861, Haydock also were exceptional in having few men whose occupation was not dependent on mining.[69]

There were also some striking variations in the occupational structure within each coalfield. Figure 3.7 shows distinctions in the Somerset coalfield, especially between the Cam Valley and Mendip districts. Mining was by far the dominant occupation in the Radstock and Paulton Basins and the eastern district of the St Helens coalfield but not in Nettlebridge or the rest of the St Helens area. These townships had a range of rural craftsmen, agricultural labourers and farmers as well as miners.[70] Manufacturing trades remained more important as new manufacturing industries provided jobs to replace the old ones.

Only where jobs in mining increased most of all at the same time as jobs in agriculture or manufacturing diminished did the growth of mining alter the character of the economy. Figure 3.8 and 3.9 show that in areas such as Lower Wellow in Somerset and Blackbrook in St Helens away from the earliest concentrations of mining, men may have been recruited to the collieries from other jobs or at least other backgrounds. As the relative and absolute numbers of miners fell in the earlier worked areas where few appear to have found alternative employment in farming or domestic manufacturing industries, many recruits to the districts where coal production was rising fastest may have been workers from these areas. (Table 3.11) No great change occurred in the occupational structure of the Whiston and Nettlebridge districts because jobs in mining and manufacturing contracted over the same period.

Yet, in Hardshaw and Eccleston where the expansion of new factory occupations outstripped mining, colliers became less important by the middle of the century. However, since some industrial and commercial trades grew alongside mining in the growing parts of the Somerset coalfield, changes in the occupational structure were not considerable.

3.4 Concluding Remarks

In both areas men could earn a living from an occupation other than mining. Although agricultural work and some handicraft industries were declining, in general jobs in industrial and building trades and services were growing. The number of jobs in large-scale manufacturing industries was increasing, particularly in and around St Helens itself. Mining could probably draw workers from the land and handicraft trades, men with irregular and low incomes attracted by better wages in a growing industry, in addition to men who lost jobs at other collieries.

Consequently, in the Somerset coalfield no shortage of labour probably arose, except for short periods in the areas where most of the new and larger collieries were located. As labour was not in short supply, wages would not have risen steeply although demand should have raised them above those in industries with a surplus. In addition, with no shortage of labour, profits at collieries would not have been improved by investment in labour saving technology, although they were eventually adopted to get coal that was difficult to reach and remove.

By contrast, a demand for workers at collieries probably discouraged what were not labour saving innovations in agriculture to improve productivity by expanding crop production.

Consequently, in the St Helens coalfield, particularly around the middle of the century, collieries may have found it more difficult to obtain labour and increase production. In spite of a dwindling amount of work on the land and in many of the traditional domestic industries such as textiles, the growing number of workers in new manufacturing trades outstripped the rate of increase in the number of miners. As well as sustaining miners' wages above levels in Somerset, coal proprietors, especially in the Blackbrook district, may have been edged into installing labour saving technology before their introduction to Somerset's collieries. Table 3.12 indicates the generally low productivity of miners in Somerset and Gloucestershire compared with Lancashire. Even so, they were deterred from producing coal that was difficult to get at. By contrast, the decline of domestic industries would have been hastened by the attraction of the sons of handicraft workers to the collieries from their families' workshops.

But, for all their greater accuracy a statistical record of employment trends is only a backcloth to the economic experiences of the people in the coalfields. Tracing the amount of work in specific occupations such as mining does not identify what was happening to work, what

differences in work or incomes were involved, or what were the repercussions of changes in the relative number of jobs down the pit.[71] The differences in their work which distinguish miners from other workers, and possibly also from each other, go beyond mere differences in demand and supply.

CHAPTER NOTES

1 J Langton Geographical change and Industrial Revolution (1979) 194; J W Scott The glassworkers of Carmaux (1974) 54. This was also true of agricultural labourers; E L Jones The agricultural labour market in England, 1793-1872 Economic History Review 2nd Series 17 (1964) 229; K D M Snell Agricultural seasonal unemployment, the standard of living and women's work in the South and East, 1690-1860 Economic History Review 2nd Series 34 (1981) 434-435

2 G Stedman Jones Outcast London (1971) 99

3 D Bythell The sweated trades (1978) 158

4 idem 158-159

5 This was evident when Somerset's pits were compared with St Helens' in Chapter 2, A J Taylor Labour productivity and technological innovation in the British coal industry, 1850-1914 Economic History Review 2nd Series 14 (1961) 62-63

6 There are problems comparing the number of fathers and household heads in different occupations because the totals from the parish registers and CEBs respectively are affected by the age structure of the workers in each occupation. Reservations about the sources used in this chapter are discussed with reference to the experience and misgivings of other users in Appendix A

7 T C Acland The farming of Somersetshire (1851) 6; J Billingsley General review of the agriculture of the county of Somerset (1794) 27

8 W Sturge Report on the farming of Somersetshire (1851) 133; Billingsley (1794) 27; PRO HO 67/2 161

9 SRO DD/SAS SX19 1804 Livestock Returns; SRO D/P/rads 2/1/3 which contains another, the Radstock return for 1803; Billingsley (1794); Sturge (1851) 146-147

10 M Williams The 1801 Crop Returns for Somerset Proceedings, Somerset Archaeological and Natural History Society 113 (1969) 70-71 and Figure 1

11 This is asserted by E J T Collins Harvest technology and labour supply in Britain, 1780-1870 Economic History Review 2nd Series 22 (1969) 453-473 and R Samuel Village labour in Village life and labour (1975) 11-12, 17

12 Billingsley (1794) 24,69; CCO 87/58

13 Hay was not mentioned in the Crop Returns although estate records show that it was the main crop; the Hylton estate, for example, SRO DD//HY 15

14 Acland (1851) 72-73, 77. Acland, however, may have exaggerated since he mentioned land drainage, idem 78, on which the Warwick estate spent some money in the 1850's, WarRO CR/1886 442, and improvements to land in the eastern part of the coalfield, idem 80-81

15 M Williams Mendip farming:the last three centuries in R Atthill ed Mendip:a new study (1976) 109-111; Billingsley (1794) 60

16 J D Wickham Records by spade and terrier (1922) 223 and F W Cleverdon A history of Mells (1974) 61 remark on their production

17 The Earl of Warwick, WarRO CR/1886 454; General Popham, SRO DD/PO 34b; and Lord Hylton SRO DD/HY 15

18 In general, farmers could be easily distinguished from smallholders. In the parish registers, though, agricultural labourers were not usually distinguished from the mass of labourers. Most labourers, however, would have worked on the land. I would make the same qualifications about the information in the CEBs as J A Sheppard East Yorkshire's agricultural labour force in the mid-nineteenth century Agricultural History Review 9 (1961) 43-54

19 Sheppard (1961) 46, 20-30 acres per labourer being a rough average

20 Possibly because homes for agricultural labourers may have been more readily available in the settlements where miners had gone to live. Sheppard (1961) 53 and W S G Thomas The agricultural labour force in some South-West Carmarthenshire parishes in the mid-nineteenth century Welsh Historical Review 3 (1966) 63-73, discovered that agricultural labourers did not necessarily live in the parishes where work for them was to be found

21 R Atthill Industry in Atthill ed (1976) 171

22 SRO DD/SH 74/27; WarRO CR/1886 Colliery labour book 1822; O Ashmore The industrial archaeology of Lancashire (1969) 111

23 B A Holderness Rural tradesmen:1660-1850 Lincolnshire History and Archaeology 7 (1972) 77-83

24 Wickham (1922) 223

25 K G Ponting The woollen industry of South-West England (1971) 117,126 and K G Ponting The structure of the Wiltshire-Somerset border woollen industry, 1816-1840 in N B Harte and K G Ponting ed Textile history and economic history (1973) 173. Wickham observed that journeymen came from Frome, Wickham (1922) 279

26 J de L Mann The cloth industry in the West of England from 1640-1880 (1971) 162. Reasons for this are discussed in J Thirsk The fantastical folly of fashion:the English stocking knitting industry, 1550-1700 in Harte and Ponting ed (1973) 68,71

27 1861 CEBs, Downside; SRO Q/REl, Kilmersdon Hundred, 1815

28 R Atthill Old Mendip (1964) 58-59

29 Idem 72,82; Cleverdon (1974) 64

30 Atthill (1964) 68; C G Down and A J Warrington The history of the Somerset coalfield (1972) 87-89

31 R A Buchanan and N Cossons The industrial archaeology of the Bristol Region (1969) 103-104, who mention that lead mining slag was being sorted and smelted down at Charterhouse in the mid-nineteenth century

32 As in other areas, R Lawton The economic geography of Craven in the early nineteenth century Transactions, Institute of British Geographers 20 (1954) 167-168; G A Feather A Pennine worsted community in the mid-nineteenth century Textile History 3 (1972) 78; M F Pickles Mid-Wharfedale 1721-1812: economic and demographic change in a Pennine dale Local Population Studies 16 (1976) 17-27

33 Baines' Lancashire 1825 volume 2 467; T C Barker and J R Harris A Merseyside town in the Industrial Revolution (1954) 287-288, 370-372

34 Barker and Harris (1954) provide a wealth of detail about many of the firms

35 J R Harris Origins of the St Helens glass industry Northern History 3 (1968) 105

36 J R Harris Saint-Gobain and Ravenhead in B M Ratcliffe ed Great Britain and her world, 1750-1914 (1975) 35,39,44-45

37 Barker and Harris (1954) 216-220

38 ibid; 1861 CEBs, Sutton

39 T C Barker The glassmakers:Pilkington (1977) contains details of the history of crown glass production

40 Barker (1977) 53,73,81

41 idem 112. Pilkington took over Mackay and West's works in 1855 although production had ceased

42 Barker and Harris (1954) 358-359, the West Midlands being the centre of this manufacture

43 1861 CEBs, Parr

44 Barker and Harris (1954) 356-357

45 The chemical industry in South-West Lancashire and Merseyside is surveyed by K Warren Chemical foundations:the alkali industry in Britain to 1926 (1980) 78-81; M H Matthews The geography of the British chemical industry in the nineteenth century Tijdschrift ESG 69 (1978) 333-335. Details of many of the ventures in St Helens are given in Barker and Harris (1954) 225-234, 334-347

46 1861 CEBs, Hardshaw

47 Matthews (1978) 336

48 M H Matthews The geography of the early synthetic alkali industry in Great Britain Scottish Geographical Magazine 96 (1980) 26. They were also technically rudimentary

49 G H Tupling The early metal trades and the beginnings of engineering in Lancashire Transactions, Lancashire and Cheshire Antiquarian Society 61 (1949) 1,13-15

50 Barker and Harris (1954) 75-89

51 idem 239-244

52 idem 364-368. In the land tax returns two are listed under Hardshaw and Sutton in the early 1800's, LRO QDL/West Derby, 1799,1804,1816

53 Tupling (1949) 27-28

54 Barker and Harris (1954) 123-124. Court noted a similar trend in the West Midlands, W H B Court The rise of the Midland industries (1938) 192-193

55 F A Bailey and T C Barker The seventeenth-century origins of watchmaking in South-West Lancashire in J R Harris ed. Liverpool and Merseyside (1969) 2,12, although Peter Stubbs of Warrington had a workshop that produced watches in 1802, Tupling (1949) 22-24

56 Baines volume 2 467; Bailey and Barker (1969) 12-13

57 D S Landes Watchmaking:a case study in enterprise and change Business History Review 53 (1979) 11,17-20

58 A J Taylor Concentration and specialisation in the Lancashire cotton industry, 1825-50 Economic History Review 2nd Series 1 (1949) 114-122

59 LRO QDL/West Derby 1810 for Ashton lists five, three of which were factories and the other two spinning shops

60 Barker and Harris (1954) 120-123; J N Slater A Brewer's tale:Greenall, Whitley and Co.Ltd. (1980) 50-52

61 H B Rodgers The Lancashire cotton industry in 1840 in A R H Barker et al ed. Geographical Interpretations of historical sources (1970) 339, Figure 1

62 A trend found also by J E Vance Housing the worker:determinative and contingent ties in nineteenth century Birmingham Economic Geography 43 (1967) 95-127 and A M Warnes Residential patterns in an emerging industrial town in B D Clark and M B Gleave ed. Social patterns in cities (1973) 169-190

63 J Benson British coalminers in the nineteenth century (1980) 83-85

64 Very similar to the Forest of Dean, C Fisher Custom, work and market capitalism (1981) 55

65 As in the Forest of Dean, Fisher (1981) 55; and Northern France, L A Tilly and J W Scott Women, work and family (1978) 86, for example

66 M R Haines Fertility and occupation (1979) 160-162

67 Not to the same extent as a market centre such as York, W A Armstrong Stability and change in an English county town (1974) 47-61, but St Helens soon grew to be more important than Prescot as a commercial centre, Barker and Harris (1954) 376-381

68 A Burton The miners (1976) 34,121 and T S Ashton and J Sykes The coal industry of the eighteenth century (1964) 100 give this impression. This was not necessarily so, even in Durham. M Bulmer ed. Mining and social change (1978) 35. See also R Hall Occupation and population structure in part of the Derbyshire Peak District in the mid-nineteenth century East Midland Geography 6 (1974) 67

69 Mining communities would be typical of the company town or factory village if they had most of their workers down the pit, J D Porteous The nature of the company town, Transactions, Institute of British Geographers 51 (1970) 127-142. Communities similar to Clandown and Haydock have been studied; G Patterson ed. Monkwearmouth colliery 1851 (1978) 44 and S A Royle The development of Coalville,

Leicestershire in the nineteenth century East Midland Geography 7 (1978) 37

70 These communities were more akin to Mills' open villages, D R Mills Lord and peasant in nineteenth century Britain (1980) 120-123

71 P H Lindert English occupations Journal of Economic History 40 (1979) 685-686

CHAPTER 4

WORKING IN THE COAL INDUSTRY

It is difficult to convey how working underground may have distinguished miners from men working at a machine or in a field, but several studies of occupational groups emphasise how people's "ordinary daily concerns" affected other characteristics of their way of life.[1] Differences in what work is done, the way work is handed out, where it takes place, and for what it is rewarded have been used to explain patterns of riots, strikes and family life in a number of sociological studies.[2] Scott has shown how the organisation of work at the glasshouse in Carmaux could have influenced the political actions of the glassworkers and determined why the history of their actions was different from the miners'.[3]

Very few studies of mining apart from Nef's have considered in any detail the economic consequences of mining in terms of what miners did underground.[4] Miners shared many experiences from working underground. They were all engaged in coal getting and carrying, worked as members of a team underground, and faced risks and dangers unlike those in any other occupation. Nef also recognised that the conditions of employment of miners "varied at different times and in different places".[5] Differences existed between old and new collieries, exhausted and newly tapped mining districts, and landsale

and seasale areas. , These inevitably marked the characteristics of the work underground because small collieries usually had a more simple organisation than large collieries; deep collieries occupied more workers carrying coal than shallow collieries; and narrow seams usually gave rise to a different method of working than thin seams. Only recently, Daunton has observed that some distinctive colliery labour practises in two rapidly growing coalfields, South Wales and North-East England, may have been the source of other socio-economic differences between them, while Spaven and Campbell and Reid have speculated that relationships between workers and management at collieries in Yorkshire and Lanarkshire depended on the ways that the workers were occupied.[6]

In the Somerset and St Helens coalfields, it is easy to distinguish what features of the miners' work and their workplace stood them apart from other workers; the scale and organisation of the collieries, the independence they managed to retain under this system until mechanisation at the beginning of this century, and the ever-present danger to life and limb. Because of uneven trends in production and employment, miners in both areas did not work under the same conditions or have the same chances of promotion and good wages. The organisation and pace of work differed since Somerset's collieries mined coal in a different manner to collieries in St Helens. Somerset's collieries were deeper and hauled coal further from the coal face to the pit bottom than in St Helens. In

addition, Somerset's collieries worked less regularly and had greater seasonal variations in production than in St Helens. These conditions varied within each coalfield.

4.1 Collieries and Other Places of Work

The organisation and scale of workplaces can distinguish the work of people in most occupations from each other. Unfortunately, the workplace of many workers has to be assumed from their occupation. This is not entirely satisfactory as it often means that subtle differences in the kind of work done by many artisans and labourers, and differences in their place of work, are not discernible. Glassworkers unlike cobblers, blacksmiths and sawyers, for example, all worked at a glasshouse and received wages. The blacksmith may have worked for himself, for a master smithy or as an employee of a colliery or foundry. The work of coal miners in Somerset and St Helens can be distinguished from that of other labourers and hired hands by their place of work, status, pay and working routine.

4.1.1 Numbers Employed

In the Somerset coalfield, only 22% of workers on the land were farmers in 1851.[7] At the same date about half the farmers employed labourers, on average over three, and few parishes had many 'peasant' smallholders. (Table 4.1, Figure 4.1)[8] But in mining nearly all of the workers were employees. Miners seldom had any financial interest in the undertaking, even before the nineteenth century

when many pits were worked by only a handful of miners.[9] By the middle of the century collieries were much larger and in both areas they had on average nearly 100 workers. (Table 4.2) Although not all of them were labourers, the bailiffs, engineers and quite often the manager as well were employees.

Mining was one of the few industries where a large workforce was assembled on one site.[10] The collieries were by far the largest places of work in the Somerset coalfield. Only the edge tool works and perhaps a couple of the breweries had workforces that were bigger than the smallest collieries, Bishops' Sutton, Travis and Ham.[11] Workshops were bigger in St Helens but the mines were matched by a few factories. (Table 4.3) Although like the collieries, factories varied greatly in size, the largest glass and chemical works had more men than any individual collieries. For example, Sutton Plate Glassworks had 465 employees in 1861 and Gamble's chemical works, 240 men.[12] However, the bottle works were much smaller.[13] Lightfoot's had 25 men and 11 boys in 1861. And most of the alkali works, foundries and potteries were only a little larger than workshops. Two foundries in St Helens employed 10 and 15 men respectively, and potteries had about 20 men. This was not much larger than they were at the turn of the century.[14]

Collieries like factories had grown. The increasing size of the workforce on farms and in workshops did not match the change at collieries up to the middle of the

century. At the beginning of the century about thirty men and boys would have been employed to produce 5,000 tons at the larger collieries in Somerset.[15] The larger collieries had similar workforces in St Helens, although they produced more coal.[16] By the middle of the century workforces at collieries in both coalfields were far larger, although generally bigger after 1851 in the areas where production was increasing most rapidly. (Table 4.2) Pits at the Radstock collieries: Middle, Ludlows, Tyning and Wellsway had well over 100 men each.[17] The Clutton collieries, which did not raise their output, employed about sixty people to produce in the region of 10,000 tons apiece.[18] Haydock Colliery and others to the east of St Helens had well over two hundred employees, matching the size of the larger factories.[19]

4.1.2 Workers' Status

Miners were nearly all hired hands who worked full-time at a colliery. Most other labourers were in a similar position. As collieries with few miners and run by working partners employed an increasingly smaller proportion of the total workforce, for most miners the division between employees and owners and between workers and managers became more distinct.[20] Somerset's and St Helens' collieries did not have butties or little buttymen, so that most of the miners were the employees of a colliery working under the proprietors' manager.[20] A few were subcontractors; sinkers in St Helens and branchers in Somerset on occasions, and a considerable number were

paid at a piece rate. It was usual though for the owners to appoint a manager who was sometimes a working partner and for the manager or deputy to employ everyone at the colliery directly. In Somerset, Samuel Travis was probably one of the last of the worker-managers, leasing a colliery at Bishops' Sutton in the 1850's.[22]

More of the men in the manufacturing industries of St Helens had the same status and careers as miners. Table 4.4 shows that the manufacturing workers in factories grew in number, altering the character of the manufacturing workforce particularly in St Helens itself. (Figure 4.2) From being outnumbered four to one by domestic manufacturing workers in St Helens about 1815, there were two factory workers for every one in a domestic trade in 1861. Workers in chemical and glass factories were largely employees, although a lot of them retained some independence, such as the glassblowers, because they worked for piece rates.

Among the remaining handicraft and building workers it is less easy to distinguish who were the labourers and who were the masters. Many of them were masters or at least independent contractors.[23] However, some of the tailors, cobblers and blacksmiths, especially in urban areas, were little more than labourers. Many were hired so that they earned piece rates like most nail, stocking and watch part workers.[24] A lot of men in industrial trades were also employed at collieries, factories and

foundries as they increased in size. Even so, many labourers in handicraft trades worked in their homes. This should have given them more independence than colliers who worked on their employers' premises. As whole families usually had to be occupied in the work if there was no alternative, nail workers for example probably worked longer hours than miners, and did monotonous and exhausting tasks for lower wages.[25]

4.1.3 Payments and Earnings

In spite of being full-time labourers, the families of colliers were a little more fortunate than domestic handicraft workers because wages were better at the pits and their families' earnings could be greater.

The miners' income did not depend entirely on their income from the colliery. In St Helens their wives and daughters could work at the glass factories and mugworks, while in Somerset some miners' daughters knitted stockings.[26] A few of them also worked at the pits in St Helens, the number being greater in townships such as Ashton where mining had expanded. (Table 4.5) The census does not reveal how many miners and other labourers had sidelines.[27] However, these included small businesses such as beerhouses, which their wives ran, and providing part-time services such as mole and rat catching. More frequently they undertook casual and seasonal work.[28] Women, children and sometimes the men did milking, hay making and crop gathering in Somerset, for in the summer

months most of the collieries worked on only a few days each week so that outdoor work could provide a substitute income.[29] In addition, most families had their allotment. Many of these were created in several parishes in the early nineteenth century.[30]

Miners were comparatively well paid. Hewers earned far more than agricultural labourers and most workers at the glass and chemical works because they still had skills which were in demand.[31] Although there was no formal apprenticeship at the pits, hewing required the strength of a man and familiarity with conditions; essential if mining was as difficult as it was in Somerset.[32] Boys were promoted as their experience increased, to become hewers as early as their late teens or early twenties. Hewers were fortunate in that they could influence promotion more effectively than most employees. In St Helens they recruited their own assistants, as the glassblowers did, and they could also choose their own workmates.[33]

But all the workers at the collieries had to expect some variations in their earnings. It was not unusual at the time for employers to lay off their workers or give them less work to do when demand fell;[34] factory workers, domestic handicraft workers and agricultural labourers all suffering from depressed earnings.[35] Collieries were prone to cyclical and also seasonal changes in production. In Somerset especially, pits worked for fewer days a week in the summer, the number

depending on whether stockpiles of winter production were sold or could be replenished.[36] On farms seasonal changes in labour demand were just as extreme but the intense demands of hay making used casual labour which the collieries do not appear to have done.[37] In all the the manufacturing industries there were cyclical changes. Workers at the plate glass factories lost work when there was a depression in the building trade.[38] In both areas, however, the collieries tried to produce coal continuously. There was a more consistent demand for coal throughout the year, so that the miners generally had to be full-time, permanent colliers.[39] Yet the wages for all workers except the landsmen varied from week to week.[40]

4.1.4 Working Routine

In contrast to the earlier custom and practice in small scale industries, work at the mines and factories had to be more organised.[41] Management, routine, and job specialisation had to come about because of the increasing scale of production as much as mechanisation. There was very little mechanisation in mining, but substantial increases in depth and output.[42] Production at the collieries in Somerset and St Helens was not round-the-clock, neither did the miners necessarily work a fixed number of hours, nor always carry out a specific task every day, which was the lot of most factory workers. However, as in the glass factories the workers at the collieries were usually organised to do particular kinds

of work at different stages of production. There were managers and clerks, underlookers and timekeepers to supervise production. Certainly, in Somerset and St Helens professional engineers were employed.[43] William Smith, the 'father' of English geology, was employed as such by a Somerset colliery, Mearns, in the 1790's. Three very able managers at the Radstock collieries successively established a strict system of management over a workforce of bailiffs, veerers, roadsmen, breakers, putters, twinboys, drivers, trappers and cutmen, engine and firemen, fill pits and branchers at each pit.[44]

4.2 Working Down the Pit

Labour practices in mining were not very uniform because conditions would reflect what was happening to the demand for labour at the pits, consequences of the scale and growth of production, geology and capital invested, and what was happening to the supply of labour to the pits, consequences of jobs in other industries, productivity and technology.[45] Miners worked at collieries with different methods of getting coal, different means of getting coal out, and at the end of the day received different rates of pay.

Business records of collieries reveal differences in work down the pits of Somerset and St Helens; broad differences in working methods, the number of miners not employed at hewing, the division of labour, the role of

management, and the volatility of work and pay. Alternative working practices were used because of the depth of working and the thickness of seams. These had economic consequences because they affected the organisation of men, the pace of work and productivity. At Somerset's collieries, but especially those in the older mined areas, rates of pay were lower because the work was less regular, coal was raised more slowly and more men were needed to cut and lift it.

4.3 Collieries in the Somerset Coalfield

4.3.1 The Organisation of Work Underground

The collieries in Somerset used the longwall method to extract coal.[46] In the early nineteenth century this system was also practised in Shropshire and Leicestershire but seldom in other areas.[47] Local mining engineers said that the longwall system was better suited for mining Somerset's thin seams.[48] More saleable coal could be got out, and less good coal would be left uncut compared with pillar and stall working.[49] In most other coalfields it was more economical to leave pillars and walls of coal. Longwall gradually became the most common system only as thicker surface seams were worked out.[50] In this century it was a more suitable system for mechanised coal cutting, but the miners had to be reorganised so that different jobs at the face were carried out on separate shifts.[51]

The Somerset collieries did not organise their men in the same way as the mechanised longwall system which

Trist and Bamforth described. Rather than doing each task separately on different shifts, the hewers did ripping, timbering and often filling themselves, so that compared with bord-and-pillar working the hewers could not spend as much time cutting coal.[52] In pillar and board working the hewer had no filling to do, very little waste to move, and less timbering. By the Somerset method of longwall working a number of hewers worked along the same face, but although this may have been 300 yards in length at the Radstock collieries, the men worked as a 'topple' company with about 12 yards of face each.[53] The company consisted of two breakers, or a breaker and an assistant filling the sledges, who did all the ripping and timbering, and two putters who filled the tubs and dragged them to the twinway. As a consequence, the hewers in Somerset still retained the cycle of underground working within their compass like the hewers who worked at stalls in other coalfields.[54] Although they were always directly hired by the proprietor, these men and boys worked as a team, and because they were paid on piece rates they worked for themselves.[55] Supervision of production at the coal face was not needed when the pace of work did not have to be coordinated between different workers or between different shifts. Deputies only carried out maintenance and did safety checks.

The division of labour away from the face in most of Somerset's collieries was more distinctive. (Table 4.6) Because of their greater depth and size compared with

collieries that consisted of multiple pits, there were more ancillary workers underground and they did a wider variety of jobs.[56] Taking coal a longer distance between the face and the shaft bottom and lifting coal a greater height required a lot of haulage workers even with the assistance of steam winding and self-acting inclines. Many of them were boys.[57] Somerset miners, Presto and Parfitt, dragged full tubs down the narrow passage from the face to the roadway as small boys.[58] This may have been a distance of 30-80 yards. At this point carting boys or pony boys took the coal to the shaft in larger wheeled tubs, perhaps a distance of 600 yards.[59] They were met by bottomers, men and boys who dealt with the transfer of coal to the surface. Along the way other boys worked at the inclines and ventilation doors. These were numerous in Somerset collieries because of faults. The numbers also grew as output increased because there were few economies of scale. Few collieries put down tracks along the roadways because they were so narrow, winding and uneven, and ponies could only be used if the main passages were large.[60] In Somerset the carting boys crawled most of the way and dragged their trucks of coal even up inclines.[61] Unlike many other areas the carting boys did not usually work for specific hewers,[62] so that they were paid independently and not out of the hewers' wages.[63] At Bishops' Sutton they were paid for the number of tubs they took away. John Fawkes and Co. were paid 2d a hudge in 1850.[64] This must have placed their

promotion to hewing in the hands of the masters rather than the hewers, even though the hewers were probably responsible for providing on-the-job training.

The larger scale of underground workings in Somerset also required miners to maintain roads continuously and for some miners to be permanently involved in branching. The hewers only did some dead work, as they did in South Wales, when coal was not being cut.[65] When hewing at Clutton finished in 1822 and at Bishops' Sutton in 1852 some of the workforce began a desperate search to open up new faces while the rest were laid off.[66] At large collieries such as Radstock specialised workers were permanently detailed to branching and repairing the roads.[67] Branchers were employed by the colliery proprietors, unlike sinkers who were usually free-lance contractors.[68] But they were paid as a team at a negotiated rate for the number of yards advanced, like the miners in St Helens.[69] At Clutton, for example, they were paid between 2/3d and 3/6d a yard each depending on the difficulty of boring.

So many men hauling coal and searching for coal as well as cutting it had to be supervised. Compared with the Forest of Dean, for example, the management at Somerset collieries was quite sophisticated. The collieries had no butties but bailiffs, veerers and underlookers working under a manager.[70] Some boys had cause to complain to the Mining Commissioner about the discipline

but they were treated no worse than boys in other coalfields who worked for their relatives.[71] The Radstock manager, Ashman, sacked a man for illtreating a boy in 1852 and also had cause to dismiss six carting boys.[72] Under this arrangement recruitment and promotion were largely in the hands of the overmen and not the hewers, while the senior carting boys had control over the putters.

Most boys would have hoped to graduate from being trappers to putters, then carting boys, and finally hewers by about the age of 20.[73] At Somerset collieries this was not always possible. In most of their workforces less of the men were skilled and more had to be employed in haulage jobs than in collieries in other coalfields. More worked underground yet a smaller proportion cut coal. Table 4.7 shows that for a coalfield in which employment was not increasing very much, a relatively large proportion of the miners were young boys and adolescents.[74] Although the workforces at collieries in Clutton, Radstock and Bishops' Sutton were very different in size, all had about twice as many haulage workers as hewers.[75] It was much the same at more primitive collieries in Scotland and Pembrokeshire where many women and children were used to carry the coal, and conversely at large, deep collieries in Cumbria.[76] Only about 25% were hewers and there were roughly two drawers for every one hewer, whereas as many as 50% were hewers in South Wales and Durham pits.[77] However, in South Wales there was often only one set of haulage

workers for two shifts of hewers.[78] Better haulage techniques did not necessarily reduce the number of drawers because the distance from the face to the shaft increased, and haulage along the narrow passages remained a task which only young lads could do.[79] Many of them did not continue their career in Somerset and, if the survival ratios calculated from the census are at all reliable, must have left the collieries from their late teens to mid-twenties. (Table 4.8)

4.3.2 Wages and Earnings

By comparison with other coalfields miners' earnings were lower at all ages in Somerset. Since so many children were taken on there was probably no shortage of young men for adult jobs once the expansion of production had slowed down.[80] Children may have been used to keep down production costs because there was no competition for their labour from other employers. Rowe, however, partly attributed Somerset's relatively low wages in the late nineteenth century to conditions at the collieries that limited the earnings which could be achieved.[81] Coal cutting was not easy, and a lot of the hewer's time was spent removing waste because the seams were so thin.[82] The collieries did not work continuously because of frequent interruptions to coal cutting in addition to the reductions in the number of turns which were worked during the summer months.

Rates of pay for hewing coal were higher than those offered for other labouring work for adults in the area. A hewer could earn 12/- to 16/- a week against 10/- to 11/- on the farms in the 1840's and 1850's.[83] Colliery craftsmen and branchers earned more, blacksmiths at Timsbury, for instance, being paid 3/- or more a day.[84] Boys were relatively well paid too. These ranged from 10d to 2/6d. a day depending on their age and grade, the older carting boys receiving the highest rates of pay.[85] At Clutton twin boys received 1/11d., drawers from 1/4d. to 1/8d. and carting boys 2/1d in 1822, much higher than the wages offered for farm work or during a craft apprenticeship.[86] But miners were paid more in other coalfields. Daily rates reported by most of the Mining Commissioners were usually over 3/-. At times these were as high as 4/6d, which they reached for a time in parts of the West Midlands in the 1840's, while miners in Durham and South Wales could earn over a pound a week.[87]

All the rates were reached by negotiation.[88] These fluctuated because the hewers only negotiated the rate of pay for working on a particular seam. At Bishops' Sutton the men earned as little as 2/- a turn on the Striking seam but 2/3d on the Three Coal vein.[89] The rates were set and altered, however, in response to the demand for coal. The depressed market and the quota system in the 1840's and early 1850's kept wage rates down when they rose in other coalfields. Wages had increased in the 1790's and 1820's when production was expanding.[90]

Morris and Williams mentioned that wages varied in South Wales because of differences in demand.[91] While they remained low in Pembrokeshire, about 2/- a day, they were rising to over 4/- in the Rhondda. They also fell sharply when production was reduced.

However, the regularity of work affected what miners were paid. Weekly earnings depended as much on whether the hewer could cut the coal or whether the drawers could take it away, as on a piece rate for the job. Weekly averages and daily rates are probably very misleading.[92] Seasonal fluctuations in the demand for coal and spasmodic interruptions to the working of collieries reduced the number and length of turns they could work in a week.[93] There was usually short-time working at most collieries in the summer months. In most years three or four turns were worked more than five in up to a dozen consecutive weeks between May and September at Clutton.[94] The regular workers were not made redundant, only a few of the casual labourers no longer finding any work at the colliery, but their wages were affected.

Unless the coal produced went to industrial users or could be accumulated at the surface for later sales, production had to remain seasonal.[95] The depression at the two landsale pits in Clutton was not of the same intensity every summer but production fell each year to about half that raised between November and January.[96]

In some weeks there were hardly three or four sales to coal carriers a day in August, whereas there were often fifteen to twenty transactions in the winter months.[97] Stockpiling summer production for the winter months was not encouraged by the continued uncertainty of future market trends.[98] Cold winter weather immediately increased demand for coal but it was not predictable enough to keep the men steadily employed throughout the year.[99] Large stocks of coal were not accumulated, and although men could be redeployed on maintenance and branching there was only a limited amount of alternative work for them to do when not much coal was being wound up.[100] Wage bills and the miners' earnings inevitably fell.[101]

In addition to this problem Somerset's collieries also had to stop or slow down production when their quota was reached.[102] At Greyfield this was a stretch of nine weeks in 1841.[103] However, production was stepped up at Radstock in 1848, for instance, when the quota was raised.[104] Quotas were quite often transferred when by ill fortune collieries could not produce their allocation. At least if production was increased at neighbouring collieries, unemployment did not ensue for all those laid off during long stoppages because of unforeseen events such as floods, shaft accidents and the exhaustion of seams. After Hayeswood was inundated, Grove and Withy Mills increased their quotas.[105] The flood at Middle Pit, Radstock, in 1803 was of some benefit to the Welton colliery and was

regarded as good news by the dons at Christ Church.[106] If a seam was exhausted or a roadway blocked, repairs had to be done and new faces opened before all the men could resume work. Teams of branchers were organised to open new seams and levels at Heighgrove and Fry's Bottom in the early 1820's and at Fry's Bottom again in 1842-3.[107] Fry's Bottom reopened about six months later but Heighgrove and other sinkings in the neighbourhood never found any seams worth mining.

Other interruptions were not so important but did reduce potential earnings. The shaft was a bottle-neck not least because both men and coal used it. Very little coal could be stored underground. At Tyning in January-February 1852 production was lost on several days because of a mechanical failure.[108] Miners asserted that continuous hewing was dogged by faults, dead ground undulations and waste bands in the seams, as if seams as thin as ten inches were not already a problem.[109] All of these increased the amount of waste that had to be cut and obviously diminished the amount of coal that the hewers could cut during a day.[110] Strikes were not a recurrent or principal cause of any loss of earnings.[111] There were disputes which included most miners in 1819, 1830 and 1848, and these were all settled in a few weeks.[112] Similarly, local grievances, such as the one at Radstock in 1848, did not last long.[113]

4.3.3 Danger and Injuries

Injury and ill-health were the other misfortunes to affect

the income of miners and these may have more seriously affected miners' earnings in the long run. Miners may not have been in the most dangerous occupation or in the only occupation in which the long-term effects were debilitating, but adult colliers were "seldom sprightly".[114] Benson believed that few miners escaped frequent injuries and some disability, which included breathlessness, broken limbs and arthritic joints.[115] In Somerset, the biggest dangers came from rockfalls and shaft accidents.[116] The greatest number of casualities arose from shaft accidents; at Wellsway in 1839 when eleven were killed, and Paulton Engine in 1830 when Skinner reported that nine died soon after four deaths in another accident at the same pit.[117] The Mining Inspector mentioned that accidents were common and a few fatalities occurred each year in the 1850's and 1860's.[118] This was not unusual and the estimated death rate in Somerset's mines was about average, well below Staffordshire's.[119] By the mid-nineteenth century the biggest disasters were caused by explosions. Gas was not generally a problem in Somerset. Nonetheless, a few miners suffered horrific injuries. Skinner reported that many who were maimed in Camerton were no longer fit for any employment, particularly poor men paralysed as a result of being crushed.[120] From his own experience Parfitt knew that no miner could avoid some injury for long.[121] During a lifetime down the Somerset pits miners could expect broken bones and ruptures which could incapacitate them for quite a few weeks, or force

them to take up less well-paid jobs as banksmen or roadmen. As they got older asthmatic and respiratory problems grew. It was said that few men over fifty could do the work of a hewer.[122] The cramped conditions in the Somerset and Forest of Dean collieries, especially, did not help. In this century 'bent knee' was found to be a problem peculiar to Somerset miners.[123]

4.4 Collieries in the St Helens Coalfield

At the collieries in St Helens more miners were employed getting the coal rather than in removing it, so that productivity was higher than in Somerset. As the pits themselves were usually smaller and shallower, the organisation of the workforce was more simple too. The hewers were more independent and supervised the drawers. They could earn higher wages because working conditions were easier and the demand for coal was less fickle. In these circumstances also, young miners were not faced by so many obstacles in the way of promotion, and all miners had plenty of ways to escape the effects of any irregularity in their work and wages at the collieries where they worked.

4.4.1 The Organisation of Work

At most collieries in the St Helens area coal was obtained from several pits rather than from one.[124] Large collieries, such as Haydock, had perhaps ten to fifteen pits but smaller collieries, especially earlier in the century, such as Hardshaw, usually had two or three pits

working at one time with another being sunk.[125] When getting coal from shallow depths, under 300 feet, it was easier to maintain productivity by making new sinkings continuously than carry out branching and tunnelling.

Because the worked seams were, in general, thick, coal was cut by the bord-and-pillar method. Widework at Cowley Hill and Union, which was similar to longwall working, was exceptional even in the 1840's.[126] The coal was usually extracted first from the extremities of the lease to reduce the amount of propping and maintenance needed. This left the hewers more time and energy to cut coal.[127] In theory, large pillars had to be left to prevent subsidence.[128]

As a consequence, the technical units, the pits, and the working units, the stalls, were smaller than their equivalents in Somerset. Possibly at most twenty men worked down each pit when fifty or more worked down most of Somerset's.[129] The hewers were able to work more independently even though the collieries they worked at had more men. (Table 4.2)[130] At this scale they could exercise more control over the pace of work. Fewer boys and haulage workers of all kinds were needed because the distance from the face to the shaft was shorter and not so tortuous.

Under this system the hewers could dictate the pace of work, training and, of great importance to them, recruitment. Essentially it was very similar to the

organisation of work in Durham described by Douglass.[131] One or two men who worked in a stall about fifteen yards wide had a couple of drawers who filled the coal tubs and took them to the shaft bottom.[132] The group worked as a team and were paid altogether for the coal they raised, so that the hewers hired their own assistants.[133] Most of them obviously used their own children or relatives whenever they could as it often relieved them of paying any wages.[134] Up to 1842 they employed their children of both sexes from the age of about six. Until children reached this age wives would often work as their husbands' drawers.[135]

Apart from the hewers and their drawers, there were few other workers underground.[136] Only boys at the shaft bottom and at ventilation doors did not cut and carry coal.[137] Deputies moved between pits and were responsible for repair work and safety, but not supervising production. There was, however, more auxiliary work such as screening, stacking and pushing trucks carried out at the surface than in Somerset. This work had to be more closely managed.[138] After women were banned from going underground, coal sorting was transferred to the surface.[139] For a few years the law was defied by some proprietors around St Helens, possibly because they had a shortage of labour.[140] Angela John has said that redundancy was unlikely where no one else would work at screens sifting the coal or pushing trucks on the banks so cheaply.[141] With an abundance of young lads and no more attractive But with no more attractive employment for young lads than

mining in Somerset, no women worked at the pits underground or at the surface. (Table 4.7)[142]

What was also significant under these arrangements compared with Somerset was that boys faced no bottleneck in promotion to hewing after starting in an ancillary job. About 40% of the miners were hewers so that far more recruits could eventually get a job with the best earnings and without having to move.[143] St Helens had a younger workforce than Somerset, fewer men aged over fifty and no large drop in the number of young men aged over twenty. The survival ratios from the census indicate that there was less imbalance between the number of jobs for men and those for boys. (Table 4.8) There was no net loss of miners on completion of their apprenticeship as there was in Somerset. Quite the opposite, since young men in their twenties were recruited, although miners' sons probably stood the best chances of becoming hewers. (Table 4.9)

4.4.2 Wages and Incomes

Earnings reflected the continued demand for labour. Wages had to be relatively high if the proprietors wanted to retain miners and attract new workers. Women and children could get work in other industries, unlike Somerset. But mining may have been more attractive because the better paid jobs were attainable by a large proportion of recruits. (Table 4.9)

Hewers were the best paid and when there was a growing demand for coal they could expect to get relatively good wages compared with their counterparts in Somerset. Wages rose in the 1800's and again in the late 1840's and 1850's.[144] In between, they may have earned little more than nailworkers. In good times though a hewer could earn 20/- a week and more after he had paid his assistant.[145] Of course it was greater if he did not pay any members of his family who worked for him. A drawer in his late teens might earn 14/- to 15/-. As a piece rate was negotiated by the hewer for each seam, either for the distance cut or the amount of coal removed,[146] St Helens' miners were also better paid than most miners because their income was not frequently reduced by difficult working conditions.[147]

Also, seasonal and cyclical fluctuations in demand were not severe in St Helens because the collieries tended to sell coal to a wide variety of users. There were a few intermittent falls in demand. About 1820 and in the early 1840's wages were cut and strikes followed.[148] But short-time working was never as frequent or as long-lived as at the collieries in Lancashire's textile areas, around Bolton, Oldham and Leigh.[149] At Worsley weekly earnings were no higher than in Somerset in the 1840's.[150]

Although lay-offs might have caused temporary hardship to miners, miners in St Helens were less likely to have been out of a job or suffer from variable wages

because of the pits' inefficiency.[151] New pits were always being sunk, many more than in Somerset. Moreover, the larger collieries were better equipped to keep up a continuous cycle of production than collieries with few faces and one shaft. There were still minor daily interruptions which affected production, but because more coal faces were being worked and more shafts used at one time, men could be transferred to other pits at the colliery with greater ease.

4.4.3 Hazards and Health

Compensations in pay and job security, however, were offset by greater dangers. Miners had a slightly higher death rate from pit accidents in South-west Lancashire than in Somerset.[152] Explosions produced by gas were becoming a greater hazard, especially at deeper collieries.[153] At Haydock twenty-six men were killed in 1868.[154] In gas explosions many others were burned. In addition, injuries from rockfalls remained commonplace.[155] Engineers, such as Hopton who worked for a time in St Helens, and the Mines Inspectors attributed many accidents to a lack of concern shown by proprietors for the safety of their workers.[156] But the collieries in St Helens were probably no more unpleasant or debilitating for the workers than the heat of the glass furnaces and foundries, the poisonous fumes of the primitive chemical works, and the exhausting hours in the domestic metal and textile trades.[157]

4.5 Differences in Work at Collieries within each Coalfield

Contrasts in the work of miners within each coalfield should be expected as well.[158] Diverging trends in production and employment within Somerset and St Helens would have affected the regularity of work and rates of pay to be had in different parts. By and large coal mining was better paid in the Radstock and Blackbrook districts which were growing rapidly than in Nettlebridge and Whiston which were stagnating. However, Benson has added that work at collieries would have also varied because of the coal being mined, the age of the pit and the expected working life of the works, while there would also have been economies of scale.[159] For example, coal was easier to cut and fewer haulage workers were required in new pits. At Clandown and Norton Hill production in the first few years was never matched afterwards.[160] Exhausted pits such as Paulton Ham used old equipment and they came in for most criticism from the Mining Inspector for their primitive techniques.[161] They were also prey to more interruptions which must have left their miners with lower earnings.

4.5.1 Organisation and Routine

Although the methods of coal getting did not vary greatly within each area, the scale and sub-division of work away from the face often did because of local conditions, scale and technology. Some differences arose naturally enough from variations in the quality, thickness and slope

of seams and other geological conditions. On Mendip a few collieries right up to the nineteenth century attempted to work vertical seams in the same way that veins of tin were worked in Cornwall.[162] The surviving collieries, Nettlebridge and Coal Barton, and probably the others too in the mid-nineteenth century, mined seams in the conventional manner.

Scale was probably a more important difference. At the larger collieries in Radstock, for example, twenty to thirty hewers could work along a single face according to Greenwell and McMurtrie.[163] At Bishops' Sutton there were usually only one or two men in each seam.[164] The size of the workforce at a pit probably varied in a direct proportion to this. The Radstock pits had well over 120 men c.1850.[165] Their neighbours in the Paulton and Radstock districts, such as Greyfield and Clandown, mostly had over eighty men.[166] By the middle of the century some collieries in St Helens had workforces down each pit that were equivalent to those in some of Somerset's, Haydock, Blackleyhurst and Sankey Brook for instance.[168] At the same time Green Lane, Eccleston, had four hewers at most down each pit, which was little larger than the majority of pits earlier in the century.[169]

At larger pits economies of scale could be made underground as well as on the surface, and these may have altered the structure of their workforces. At Radstock, Camerton and Gerard's Bridge, for example, the movement of

coal away from the face was made more efficient. The coal was put in larger trucks, ponies were used instead of boys once the roadways were widened, and self-acting inclines installed. Fewer boys were needed to serve the hewers in these operations. By reducing the number of twinboys while increasing the number of hewers, carting boys and drivers 1853-55, savings were made at the Radstock Collieries.[170] Middle Pit underwent some modernisation first of all and, in 1848, there were more boys over fifteen compared with those aged under fifteen than at the others.[171] Fewer small children were used at collieries in Lancashire once tracks were extended to the face according to the Mining Commissioners.[172] Angela John has said that women were becoming redundant for the same reasons.[173] This coincided with their exclusion from working underground in Lancashire. Their banishment could have hastened technological changes, however, for in 1842 many of the collieries around Ashton and Prescot, where large numbers of them worked, were primitive and had fewer adult men.[174] The installation of cages rationalised coal handling on the surface and underground.[175] Because more coal could be lifted easily, sorting could be done at the surface in South-west Lancashire by women who had formerly been drawers.[176] In Somerset, at Radstock and also at Welton, the intention was to reduce the numbers drawing and shaft winding.

The larger collieries in both coalfields had more

specialised workers on the payroll. As the scale of working grew the number of workers doing repairing and branching was increased. To maintain production at a higher level it was essential at Radstock, for example, to have a steady supply of new faces for the colliers to continue cutting. Branchers, veerers and roadsmen worked at their tasks full-time at Radstock and even Clutton.[177] Where the distance between the face and shaft was longer there was a much sharper division of haulage work by age and skill among the boys. Radstock Collieries had gug winders, putters, twinboys, fillers and carting boys, whereas at Bishops' Sutton there was no such distinction in pay and grading.[178] Above ground the bigger collieries had a manager who was often a professional engineer and surveyor in charge of the overseers and craftsmen.[179] Other managers were more involved in the day to day problems underground. At small collieries such as Bishops' Sutton and Green Lane the adult workforce remained jacks-of-all-trades, too. By necessity the hewers had to turn their hands to branching and road work, and even mending the pump when coal could not be cut.

4.5.2 Wages and Conditions

Significantly, rates of pay were better at collieries that were in the growing parts of each coalfield. Moreover, production was becoming less irregular in these areas. Because they were better equipped, work did not come to a

halt so frequently. In addition, production was not reduced so much during the summer.

About the middle of the century miners could earn more money at collieries in regular production where demand was growing. According to the miners, the average daily wages at Radstock and Timsbury in Somerset and in St Helens itself were relatively higher.[180] In Timsbury the hewers earned between 2/6d and 3/- a turn in the 1840's. About 1850 the Radstock hewers were getting from 2/6d to 2/8d a turn while they earned 2/- at best at Bishops' Sutton.[181] In 1842 the miners at Coleford complained that they worked fewer turns than at Radstock in the summer months.[182] In Paulton and Clutton there were several reports of a lot of short-time working in the late 1840's.[183] In most years, 1831-44, the Clutton collieries only raised about 20% of their annual output in the summer quarter.[184] Greenwell, the Waldegrave's engineer at Radstock, intended to transfer more production to the slack summer period after the railway arrived in 1854.[185] There was often a downturn in the summer still, but in 1860 for example, Ludlows and Wellsway produced 25% of their coal in the summer quarter.[186]

In addition, the problems of everyday working were greater at the collieries in declining areas such as Paulton and Nettlebridge. More collieries in the Paulton district were unable to produce their quota in the 1830's and 1840's. Radford failed in every year in the early

1840's, and production was dogged for much of the time at Hayeswood, Paulton Ham and Hill, and Greyfield.[187] If the stability and duration of colliery working provide a rough guide to the regularity of work, workers at the collieries in the expanding Radstock and Blackbrook districts in each coalfield were possibly better off throughout the early nineteenth century because they were less frequently upset. (Table 2.2)[188] Consequently, the miners should have had greater prospects of promotion, fewer fears of redundancy or being laid-off, and better rates of pay.

In support of this, the expanding mining areas in both coalfields had younger workforces and more of the recent recuits among them. (Table 4.10-4.13;Figure 4.3-4.5)[189] Far more of the miners were younger household heads and juveniles in the Lower Wellow and Lower Cam districts of Somerset than in Upper Cam, for example, and in the Blackbrook district of St Helens than Whiston. For every miner aged over thirty-five there were more sons of miners too in these areas. Also, in all the growing areas more miners could be classified as 'outsiders', that is sons of non-miners, lodgers and relatives of miners. Radstock, for example, had more miners who were lodgers than other parishes, 1841-61, as well as a larger number of fathers with their sons down the pits and more households of non-miners containing colliers. (Figure 4.4) Townships in Blackbrook, such as Billinge and Rainford, had more outsiders in 1851 and a

much younger workforce, while Ashton had a large contingent of miners who were the sons of non-miners. (Figure 4.5)

Finally, the large, better equipped collieries in Somerset were also safer. Like many small pits in Staffordshire run by butties, most of the older collieries had antiquated shafts and haulage arrangements up to and beyond the middle of the century.[190] Unguarded and unbricked shafts were common, and men were lowered down by hitching themselves to a chain or rope, a practice which persisted at the oldest and smallest pits.[191] In St Helens, though, greater safety was balanced by the increased risk of an explosion occurring at a larger, deeper colliery. These happened at Haydock although multiple deaths were rare before the 1860's.[192] In Somerset firedamp was only a problem at a couple of collieries around Coleford; Coal Barton, Newbury and Vobster.[193] The miners at these pits asserted that they had to retire earlier because the gassy seams caused breathlessness by the age of forty-five.[194] Premature retirement from hewing may have curtailed their well-paid careers before miners in the rest of the coalfield. Less taxing jobs were not so well paid and only a limited number of these may have been available in Somerset as there was no shortage of older men and boys to do ancillary tasks, especially in the earlier worked areas around Coleford which had the gassy seams.

Miners may have also had more protection from hazards in the larger mining communities and if they worked at collieries owned by benevolent proprietors.[195] The larger collieries could afford to find work for the injured and old. Owners such as the Jarretts at Camerton and later the Waldegraves at Radstock provided homes for their workers and often gave help to the sick and maimed.[196] Skinner for one though did not consider that the Jarretts' actions, like the Fitzwilliams', was wholly charitable.[197] But there were burial clubs and friendly societies in most pit villages and these provided miners who belonged with some compensation.[198] Unfortunately, not all miners were members, some living in communities without these social organisations.

4.6 Concluding Remarks

In general, the miners' work and wages at collieries in both areas reflected what was happening to the demand for labour, so that they were consequences of the scale and growth of production, geological conditions, the capital invested, and the profit hoped for if not realised, and what was happening to the supply of labour, so that they were consequences of technology, productivity and trends in other employments.

By comparison with other workers, characteristics of working at collieries easily distinguished the miners from other workers. The organisation of pit work

differed from work on farms and in factories and workshops, even though all the workers in them were mostly full-time hired hands. The miner had to be trained and skilled to become a hewer and he retained an influence over training and recruitment. Because he worked without supervision the miner had some freedom to determine his routine, pace of work and methods of work, so that he did not have to work fixed hours or do a set amount of work. In addition, miners were distinguished from other workers also employed in part of a chain of production in large concerns by their many and varied fluctuations of pay and the appalling physical conditions, risks and dangers to health and wealth that the work entailed. However, in spite of these risks and vicissitudes of fortunes, miners were compensated by better wages than most labourers.

The typical miner had a succession of jobs during his career at the pit; starting out as a putter then becoming a drawer and graduating to be a carting boy before eventually becoming a hewer and being relatively well paid by his early twenties. The lucky ones continued to work underground using their accumulated skills and experience to do branching and repair work. For others, accidents and the hard work took their toll, shortened their careers and left them to find less remunerative work.

Many disparities existed in the ways coal was won in the two coalfields, so that miners' work and careers

varied. As a consequence of different ways of working, how the workforce was employed, and what they earned, varied from pit to pit. Somerset's collieries cut and removed the coal in a different manner and at a different pace to those in St Helens. More hewers and fewer haulage workers were employed at pits in St Helens because they were not so deep and the distance from face to pit bottom was generally shorter. Because of the organisation of ancillary and face work in thicker seams, miners in St Helens had a tighter rein over the chain of production than the men at the face in Somerset. Since the work was more regular too, rates of pay were better in St Helens. Demand in Somerset was still highly seasonal.

Miners could expect relatively low earnings and fewer chances of promotion at older, smaller pits with landsales, many more of which were in the Somerset coalfield. What with the greater hazards to health and safety at these collieries as well, the miners' circumstances varied considerably within each area. Consequently, getting a job at a pit and then graduating must have been easier at collieries where production was growing and more stable, especially at the larger, newer coalworks in the districts mining deeper coal.

These differences make it difficult to generalise about the effects of work outside the pit, in spite of the common characteristics of men employed in coal getting.

The enquiry continues with an examination of how work might have affected the miners outside the pits in Somerset and St Helens in the early nineteenth century.

CHAPTER NOTES

1 J H Goldthorpe Technical organisation as a factor in supervisor-worker conflict:some preliminary observations on a study made in the mining industry British Journal of Sociology 10 (1959) 213-230. Among the best studies are J W Scott The glassworkers of Carmaux (1974) and R Samuel Quarry roughs in Village life and labour (1975) 139-263. Comparisons of workers are made by G Stedman Jones Outcast London (1971) and E Hopkins Working conditions in Victorian Stourbridge International Review of Social History 19 (1974) 401-425

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3 Scott (1974) 55

4 J U Nef The rise of the British coal industry Volume 1 (1932) 135-197. Caution, however, has to be exercised when using a few collieries' records to generalise about the experiences of work in coalfields (see Appendix B)

5 Nef Volume 2 (1932) 183. This is illustrated by J Benson British coal miners in the nineteenth century (1980) 57; J Rule The experiences of labour in eighteenth century industry (1981) 29-30; and J W F Rowe Wages in the coal industry (1923). Differences in the working conditions of collieries because of their sales and depth are described by P L Payne The Govan collieries 1804-5 Business History 3 (1960) 80; J H Morris and L J Williams The South Wales coal industry, 1841-1875 (1958) 136; J E Williams and B McCormick The miners and the eight hour day,1863-1910 Economic History Review 2nd Series 12 (1959) 227-228

6 M Daunton Down the pit:Work in the Great Northern and South Wales coalfields, 1870-1914 Economic History Review 2nd Series 34 (1981) 578; P Spaven Main gates of protest:Contrasts in rank and file activity among the South Yorkshire miners, 1858-1894 in R Harrison ed. Independent collier (1978) 206-207; and A Campbell and F Reid The independent collier in Scotland in idem 59-60. Hair said much the same in his thesis, P E H Hair The social history of British coal miners, 1800-1845 DPhil Oxford (1955) 312. Differences in experiences were common among other workers in the same industry; R Q Gray The aristocracy of labour in nineteenth century Britain c.1850-1914 (1981) 9; S Pollard Labour in Great Britain Cambridge Economic History 7

(1978) 119. Numerous examples can be found in M Rowlands Masters and men in the West Midlands metalware trades (1975) 156-165 and J H Treble Urban poverty in Britain (1979) 52-80

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12 A J Taylor The Wigan coalfield in 1851 Transactions, Historical Society of Lancashire and Cheshire 106 (1954) 121-126

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99 It is unlikely that miners deliberately sought alternative work in the summer months because none was better paid than mining
100 Costs per cwt rose when men were doing more non-productive work, SRO DD/WG 36
101 This even occurred at the Radstock Collieries where the wage bill fell from £412 in the first week of January, 1848, to £257 in the last week of May; SRO DD/WG 20
102 It was obviously difficult to plan production in the 1830's and 1840's to meet an agreed tonnage
103 WarRO CR/1886 442
104 SRO DD/SH 74/17/1
105 Bulley (1952) 77
106 CCO 87/138
107 SRO DD/PO 36b Accounts; WarRO CR/1886 454
108 SRO DD/SH 74/17/2, and this occurred again in April 1853. Other periodic disruptions could last longer; four months at Heighgrove 1810, Bulley (1952) 124; two weeks at Frys Bottom 1843, WarRO CR/1886 442; and a few months at Clandown 1859, DCO T5 Docketed Correspondence, Clandown
109 Parfitt (1930) 18; Flower (1970) 19-20. It was not just the miners who complained about the difficulties either, as surveyors made lengthy comments, SRO DD/NCB 59; DCO T5 Docketed Correspondence, Somerset Collieries (Generally), Bundle 1
110 Small coal usually amounted to 10-15% of production, SRO DD/SH 74/26
111 Benson believed that strikes were not as important as the variability of seams, Benson (1980) 64-65. Slaven, however, found that at one colliery they caused as much loss of work as in summer when the colliery was closed down, A Slaven Earnings and productivity in the Scottish coal mining industry during the nineteenth century:the Dixon enterprises in P L Payne ed Studies in Scottish business history (1967) 224-225,238
112 Skinner mentioned that there was a pitched battle at Clan Down during the 1818 dispute, Skinner (1930) 152, and another riot in 1830, idem 244-249. There was a riot in Radstock in 1848, Bulley (1952) 45
113 A small dispute arose at Tyning on two days in November 1852 over the day of the 'reckoning', SRO DD/SH 74/19
114 BPP 1842 xvii 179; Rule (1981) Chapter 3; although Hair has argued that the occupational mortality of miners was higher than among other adult males, P E H Hair Accidents, death and suicide in Shropshire 1780-1809 Transactions, Shropshire Archaeological Society 59 (1969) 68-69
115 J Benson Non-fatal coal mining accidents Bulletin, Society for the Study of Labour History 32 (1976) 21-22; F Machin The Yorkshire miners (1958) 7-8

116 BPP 1852-3 xcix 77
117 Skinner (1930) 238; R K Bluhm A bibliography of the Somerset coalfield Library Association thesis (1966) quoting from newspapers; Down and Warrington (1972) 89
118 BPP 1854 xix 154; BPP 1856 xviii 170-171
119 P E H Hair Mortality from violence in British coal mines, 1800-50 Economic History Review 2nd Series 21 (1968) 545-547, about 4.3 deaths per 1000 in South Wales and the South-west of England
120 Skinner (1930) 42,87,116,119; with additional examples in Skinner (1971 edition) 13,25
121 Parfitt (1930) 12
122 BPP 1842 xvii 50
123 Down and Warrington (1972) 53
124 D Anderson Blundell's collieries:Technical developments 1766-1966 Transactions, Lancashire and Cheshire Historical Society 124 (1967) 130
125 Haydock, J R L Haigh Mss Collieries around Haigh 1851; Hardshaw, Barker and Harris (1954) 69, J Slater A brewer's tale:Greenall Whitley and Co. Ltd (1980) 56
126 PA WH 1 15. Widework was similar to longwall working, W Hopton Conversation on mines (1891) 96-97
127 This was often known as strait work, D Anderson The Orrell coalfield (1975) 58, which left wide pillars and had narrow roads
128 In 1860, for example, David Bromilow was accused by the Misses Orrell that he had ignored the terms of his lease and begun to cut coal without wide enough pillars underneath their home, Parr Dam House, StHLocHistLib M/GI/12
129 The workforce down a pit was possibly equivalent in size to the number working in a seam in Somerset. In Sutton fewer than five hewers worked at a pit in the 1820's, LRO QDL/West Derby, Sutton. By the 1840's and 1850's large collieries would have about 10-15 hewers at a pit, about the same number as at the larger Somerset collieries, StHLocHistLib Parr Poor Rate Books 1840-7; J R L Haigh Mss Collieries around Haigh 1851
130 Daunton (1981) 583-584
131 Douglass (1977) 218-219
132 J Dickinson Statistics of the collieries of Lancashire, Cheshire and North Wales Memoirs, Literary and Philosophical Society of Manchester 2nd Series 12 (1855) 74
133 A system described by D H Lawrence in Sons and Lovers (1977 edition) 89-92; BPP 1842 xvii 161-164; PA WH 1
134 StHLocHistLib, Sibson Papers 1816
135 BPP 1842 xvii 163
136 idem 156, Rowe (1923) 62,192
137 BPP 1842 xvii 180
138 A V John By the sweat of their brow (1980) 73,79. Stutchbury, a surveyor, advocated sorting in Somerset,

so that the Duchy of Cornwall's freeshare would be increased but nothing was done, DCO T5 Docketed Correspondence, Somerset collieries (Generally) Bundle 1

139 A V John (1980) 23-24,39

140 A V John Colliery legislation and its consequences: 1842 and the women miners of Lancashire Bulletin, John Rylands Library 61 (1978) 99. Efficient riddling meant that they could get a better price for coal, idem 73. It was formerly riddled underground, BPP 1842 xvii 161

141 A V John (1980) 56

142 idem 21

143 Barker (1977) note 40

144 Hewers were getting between 4/- and 5/- a week in the 1840's, Barker and Harris (1954) 276

145 Barker and Harris (1954) 270-271. In addition, hewers were paid a set rate for their drawers, BPP 1842 xvii 209, so that a collier and his sons who were drawers in Haydock, 1816, were getting up to 22/6d, StHLocHistLib Sibson Papers

146 PA WH 1. Higher rates were paid for working thin seams, LRO DD/M 4/6; BPP 1842 xvii 181,218-219

147 Miners had lower earnings in other parts of the Lancashire coalfield, BPP 1842 xvii 180. They were paid every three weeks, R Neville ed The Martyrdom of the mine History Workshop Journal 1 (1976) 224-240

148 At the behest of the Sankey Coal Owners' Association, R Challinor The Lancashire and Cheshire miners (1972) 23 (1818), 27 (1830), 37 (1844); PA BPG 7

149 BPP 1842 xvii 218-219; F Mather After the canal Duke (1970) 315-316

150 Mather (1970) 321,324-325

151 Anderson (1975) 124

152 With 5.3 deaths per 1000 miners, Benson (1980) 42; Dickinson (1855) 75

153 Barker and Harris (1954) 273,283, quoting examples from newspapers and the Civil Death Registers 1837-1849; BPP 1842 xvii 189-190; Anderson (1975) 142. Between 1828 and 1837, 62 of the deaths recorded by the Orrell coroners were from explosions

154 StHLocHistLib M/W/72

155 BPP 1842 xvii 171; F Bailey Coroners' inquests held in the manor of Prescot 1746-89 Transactions, Lancashire and Cheshire Historical Society 86 (1934) 25-28

156 Barker and Harris (1954) 272. Shafts were usually unwalled and unguarded, BPP 1859 xii 47

157 idem 288; C Forman Industrial town (1979) 77-9 which paints an unpleasant picture of conditions in the chemical industry

158 Morris and Williams (1958) 78-80

159 Benson (1980) 57; J Langton Geographical change and Industrial Revolution (1979) 151-152

160 DCO T5 Docketed Correspondence, Clandown; CCO 88/162,172

161 John Watts' recollections, C Howell Some of our old pictures (1979) 2-3. This was also common in the Forest of Dean, Fisher (1981) 18
162 DCO T5 Somerset collieries, Docketed Correspondence, Nettlebridge Bundle 1; Bulley (1952) 68
163 Greenwell and McMurtrie (1864) 13
164 SRO DD/FS 16
165 Bulley (1952) 119
166 WarRO CR/1886 454; 1851 CEBs Clutton
167 BPP 1842 xvii 50; DCO T5 Somerset Collieries, Docketed Correspondence, Nettlebridge Bundle 1; SRO DD/FS 16
168 J R L Haigh Mss Collieries round Haigh 1851
169 PA WH 1
170 SRO DD/SH 74/27. Costs underground fell from 5/3d to 4/11d a ton and on the surface from 1/3d to 11d a ton. The plan is referred to in SRO DD/SH 40/19 and the replacement of surface workers is mentioned in SRO DD/SH 74/17/2
171 SRO DD/SH 17/1. Carting boys at Middle Pit were older than at Wellsway, Ludlows and Tyning
172 BPP 1842 xvii 156,194-196
173 A V John (1980) 23-24
174 With improvements fewer women and small boys were needed, BPP 1842 xvii 152,229
175 Cages were carrying 11 cwt tubs at Radstock, Greenwell and McMurtrie (1864) 10, and 12 cwt tubs at Blackbrook, 1852, J R L Legh Mss T7/D7. Formerly 3 cwt tubs were raised, BPP 1842 xvii 54
176 BPP 1842 xvii 150,202
177 Parfitt (1930) 39. Large collieries in Durham had similar workforces, Moyes (1969) 88. There were no craftsmen and engineers at Bishops' Sutton, SRO DD/FS 16
178 BPP 1842 xvii 54; SRO DD/FS 16
179 For example, Ashton, BPP 1842 xvii 51; and Holwey, WarRO CR/1886 736/7. Holwey was accused of incompetence at Greyfield
180 BPP 1842 xvii 56
181 SRO DD/FS 16
182 BPP 1842 xvii 51; and the collieries were undoubtedly more precarious, SRO DD/DN 290
183 SRO DD/SH 74/17/1; SRO DD/RM 21. The agent at Radstock remarked that the men were often working 6 or 8 turns at Radstock compared with 3 or 4 at Paulton, BPP 1842 xvii 54
184 WarRO CR/1886 442
185 SRO DD/SH 74/20/1. By 1861 Radstock was sending about 75% of its coal by rail and only selling about 15% to carriers, SRO DD/SH 74/25/7
186 SH/NCB 3/30; SRO DD/WG 36. Summer trade was far better than ten years earlier, SRO DD/SH 74/17/2, SRO DD/WG 20
187 Radford, CCO 87/294; Hayeswood, Down and Warrington (1972) 96; Paulton Ham and Hill, SRO D/P/pau 13/3/2; Greyfield, WarRO CR/1886 454
188 Langton (1979) 203

189 It has to be assumed that the miners lived in the areas that they worked. This is not altogether satisfactory as some miners walked up to 3 miles to work, SRO DD/SH 74/16

190 BPP 1857 xvi 114-115. Mackworth listed the pits which had received notices in 1857 and these included Travis', Nettlebridge, Norton Hill, all the old Timsbury collieries, and the two Clutton coal works, BPP 1858 xxxii 90-110. None of those with walled shafts were included

191 Greenwell and McMurtrie (1864) 9

192 BPP 1852-3 xcix 77 (Haydock)

193 idem (Vobster), although in 1791 a Bath newspaper reported that 11 men had died in a fire at a Mells colliery, Bluhm (1966)

194 BPP 1842, xvii 51

195 Mee (1975) 139-145; Benson (1980) 89-90, Chapter 7

196 Skinner (1930) 245; SRO DD/SH 74/17/3

197 Skinner (1930) 245. He thought that charity was a sop for the stingy provision of poor relief in the parish and the cottage rents they charged.

198 Skinner (1971) 41, referring to the Camerton Club in 1809, and idem (1930) 42-43 referring to the club doctor attending an injured miner. Clandown also had a sickness club, BPP 1842 xvii 52; and in Radstock five friendly societies existed in the 1850's, SRO DD/SH 20/1-3, the oldest of which had been formed in 1817

CHAPTER 5

MAKING A LIVING FROM COAL MINING

To many nineteenth century observers miners had independence and a favourable standard of living.[1] In Somerset several commentators such as Camerton's diarist, John Skinner, remarked that the miners' families were usually relatively well-off.[2] They regularly ate meat; they had roaring coal fires throughout the year; and they had plenty to drink on Saturdays after receiving their pay.[3] To cap it all, single young men were notoriously precocious lotharios. In Camerton they could afford to go wenching at the village bordellos as well as frequent the less salubrious streets of Bath.[4] It was surprising perhaps to people like Skinner that the miners' pleasures were not confined to high days and holidays like most other labourers and that they had the spare time during the day to loaf around. Miners were not always paid weekly, they did not have to cut coal on more than nine or ten days a fortnight, and the hewers went to work at about five o'clock in the morning, so that after a hard day's work or on a weekday miners were not fit for doing much else but sit on their haunches in the streets.[5]

Social characteristics of miners are obviously best explained by characteristics of the work underground. What miners achieved from making a living cutting and

carrying coal bridges the gap between their work and their life style.[6] What follows first of all is a discussion of how the work underground and the earnings and careers of miners described in Chapter 4 affected the standards of living enjoyed by miners and their families.

5.1 Economic Consequences of working at a Colliery

5.1.1 The 'Independent' Miner

Few workers at the time had fixed shifts or the amount of work they had to do determined by a machine; most were like miners and worked for piece rates while having to adapt to some conditions imposed by their employers.[7] But miners, or at least the hewers, branchers and sinkers, were able to exercise some control over the length of time they worked and what they did. In Somerset they could decide when they descended and came up.[8] In St Helens they reputedly took a day off following the three-weekly reckoning.[9] Only the self-employed and skilled workers such as glass workers retained the privileges which 'independent colliers' enjoyed.[10]

Miners, more so in St Helens than in Somerset, were able to influence with whom they worked. Control over recruitment and training limited the influence of managers.[11] By this means they could provide work for their families, effectively bar all but family recruitment, and preserve their skilled status. The hewers in St Helens and branchers in Somerset were sub-contractors

without any of the trammels of the butty system as their 'employees' were not barred from becoming sub-contractors themselves.[12]

5.1.2 Miners' Incomes and Earnings

Compared with other labourers in both these areas miners had a reasonable standard of living, relatively secure employment, potential increments when demand for coal grew, and relatively few problems finding work for their children. The average clodhopper, labourer, nailmaker and cobbler was not as well off, and few workers in glass factories commanded the same benefits as most of the adult workers at St Helens' collieries.[13] Moreover, with their children down the pit from the age of about ten miners were even less likely to fall below the poverty line than other workers. No self-respecting miner supposedly allowed his son to take up a job as an ordinary labourer, not least because so many jobs hauling coal could only be done by boys.[14]

Since mining was an industry which generally had a shortage of labour, wages were more often moving upwards than downwards, and miners' children could easily be found work in the industry. Miners should have achieved a better standard of living than agricultural workers, for instance, because of the earnings of their sons. However, the value of the earnings of miners' sons was probably greater because miners' wives were not usually additional wage earners.[15]

But miners were not immune to the misfortunes which could reduce the incomes of wage earners either. Wages in mining were invariably reduced when trading conditions were depressed, in addition to which every miner's standard of living was reduced by temporary closures of collieries, injury and illness.[16] At Somerset's pits the demand for coal was still highly seasonal, and no collieries escaped without having some interruptions to working. Once coal production was no longer growing nor new pits opening, miners' sons and older miners unfit for hewing were not so assured of a job. If miners' children could not get work, families would be more dependent on the head's earnings with all the consequences of a standard of living that was more at risk if the miner was injured, laid off or made redundant.[17]

5.1.3 Miners' Family Economies

Since work at the collieries was usually only available to men and their sons, miners' family economies were dominated by the income of men.[18] In the absence of jobs for wives the miner was more likely to be the sole earner until his sons could go underground. However, a miner's family income should have attained a greater size than other men's in middle age if he had several sons working underground beside himself. This state of good fortune possibly depended on whether boys could start down the pit and earn promotion without moving away from home.

The miner's family probably had to be a budgetary unit with its costs of subsistence offset by income.[19] Children, wives, lodgers and even kin who worked were a means of improving income, or at best reducing the chances of hardship.[20] Consequently, working conditions that affected how miners had to make a living could have influenced childbearing, getting married and the membership of households in coalfields.[21] Although it is difficult to discover if individuals acted as objectively as this, some studies have found that for a range of factory workers and labourers characteristics of work and family economies may explain their family size, ages at marriage and fertility.[22]

However, as a first step it is no simple matter to estimate the incomes of miners' families or other workers in the Somerset and St Helens coalfields. No nominal wage records exist in either coalfield at the same time as a census of families.[23] But considering the differences between pits it would be necessary to have wage books for various collieries to make any generalisations. With only a paltry range of wage figures and no series of these there is not enough information to gauge family earnings, take-home pay and relative standards of living.[24] Poor rate expenditure, payments, and the numbers assisted by the overseers in poor relief accounts are the best supplementary indicators of standards of living in each coalfield, even though out-relief was not

provided to make up for wages that were not enough to keep families clothed and fed. In addition, some impressions of family economies, such as who worked, how many of the family worked and what kind of work they did, can be obtained by using the occupations of individuals stated in the 1851 CEBs. These have the advantage of comparability between areas and between occupational groups, even if they do not provide necessarily complete and accurate statements of who worked. (See Appendix A)[25]

What follows in the second half of the chapter is an examination of how work at the pits affected standards of living. The evidence shows that people were better off in the growing parts of each coalfield; more people were on poor relief in districts where production fell such as Nettlebridge; and poor rates were smaller in the growing parts. Miners though could avoid parochial relief by having larger incomes than other workers, especially having greater earnings when they got married and had their first children, and when they grew older. Miners had workers at home, principally sons, at older and younger ages than most other workers. Miners also had more sons who followed them down the pits; significantly more in the areas where miners and coal were in greater demand. No doubt children may have been an insurance against the risks of work and old age.

5.2 Poverty in the Study Areas

The extent of poor relief shows that standards of living

for many families in both areas must have fallen well below Rowntree's poverty line.[26] There was not a great deal of poverty in either coalfield; very little hardship in Somerset by comparison with other rural areas in southern England and very little in St Helens by comparison with other industrial and urban areas. Poor relief was particularly burdensome in rural southern England from the end of the Napoleonic Wars.[27] Towards the end of the nineteenth century as many as 30% of all families were possibly below the poverty line in urban areas as a result of uncertain wages from casual work and working in lowly-paid trades.[28] At times there were probably more.[29] Relief increased in Somerset once the production of coal was no longer increasing and where mining came to an end.

5.2.1 Poverty and Mining

Miners could expect to be unemployed at some time in their career in Somerset and St Helens when mines closed because of exhaustion and unprofitability, and when mines stopped production temporarily because of accidents, seasonal falls in demand and unforeseen faults in coal seams. Miners' working lives of up to sixty years were longer than the lifespan of most collieries, so that almost all miners had to look for another job. The long careers of several workers at Ravenhead were exceptional.[30] However, underemployment was a more common problem for miners like other labourers. The Bath newspapers in 1862, for example, reported "great distress" caused by

short-time working at the pits.[31] But poverty was not just a problem associated with periods of the year when wages could not be guaranteed or jobs lost. In coal mining districts such as Worsley in Lancashire, the Forest of Dean, Ayrshire and Somerset, many miners were probably not earning high enough rates to support their families.[32] The Mining Commissioners found the miners in Macclesfield and Pembrokeshire little better-off than workers in sweated trades.[33] When food prices increased, especially the cost of bread, riots were not unusual. There was even a disturbance in Radstock in 1817, for example, although the extent of want was not as great as in nearby Bath in the 1810's.[34]

The miners were prey to the alternating periods of plenty and want over the life cycle common to most of the working classes. There were poverty traps arising from sickness and death, bringing up children with only one wage earner, and growing old.[35] Families more easily fell into primary poverty when they had several young children who were not earning and then again after their children had left home.[36] In between they were possibly better off. Miners' families may have escaped it because of the earnings of their children. Haines found that among a wide range of industrial workers more miners had secured well-paid work for their sons.[37] As a consequence, their family incomes could grow while their own earnings were declining. This may have kept miners' families off poor relief when the main

breadwinner was incapacitated or had died. Less fortunate people had to claim poor relief which was often as little as 1/6d a week for an able-bodied adult in some parishes.[38] Skinner mentioned an old man he knew who preferred to seek casual labouring jobs for which he might earn 4/- a week rather than apply for such a miserable allowance.[39]

Retirement was out of the question in these circumstances even for miners because their children would not be able to support them once they left home. For lame and injured miners there was no alternative. Immediate assistance came from benefit clubs, one or two of which existed in most villages, and many of the miners belonged to them by way of insurance as well as for pleasure.[40]

5.2.2 Poor Relief and Unemployment

In both coalfields the amount spent on poor relief was lower than in surrounding areas, highlighting sharp contrasts in the extent of poverty between depressed rural areas with declining industries and the coalfields.[41] Large differences existed in Lancashire and Nottinghamshire between districts with depressed domestic manufacturing industries and districts with growing factory industries, in spite of the volatile demand for labour at factories.[42] Expenditure on poor relief was lower in St Helens; from 4/- to 5/- a head in the early nineteenth century compared with 7/- to 10/- in Somerset.

At the censuses, 1841-61, fewer household heads in Somerset admitted to being unemployed than in St Helens although, as Bowley and Bennett-Hurst found fifty years later, poverty could still have been pervasive even though most of the able-bodied men worked.[43]

In the Somerset coalfield, although the amount of parochial expenditure was much lower than in the county as a whole and not rising between about 1810 and 1835, it did increase against national trends later in the 1830's and 1840's.[44] (Figure 5.1) Assistance to the poor did not rise much immediately after Waterloo as it did in most of southern England. Coal production was generally increasing rapidly in Somerset until the 1830's. But when the mining industry's growth was more fitful, less widespread and possibly not providing the same chances for promotion or a career in mining for miners' children in the 1840's, rates of expenditure were far nearer to the amounts paid in the county as a whole than in 1803 or 1812. Miners and men in other trades as well may have been less able to support dependants. In St Helens, a rise in rates occurred after 1839. It coincided with the depression which brought some unemployment and interruptions to work at the mines and glass factories.[45] But whereas 5.5% of male household heads in the Somerset coalfield did not work in 1851, only 1.9% could be classified as inactive in St Helens at the same time.

Poverty was greater in the parts of Somerset and

St Helens where mining and manufacturing was declining. In the Somerset coalfield, the rates of expenditure were higher in the Nettlebridge and Pensford districts throughout the early nineteenth century.[46] (Table 5.1) It reached 12/7d a head in Nettlebridge in 1840-2 whereas it was only 6/10d in Radstock. However, no parishes spent as much as depressed parts of Warwickshire and Kent. (Figure 5.2) Some parishes in the Felden were spending 25/-.[47] Yet, it was consistently over 15/- in Mells where the weaving trade was stagnating and it topped 20/- in Priston, an agricultural parish on the northern edge of the coalfield. Relief increased in Nettlebridge and Pensford where mining was not expanding; Holcombe, for example, but not in Stratton-on-the-Fosse where the Nettlebridge colliery continued to provide work.[48] The amounts spent on relief rose in Paulton in Somerset and Whiston in St Helens at a time when mining was no longer growing. In the concealed areas of the coalfield around Radstock rates remained low at around 5/- a head, which was much the same as in Parr and Haydock where collieries were increasing production as well.[49] In 1830-2, for example, Radstock was raising only £311 to relieve a population of a similar size to Mells which was spending £860. Annual amounts of relief fell as more collieries opened in the Radstock Basin and to the east of St Helens. The amount of relief which Wellow was dispensing, for instance, diminished in the 1830's and 1840's at the same time as the number of miners grew in number in the

tything of Shoscombe.

By the middle of the century there was clearly more unemployment in the districts where mining was not growing. (Table 5.2)[50] Whatever the drawbacks of the CEBs, Figure 5.4 and 5.5 show that variations in unemployment followed the trends in employment at the mines. In 1851 over 7% of the male household heads of Upper Cam and Mendip were not working. In the parishes of Ashwick, Coleford and Holcombe on Mendip, over 15% of all the households had a head who was unemployed, while usually fewer than 10% of heads and 5% of male heads were without an occupation in the parishes where employment at the mines had grown.[51]

5.2.3 Poor Relief and the Collieries

Poor relief payments in a few parishes indicate some direct connections between work at the collieries and the amounts disbursed; for unemployed and injured miners claimed relief for their families and dependants.[52] James Treasure of Holcombe was paid 6/- after he lost his finger at the pit.[53] Assistance was also obtained for men hurt at the colliery at Camerton.[54] Occasional relief was paid at Paulton to men without work at the collieries, especially if they had a large number of dependants.[55] At the same time, men with low pay at the mines may have been less able to support orphans and widowed mothers because of short-time working, for example.

As more relief was casual in parishes with high rates of expenditure in Pensford and Nettlebridge, it is likely that dependants qualified for poor relief even if a miner and his family did not.[56] Series of annual payments indicate how closely trends in employment and particularly the prosperous or 'ruinous state of the pits' affected the amount of poor relief needed.[57] In Paulton, for example, annual expenditure increased after 1816 but fell back below £500 soon after 1820 before rising again in the 1830's. After the 1830's employment at the mines did not grow and the collieries were dogged by problems. Radford was nearly exhausted and Ham and Hill colliery was seldom able to produce its quota. Increases at Holcombe, 1818-20, Farrington Gurney, 1830-34, and Timsbury, 1839-42, occurred at the same time as local pits closed.[58] Casual relief significantly rose far more sharply than permanent relief in several parishes; Paulton, Stratton and Farrington, when the total amount went up. For example, casual relief doubled between 1815-16 and 1817-18 and again in the early 1830's in Paulton when many families dependent on mining were probably in need of assistance.[59]

5.3 Family Economies in the Study Areas

Investigating who worked, how many people worked, and what kind of work they did in families focuses more directly on the effects of working conditions at the pits on the incomes of miners' families and their standard of

living.[60] Among studies that have done this, Hareven has shown how the number of workers and the age and sex of workers at different stages in the life cycle of factory workers' families in Manchester, New Hampshire, was a result of their employment in a textile mill and their principal employer, the Amoskeag Company.[61] She described the family economy as the balance between labour supply and demand, so that miners' family economies and their standards of living should reflect their work at the collieries.[62] Occupations in the CEBs show that miners' families had more workers, owing largely to sons and relations whom the miners could recruit, train and promote.

5.3.1 Family Economies and Mining

Since most members of miners' families supposedly worked exclusively at the pit, it would be surprising if their family economies were not dependent on the organisation of work underground and the money to be earned at the collieries. Vestiges of the miners' independence, the division of labour of coalworks, and the rising demand for miners were most likely to have affected their family economies, especially the relative degrees of poverty and prosperity they experienced and the length of these periods over the life cycle. Consequently, the division of work by age and sex, the skills needed to obtain a job, and the wages that were paid at collieries distinguished miners' family economies from other workers in Somerset and St Helens.

In St Helens and to a lesser extent Somerset miners were able to recruit and seek promotion for their children and other relatives.[63] By serving an apprenticeship partly under paternal guidance, sons secured a foothold in an industry which had better prospects than a lot of others. The hewers also protected their skilled status as entry to the higher paid jobs was determined by age and experience and not just physical strength. Although this was slipping from the miners' grasp once promotion depended more on the goodwill of overseers, while children and hewers were plentiful any loss in their status was offset by demand for their labour and increased earnings.

Family members did not necessarily work together but in neither coalfield were sons expected to find work themselves or work unsupervised by their elders.[64] Sons in St Helens were more likely to work for their fathers and with them, first of all as drawers and then as assistants and partners in a stall, although it was not uncommon in Somerset, because men recruited their work mates.[65] Brothers often drew coal together in Somerset's pits or worked in tandem as drawer and carting boy.[66] Families though probably worked more closely at the smaller collieries such as Bishops' Sutton where there was no narrow division of labour.[67] The workers at the colliery in 1852, for example, shared a handful of surnames; four young Sages being employed as drawers.

Fortunately, many jobs at all collieries in the two areas could only be done by boys. Most collieries in Somerset recruited young boys of 10-12 because of the narrow passages and thin seams.[69] Children could also increase their earnings as they grew up because of the divisions of labour. At the largest collieries in both areas jobs removing the coal were finely graded. By eighteen or nineteen most boys could expect to be carting boys in Somerset or hewers' assistants.[70] Jobs for hewers were more limited, particularly in Somerset's pits.[71] When this age was reached a miner's influence over his son's progress may have been at an end.[72]

"The colliers depended a great deal upon the earnings of their children" and by providing them with work at the pit throughout adolescence while they were living at home they could raise the family's income considerably.[73] Miners' families could perhaps count themselves fortunate compared with many other workers because they had subsidiary earners who were able to supplement the breadwinner's wages.[74] Miners' sons down the pit could in all probability earn enough to keep themselves from the age of about twelve, making them net contributors before other workers' children.[75] A pair of boys in their teens could earn as much as an adult.[76] Of course, many of their daughters could not get jobs, although St Helens was exceptional with its glass factories and pit brow work like mining areas that had factory and domestic textile industries. Apart from entering domestic

service girls in Somerset had few chances of work unless they left the coalfield.

Having several wage earners was a considerable insurance against the risks and dangers associated with mining, unless fathers and sons worked together. Families with only one breadwinner working down the pit would be vulnerable if the breadwinner was laid off or injured and off work for any length of time.[77] For miners over the age of forty-five the increasing earnings brought home by their sons could have compensated for a gradual fall in their own.[78] Usually labourers earned their best wages between the ages of nineteen and forty with a peak in their early thirties.[79] Older men could not earn so much on piece rates and would receive lower wages for repair or surface work.[80] Ill health often forced miners to take less arduous jobs than hewing. Also, if a miner was made redundant, the older men were possibly less able to transfer to another colliery on the same terms, or even obtain another job underground. Yet Haines found that the incomes of miners' families were greatest when the miner was in his fifties.[81]

In addition, miners' widows and daughters may have been helped by boys' earnings underground. Many more girls would have had to enter domestic service and more may have drifted into prostitution if they had not been employed to do domestic work at home because their brothers were working.[82]

Consequently, the family economies of miners should have experienced the same periods of want and plenty as other labourers during their careers. Standards of living obviously fell when there was no work, illness or the breadwinner died. But the family economies of miners should stand out from those of other men in Somerset and St Helens. The periods below the poverty line would have been shorter; in their twenties and thirties when they were offset by higher earnings and in middle and old age when their children began to earn money at the pit and stayed at home while they were doing their apprenticeship. These could have varied between districts since there were plenty of differences in the working arrangements at the pits that could have affected family economies. Some miners may have had lower incomes because their sons could not always get work at the collieries where they worked for so long. In examining the CEBs for 1851, the distinctions of miners' family economies, as well as the variations, appear to have arisen from mining in the two areas.

By and large, differences in the average number of workers in families in each area demonstrate that hardships over the life cycle were probably greater in Somerset where the number of jobs was not growing very much. More of the older families did not have supplementary earners; at all ages fewer children augmented the family's wages; fewer women worked, especially daughters, and fewer families looked after boarders. The

information in the CEBs also discloses that miners were probably better off, although the families of miners in Somerset contained fewer workers than miners and some non-miners, such as the glassworkers, in St Helens. In general, miners had more children at work than their neighbours in other occupations. They also had more sons at work when their resources may have been most stretched, in their thirties and in later life. Succession was high compared with other labourers. At the same time women and girls were only rarely wage earners in their families.

5.3.2 Workers in Families living in the Somerset Coalfield, 1851

Compared with urban-industrial areas families in the Somerset coalfield had smaller numbers of workers. (Table 5.3) Having so few adult women working would be the principal reason for this.[83] Male household heads were the main wage earners, and because mining and farming were the most important occupations, other adult males were usually the only supplementary wage workers. The absence of a working male head was not compensated for by more women and children working, although in households headed by females more adult women worked than in male headed households. (Figure 5.6) Female householders more frequently took in boarders, but in general fewer households had lodgers than in many growing urban and industrial areas at the time, such as Preston, Bolton, and the ironstone mining district of Cleveland.[84]

Among the families of working males, miners had more workers than agricultural labourers and manufacturing workers. (Table 5.4) This was mainly because of the number of adult male offspring and kin who were working, since fewer women worked in miners' families than in other men's. Miners had more workers than all the other occupational groups except farmers. In addition, miners had more children under the age of fourteen who worked than men in other occupations, so that in miners' families only 57% of the workers were household heads, while 9% were young children.

Table 5.5 shows that the miners were better able to secure a job for their children in their own line of work. More of the miners' households had sons following their father's occupation (32%)[85] Miners also had more sons who did so than men in all the other occupations except farming. Just 14% of agricultural labourers' households had sons who were also farm workers. In spite of the fact that succession was as great among domestic workshop industries as miners in other areas, none of the handicarft workers in the Somerset coalfield matched the miners; some of them having sons who worked down the pit instead.[86]

Table 5.6 would suggest that miners' families did not contain many women who worked but a relatively larger number of their children in work than other working males. General labourers would appear to be an exception. Only about 5% of the wives worked and fewer females were part

of the adult workforce in miners' families.[87] Women, however, had a lot more to do in miners' homes if the head and several other members of the family worked underground, which could have discouraged wives and daughters going out to work.[88] But, they frequently did so in coal mining areas where there were jobs in industries such as textile manufacturing.[89]

In all households these characteristics varied with the age of the head.[90] Supplementary wage earners, such as wives, and the incomes brought in by boarders were replaced by children. (Table 5.7) The average size of the number of workers in families rose from only just over one when the head was aged under thirty-five to over two when the head was aged forty-five to fifty-four. A slow fall accompanied increasing age, so that at seventy the average was about one again. These age differences mark the entry of children into the workforce and their earnings before their departure from home. Heads in their forties and fifties obviously had most children working and the largest number of workers. By comparison with other populations these were large averages.

When the family was growing up and still increasing in number the household head made by far the largest contribution. (Table 5.7) Over 80% of the adult workforce in these families were household heads. Wives, kin and probably boarders also made their greatest contribution at this age. About one in ten of wives worked and about one in eight of families took in a lodger. With

increasing age the male head was gradually ousted from his role as sole breadwinner in the majority of households. In families where the head was aged over thirty-five young children displaced women as the additional earners.[91] At fifty-five, sons were the main wage earners and daughters made their greatest contribution. But once children, who in Somerset were mainly boys, could provide the supplementary income, few women, and indeed daughters as well, had to find work. In households headed by women, though, more females worked but more young children, adolescents and kin also went out to work. Older widows took in more lodgers as did other families with smaller incomes from adult males; young families with a single wage earner and older families whose children had mainly left home. Lodgers were alternative ways of earning money for many housewives, and families without working children were probably more prepared to find space for them.[92]

The family incomes of miners should have been greater than other people's from middle age onwards. In general, miners over thirty-five had much larger than average numbers of workers in their families than almost all other occupational groups in the coalfield, despite having a smaller number of workers who were women. The difference in size arose between men in their late thirties and lasted until they reached their mid-fifties. Up to their seventies miners had more workers in their families than agricultural labourers, handicraft workers

and other labourers apart from general labourers aged fifty to fifty-four, and building craftsmen aged fifty-five to fifty-nine. Miners from forty to sixty-four had an average of over two workers, so that men aged forty to fifty-nine had the largest numbers.[93]

Having other adult males, especially sons, and children who worked, were the main sources of these differences and they would have effectively reduced the poverty of young miners' families at an earlier stage than other workers. Table 5.9 shows that miners at all ages had more adult males working in their families than other groups of workers, particularly between the ages of thirty-five and fifty-four when they were only matched by building craftsmen. Over half of the miners had more than one adule male worker, only building craftsmen exceeding them. Miners' children were starting work earlier. At thirty-five to thirty-nine 25% of miners' families had working children aged under fourteen, and they had consistently more than men in other occupations from thirty to forty-nine.[94] In their forties and fifties only about half as many agricultural labourers and craftsmen had them, so that it could not just have been a consequence of earlier marriage.

Closed family recruitment may explain the difference because miners' families were distinguished from other workers by the numbers of sons following in their fathers' footsteps. At thirty to thirty-four over 10% of

miners' families already had a son who worked at the pit, and this increased to over half by the age of forty. Very few men in other occupations in their thirties and early forties had children who worked with them, less than a quarter of men aged forty to forty-four. Among men aged forty-five to forty-nine, 62% of the miners had sons at the collieries as well, so that compared with agricultural labourers, for instance, very few miners with heirs must have lacked one in mining.[95] Having so many sons down the pit when they were over sixty may have preserved miners' families from poverty.

Consequently, in the miners' households the household head made up less than half of the family's workforce between the ages of forty and sixty-four, and females were relatively insignificant. (Table 5.8)[96] In other workers' households the head was more often the only worker and women were more important. Miners from their thirties onwards would have drawn benefits from having children working. For example, among workers aged forty to forty-four, 35% of the workers in the miners' families were adult males other than the head, whereas adult males were only 16% of the workers in agricultural labourers' families and 12.5% in labourers'. In addition, at the age of thirty-five to thirty-nine, 17% of the workers in miners' families were children under the age of fourteen whereas they were fewer than 10% in agricultural labourers' and handicraft workers' families. Furthermore, even though mining was attracting outsiders, fewer miners between the ages of forty and

sixty-four took in lodgers than miners without working children and labourers of the same ages in other occupations.[97]

5.3.3 Workers in Families living in St Helens, 1851

Families in St Helens had more workers, more household heads had an occupation, and more children of all ages worked, especially daughters. Widows were less likely to be destitute, not only because they worked more often, but also because their children of both sexes could get jobs. Although family recruitment was less important when there were few restrictions in the labour market and a sustained demand for labour, the families of miners had more sons at work and larger numbers of workers. This was mainly because more miners had sons who took up their occupation, as in Somerset.

In general, the families had relatively large numbers of workers employed outside the home, for they contained both more adult males and more adult females who worked than in Somerset. (Table 5.10) In addition, there was more boarding which often made up for any shortage of working children. There were lodgers in 24% of the households, which is comparable to some other growing industrial towns.[98] Consequently, the head was only just over half of the family's workforce, which was less than in Somerset, while women, although not wives, were larger contributors. But, children were the main supplementary sources of income to families in St Helens, as in Somerset.

In spite of some differences between families in the two study areas, miners' families in St Helens still

differed from those in other occupations in much the same ways as in Somerset. (Table 5.11) Differences from the Somerset miners' family economies can be attributed to a greater demand for miners and conditions at work.[99] Again, miners' families had more workers than almost any other occupation or group of workers. They had more than miners in Somerset, having more women and children who worked. Considerably more children, other adult males, and females were working in miners' households than in the families of glass workers, indeed all manufacturing workers and labourers. In addition, miners had no fewer lodgers than other occupational groups. As a consequence, household heads were only 48% of the workers in miners' households compared with 58% in general labourers', and more of the workers were children under the age of fourteen, 10%; other adult males, 27%; and females, 12%; than in glassworkers' families, for example, and other manufacturing workers' families in which only 7.7% were child workers and 24.6% were other adult males.

This was only partly as a result of a high crude rate of occupational succession. (Table 5.12) The rate for miners was much higher than the average, 18%, but it was nearly as common for some fathers who made a living in other occupations to have sons in the same occupation, especially men in occupations that were similar to mining in some respects, such as those in glass and copper works where the number of jobs was growing, or in potteries and watch and nail making where there was some element of family production.[100] Miners, however, had nearly twice

the average number of sons in mining, behind which trailed glassworkers with .37 sons in the glassworks. Very few miners' sons who were at home and working were not miners.

The differences were additionally a result of the children in miners' families who were able to start work at an earlier age than other children, as they did in Somerset. (Table 5.13) Miners' children of both sexes could get work at the colliery in St Helens, and daughters could obtain a job in a wide range of occupations.[101] Not surprisingly, Table 5.13 shows that a higher proportion of adults in miners' families, excluding the head and spouse, were at work than in Somerset.

Age differences in Table 5.14 show the predominance of male workers at all ages and the growing importance of supplementary earnings by children as the household head aged. Men in their fifties had the largest workforces; a peak size at fifty to fifty-four after expanding rapidly between the ages of thirty-five and fifty. The age differences were much the same as in Somerset but the number of workers was greater, 2.6 workers at fifty to fifty-four compared with 2.15 for example; the numbers rose more quickly, a slightly larger number aged from thirty-five to forty-nine had a child under fourteen at work; and more daughters were out at work in the families of middle-aged heads.

All in all, the head was a less prominent component

of families' workforces at all ages. Only about a quarter of the workers in families of fifty-five to fifty-nine year olds were heads compared with about a third in Somerset. Young householders in St Helens were not so frequently the only worker either, even though the head was the most important single earner in the family before the age of forty. Wives made little contribution except before the head was thirty-five, as in Somerset. But, kin and boarders more often supplemented a young household head's earnings before his own children started work than in Somerset. The contribution from other adult males and females became much greater in households of heads aged over thirty-five. More working sons must have remained at home throughout adolescence, for in their late fifties and sixties, especially, families in St Helens had considerably more workers other than the head.[102]

Although Table 5.16 shows that there were more occupations in St Helens in which the family had some influence over the employment of their children than in Somerset, the miners', like their counterparts in Somerset, more frequently had children at work in middle age and in later years than other workers. Table 5.15 reveals that miners over the age of thirty-five had more members of their families at work than other occupations. Over the age of forty differences in size widened. At fifty to fifty-four each miner's family had an average of 3.5 workers. Other workers had no more than miners in Somerset.

Most of the difference can be accounted for by the number of adult working males and children who worked. Miners aged fifty to fifty-four had 1.6 other adult working males, and at forty to forty-four had 0.4 working children, more than Somerset's miners. But in addition, miners in their middle ages had as many adult females as most other men, which was far more than in Somerset. Consequently, except for a greater tendency for a few miners' families in St Helens to have additional adult male workers who were kin and boarders, the average number of workers was similar to Somerset miners' families until about the age of forty. As their families grew up they diverged. First of all more miners' children under fourteen in the households of miners aged thirty-five to forty-nine went to work in St Helens. Then as young boys and girls were both working, more of their children were staying at home to a later age.

As a result, the burden on the miner to support his family was not so great at all ages. Whereas over 45% of the workers in St Helens' miners' families were adult males other than the head and 30% were heads, they were each 40% of the workforce in the families of Somerset miners. By the same token the lesser importance of the head as a worker in the miners' families distinguished them from other occupations in St Helens. In middle-aged labourers' and manufacturing workers' families the heads were only just under half of the workers. In younger labourers, manufacturing and craftworkers' families

children were not so significant.

Work for children at the mines, especially sons, appears to be the main factor behind these patterns. Table 5.16 shows that more miners' sons went into the industry and stayed at home. Among heads aged forty-five to forty-nine, for instance, 70% of the miners had a son in mining, whereas only just over half of the glassworkers and a third of the labourers had sons in their occupation.[103] Far more of them between the ages of thirty and sixty-four had children who worked, over a third in their forties. Older miners were perhaps far more fortunate than manufacturing workers and labourers because fewer of their sons must have left home before marriage. Also, since miners' children had a better chance of getting a job at an earlier age and getting promotion locally in St Helens, the miners had more sons and young children down the pit than in Somerset.

5.3.4 Workers in Families within the Somerset Coalfield 1851

In general, the families of miners in Somerset had fewer sons who worked, lower rates of succession and smaller numbers in which earnings were augmented by boarders and working women. Within each district of the coalfield the average size of the number of workers in miners' families varied. Not surprisingly these variations corresponded to differences in the demand for miners. In parishes in the growing areas of the coalfield families had more adult males working, fewer widows were without support from

children and more young children were getting work. These families had a higher rate of succession and had more working sons at home than families in the declining parishes. They also had less recourse to boarding in old age but had the advantage of finding more lodgers in the area to take in when their young children were not working. Consequently, workforces of miners' families in the newly mined areas were similar to the miners in St Helens where mining was also growing, because there were plenty of jobs and fewer obstacles to graduation and promotion.

Families around Radstock had more workers compared with families in the parishes on the southern and western periphery of the coalfield.[104] It is clear from Figure 5.7 that parishes such as High Littleton, Clutton, Holcombe and Coleford, which were spending more on poor relief in the 1840's and had experienced a decline in the number of men employed in mining, had the smallest numbers of adult male workers, under 1.1. Families had larger numbers of working adult males in the parishes where employment was increasing. Table 5.17 shows what families in the districts where coal production was not growing, principally Mendip and Upper Cam, had fewer workers, particularly fewer adult males and children, because more of them, over 15%, lacked a male worker, fewer had more than one adult male worker, and a relatively smaller number had sons who followed in their father's trade. But largely because of the survival of

handknitting, more families on Mendip had females who worked than elsewhere in the coalfield. (Figure 5.9a)[105]

This is illustrated in the other maps. (Figure 5.8, 5.9,5.10). Few families, under 10%, were without a working male household head in the Wellow Brook and Lower Cam districts, whereas in parishes on Mendip such as Coleford, Stratton and Ashwick more than 20% were in this situation. (Figure 5.8b) Many more families in Nettlebridge had no worker at all while the number of families with more than one adult male working was greater around Radstock, over 60% compared with under 40% in Nettlebridge and Upper Cam. (Figure 5.8a) Indeed, the greatest numbers of families with a son in the same occupation as his father, and the greatest proportion of families with a child working lived in the parts of the coalfield where production had grown most. (Figure 5.9b,c)

Differences to miners' families in each district were marked by the same disparities, although these were by no means as great as between miners and non-miners. Miners' families in the Lower Wellow district had the greatest number of workers, especially more males and children. (Table 5.18) Not so many of the miners' families on Mendip and in Upper Cam had more than one adult male (under 30%) and a lot more lacked a son in mining, about two-thirds, whereas well over half had a son down the pit in Lower and Upper Wellow.

On the whole, miners in the Radstock Basin, in

which production had expanded most had more workers in their families at most ages than miners in the declining and stable parts, Upper Cam and Nettlebridge. Parishes with fewest sons in their households who were miners were all in the exposed parts of the coalfield. (Figure 5.10a) This included parishes such as Timsbury, High Littleton and Coleford that had large numbers of miners' families but where the collieries had decayed by the middle of the century, so that there were fewer chances for sons to make a career at the local pits.[106] Over and above 60% of the miners aged over thirty-five in Radstock and Writhlington over the concealed measures, for example, had a son down the pit.

More young children of miners were also working in the parishes where production was increasing most. (Figure 5.10b) Miners in most of the parishes close to the exposed measures in the Paulton Basin had fewer children under the age of fourteen at work than in Radstock and Shoscombe in the Lower Wellow Valley where there were obviously more jobs for children. However, in the parishes of Nettlebridge, Paulton and Bishops' Sutton, for example, where collieries such as Bishops' Sutton and Ham and Hill probably employed more small children in drawing coal, there were as many children under the age of fourteen at work as in Radstock.[107] Moreover, there were fewer children who worked in Welton's families where the lessees had declared that they had

carried out an overhaul of production methods without increasing production in their vain attempts to remain profitable.[108]

Table 5.19 and Table 5.20 show variations in the number of workers in the families of miners at different ages. They appear to have arisen from differences in the numbers of working adult males, attributable to the length of time sons may have worked at the collieries before leaving home. The miners over forty in Nettlebridge and Upper Cam generally had smaller numbers of workers; for example, miners in Lower Wellow aged from forty-five to fifty-four had about one more worker than miners in Nettlebridge. Significantly, a lot of the difference was due to other adult males again, more being in the miners' families aged over thirty-five in Lower and Upper Wellow where higher rates of recruitment prevailed and promotion could be achieved. More of them also had a son down the pit. More miners' families over the age of thirty-five had children at work and more miners' families over the age of forty-five had a son down the pit in the districts where there was faster growth of employment at the collieries. In Nettlebridge only 45% of miners aged forty to forty-nine had a son in mining compared with 75% of the miners of the same age in the Lower Wellow district. The difference persisted among miners in their late fifties and sixties, so that in addition to their lower earnings and greater job

insecurity, miners in the declining areas had less income from family earnings. They were possibly more likely to succomb to poverty in old age and were less able to support dependants.

5.4 Concluding Remarks

From making a living at the pits miners earned more than most labourers and handicraft workers because of a demand for their labour and skills. If they managed to stay fit and healthy they could find work and obtain relatively good wages most of the time. Miners also earned more because of the demand for their families' labour, especially if their sons were found work at the coal works and progressed without leaving home. Their contributions could offset poverty caused by illness, lay-offs, age and infirmity. Because wages followed demand for labour and coal, since demand varied across and between coalfields, so did the standards of living among the general population and among pitmen and their families. Because wages reflected the regularity of work at collieries, since production at collieries varied across and between coalfields, so did the earnings miners could hope to make.

In support of these observations, there was less hardship in the coalfields than in surrounding areas and less poverty in St Helens than Somerset. At the same time there were poor people in both study areas as a result of unemployment and the volatility of weekly

earnings in most occupations. Most hardship racked the elderly, widows, and children in families without a bread-winner and more people were on poor relief in areas where coal production was no longer increasing. Miners could usually avoid parochial relief by having larger family incomes. Miners' families contained more sons in paid work, especially sons down the pits like their fathers. All of them had more children at work from an earlier age than men in other occupations thereby narrowing the "child poverty gap" and most of them had children at work when they were older too.

Mining was one of the few occupations which provided families with good earnings. In spite of the risks to the miners' health from working at collieries and the high dependence miners' families placed on the earnings of males, and the head's wages especially, the standards of living of families in mining did not diminish so sharply as the head aged, as a young family was growing up or when the head died. Where mining was growing sons of non-miners could also get work, widows were supported by sons working at the collieries, more lodgers were around to supplement the incomes of poor families, and miners' wives and daughters were not forced into sweat-work. In areas such as Nettlebridge where there was more poverty there were fewer workers to support the dependant population. In general, more people were on poor relief where mining had declined and employment had not increased at the collieries.

Several studies of families in a variety of contexts in the eighteenth and nineteenth centuries show to some extent that living arrangements and family size, and also differences in these characteristics between stages of the life cycle, were a result of making a living.[109] For specific industrial areas similar to Somerset and St Helens they considered conditions and terms of work and wages to be important because a family's consumers had to be balanced by wage earners.

If experiences of working on the land, in factories, workshops and collieries were able to modify family structure, did work directly affect the sequence and timing of demographic events; marriage and child-bearing? Although only Haines has attempted to dissect the effects of making a living from mining, it is often alleged that miners' sexual proclivities were a product of their work, and the rapid expansion of the population in mining areas a direct result.[110] Work probably did affect these decisions if men and women married once they had the wherewithal to set up a home and start a family.

From Malthus to Chayanov, and more recently Easterlin, economic theories have been popular and persuasive explanations of demographic trends. Most studies best explain demographic characteristics as voluntary actions constrained by circumstances because these are most easily recognised. In Charles Tilly's recent book on fertility, Wrigley concluded that the

strategy of families at an aggregate if not an individual level was to adjust their age of marriage and completed family size to their incomes, careers, prospects of getting work for their children, alternative sources of income, and the cost of bringing up children before they could earn their keep.[111] Few studies have been able to delve this deeply.[112] But, in this context Haines has asserted that more miners married and did not practise birth control than men in other occupations because there were advantages in marrying and having children while they were still young to bolster their standard of living when they were older.[113]

These explanations tend to disregard chance variations of individual circumstances and inclinations. Were all miners so calculating and could they be calculative in the same way? Could they possibly have been influenced by their better chances of having several sons working from the age of ten to nineteen while at home for about twenty to twenty-five years as their own earnings diminished after the age of forty-five, for example? In the succeeding chapters, however, these hypotheses can be tested by considering the demographic characteristics of the population in Somerset and St Helens against the evidence gathered so far about work and its effects in the two areas.

CHAPTER NOTES

1 Impressions quoted by R Harrison ed Independent collier (1978) 2-3; M Bulmer ed. Working class images of society (1975) 63-64; J Rule The experience of labour in eighteenth century industry (1981) 65; J Burnett ed. Plenty and want (1968) 60; J H Morris and L J Williams The South Wales coal industry (1958) 209; T C Barker and J R Harris A Merseyside town in the Industrial Revolution (1954) 270; B F Duckham A history of the Scottish coal mining industry Volume 1 (1970) 254; B S Trinder The Industrial Revolution in Shropshire (1973) 340,360

2 Rev. J Skinner Journal of a Somerset rector ed. H Coombs and A N Bax (1930) 266

3 Miners had a regular coal allowance, Harrison (1978) 7, and miners in Somerset were no exception; DCO Docketed Correspondence, Somerset Collieries (Generally), Bundle 1 1845-58. 12 tons a week were dispensed to men at Clandown with each man getting 2 bushels of rubble and a bushel of small coal worth about 2d or 3d a bushel at the pithead. See also WarRO CR/1886 454 and H and P Coombs ed. Journal of a Somerset Rector 1803-34 (1971) 66

4 Skinner (1930) 231. He often referred to village low life, idem 50,123,134-135,209 idem (1971)35,60,89

5 A J Parfitt My life as a Somerset miner (1930) 17. Rule (1981) 58 discusses this more generally. Usually in periods of good work an extra or longer shift was worked so that the men hewed coal 10-11 days a fortnight, BPP 1842 xvii 50,54. The Waldegrave's Chewton agent probably mistook the men for being idle when he passed through one afternoon, SRO DD/SH 74/18. Although gambling was a common pursuit according to popular opinion, quoits was about the only common pursuit in Somerset, J A Bulley To Mendip for coal: Masters and men Proceedings, Somerset Archaeological and Natural History Society 98 (1953) 48

6 The effects of relatively good pay but awful conditions on leisure habits were perhaps more vivid than the effects that the system of work underground may have had on their careers. The vicar of Pemberton felt that miners had "a want of education, accompanied by degraded moral sense, gross and brutalised habits, depravity and crime," BPP 1842 xvii 183. The vices of the miners were not peculiar to them, J U Nef The rise of the British coal industry Volume 2 (1932) 175,183; J E Williams Labour in the coalfields:a critical bibliography Bulletin, Society for the History of Labour 4 (1962) 28. The views of Harrison's collaborators and Benson have been gaining ground (see Arts Council of Breat Britain Coal:British mining in Art, 1680-1880 (1982) 51-54) over those which still appear in some popular works about miners and the social history of the period; A Burton The miners (1976) 81,83; B Lewis Coal mining in the eighteenth and nineteenth century (1971) 29; D Marshall

Industrial England 1776-1851 (1973) 107-108; B S Trinder Ironbridge:The cradle of industrialisation History Today 33 April (1983) 32-34

7 This is enlarged upon by R Samuel The workshop of the world:Steam power and hand technology in mid-Victorian Britain History Workshop Journal 3 (1977) 6-72, and E Hopkins Working hours and conditions during the Industrial Revolution:a reappraisal Economic History Review 2nd Series 35 (1982) 52-66

8 Parfitt (1930) 17, and this was common elsewhere, J R Leifchild Our coal and our coal pits (1853) 193, even though ancillary workers could not choose

9 BPP 1842 xvii 176. This was not usual in Somerset and only occurred after seam discoveries. There is no evidence from wage and output books of Saint Monday; SRO DD/WG 37; WarRO CR/1886 454, which was reputedly common among miners and metal trade workers, D A Reid The decline of Saint Monday 1766-1876 Past and Present 71 (1976) 91

10 J W Scott The glassworkers of Carmaux (1974) 34-35

11 Retaining some control over supervision was most important for men who were dependent on wages, Scott (1974) 61. It survived to some extent in factories and domestic industries.

12 C Fisher Custom, work and market capitalism (1981) xiii

13 Although not all colliers were well paid, J Langton Geographical change and Industrial Revolution (1979) 210, and the wages of agricultural labourers were better in industrial areas such as the Somerset coalfield, A H John The industrial development of South Wales 1750-1850 (1950) 67; J D Marshall The Lancashire rural labourer in the early nineteenth century Transactions, Lancashire and Cheshire Antiquarian Society 71 (1961) 98

14 P E Razzell and R W Wainwright ed. The Victorian working class:Selections from letters to the 'Morning Chronicle' (1973) 232

15 P Horn The employment of children in Victorian Oxfordshire Midland History 4 (1977) 66-69; A J Heesom The northern coal owners and the opposition to the Coal Mines Act of 1842 International Review of Social History 25 (1980) 241. At the same time only a few wives of miners worked; M R Haines Industrial work and the family life cycle 1889-1890 Research in Economic History 4 (1979a) 290; J Benson British coal miners in the nineteenth century (1980) 130

16 E W Evans The miners of South Wales (1961) 60-62. The effects of strikes are described quite vividly in R Fynes The miners of Northumberland and Durham (1873) 27-28 and J Macfarlane Counter offensive for a South Yorkshire mining community in R Harrison ed (1978) 185

17 This is clear from Sibson's survey of the Poor in Haydock and Garswood; otherwise they "never had recourse to the workhouse", BPP 1842 xvii 52

18 Benson (1980) 116; M R Haines Fertility and occupation (1979b) chapter 2; N Dennis et al Coal is our life (1956) 38-75

19 L A Tilly and J W Scott Women, work and family (1978) 104-105. This increased in extent as wages became more important to families; H Medick The proto-industrial family economy:the structural function of household and family during the transition from peasant society to industrial capitalism Social History 3 (1976) 296-297; M R Rowlands Masters and men in the West Midlands metalware trades before the Industrial Revolution (1975) 156-157

20 Many earners were necessary to do this; J Humphries Class struggle and the persistence of the working class family Cambridge Journal of Economics 1 (1977) 246, 250-256; M Anderson Approaches to the history of the Western family, 1500-1914 (1980) 77-78

21 Anderson (1980) 69-71

22 This is stated by T K Hareven Family time and industrial time (1982); D Kertzer The impact of urbanisation on household composition:Implications from an Italian parish Urban Anthropology 7 (1978) 1-24; J C Holley The two family economies of industrialisation:Factory workers in Victorian Scotland Journal of Family History 6 (1981) 57-69. The thesis is not new, however; F Collier The family economy of the working classes in the cotton industry 1784-1833 ed F S Fitton (1964)

23 There are a few labour records but none are very long series, nor do they overlap with any of the censuses 1841-61

24 Sibson's Census of the Poor is an exception but this is possibly only a snapshot. There are no corresponding details of prices

25 Details of the data collected from the census for this purpose and the validity of making comparisons from information about individuals in the CEBs are discussed in Appendix A. As they rely on statements of occupation they may not contain reliable information about the participation of females and children in work outside the home. The CEBs may also be misleading since miners' children may have had an occupation but 'worked' no more than other workers' children who had no regular employment

26 B S Rowntree Poverty:a study of town life in P Keating ed Into unknown England (1976) 193

27 Amounts increased in Dorset and Wiltshire where many labourers were fortunate to earn 8/- to 9/- a week; B Kerr The Dorset agricultural labourer, 1750-1850 Proceedings, Dorset Natural History and Archaeological Society 84 (1962) 162, K D M Snell Agricultural seasonal unemployment, the standard of living, and women's work in the South and East, 1690-1860 Economic History Review 2nd Series 34 (1981) 414-415, P Horn Labouring life in the Victorian countryside (1976) Appendix G, 259

28 Evidence in other studies of towns in the nineteenth century support Rowntree; R S Neale Bath:a social history (1981) 77-83; W A Armstrong Stability and change in an English country town (1974) 59; J H Treble Urban poverty in Britain 1830-1914 (1979) 29; G S Jones Outcast London (1971) 67; R Samuel Comers and goers in H J Dyos and M Woolf ed The Victorian city:Images and realities (1975) 132; Hopkins (1977) 194

29 Oldham, J Foster Class struggle and Industrial Revolution (1974) 81; Bath, Neale (1981) 84-85

30 LRO DD/Cs 35/12

31 R K Bluhm A bibliography of the Somerset coalfield Library Association thesis (1966)

32 F C Mather After the Canal Duke (1970) 321-322; B Paterson The social and working conditions of the Ayrshire mining population Ayrshire Archaeological and Natural History Society Collections 10 2nd Series (1972) 212-214; BPP 1842 xvii 180

33 BPP 1842 xvii 180,209; G Edwards The coal industry in Pembrokeshire Field Studies 1 (1963) 60

34 Bulley (1953) 44-45; Rad.Lib Moses Horler's Recollections; Neale (1981) 408-409,418

35 Treble (1979) 9

36 Families in York in the 1890's for example; Rowntree (1976) 192-194

37 Haines (1979b) 51

38 SRO D/P/Pau 13/2/2 which contains details of daily payments, 1814-33. A man with a family of six children was receiving 7/- a week in Writhlington, SRO D/P/Writh 4/1/2

39 Skinner (1971) 68

40 BPP 1842 xvii 233. There were a number of friendly societies in the area, Bulley (1953) 43. Radstock had five clubs in the 1850's. In 1803 Midsomer Norton had three, Kilmersdon had four, Mells had two, and Paulton had two. The townships of St Helens had as many; four in Ashton, five in Sutton and eight in Windle. Memberships are also given in BPP 1803-4 demy folio xiii. Club days in Radstock and Camerton were Whit Monday. Then, the club walked and had a celebration

41 This is evident in Shropshire, Trinder (1973) 313; Warwickshire, J M Martin Marriage and economic stress in the Felden of Warwickshire during the eighteenth century Population Studies 31 (1976) 528; and Nottinghamshire, J D Marshall Nottinghamshire labourers in the early nineteenth century Transactions, Thoroton Society of Nottinghamshire 64 (1960) 57

42 Marshall (1960) 58; Susan Blay's doctoral research at the University of Liverpool

43 A L Bowley and A R Bennett-Hurst Livelihood and poverty (1915) 145

44 N Cash Rural unemployment, 1815-34 Economic History Review 6 (1935-6) 91-92. In Dorset, the amount per capita reached a peak in 1817-18, Kerr (1962) 171.

However, trends in the amount spent on poor relief may have been altered by the 1834 Act, Snell (1981) 430-431

45 Barker and Harris (1954) 320

46 So were the estimated proportions of people offered occasional relief in 1803; Nettlebridge (5.9%), Pensford (6.4%), Paulton (2.6%), Radstock (1.3%). Parochial practice may have varied, P Dunkley Paternalism, the magistracy and poor relief in England, 1795-1834 International Review of Social History 24 (1979) 371-397. Skinner remarked that the overseers in Camerton were not generous. Mr Purnell, a colliery shareholder and landowner, was particularly hard-hearted, Skinner (1930) 108,187. On one occasion he discovered that an infirm man had been lying in his excrement at the poorhouse for several days

47 Martin (1976) 528. Only 19.5% of the parishes in rural Kent were spending under 15/- per capita, 1821-30 and 14.2% were paying over 35/-, J P Huzel The demographic impact of the old Poor Law:More reflections on Malthus Economic History Review 2nd Series 33 (1980) 378. In 1803 and 1813 the average amount spent in Somerset was greater than in Warwickshire and Kent

48 DCO T5, Docketed Correspondence, Nettlebridge, Bundle 1; whereas the colliery at Holcombe had closed, SRO D/P/holc 13/2/1. However, in 1855 Hippisley-Horner was writing to the Duchy's agent about Nettlebridge that "the colliery operates solely to provide employment to 40 or 50 families" when pleading to have his freeshare payment waived

49 Barker and Harris (1954) 311 remarked that there was very little out relief because of the growth of mining

50 The 1841 CEBs are probably not as accurate as the others. In all of them women may not have recorded their jobs as frequently as men, while men who were retired may have given an occupation when they were not recording

51 The declining parishes may have had an older population, so that more people were retired

52 Most payments of permanent relief were to widows, unmarried mothers and the elderly and infirm in the coalfield's parishes as in South Lancashire, SRO D/P/mls 13/10/3. Of the 183 persons relieved in Mells, 1833-34, 43 were orphans, 66 were wives and children of men on poor relief, 68 were under sixteen, 22 were disabled adult males, and 43 were disabled adult females. See also G Oxley The permanent poor in South-west Lancashire under the old Poor Law in J R Harris ed Liverpool and Merseyside (1967) 25

53 J D C Wickham Records by spade and terrier (1922) 180. John Padfield must have lost a leg to have been given a guinea, idem

54 Skinner (1971) 13,25,27,35

55 SRO D/P/pau 13/2/2

56 For example, Holcombe, Kilmersdon, Chew Magna, Stoke Lane and Mells

57 SRO DD/DN 290; SRO D/P/mls 13/2/15,16; Lord Hylton

Notes on the history of the parish of Kilmersdon (1910) 116. There are records for Paulton, Stratton, Mells, Farrington, Holcombe, Writhlington and Wellow

58 In addition, the decline of weaving was blamed for high poor rates in Mells where they rose in the 1820's, F W Cleverdon The history of Mells (1974) 66-70

59 Rising from £150 to £300, SRO D/P/pau 13/2/2

60 These kinds of studies have increased in number since N Smelser Sociological history:the Industrial Revolution and the British working class family Journal of Social History 1 (1967) 18-35 and M Anderson Family structure in nineteenth century Lancashire (1971); for example, Holley (1981), L A Tilly The family wage economy of a French textile city 1872-1906 Journal of Family History 4 (1979) 381-382, and O Saito Who worked when Local Population Studies 22 (1979) 28

61 Hareven (1982)

62 As Haines has concluded, Haines (1979a) 290

63 D Anderson The Orrell coalfield (1975) 133

64 BPP 1842 xvii 209,213, as did some factory textile workers, M M Edwards and R Lloyd Jones; N J Smelser and the cotton factory family:areassessment in N B Harte and K G Ponting ed Textile history and economic history (1976) 310-316, and a few urban labourers, L H Lees Exiles of Erin (1979). Children only worked under the direct control of their parents in domestic industries; D S Landes Watchmaking:a case study in enterprise and change Business History Review 53 (1979) 16; Rowlands (1975) 39

65 SRO DD/SH 74/116; SRO DD/FS 16

66 This is referred to in BPP 1842 xvii 213 and Parfitt (1930) 15. In St Helens, mothers and sisters drew coal together at some pits up to 1842, and wives also drew for their husbands, BPP 1842 xvii 163

67 SRO DD/FS 16. This was certainly so in Pembrokeshire, Edwards (1963) 62-63, and the Forest of Dean, C Fisher The free miners of the Forest of Dean 1800-41 in Harrison ed (1978) 19-21

68 SRO DD/FS 16. They earned 5/-, 7/-, 7/6d. and 9/6d. respectively in the week ending 6 November 1852

69 Narrow passages also kept up the demand for boys in other areas; Durham, Heesom (1980) 249; and parts of Yorkshire, Lancashire and Lothian, P E H Hair The social history of British coal miners 1800-50 DPhil Oxford (1955) 201

70 Hewing was quite a knack and had to be learned by observation, Parfitt (1930) 17

71 BPP 1842 xvii 53. Carting boys in Somerset were sometimes over 20 while in St Helens they were becoming hewers as young as 18, BPP 1842 xvii 157

72 Parfitt (1930) 10

73 BPP 1842 xvii 209. Wages were usually contributed to a family kitty, however old sons were; Razzell and Wainwright ed (1973) 231; E D Lewis The Rhondda valleys:a study in industrial development (1959) 200-201

74 Burnett makes this comparison, Burnett (1968) 66
75 E Hopkins Working conditions in Victorian Stourbridge International Review of Social History 19 (1974) 405-407. Children usually worked from about the age of seven until their early teens doing odd jobs or giving ill-paid or unpaid assistance
76 In Ashton and Haydock, a family's income was boosted from about 12/6d., if only the father was working, to 22/6d or 25/- if he had a couple of sons working as drawers, Sibson Papers, Survey of the Poor in Garswood and Haydock 1816. This is also supported by Skinner (1930) 40
77 Benson (1980) 37,61
78 Haines (1979b) 42; Razzell and Wainwright (1973) 232
79 Agricultural labourers could also earn an adult's wage by the time they were nineteen, Snell (1981) 418
80 This was uncommon for labourers working out of doors and some working in factories, such as chemical factories, Treble (1979) 104
81 Haines (1979b) 231
82 Tremenheere remarked rather rashly that hewers' daughters did not go into service, Razzell and Wainwright (1973) 231. Skinner cited several instances of females led into prostitution in Camerton, Skinner (1930) 50,94; idem (1971) 89. Winifred Foley has described how she was made to leave the Forest of Dean as a young girl to go into service, W Foley A child in the forest (1977)
83 Large numbers of family workers were women in textile manufacturing areas, as many as 40%, R Burr-Litchfield The family and the mill:cotton mill-work, family work patterns and fertility in mid-Victorian Stockport in A S Wohl ed The Victorian family (1978) 182-183
84 M Anderson Household structure and the Industrial Revolution in P Laslett ed Household and family in past times (1972) 220-221; B Preston Boarders and lodgers in mid-Victorian Britain Reading Geographer 5 (1976) 40; S Swales The growth and origins of the Cleveland ironstone mining population in the mid-nineteenth century BADiss. Liverpool (1979) 15. There were, however, as many in the coalfield as in growing towns such as Leeds, D Ward Environs and neighbours in the "Two Nations" Journal of Historical Geography 6 (1980) 145
85 Coal merchants (24%) and tailors (27.5%) were the only occupations which had more than 20%
86 Ward (1981) 145; B Preston Occupations of father and son in mid-Victorian England Geographical Papers, University of Reading No 56 (1977) 31-32. The relatively high succession of miners was also found by R Hall Occupation and population structure in parts of the Derbyshire Peak District in the mid-nineteenth century East Midland Geography 6 (1974) 74
87 Few women did in Co. Durham and Lanarkshire either; G Patterson ed Monkwearmouth in 1851 Centre of Extra Mural Studies, University of Durham (1978) 57,

A Campbell Honourable men and degraded slaves:a comparative study of Trade Unionism in two Lanarkshire mining communities, c1830-1874 in R Harrison ed (1978) 84. But, Tilly and Scott found that no more wives worked in Roubaix, a textile town, than Anzin, a coal mining town, Tilly and Scott (1978) 84

88 Miners' family economies may not have been any the worse off because women were so badly paid compared with men in rural areas like Somerset, Benson (1980) 129, Leifchild (1853) 197, D Friedlander Demographic patterns and socio-economic characteristics of the coal mining population in England and Wales in the nineteenth century Economic Development and Cultural Change 22 (1973) 47, quoting the studies of A L Bowley

89 About 20% of the workers were women in Bolton and Farnworth, Preston (1976) 9; although more wives and daughters worked in textile towns such as Stockport, Leeds and Amiens, Tilly and Scott (1978) 79, or villages such as Low Moor, O Ashmore Low Moor, Clitheroe: a nineteenth century factory community Transactions, Lancashire and Cheshire Antiquarian Society 73-4 (1963-4) 144

90 Age differences highlight variations over the life cycle, M Anderson (1971) 25-29. There are some drawbacks and these are discussed in Appendix A and in Chapter 8

91 Only in a textile town such as Stockport did women go back to work because they could earn more than young children, Burr-Litchfield (1978) 192

92 Other studies of boarding have found similar differences in the families who took in lodgers, L Davidoff The separation of home and work? Landladies and lodgers in nineteenth and twentieth century England in S Burman ed Fit work for women (1979) 65-66,83; J Modell and T K Hareven Urbanisation and the malleable household: an examination of boarding and lodging in American families Journal of Marriage and Family 35 (1973) 470-472

93 Haines (1979a) 30-32 found this, miners only being superseded by textile workers

94 Children's contributions to the miners' families rose to 35%, Haines (1979b) 223, but matched the pattern of other workers whose children could find work; Foster (1974) 96-97, M Katz The people of Hamilton, Canada West (1975) 592

95 However, some agricultural labourers, as many as one in eight, had sons who went to work at the collieries. Hardly any miners' sons worked on a farm

96 In terms of earnings this may have been greater, Haines (1979a) 301

97 Haines found the same, idem 362

98 M Ebury and B Preston Domestic service in late Victorian and Edwardian England, 1871-1914 Reading Geographical Papers No 42 (1976) 33. Even if paupers and orphans were not working they would have been paying guests

99 There were better chances for boys to graduate at the collieries and a chance for girls to obtain work at the mines

100 Although there were more industries in St Helens in which labouring families could influence employment, Barker and Harris (1954) 288, the extent of succession among agricultural labourers and general labourers was similar to Somerset

101 They worked at glassworks and potteries as well as at the pit brow and in service

102 Work for children assisted female household heads, S Alexander et al Labouring women:a reply to Eric Hobsbawm History Workshop Journal 8 (1979) 177-179

103 In the glassworks, the chances of graduation to a well-paid job were not so great in spite of the expansion of glass production, Barker and Harris (1954) 285

104 This was observed around St Helens and Wigan by J T Jackson Housing and social structure in mid-Victorian Wigan and St Helens PhD Liverpool (1977) 192, although differences in age structure may account for some of the variation

105 Very few females in miners' families worked in the northern parishes of the coalfield, but slightly more did so in the larger communities (Paulton, Radstock and Midsomer Norton) where there was possibly more domestic work

106 This is supported by Figure 4.4 showing the older age structure of the miners in these parishes than around Radstock

107 These were primitive collieries (See Appendix C)

108 DCO T5 Somerset Collieries (Generally) Bundle No 1

109 Anderson (1971); Lees (1979); Hareven (1982)

110 Hair and Benson have stated that it is unjustifiable to link rapid population growth with the brutalised effects of mining, Hair (1955) 88, Benson (1980) 121; as in Leifchild (1853) 221 and Razzell and Wainwright (1973) 29

111 E A Wrigley Fertility strategy for the individual and the group in C Tilly ed Historical studies in changing fertility (1978) 135-154 especially 151-152. Easterlin's and Hagerstrand's approaches converge with this, E A Wrigley Reflections on the history of the family Daedalus 106 (1977) 77

112 The studies by Levine and Hareven are exceptions

113 Haines (1979b) 2, see Chapter 2. It was said that miners could get married when they wished because they could achieve high wages after they became hewers at about the age of 20, Razzell and Wainwright (1973) 231

CHAPTER 6

COAL MINING AND POPULATION CHANGE

'Remarkable' and 'extraordinary' increases in population have been associated with the expansion of employment and output at coal mines.[1] As coal production rose in the nineteenth century the population in the coalfields grew rapidly. Apart from some influxes of migrants to areas of new mining settlement, natural increase was invariably the main component of population change.[2]

Population change mirrored closely the geographical pattern of expansion and contraction in coal production. This is evident from population growth in Durham in the first half of the century, South Wales in the second half, and South Yorkshire in the last few decades.[3] It was as true locally as it was between coalfields. Within coalfields such as Durham and Nottinghamshire the population only grew in the areas that had disproportionately more of the new coalworks, coal that was profitable to mine, and collieries with access to growing markets.[4] After a new colliery was sunk, it was common for the population in the immediate neighbourhood to grow very quickly, transforming hamlets into large villages between successive censuses.[5]

The population grew at a high rate in Somerset and St Helens while production was increasing.[6] Local registrars remarked upon the relationship in their marginal

notes to the census abstracts, attributing large population gains to "advances in mining" in parishes such as Radstock in the 1810's and Parr in the 1840's.[7] They also blamed mining, closures of pits and "problems at the collieries" for population losses at Timsbury and Clutton in the 1850's, and in some of Nettlebridge's parishes earlier in the century. The Revd John Skinner saw the connection all too clearly when the number of miners and their families was increasing very quickly in the hamlets around Radstock.[8] During his incumbency at Camerton from 1803 to 1837 the population in the parish nearly tripled. A large number of miners had settled in the hamlet of Cridlincot which straddled the boundary with Dunkerton.[9]

Not surprisingly, changes in the scale and location of work in other industries affected the number and distribution of people too. Population was falling in rural areas where production in consumer and large-scale manufacturing industries was becoming concentrated.[10] More particularly, the vicissitudes of employment on farms, in factories, and in workshops left distinctive marks on the size of parish populations and how they changed. For example, at Portpatrick in Wigtown population rose and fell with the fortunes of the port; at Cardington, Bedfordshire, and Shepshed, Leicestershire, with the ups and down of lacemaking and stocking knitting, respectively.[11] Because of the scale and organisation of collieries, work at the pits should have altered population in different ways to other industries and workplaces.[12] At a smaller scale

especially, features of the collieries and their work and pay must have affected the exact relationship between population and work.[13] It is only necessary to look at how some of the factors of production affected miners and mining to conjecture what connections there were between mining and the population in coalfields.

6.1 Work at the Mines and Population Change

Figure 6.1 draws together the factors affecting coal mining and collieries in the two study areas discussed in Chapters 2-5 that should have influenced the number of people supported by mining, and hence to some extent the rates and components of population change in them. In general, the relationship between population and mining should have been close at all scales because the amount of labour was usually increased in proportion to the increasing tonnage of coal raised.[14] At the time, technological advances were neutralised by difficulties encountered getting coal. Consequently, population changes should have been sudden in communities where new collieries employing over 100 men and boys were opened and closed, and in whole districts where production was boosted by both new and old collieries. Population should also have been growing rapidly because the demand for coal was sustained and rising. This encouraged the exploitation of deeper and more difficult coal hitherto left underground.

More specifically, population trends in coalfields should be closely linked to changes in the demand for coal

and its supply, because the numbers employed at the pits depended on the market served, geological conditions and the technology in use. On the one hand, population trends would be turned by changes in the relative advantages held by coalfields and collieries to supply a particular market. Access by other producers brought an end to mining and a fall in population in lead mining areas in England in the nineteenth century, while the number of people rose considerably following canal and tramway developments in the Leicestershire coalfield in the 1820's and in East Durham in the 1830's.[15] On the other hand, population trends would also follow the life cycle of collieries. In mining communities supported by only a single colliery, the population usually grew rapidly in the first few years, then grew more gradually, but inevitably declined as the accessible coal was worked out and became less profitable to mine.[16] Within coalfields population was falling in areas that mined measures near the surface because more of the collieries were being worked out and few new collieries could be sunk.[17]

However, the relationship between the demand and supply of coal and population can never be exact, because the fortunes of employment in other industries (Chapter 3), differences in productivity, technology and the regularity of work (Chapter 4) and the varied standards of living of miners (Chapter 5) would have affected the demand for and supply of workers at collieries.[18] A few examples illustrate this. Fewer workers would be needed to

increase production if labour saving devices were installed or coal was obtained from shallower and thicker seams.[19] Collieries would have only had to recruit outsiders if there was no supply of labour from other industries. Attracting labour, however, depended on having better wages.[20] Keeping workers, so that population changes became less volatile, depended on whether work and wages became less erratic.

At a smaller scale, jobs in collieries and other industries and the vagaries of housebuilding would have obscured the relationship between changes in the numbers employed at the mines and population size. Having the homes of miners was possibly as important to a parish's population as the colliery.[21] Equally, if the loss of jobs at one pit was compensated by the expansion of production at another close by, miners would be able to change their workplace without needing to move, so that the population remained stable.

Consequently, because of work I would expect that population change in coalfields should have varied with scale. In coalfields, population would have changed at a pace that closely matched the rise of coal production employment at the pits. When output was increased population was increased by immigration. As soon as output was only growing slowly or not at all, immigration stopped. Migrants would only have come from outside the coalfield and from non-mining backgrounds if there was a large shortfall of workers in the coalfields as a whole.

More than enough labour could probably be recruited from the families of miners in the coalfield even if this required some movement within the coalfield. High rates of natural increase would be expected after heavy immigration because of the younger age structure. High rates should also have followed because people would be encouraged to marry and have children in a growing coalfield that offered jobs for children and young men but few remunerative jobs for women.

Population changes at a smaller scale would not mirror changes at the collieries so closely. At a parochial scale much would depend on whether the miners lived close to their colliery; whether the miners had to move to get another job instead of walking to work at a different colliery; and whether or not more miners could be recruited from miners' and non-miners' families or had to be attracted from elsewhere. Population changes would more closely mirror trends within the mining industry and the working conditions of the collieries. At a parochial scale migration would be a more significant component of population change. Immigration would continue if there was a demand for miners from several collieries close together and emigration would begin once the growth of employment faded. Migration could also be the main trigger of population growth. After immigration by younger men, natural increase could be high. By contrast, gradual increases in the scale of working and number of jobs would mean that population growth could be

sustained by family recruitment and succession. Family recruitment could exclude outsiders from the industry.

An examination of the amount and pace of population change and its components in Somerset and St Helens in this chapter sets the scene from the returns of population contained in the Reports of the Census from 1801 and the parish registers. (See Appendix A)

6.2 Population Changes in the Study Areas

6.2.1 The Coalfields

In the Somerset coalfield the expansion of population up to 1851 failed to match the massive rates of growth in many other mining areas. (Figure 6.2)[22] Nevertheless a rise of 83.5% from 1801 to 1851 was well above average for a rural area in England and Wales. (Table 6.1)[23] The highest rates of population growth coincided with the fastest rate of expansion in output, so that the number of people increased until the 1830's and slowed down thereafter once Somerset's hold over its market in the Upper Thames Basin weakened. (Figure 6.3)[24]

Between 1801 and 1831 a large cluster of parishes at the core of the Somerset coalfield expanded at an uncommonly high rate for rural North-east Somerset. (Figure 6.4) On the whole, most parishes around the coalfield were growing at fairly low rates and some had falling populations. Also, between 1831 and 1861 parishes in the coalfield around Radstock were among only a handful in the area to record an increase. Nearly all

of them by this time were on the concealed part of the coalfield where many of the new collieries had opened after 1830. (Table 6.2) Consequently, population growth in the first three decades of the century mirrored the growth of coal production which was occurring in parishes where the mines were connected to the canal and grew considerably in scale. Throughout the period changes in the number of people reflect the sinking of new pits to mine deeper coal on the eastern margins, while collieries were closing over the exposed measures as a result of competition; poor access to the market; and high costs of production.[25]

At the same time, in South Lancashire, the mid-Mersey and South-west Lancashire coalfield stood out as areas of high population growth.[26] Rapid rates of population increase occurred in the second and third quarters of the century when employment at the collieries tripled, 1841-1861. Increases of population as large as those in Somerset may not have been needed to double production, 1800-30, because it was less difficult to extract coal. From the beginning of a rapid increase in coal production and the manufacture of glass and chemicals c.1820, intercensal population growth was far higher than any increase in the Somerset coalfield. There was, however, only a small rise 1811-21 when a large number of mines around St Helens closed. Population growth was not dampened by the decline of jobs in domestic manufacturing.

Most of the townships around St Helens and Wigan in

which the number of mines increased were growing at above average rates over the years 1801-31. (Figure 6.5) At this period, however, only a few matched the rates of increase in the fastest growing parishes in Somerset. From 1831 to 1861 population grew in most townships in the coalfield at a very high rate compared with Somerset. Outside the coalfield as well townships grew very little, usually less than during the years 1801-31. The pattern in the coalfield matched the extension of mining and the opening of new, larger-scale collieries, first to the east and later to the north of St Helens, but also the location of factory industries in Widnes and Newton, for example.[27] As in Somerset, population was falling in townships such as Orrell, Prescot and Tarbock on the western edge of the coalfield where coal had been mined for a longer time.

6.2.2 Parishes and Townships

Figure 6.6 shows how clearly changes in the density and distribution of population in the Somerset coalfield were largely a consequence of coal production. Differences in population density between 1811 and 1851 closely mirror the loss of pits straddling the exposed measures and the growth of output and employment at the mines along the Cam and Wellow Brook valleys. By 1861 far more of the coalfield's residents lived in the Radstock Basin than in 1801. (Table 6.3) The share of the population in Nettlebridge fell steadily from 1801 and in

Paulton too after 1831, matching the re-orientation of employment at the coal pits and coal production as the Radstock Basin's market was expanded after 1815 with the opening of the tramway and, after 1854, with the opening of the railway.

Figure 6.7 shows that parochial populations in the coalfield grew at the highest rates from 1801 to 1861, and grew most consistently as well, in the vicinity of Radstock.[28] Population ceased to grow in parishes with solely landsale collieries working exposed measures very early in the century. But only later did this begin to happen in parishes that had collieries connected to the canal. In the 1840's and 1850's jobs disappeared when deeper collieries in the Paulton Basin began to close because of exhaustion. A high rate of expansion was occurring in all the parishes in the Wellow Brook valley and the Cam valley east of Paulton in the years 1821-41 when quite a few pits opened and most of the collieries had increased in scale. (Figure 6.7b) The number of people in parishes around Paulton grew most of all before 1821 when the canal gave its greatest boost to production in the district. (Figure 6.7a) After 1841 only a few parishes had an increasing population since for the most part coal production and employment at collieries, except for Radstock's, was either stationary, falling or highly variable. At a time when the only additional collieries were being sunk around Radstock, and late in the 1850's around Vobster too, the number of people was only rising considerably in Lower Wellow, and

a little in East Mendip.[29]

Significantly, the most extraordinary bursts of population growth in parishes in single decades coincided with the opening of new pits that brought new communities in their wake.[30] One of the largest increases probably took place in Welton between 1811 and 1821 when two large collieries began to work coal[31] On the other hand, population fell after coalworks closed at Holcombe, 1821-31, and Paulton, 1851-61, particularly when collieries shut down suddenly because of floods, faulted seams or bankruptcy. More often than not population changes were more gradual. Falls and rises were not always erratic or fast and most parishes had fairly stable population sizes because collieries maintained production after steady but unspectacular expansion. In Camerton, for example, population grew more slowly after 1821 but only fell from 1851 to 1861.

The expansion of the population in and around St Helens rather than Prescot was the most obvious feature of changes in the density of population between 1811 and 1851 in the St Helens coalfield. (Figure 6.8) During that time mining had spread eastwards, there was a greater concentration of mines around St Helens and no large increase in coal production or the number of collieries in Whiston. Table 6.4 shows that after 1821 the proportion of the coalfield's population in the Whiston area gradually fell. Not surprisingly, it marked time

with the phenomenal growth of coal production east of St Helens.

The effects of an invasion of mining were far greater than on the population of Somerset. Between 1821 and 1841, for example, very high rates of growth occurred in Parr and from 1841 to 1861 in Billinge, Parr, Rainford and Haydock when many new pits were opened up in areas on what had formerly been the fringes of the coalfield. (Figure 6.9) By the 1850's the population was declining in townships where the number of miners was falling. There were few new collieries in Windle, Whiston and Tarbock and no increases in scale to match those in Haydock and Parr. But until the 1830's and 1840's mining often had less impact than other industries. Population increases in Tarbock, 1801-21, and in Windle, 1801-11, where new mines opened were exceptions.[32] The effect of mining in some townships where the number of jobs at the mines increased very rapidly 1841-61 was smothered by the decline of employment in textile and metal-working industries. The collieries in Ashton employed many children of metalworkers in the 1840's.

6.2.3 Net Migration[33]

Table 6.5 shows that little of the population growth in both coalfields may have been a result of migration gain. However, it was important at the stages when coal production was growing fastest; in Somerset between 1811 and 1821 and in St Helens from 1831 to 1861.[34]

It was not usual in coalfields for there to be a surplus of migrants continuing after coal production ceased to grow. In other decades the Somerset coalfield suffered a loss of migrants even though coal production was still increasing. The emigration of miners from Somerset to other coalfields was mentioned during the early nineteenth century both in Somerset and particularly South Wales.[35] Not unexpectedly, a loss of people only occurred in St Helens in the years 1811-21 when a large number of collieries shut down. There were particularly large numbers of migrants during the 1840's and 1850's when the number of miners grew most of all.

Precisely because miners had to be recruited by the newest collieries, migration gain was confined to areas of the coalfields that markedly increased production. From Table 6.6 it appears that migration gains and losses in smaller divisions of the two coalfields diverged from these general patterns. For most of the whole period the districts that had falling numbers of miners, Nettlebridge and Whiston, had a loss of migrants. By contrast, the population in the Radstock area of Somerset and the Blackbrook area of St Helens had gains by migration, even in the 1850's. But, of course, employment at these collieries was still growing when it was falling elsewhere. A much higher proportion of population growth was a product of migration when coal production was rising in the parishes around Radstock in the years 1811-31 and in the townships east of St Helens after 1831. These gains

of migrants often occurred at the same time as losses of migrants from parishes and townships that had experienced smaller increases in production after the 1820's, more job losses at collieries and higher levels of poverty. Consequently, the balance of migration in and out of both coalfields may conceal the movement of population within them.

6.2.4 Natural Increase

Estimates of natural increase from the parish registers in Somerset and Civil Registration data for both coalfields from 1841 to 1861 suggest that natural increase was greater than the national average (Table 6.7), so that gains of migrants must have been smaller than the estimates in Table 6.5, accounting for only half of the population growth in St Helens 1841-51 and contributing to population growth in the Somerset coalfield only between 1811 and 1831. In addition, migration from the Somerset coalfield was higher and probably began as early as the 1830's.

The counts are unfortunately not realistic means of calculating natural increase with any accuracy because the number of events that went unrecorded as baptisms, burials and marriages cannot be estimated. (Appendix A)[36] Nevertheless, the amount of natural increase in Somerset rose in time with the expansion of employment in coal mines and at a high rate, just as Hodgson and Chambers found in two other coal mining areas. (Figure 6.10)[37] A swift rise in

the number of baptisms in the Somerset coalfield matched the expansion of employment at the mines. Then the gap between burials and baptisms grew at roughly the same time as the baptisms began to rise. (Figure 6.11) Baptisms virtually doubled in number over the first thirty years of the century but grew most rapidly from about 1815. They grew especially in the 1820's when production from new pits around Radstock and coal sold along the canal increased. Burials did not rise anywhere near so much. There was not even any natural decrease during a serious outbreak of cholera in 1832 when 'upwards of 60 people' died in Paulton alone.[38] At over 200 the number of baptisms per 100 burials was very high in the 1820's.[39] It had risen in the first decade when coal production was boosted in a few areas by the opening of the canal, jumped about 1815 to reach 200, and then remained there for most of the 1820's and 1830's.

There is some slight evidence that the rising number of baptisms and natural increase was related to migration gains occurring beforehand. About 1820 there was a sudden increase in the number of marriages, which could have been caused by an increase in the number of single men in their 20's in the coalfield. Looking back to Tables 4.10 and 4.11, the miners living in the growing parts of both study areas in the middle of the century were relatively younger and more frequently 'outsiders'. A large rise in the ratio of baptisms to marriages at about the same time and a rise in the ratio to over six

between about 1810 and 1830 could have occurred because of migration (Table 6.10), if couples who married outside the coalfield had children after they had settled in the coalfield.[40] However, increases in age specific fertility cannot be ruled out. Crude baptism rates were high. (Table 6.8)

Migration could have precipitated a surge in the rate and amount of natural increase in parts of the Somerset coalfield in which coal production had grown.[41] In the first decade the largest increases in baptisms occurred in the Paulton area where coal production was first boosted by the canal. (Figure 6.13)[42] Then from about 1815 the number of baptisms was growing most of all to the east of Paulton. Indeed after the early 1820's the most extraordinary increases took place in the parishes in the Radstock Basin where most of the new pits had opened during the 1820's and 1830's. Consequently, higher rates of natural increase occurred in the areas where production was increasing and lower rates where it was stable or falling.[43] Table 6.9 shows that differences in baptisms over burials grew in the Paulton area in the 1800's before the parishes over the concealed coal measures to the east where they grew as expected most of all after 1814. The Lower Wellow parishes had the most sustained high ratio of baptisms to burials and it increased until the 1830's. It was, of course, the only area in which coal production and employment at the mines continued to rise. By contrast, natural

increase in Nettlebridge was little changed.

Migration could have contributed to differences in the marriage-baptism ratio. (Table 6.10) Before about 1815 the ratio was higher in the Paulton Basin than in areas where mining was not growing, which may also have been a source of migrants. For the early nineteenth century a ratio of over five was very high. It rose above this in the Radstock Basin as mining expanded. For brief periods when coal production grew most rapidly there were higher ratios and sudden increases. The arrival of new families could have triggered off more baptisms and a a higher rate of natural increase. Conversely, lower ratios elsewhere could have arisen from emigration although there may have been underlying differences in age specific marital fertility because of other differences in the population.[44]

Hence, for short periods a small element of the population growth in the Paulton area and then in the parishes around Radstock was a result of immigration. (Table 6.7) These were during the few years when coal production was increasing rapidly and labour may have been locally in shortest supply. The large rates of natural increase in these areas soon accounted for all population increase, even the high rates of population growth occurring in Radstock after 1831. By the 1830's emigration was taking place from all parts of the coalfield, even though in a few areas such as Radstock the number of jobs at the mines was still growing and miners were able to

recruit as many of their children to go down the pits as in St Helens.

6.3 Concluding Remarks

Rapidly expanding industrial areas and communities other than coalfields and mining communities often experienced a short period of immigration mainly by single people and young families.[45] The migrants soon helped to raise crude birth rates. Once the growth of employment was steadier labour supplied from local families could meet further labour demands without any immigration unless economic growth was sustained or life expectancy was low. Whatever the shortcomings of some of the data, this appears to have happened in the Somerset and St Helens coalfields as a consequence of mining; work at the pits, the location of the mines, and the scale and methods of production.

Population grew in both coalfields during this period. It usually increased at a pace that matched the rise of coal production and employment at the pits, growing faster in St Helens than in Somerset; fastest in the parts that had the newest more productive collieries; slowest where coal production was not expanding and frequently unstable; and falling once collieries closed and total population was dropping. The relationship between output of coal and population growth, nevertheless, appears to have been dependent on factors affecting the supply and demand of labour. Smaller numbers of men and

boys were needed to increase production where productivity was greater. Fewer men and boys were needed where mining could recruit labourers from other industries and other collieries.

As expected, natural increase was invariably the main component of large population gains, although it usually increased after the population had grown because of people moving to the coalfields. This appears to have arisen because new collieries that rapidly increased production needed to recruit a large number of labourers to achieve it. More migrants augmented the population increases in the concealed parts of the Somerset coalfield and the areas mining deeper seams in the St Helens coalfield containing collieries some distance from other coalworks and several collieries that increased output at about the same time. Natural increase was possibly high because migrants married and stayed, and their families grew up and did not have to emigrate.

So far though, it is only possible to speculate on how the impact of mining on population change at any scale in these two areas could have occurred in several ways; through a rise in natural increase from rising birth rates, earlier marriage, or greater life expectancy; or through immigration.[46] Miners' wives allegedly had more children than other wives.[47] But, higher birth rates in coalfields could have come about from an increase in the number of wives of child bearing age in the population, or even more women marrying miners.[48] Without reconstitution it is not

possible to show whether the age specific fertility of miners' wives rose. Without tracing migration and knowing parental occupations it is not possible to ascertain whether miners were coming from outside mining, from mining families, or from areas where employment at the mines was falling.

The next step is to examine some of these components especially migration, marriage and child-bearing from other angles. Birthplaces, age structure, estimates of the age of marriage and age specific marital fertility, and family and household size obtained from the CEBs provide further, even if in some ways limited, information about them. (Appendix A) Several problems concerning migration have to be solved first of all; its direction and amount, its links to mining and the type of migrants. These are examined in Chapter 7.

CHAPTER NOTES

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7 BPP 1852 xlvi; BPP 1861 1

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25 A pattern that was also apparent in Durham, A E Smailes North England (1960) 162-168; Nottinghamshire, Osborne (1966) 341-346; Leicestershire, Chandler (1957) 168; Staffordshire, Wise (1951) 238-239; and Warwickshire, Johnson and Wise (1951) 239-240

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29 These were Wellsway, Tyning, Braysdown, Lower Writhlington and Norton Hill in the Radstock area, and Newbury, Vobster and Edford in East Mendip

30 These matched the expansion of population near to new collieries in other coalfields, Sill (1979) 44; Lewis (1959) 233-235; A Campbell Honourable men and degraded slaves: a comparative study of Trade Unionism in two Lanarkshire mining communities

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31 Within 3 years of opening production at Clandown rose very quickly to about 15,000 tons, its peak of production. Before the end of the decade Welton Hill had also opened, DCO T5 Somerset collieries Docketed Correspondence Clandown 1841-1916

32 A colliery opened in Tarbock in the first decade as did a large number in Hardshaw. Population rises 1811-21 were very small in Windle, Hardshaw and Sutton when several collieries closed

33 This estimate of intercensal net migration is the difference between natural increase and total population change between censuses, assuming that the average intercensal rate of natural increase prevailed, D E Baines The use of published census data in migration studies in E A Wrigley ed Nineteenth century society (1971) 311-335

34 This is detected by Jackson (1977) 32 but was common in other coalfields; Smailes (1938) 223, Wrigley (1961) Table 4b, M R Haines Fertility and occupation (1979) 157, A K Cairncross Internal migration in Victorian England Manchester School of Economic and Social Studies 17 (1949) 78. They were of relatively short duration compared with urban areas and were consistently related to a stage of development, Haines (1979) 27-28

35 Benson (1980) 127; Hair (1955) 33. Many colliers went to the same pits. Several Somerset miners were killed in an accident at Risca in 1847, Morris and Williams (1958) 182-183

36 To produce accurate estimates of natural increase births and deaths would have to be equally under-registered. In spite of adding in baptisms from non-conformist registers, it is most likely that there is a less complete record of births in the baptisms than deaths from the burials, so that natural increase is underestimated. Appendix A contains a discussion of the parish registers of the study areas for a study of this kind

37 R I Hodgson Demographic trends in County Durham, 1560-1801 : data sources and preliminary findings with particular reference to North Durham, University of Manchester School of Geography Research Paper No 5 (1978) 22; J D Chambers Three essays on the population and economy of the Midlands in D V Glass and D E C Eversley ed Population in history (1965) 330-331. It was also true in other coal mining areas; J M Martin The rise of population in eighteenth century Warwickshire Dugdale Society Occasional Papers No23 (1976) 5, S Jackson Population and change:a study of the spatial variation in population growth in North-East Somerset and West Wiltshire, 1701-1800 PhD Liverpool (1980) 217, 291-292, N Friberg The growth of population and its economic and geographical background in a mining district in Central Sweden,

1650-1750, Geografiska Annaler 38 (1956) 423-424, M Yasumoto Industrialisation and demographic change in a Yorkshire parish Local Population Studies 27 (1981) 10-13

38 Skinner (1930) 292-298. The outbreak was largely confined to Paulton but a few deaths occurred in Camerton and other neighbouring parishes. The overseers of the poor in Kilmersdon ordered precautions to be taken, SRO D/P/Kilm 9/1/1-2

39 By comparison with figures in D B Grigg Population growth and agrarian change:an historical perspective (1980) 167, S Sogner Aspects of the demographic situation in seventeen parishes in Shropshire 1711-60 Population Studies (1963-4) 137, D McCallum A demographic study of the parishes of Bruton and Pitcombe in the county of Somerset Proceedings, Somerset Archaeological and Natural History Society 121 (1977) 84, and J M Martin Marriage and economic stress in the Felden of Warwickshire during the eighteenth century Population studies 31 (1977) Table IX

40 The ratios of baptisms to marriages were relatively high; Chambers (1965) 333, E A Wrigley Population and history (1969) 138, D E C Eversley A survey of population in an area of Worcestershire from 1660 to 1850 on the basis of parish registers in Glass and Eversley ed (1965) 402,416, Martin (1976) 42-46. Jackson (1980) 178 attributed rises in the ratio to immigration

41 The quality of the parish registers undermines their use at a parochial scale. The series for each parish have been grouped to correspond as closely as possible to the districts of the coalfields (see Chapter 2)

42 IfCollinson's figures of parish populations are accurate population growth in the Paulton area would have been higher than in the rest of the coalfield in the last three decades of the eighteenth century, Davis (1959) 36. On the basis of increasing numbers of baptisms Jackson would agree, Jackson (1980) 231. Production in the area may have been stimulated by the Bath market to which it had the best road connections

43 A characteristic which was also found by Cairncross (1949) 83 and House (1954) 39

44 This is a problem that confronted Jackson, Jackson (1980) 278. I would discount the marriage-baptism ratios in West Mendip because ministers reported that couples were not marrying locally, PRO HO 71/73,77

45 For example, a lumbering area, A Norberg and S Akerman Migration and the building of families Studia Historica Upsaliensis 47 (1973) 33-119

46 Hodgson (1978) 29

47 Redford (1926) 49, who is the source for remarks in Smailes (1960) 161 rather than studies such as

D V Glass Changes in fertility in England and Wales 1851 to 1931 in L Hogben ed Political arithmetic (1938) 161-212 or T H C Stevenson The fertility of various social classes in England and Wales from the middle of the nineteenth century to 1911 Journal of the Royal Statistical Society New Series 83 (1920) 401-432

48 By fewer women remaining single, and the additional women marrying, being wed to miners.

CHAPTER 7

MIGRATION AND POPULATION CHANGE

In Somerset and in other coalfields it was said that the miners would go anywhere rather than take a job outside coal mining, often tramping to another coalfield to find work and lodgings and when settled bringing their families to join them.[1] A J Parfitt worked at about a dozen collieries, and men interviewed in 1842 in Lancashire and Somerset listed many pits in widely different places at which they had been employed during their working life.[2] Miners had to be mobile if they wanted to continue making their living from mining once they had begun a career in the industry.[3] Owing to the uncertainty of work and wages at times there is good reason to expect this, especially as miners' earnings were far more important than their wives'.[4] But miners may have also chosen to move from their home villages to get work. If Skinner is to be believed, Camerton was one of several overcrowded and squalid mining communities that grew up around new collieries and attracted some of the worst elements of society in the process.[5]

In spite of the cycles of openings and closures which rippled across coalfields, and fluctuations in production at collieries, miners need not have been out of a job if they were prepared to move. Most miners were living in coalfields in which production was growing in the

nineteenth century, so that they did not have to move very far. For many miners, too, jobs at individual collieries were gradually becoming less transitory.[6] Mobility may have decreased since collieries were working more or less continuously over longer periods, collieries grew in scale, and more collieries produced coal for manufacturing industries, so that miners were not so frequently thrown out of work or laid off, they earned more regular wages, and their children could follow in their footsteps.

Understanding labour mobility, albeit from lifetime migration, may go some way to discovering how population changed in relation to the economic changes observed in the two coalfields. From the population changes described in the last chapter, it appears that not many people were moving into the Somerset coalfield compared with St Helens. Not much of the population increase in Somerset in the first half of the century could be attributed to migration except during the decade when coal production rose considerably. More migrants may have moved short distances and only come into the coalfield when there was a shortage of men. Migrants swelled the population in the growing parts of both areas. In addition, while some parishes were growing, others had falling populations because of emigration. Migrants may have moved within the coalfield because they were moving between jobs at collieries. Many studies have found a relationship between lifetime migration and the supply and

demand of labour among other groups of workers that highlight one way in which an economy affected population change; for example, the distance and frequency of moves by iron workers to Middlesbrough and Sheffield reflected trends in employment in their industry.[7] How trends in coal mining and characteristics of the industry should have influenced migration are set out in Table 7.1. The fortunes of mining, trends in the number of jobs, the technical organisation of the collieries, the markets they served, and the contracts and wages of the miners must have influenced how far, from where, whence and how frequently miners moved.[8]

The birthplaces of people in the coalfield should indicate how a relationship may have arisen between demand for labour at the pits and population change rather better than the coincidences evident in the last chapter. The birthplaces listed for individuals in the 1851 CEBs give a measure of lifetime migration but not a complete record of all movements. But in a number of studies in which they have been principally used to uncover the relationship between economic changes and the shape of net and gross flows of migrants, their drawbacks are not sufficient to discredit their usefulness.[9] Since it is possible also to cross-tabulate birthplaces with occupations and other characteristics such as age and family relationship, it is possible to consider whether migrants were economically motivated.

7.1 Migrants in the Study Areas

The origins of migrants; places they had moved to; and distances that they had moved, should indicate how significant migration was, when it occurred, and possibly why it was taking place. Other studies of lifetime migrants provide a yardstick against which the birthplaces of people in the two study areas can be compared.[10] A small number of migrants was more usual than a lot except where jobs were particularly transitory or had only recently begun to grow.[11] Short distance migrants were more common than long distance migrants, most migrants having come from the immediate vicinity and the number decreasing with distance. Long distance migrants were only frequent among migrants where new industries had started and needed men and even women with uncommon skills, or a lot of unskilled labour that was not immediately available.[12] Young people of both sexes were the main migrants because they were the first victims of a fall in any demand for labour; they had to find work, they were more adventurous, and it was easier for them to move.[13] Families were nonetheless uprooted because of the volatile labour market, but did not usually move as far as young people.[14]

By comparison, birthplaces of the Somerset coalfield's population in 1851 disclose a relatively low rate of immigration, a low turnover of people, and little attraction for outsiders because of an ample supply of labour within the coalfield. People's birthplaces did,

however, reflect the growth of jobs in the principal employment for men during most of the first half of the nineteenth century, the need for young people to move, a brief period only when there was a shortage of labour, and no new industrial development requiring people with skills unavailable locally. The differences with the people of St Helens' birthplaces stem from the very presence of long distance migrants in St Helens who were attracted by the growing economy and new manufacturing industries. Because of the increasing number of jobs also, migrants in St Helens had moved from places beyond the immediate locality, more migrants had moved with their families, but a lot more young people had settled in the area too.

7.1.1 The Somerset Coalfield

Only 54% of male household heads were migrants and only a small number of these had been born outside Somerset or more than fifty miles away. (Table 7.2)[15] Relatively more adult migrants were living in burgeoning urban and industrial centres than in the coalfield, although there were relatively fewer in areas where the population was falling.[16] Nearly all migrants to the coalfield had only come from the immediate locality. Table 7.3 shows that only 27% of those born outside the parish where they lived had been born over ten miles away.[17] As few as 8% were born in places over fifty miles from their home and only a handful had been born in Ireland or other coalfields. (Table 7.4)[18]

Figure 7.1 shows a rapid distance decay as most of the migrants had only moved within the coalfield or from the surrounding rural areas.[19] Parishes which formerly contained some mining and those with employment falling in mining and manufacturing stood out as the most important sources of migrants in the coalfield.[20] Very few migrants came from mining parishes in the Radstock and Paulton Basins where the mining industry was expanding and employment at the pits was being concentrated. Neither had many migrants come from the textile manufacturing and agricultural parishes on the fringes of the coalfield to the east and on the Mendips, or from the surrounding towns such as Frome, Shepton Mallet and Bath where the number of jobs was declining too, which might have been expected to be sources of recruits to the collieries.[21]

Young single people seeking their first job or promotion were the main migrants into the coalfield both earlier in the century and just before the census. Rapid economic growth in the coalfield twenty to thirty years earlier could have given rise to the largest number of adult male migrants among those aged forty-five to forty-nine evident in Table 7.5. More of the migrants aged forty to fifty-four had also been born outside the coalfield. Also, more of the household heads under thirty had moved from outside the coalfield than children aged over twenty (Table 7.6), and lodgers had moved over longer distances than other workers. (Table 7.3)

Men who had families may have found it more difficult to take a job beyond the distance they could walk to work each day from home.[22] Some children in the coalfield were migrants and a few families had children who had been born in several different places. About 10% of the children under the age of five had moved and a small number of these had been born as far away as South Wales. But in the main few children even in their teens had moved much compared with independent young people a few years older who were lodgers or household heads.[23] For example, only a third of those living with their parents aged over twenty were migrants, whereas about a half of the household heads in their twenties were. Children had also only moved shorter distances. Most of them had been born in another parish in and around the coalfield.

7.1.2 The St Helens Coalfield

Migrants to St Helens came from further afield and fewer migrants moved from townships on the coalfield. Long distance migrants were more numerous than in Somerset. Only 26% of the migrants had been born within a five mile radius of the centre of St Helens itself, while 29% had been born over ten miles away, with a large proportion born outside England and Wales. 9% were Irish. (Table 7.9) This was the main difference between the birthplaces of adults in Somerset and St Helens. A lot of Irish people had come to settle in Lancashire although a lot more of them were attracted to Liverpool and the textile manufacturing

towns than to the coalfield up to 1851.[24]

From Table 7.8 it appears that apart from having relatively more migrants from Ireland, more migrants to St Helens from outside Lancashire came from the North-east of England and the West Midlands. These were areas that had towns with similar industries to St Helens. Some men and their families had been born in places that had large glass and alkali works. Most of them had not moved far, coming from nearby towns such as Liverpool and Warrington, but others had been born in Dumbarton, Sunderland and Castleford.[25]

Table 7.10 and 7.11 indicate that many of the migrants were possibly young and single. More men under the age of fifty were migrants than among those over fifty, which would have followed from the increase of immigration after 1830 at the same time as both jobs and the population as a whole began to grow rapidly. Only a third of the household heads in their twenties were not migrants whereas two-thirds of the adults of the same age but still living with their parents had not moved. Many would have moved from home into lodgings. Nearly all the working lodgers, most of whom were aged from fifteen to thirty and were unmarried, were migrants. (Table 7.8) A larger proportion of them had been born over ten miles away than in Somerset, and about a third were Irish.[26]

Some migrants, however, were men with families. From comparing Table 7.11 with Table 7.6 it is obvious that more

families had moved into St Helens than Somerset, particularly in the previous two decades. However, even though the proportion of children who were long distance migrants increased with age, fewer children than adults or lodgers had been born more than ten miles away. A small number had been born in Ireland, a lot of Irish people having emigrated with their entire families, but only 10% of children under the age of five had been born more than five miles from St Helens.[27] The birthplaces of heads and their spouses imply that people were more likely to have moved when they were single than once they were married.[28]

7.2 Migrant Miners in the Study Areas

Miners did not usually move as frequently or as far as other labourers and craftsmen because collieries were relatively stable employers, sons could be found a job by their fathers, and other jobs were often near at hand.[29] Miners had moved further and were more often migrants at collieries that were new, had raised production quickly, and were in expanding, newly mined areas.[30] Miners usually only had to move short distances within coalfields to find work although they may have moved, on occasions, longer distances between coalfields.[31] Many of the migrants were young people although a lot of these would have been recruits from non-mining jobs.

The miners in Somerset and St Helens had not moved as much as other workers. Miners who were migrants had predominantly moved within the coalfields. They were

moving towards new pits, new seams and growing coal production, and away from areas where collieries were closing and miners had relatively insecure jobs. Young miners were encouraged to move more than families. They had to move to obtain promotion and graduate to hewing or even to enter the industry, although they were much more likely to secure a job without moving than other boys. Significantly, in view of the higher growth of production and the greater rate of increase after 1830, more of the miners in St Helens had moved; they had moved from further away; and more of them were single men and men with families from outside the coalfield. But, in general, the differences were not great. St Helens' collieries must have easily recruited men and boys whose fathers were not miners from inside the coalfield because of better wages in mining and a falling number of jobs for men in metal trades and textiles, whereas new industries requiring skilled and unskilled labour had to recruit people from further afield.

7.2.1 The Somerset Coalfield

Table 7.12 shows that more of the miners had been born in the coalfield than men in other occupations, and relatively more of them had not moved at all. Whereas a third of agricultural labourers had been born in another part of Somerset, less than 10% of miners had been born outside the coalfield. This distinction owed much to the different organisation and nature of mining and farmwork.[32] But coal production was not undergoing a rapid increase either, with none of the acute shortages of labour which

occurred in other coalfields, so that fewer miners in Somerset were migrants or born outside the district than in areas such as Easington, Durham and South Wales.[33]

Of the migrant miners in Somerset, relatively few had moved long distances either compared with other men. It appears from Table 7.13 that migrant miners moved more frequently within the coalfield, and seldom came from backgrounds that had no contact with mining. Most of the migrant miners had been born less than five miles away. As few as 10% had been born over ten miles away, whereas 42% of the migrant agricultural labourers had moved at least ten miles.[34] Only a handful had been born outside the West of England, and not very many either had originated from areas which did not have a coal mining industry. Of the few long distance migrants, most had been born in other coalfields; South Gloucestershire, Staffordshire and South Wales.[35] Many more of the migrants from outside the study area had been born in parishes in Somerset that formerly had coal pits.

Table 7.14 indicates that miners with families had moved about as much as other workers, although they had distinctly moved more often within the coalfield and moved shorter distances. Relatively more of the miners' children had moved under five miles than other workers'.[36] But, compared with other coalfields, very few of the colliers' children had moved very far.[37] Only a few had been born in South Wales and Staffordshire, and then often

in between other siblings born in the Somerset coalfield.[38]

Although most of the migrant miners in 1851 and earlier must have been young men and boys, the principal difference between miners and many of the non-miners was that because of succession miners did not have to move so frequently in early adulthood.[39] Table 7.15 shows that whereas miners' children were as often migrants as non-miners' children, miners in their twenties and thirties, who were by then household heads, were far less likely to have moved than non-miners. It also shows that more middle-aged miners were migrants and more of them had been born outside the coalfield than younger miners. They would have come into the coalfield as young men twenty to thirty years before the census when a shortage of labour existed in the coalfield. Older non-miners were no more frequently migrants than younger non-miners. Also, a higher proportion of the adult miners under thirty were migrants than the offspring of miners aged over twenty living at home. In addition, more of the miners who were lodgers had been born further away than householders.[40] Some young people were probably not miners before they moved but had taken up mining in preference to following their father's occupation.[41] This may have happened to some miners in lodgings born outside the coalfield, such as the dozen young boarders born in Wiltshire living in Radstock. A handful of them lodging together had all been born in Trowbridge, a town suffering from the demise of its weaving industry.[42]

7.2.2 The St Helens Coalfield

More of the migrant miners to St Helens were probably young men in search of their first job down the pit or promotion. A few more miners had originated some distance away than in the Somerset coalfield, and also from surrounding townships without any coal mining. In general, however, most of the miners had been recruited from the locality, as in Somerset, far more so than other workers, and more of the miners had also been born in St Helens and the other townships on the coalfield.

The miners were as stable as miners in Somerset in spite of the coalfield's more rapid growth, especially in the 1830's and 1840's. (Table 7.16) Mining had less need for newcomers from outside the coalfield than other industries. 54% of the miners were still living in their native township. Moreover, only about 8% of the miners had been born over ten miles away, whereas 23% of the adult glassworkers had.[43] Only 3.5% of miners had moved more than fifty miles compared with over 20% of the manufacturing workers and labourers. Few of the migrant miners were Irish, though; 4% as against 25% of general labourers.[44] Although St Helens had more migrant miners from outside the immediate neighbourhood than in Somerset, by no means as many miners were migrants as in newly mined areas. (Table 7.17)[45] A number had originated from agricultural parishes to the south and Cheshire, but this was markedly fewer recruits from a non-mining background in a wide surrounding area than in sparsely populated townships of

Durham and South Wales where coal was being newly raised. Not many migrant miners had moved from outside North-west England and few had come to St Helens from other coal-fields either. In addition, compared with other industrial workers, few miners were migrants from the surrounding areas of Lancashire and Cheshire or further afield. Some glassworkers, for example, had moved much greater distances, from the West Midlands, Yorkshire, Scotland and even the Continent. Their children had been born in a wider variety of places than miners' too, more of whose children had not moved, and more of those that had, had been born in the confines of the coalfield. (Table 7.19) It illustrates that whereas some glassworkers moved long distances between contracts, often with their families, miners seldom had to do more than alter their walk to work from home after changing jobs.[46]

Young, single men were probably the principal immigrants coming to work at the collieries, and there is far more evidence of immigration by young people than in Somerset. More of the young household heads working at the pits were migrants than miners still living with their parents, as in Somerset. (Table 7.18) Because of the industry's greater expansion than in Somerset, however, more of the younger miners were migrants and a lot more of them had originated from further away. Of the miners who were lodgers, some 70% were migrants. Many may have been entering coal mining for the first time; 10% were Irish, an indication perhaps of a shortage of labour, and others

had been born in Cheshire, Liverpool and outside North-west England.

7.3 Migrants in the Somerset Coalfield

Cross-tabulations of origins and destinations can be obtained by disaggregating the birthplaces of individuals, as Pooley, Barke and Bryant among others have done, to investigate if there were links between the source and residence of migrants.[47] In the Somerset coalfield the migrants, especially miners, had moved from the parishes where coal mining was no longer growing to the parishes where the number of jobs was increasing. As in St Helens, more migrants lived where the greatest increases in coal production had occurred.

More migrants were resident in the growing districts and more of the non-movers were resident in the stable parts of the coalfield, so that there was a correlation between numbers of migrants, population increase and economic growth. (Figure 7.2; Table 7.20) In parishes such as Clandown, Dunkerton and Shoscombe, over 75% of the male household heads were migrants. These were nearly as high as in new communities which had grown up around collieries, such as Monkwearmouth and Hetton in Co. Durham and Coalville in Leicestershire, nor any different from other communities that had grown.[48] By contrast, few migrants lived in parishes like Clutton and Coleford where the numbers of jobs was shrinking, although these were not as low as in some industrial and mining parishes in the Peak

District and Yorkshire in 1861 suffering from economic decline.[49] However, the correlation was not an exact one because of differences in turnover and persistence between miners and non-miners.[50] More non-miners such as agricultural labourers, who moved more frequently than miners, lived in Nettlebridge, so that there were more migrants in some of these parishes in spite of the falling number of jobs.

More of the single, young migrants and the long distance migrants had been attracted to the districts that were growing. (Table 7.21) More migrants who had moved greater distances lived in the parishes in which job vacancies may have existed. (Figure 7.3)[51] In declining parishes such as Coleford, Holcombe and Clutton, few household heads had been born outside Somerset. Most migrants who were not natives of the coalfield but of non-mining areas were living in the growing parishes, most of all in the parishes furthest away from the earliest worked mining area. For example, the Lower Wellow and Lower Cam districts which had the newest and largest collieries and the greatest growth in coal production, had more men born over ten miles away. (Table 7.21)

Migration within the coalfield was correlated with the patterns of relative gains and losses by migration in the coalfield. It is noticeable in Table 7.22 that older men in mining areas that had begun to decline by the middle of the century were more frequently migrants than men under forty. In the areas that had grown most of all and were

still growing, young men were more likely to have been migrants than young men in the contracting parts of the coalfield, and they were migrants as frequently as older men. In addition, parishes around Radstock had received a larger volume of intra-coalfield migrants, so that they gained migrants from other parts of the coalfield. (Figure 7.4) In particular, migrants had left Nettlebridge and moved from Mendip northwards. Figure 7.5 shows that these are quite striking one-way flows of migrants compared with the flows between neighbouring parishes throughout the coalfield which largely cancel each other out.[52] They match mining development, the greater concentration of mining away from the exposed measures, and the complementary rises and falls in jobs at the pits.

7.4 Migrant Miners in the Somerset Coalfield

Miners were the most important migrants in these flows of men within the coalfield. Not unexpectedly, miners were overwhelmingly attracted to the parishes where employment at the pits was growing, often from those where it was declining.

Most migrant miners lived in the parishes of the Lower Wellow, Upper Wellow and Lower Cam districts of the coalfield; more than half of the miners were migrants. (Table 7.23) They were as numerous in Radstock, Shoscombe and Dunkerton as in rapidly growing mining communities such as Hetton and Monkwearmouth in Co. Durham, which had sprung up as quickly. (Figure 7.6) Relatively few migrant miners

were resident in the mining areas where pits had closed and none had replaced them, and where production had reached a peak and was no longer growing. These same parishes had few outsiders among their miners and smaller numbers of miners' sons who went down the pit.

It was mainly these parishes that also had the least number of miners born outside the coalfield and most born within a very short distance of where they were living at the census. (Figure 7.7) Generally, less than 25% of their miners had been born over three miles away. Although no parish had as many migrants from other coalfields and non-mining areas as 'mushroom' settlements in Durham and Scotland, the district around Radstock had a lot more long distance migrant miners than the rest of the coalfield.[53] The parishes furthest away from the exposed coal measures where there had been little mining before the end of the eighteenth century had most long distance miners, 25% of Lower Cam's and 18.5% of Lower Wellow's having moved over five miles, whereas under 5% of Upper Cam's and Nettlebridge's had done so. (Table 7.23) Being closer to the rest of the coalfield, migrant miners in Upper Wellow had not moved as far.[54]

Table 7.24 highlights the significant distinctions. In Nettlebridge and Upper Cam where production had dropped if it had changed at all, the miners were overwhelmingly still working in the immediate mining district in which they were born. These districts had very few miners from

the other districts. By contrast, Lower Wellow had plenty of miners from Nettlebridge, and Lower Cam had as many miners born in Nettlebridge as had been born in the Paulton Basin. In the districts where production, jobs and population were all growing steadily and occasionally spectacularly, more of the miners had been born outside the coalfield. Up to 23% of the miners in Lower Wellow against under 10% in the earliest worked areas possibly originated from non-mining backgrounds.

Changes in employment at the mines were correlated with the direction and magnitude of the moves made by miners in the coalfield[55] Figure 7.8 shows that most of the migrants who had moved in the coalfield had been born in the declining areas, and more of them had moved to become residents around Radstock and Camerton. The flows of miners mainly emanated from the Nettlebridge area and were aimed towards the Radstock area too. (Figure 7.9) With pit closures and poorer prospects of obtaining secure employment in Holcombe and Coleford after the 1820's at much the same time as an expansion of jobs in the vicinity of Radstock, miners would have been encouraged to move between Holcombe and Camerton, Dunkerton and Radstock, and from Kilmersdon to Clandown and Camerton. In view of the rapid growth of production in the Paulton area as well as Radstock until about 1830, it is probably not surprising to find that there were few miners who moved from the parishes in the Paulton area to the Radstock Basin, nor that few miners from Nettlebridge headed towards Paulton.

Most found work at the newer, larger collieries owned by the Duchy of Cornwall, the Waldegraves and the Jarretts.

At the same time many miners had moved between other parishes. As many of these moves were between neighbouring parishes they may reflect miners who adjusted to short-term fluctuations in work and wages and not longer-term economic trends. Although some of the children of miners in the Radstock Basin were born in Nettlebridge's parishes, which implies that a few miners with families were among the migrants, most children had not moved from their birthplace and of those that had, few had gone far. (Figure 7.10) They appear to have moved most frequently in areas where jobs at the pits were probably least secure and not moved so much in the areas where the number of jobs had risen.[56]

7.5 Concluding Remarks

Some characteristics of labour migration in both study areas indicate how employment at the mines was linked to population trends. Ostensibly, mining affected the pattern and extent of lifetime migration in both coalfields. From the birthplaces of miners and their families, it seems that people were moving as expected according to the prevailing conditions in the industry; succession, wages, regularity of work. They moved in search of work, so that the extent and direction they took corresponded with differences in the demand for labour at the pits, the supply of labour from other miners' families, the relative

levels of earnings and the security of jobs. More miners had moved to St Helens, younger miners had sought work in the areas with newer mines, and the native miners were more settled in the districts with larger collieries. Miners had gone to the growing parts of both coalfields, heading towards the districts where there was a shortage of local labour to work at the new and expanding pits. They appear to have moved when production was increasing most of all, and also to have moved from areas that had a falling demand for workers at the pits as well as from outside the coalfield at these times.

Other characteristics of labour mobility associated with mining at the time may have influenced how population changed in each area. Because mining instigated more local migration, miners moving within the coalfield to obtain alternative jobs, and non-miners trying to gain admission to a better paid industry, men would not have been drawn into the coalfield in any great quantity. Yet because collieries with a shortage of labour recruited men without any experience of mining from within and outside the coalfield, as well as miners' offspring from declining areas, it was mainly young people who moved to the growing parts of the coalfield. Consequently, high rates of natural increase could have been set in motion by migration into and within the coalfield.

Unfortunately, an interpretation of lifetime migration cannot afford altogether convincing proof of the relationships between mining and population change. First of all,

the patterns of economic change and migration only coincide at a general level. It is difficult to ascribe work as the sole reason for moving, even though at the time it was probably more commonly the reason than now.[57] Also, mining could have only influenced a section of the workforce, although the gains and losses of migrant miners appear to be in step with population changes. Secondly, the age and sex of migrants which would have affected patterns of natural increase are not very clearly discernible from the data in the CEBs.

Consequently, these are only strong hints that substantial numbers of miners with distinctive characteristics affected population change. Nevertheless, the influences of mining on the type of migrants can be examined further. The relationship between population change and migration can also be assessed from the age and sex structure of the population. The ages and sex ratios of the populations of the study areas are investigated in Chapter 8.

CHAPTER NOTES

1 J Benson British coal miners in the nineteenth century (1980) 106; C Storm-Clark The miners:the relevance of oral evidence Oral History 1 (1972) 87

2 A J Parfitt My life as a Somerset miner (1930) 20-21, 26; John Oldham, BPP 1842 xvii 210; and a miner whose autobiography appears in J Burnett ed Useful toil (1974) 293

3 Table 2.2 shows that collieries working longer than a couple of decades were not all that common and as many as one-fifth closed in every decade

4 R Samuel Mineral workers in Miners, quarrymen and saltworkers (1977) 67-68; J U Nef The rise of the British coal industry Vol 2 (1932) 147. Only miners in a textile manufacturing area such as Bolton during a depression might have taken the earnings of women into account, BPP 1842 xvii 202

5 J Skinner Journal of a Somerset Rector ed H Coombs and A N Bax (1930) 3,121,266,301. Radstock was supposedly little better, J A Bulley To Mendip for coal Part II Proceedings, Somerset Archaeological and Natural History Society 98 (1953) 47, and conditions in St Helens were grim, T C Barker and J R Harris A Merseyside town in the Industrial Revolution (1954) 270; R Challinor The Lancashire miners (1972) 244. They do not vie with the descriptions of other places, A Burton The miners (1976) 82; B F Duckham A history of the Scottish coal industry vol.1 (1970) 254; Samuel (1977) 68; P E Razzell and R W Wainwright ed The Victorian working class:Selections from letters to the "Morning Chronicle" (1973) 27

6 Relatively high succession may be evidence of the growing stability of the mining community, which undoubtedly characterised many mining communities in the early decades of this century, Samuel (1977) 67; D Smith Myth and meaning in the literature of the South Wales coalfield in the 1930's Anglo-Welsh Review 25 (1976) 28-40

7 T Gwynne and M Sill Welsh immigration into Middlesbrough in the mid-nineteenth century Bulletin, Cleveland and Teeside Local History Society 31 (1975) 20-22; P Cromar Labour migration and urban expansion in the North of England:Sheffield in the 1860's and 1870's in P E White and R Woods ed The geographical impact of migration (1980) 131. Similarly, B Turton Crewe new town in 1851 North Staffordshire Journal of Field Studies 16 (1976) 63-66 shows that metal workers in Crewe came from areas with engineering trades

8 Other studies touching on the mobility of miners have only managed to hint at this , I Leister The sea coal mine and the Durham miner University of Durham Geography Department Occasional Publication (New Series)

No 5 (1975) 46-47; J Langton Geographical change and Industrial Revolution (1979) 194-197; M Sill Mid-nineteenth century labour mobility:the case of the coal miners of Hetton-le-Hole, Co.Durham Local Population Studies 22 (1979) 44-50

9 The problems and patterns are neatly summarised in R Lawton Mobility in nineteenth century British cities Geographical Journal 145 (1979) 207-210

10 idem

11 This is evident from numerous other studies although the validity of some comparisons is doubtful because of differences in scale; D Bryant Demographic trends in South Devon in the mid-nineteenth century in K J Gregory and W L D Ravenhill ed Exeter Essays in Geography (1971) 125; M Barke The population of Brighouse, West Yorkshire, in 1851 Yorkshire Archaeological Journal 48 (1976) 141; R Gurney Population change and population structure in the Peak District of Derbyshire PhD Liverpool (1970) 107; S A Royle Aspects of nineteenth century small town society:a comparative study from Leicestershire Midland History 5 (1979-80) 58; R Lawton An age of great cities Town Planning Review 43 (1972) 204; A M Williams Migration and residential patterns in mid-nineteenth century Cardiff Cambria 6 (1979) 5

12 Gwynne and Sill (1975) 20-22; W Turner Patterns of migration of textile workers into Accrington in the early nineteenth century Local Population Studies 30 (1983) 31-33. Many growing towns had attracted the poverty-stricken Irish; R Lawton Irish immigration to England and Wales in the mid-nineteenth century Irish Geography 4 (1959) 38, L H Lees Exiles of Erin (1979) 22-41

13 Because families could not support older children they had to leave home to find work, D B Grigg E G Ravenstein and the "laws of migration" Journal of Historical Geography 3 (1977) 50. Young people often moved from areas with a declining number of jobs; M Anderson Family structure in nineteenth century Lancashire (1971) 152; Gurney (1970) 107; M Long and B Maltby Personal mobility in three West Riding parishes Local Population Studies 24 (1980) 21

14 The Irish and urban poor were the exceptions, C Richardson Irish settlement in mid-nineteenth century Bradford Yorkshire Bulletin of Economic and Social Research 20 (1968) 46; Lees (1979) 22-41

15 Migrants are defined as people who moved between parishes

16 See Note 11

17 The distances moved by migrants were calculated from a mileage chart. Distances were measured between the centre of all the main communities in and around the coalfield and not between the centres of each parish

18 2.9% of the national population were Irish in 1851, Lawton (1959) 38. More Irish migrants found their way to the coalfields of Lancashire, Durham and Central Scotland

19 These isopleth maps are constructed from the number of migrants from each parish represented as a % of the population resident there in 1851 (the total number of males in Figure 7.1a and the total number of females in Figure 7.1b) This was carried out by Bryant (1971) 135 and W M Brayshay The demography of three West Cornwall mining communities, 1851-1871:a society in decline PhD Exeter (1977) 242

20 This was also found by W T R Pryce Migration and the evolution of culture areas:cultural linguistic frontiers in North-east Wales, 1750 and 1851 Transactions, Institute of British Geographers 65 (1975) 92; Sill (1979) 46

21 It has often been said that recruits did not usually come from local non-mining areas because of the low social status of miners; J R Leifchild Our coal and our coal pits (1853) 218; Nef Volume 2 (1932) 154-155; A Redford Labour migration in England, 1800-1850 (1926) 51; G Patterson ed Monkwearmouth colliery 1851 Centre of Extra-Mural Studies Publication University of Durham (1978) 38. This was obviously not so in South Wales; B Thomas Migration of labour into the Glamorganshire coalfield 1861-1911 Economica 10 (1930) 276

22 Benson (1980) 127, although Leifchild remarked that it was not difficult for miners to move with a family because homes were not usually a problem, Patterson ed (1978) 40

23 Far more of the children in growing towns and in rural areas with a high turnover of people had been migrants; 32% in Cardiff, Williams (1979) 5; 27% in South Cardiganshire, C Thomas Rural society in nineteenth century Wales:South Cardiganshire in 1851 Ceredigion 6 (1971) 409

24 J T Danson and T A Welton On the population of Lancashire and Cheshire and its local distribution during the fifty years, 1801-51 Part III Transactions, Historical Society of Lancashire and Cheshire 11 (1859) 40; J T Jackson Housing and social structure in mid-Victorian Wigan and St Helens PhD Liverpool (1977) 33,37. The Irish in St Helens had been mainly attracted by labouring jobs in the town, Barker and Harris (1954) 283, and most of them had only made a recent appearance, idem 281

25 Barker and Harris (1954) 284; Jackson (1977) 42

26 Many Irish born householders had taken in Irish lodgers. This was common among the Irish in other towns; Bradford, Richardson (1968) 46; Leeds, T Dillon The Irish in Leeds, 1851-61 Publications of the Thoresby Society Miscellany 16 (1973) 6; and London, Lees (1979) 48-50

27 Apart from the Irish this proportion was not much greater than in Somerset

28 As in Somerset, Table 7.7, more migrant husbands and wives had different birthplaces (33%, St Helens). There were few couples in Monkwearmouth, a colliery community that had grown very quickly, who had the same

birthplace, Patterson ed (1978) 41

29 Some of these explanations have also been used by Redford (1926) 49,157, Gurney (1970) 116,133, G J Lewis Mobility, locality and demographic change: the case of North Cardiganshire, 1851-1871 Welsh Historical Review 9 (1979) 353, D Gaunt Pre-industrial economy and population structure Scandinavian Journal of History 2 (1977) 197, to distinguish miners from other workers. Mining was not as transient as farming or general labouring whose workers were hired for short terms or on contracts, N L Tranter The social structure of a Bedfordshire parish in the mid-nineteenth century International Review of Social History 18 (1973) 101, G J Lewis The demographic structure of a Welsh rural village during the mid-nineteenth century Ceredigion 5 (1966) 300-301, Lewis (1979) 353, B A Holderness Personal mobility in some rural parishes of Yorkshire 1777-1822 Yorkshire Archaeological Journal 42 (1970) 448-449, R Hall Occupation and population structure in part of the Derbyshire Peak District in the mid-nineteenth century East Midland Geography 6 (1974) 73, R Samuel Comers and goers in H J Dyos and M Woolf ed The Victorian city (1975) 123-160

30 M R Haines Fertility and occupation (1979) 156,162-163, Leister (1975) 44, Pryce (1975) 96, S A Royle The development of Coalville, Leicestershire in the nineteenth century East Midland Geography 7 (1978) 37, Sill (1979) 46, Patterson ed (1978) 36, M Yasumoto Industrialisation and demographic change in a Yorkshire parish Local Population Studies 27 (1981) 19, P A Grant The coal mines of Durham City Occasional Publication Department of Geography, University of Durham New Series No 2 (1973) 9, W A Moyes Mostly mining (1969) 99. Harrison found that differences in the preponderance of migrant ironstone miners were related to phases of the industry's development in Cleveland, B J D Harrison The origins of Cleveland and Rosedale miners from the 1871 census Bulletin, Cleveland and Teeside Local History Society 19 (1972) 2-3

31 Pryce (1975) 85, Royle (1978) 37, Redford (1926) 50, Sill (1979) 46, Harrison (1972) 6-8

32 Lewis (1966) 300-301, Hall (1974) 73, Gaunt (1977) 197

33 Haines (1979) 156,162-163. However, the proportions were not less than in other mining areas; Brighouse, Barke (1976) 142; Forest of Dean, C Fisher Custom, work and market capitalism (1981) Table 4.3 56-57

34 This was not uncommon among miners either, Royle (1978) 37 (50% had been born within 5 miles of Coalville and only 7% had been born over 10 miles away); G Stevenson Portland Row, Kirkby-in-Ashfield Transactions of the Thoroton Society 70 (1966) 67-70; B S Trinder The Industrial Revolution in Shropshire (1973) 315-316 although there were more outsiders at collieries in parts of Lanarkshire, Cumbria and Lancashire; A Campbell Honourable men and degraded slaves in R Harrison ed The independent collier (1978) 83; O Wood A colliery pay

roll of 1802 Transactions, Cumberland and Westmoreland Antiquarian and Archaeological Society New Series 72 (1972) 3-7; A V John By the sweat of their brow (1980) 156. There is also a significant difference between the distances moved by miners and non-miners to the coalfield. A χ^2 test on the distribution produced a value for χ^2 of 23.48 which is greater than the expected value

35 Many long distance migrants to mines in Durham had come from lead mining areas in the Pennines but some, as Hair has argued, must have come from non-mining areas, P E H Hair The social history of British coal miners 1800-1845 DPhil Oxford (1955) 60

36 Sill (1979) 48; and Monkwearmouth, Patterson (1978) 36. As in Hetton, very few migrant children had been born outside the coal mining area. The method of tracing is discussed by Bryant (1971) 139-141

37 The children had moved further to Hetton and Monkwearmouth, Co Durham, because these were mining communities at some distance from earlier mined parts of the coalfield; Sill (1979) 48-49, Patterson ed (1978) 36

38 These were probably the main destinations of Somerset miners, C G Down and A J Warrington A history of the Somerset coalfield (1972) 37, J H Morris and L J Williams The South Wales coal industry 1841-1875 (1958) 182-183. Some fathers in the baptism registers of Clutton and Stanton Drew gave their residence as places in South Wales. A collier father of a child baptised at Clutton in 1834 was stated to have been in America

39 It is unfortunate that in the Somerset coalfield many of the young men moved out of the coalfield rather than within it and their destinations cannot be traced

40 Only about half of the lodgers who were miners were migrants (51.4%) but no more of them had come from further afield. Only 4.7% had been over 10 miles away while 34.7% had been born within 5 miles of where they were living

41 Few men without any experience of mining could expect a job underground in Somerset so that raw recruits had to be young. Only in areas with less difficult conditions such as South Wales could casual labourers be taken on to relieve acute shortages of labour, A H John The industrial development of South Wales 1750-1850 (1950) 63

42 J de L Mann The cloth industry in the West of England from 1640 to 1880 (1971) 196

43 Scott found a similar contrast in Carmaux, J W Scott The glassworkers of Carmaux (1974) 36. Again there is a significant difference between the birthplaces of migrant miners and non-miners (χ^2 = 289)

44 Most of the Irish in St Helens gave their occupation as labourer, as they did in Cardiff, Williams (1979) 11

45 See Note 30

46 Specialist glass workers such as glassblowers were often recruited from abroad but many were poached from glass factories in Scotland and the West Midlands by

the factory owners, Jackson (1977) 42, T C Barker The glassworkers (1977) 34,64,83

47 C G Pooley The residential segregation of migrant communities in mid-Victorian Liverpool Transactions, Institute of British Geographers New Series 2 (1977) 364-382; Barke (1976); Bryant (1971)

48 Patterson ed (1978) 36; Sill (1979) 45; Royle (1978) 37, and also Moyes (1969) 99 and Grant (1973) 9

49 Gurney (1970) 110, G A Feather A Pennine worsted community in the mid-nineteenth century Textile History 3 (1972) 75

50 Gurney idem. In other studies this is attributed to differences in occupational structure; Long and Maltby (1980) 15, Cromar (1980) 143, D Levine Family formation in an age of nascent capitalism (1977) 43-44

51 There were relatively more in Monkwearmouth than in other townships in Co.Durham that had not grown very much, Patterson ed (1978) 36

52 The measures mapped in Figure 7.4 and 7.8 are similar to Pooley's standardised migration ratios, C G Pooley Population, migration and urban development in the North-west, 1851-1901 Paper presented to the Urban History Group Conference, Sheffield (1979). They take the form of

$$I = \frac{MIG(A)}{\sqrt{M(A)} \times [M(C)-M(A)]}$$

MIG(A) = Migrant males from or to parish, A, into or from the coalfield, C
M(A) = All males born in A living in the coalfield
M(C) = all males born in the coalfield

53 Moyes (1969) 99; Sill (1979) 45; Campbell (1978) 83

54 Hetton and Monkwearmouth had more long distance migrants because of their distance from the main part of the coalfield. Where new jobs were close by older works miners did not move far; Leister (1975) 40, Lewis (1966) 295

55 Barke (1976) 140-141

56 Leister (1975) 67 concludes that mobility was probably greater in the landsale areas of the Durham coalfield

57 Nowadays voluntary reasons are more important than those owing to work, W A V Clark and J Lonaka Life cycle and housing adjustment as explanations of residential mobility Urban Studies 20 (1983) 50. Explanations for mobility at a small scale sought by Dennis do not appear to be significant, R J Dennis Intercensal mobility in a Victorian city Transactions, Institute of British Geographers New Series 2 (1977) 349-363

CHAPTER 8

AGE AND SEX STRUCTURES

Mining areas were noted for having youthful populations, and also having larger numbers of young men than young women in them.[1] Hair questioned the popular impression that because of the preponderance of families with children and hordes of infants observed playing in the dirt, relatively high rates of population growth within them arose from higher fertility and not migration.[2] But if a growing industry such as mining was offering jobs chiefly to men and attracting single young men as migrants, a population with a bulge in the age group 15-29, plenty of small children, a sex ratio in favour of males, and more bachelors than spinsters might be expected. The population in other heavy industrial areas, fishing ports and lumbering districts where men got most of the jobs were much the same.[3]

Since migrants were never a cross-section of the whole population, rates of natural increase must always be partly a by-product of migration. Migrants would determine how many fertile women there were, and how many marriageable men and women. Consequently, if young women emigrated and were not attracted back to marry, the population would have a large number of unmarried men and more men than women. A relatively low rate of natural

increase would follow. Distinctive, if not peculiar, characteristics of migration to and from the coalfields should have influenced what were extraordinarily high rates of natural increase as well as sustained and rapid population growth. Migration to the coalfields by young men who were unmarried should have produced a younger population, one with fewer unmarried women and a sex ratio in favour of males, but no shortage of women to marry.[4] In these circumstances, rates of natural increase would be high and owe much to the coal mining industry: men moving to take up jobs; boys recruited to an occupation at the pits by their fathers, neighbours and relatives; young men having to move more often than men with families; and young girls like Winifred Foley, the daughter of a Forest of Dean collier, being forced to leave home to get work.[5]

Descriptive statistics of age and sex structures, such as age and sex ratios, are rough indicators of who was migrating and the course of migration.[6] They can make up for some of the shortcomings of individuals' birthplaces in the CEBs, with other studies of a range of communities and areas acting as yardsticks of the effects of migration. However, ages stated by individuals in the census have to be treated with some caution. The early British censuses may be as unreliable as those in many Third World countries today.[7] Quite a lot of people must have rounded their ages, for age heaping is noticeable in Somerset and St Helens at forty and other

multiples of five. But when treated in five year age groups, the age structures are not so awry.[8] Ages that were misreported are more difficult to assess. Since there may have been a greater tendency for women in specific age groups to do this, the sex ratios at some ages may be seriously upset, although exceptional imbalances in an age-sex pyramid are unlikely to be the result of misreporting.

Even though the quality of the data is a little uncertain, the inferences about migration and its links to mining and succession which can be drawn from the age and sex structures do not seem invalid. In the study areas there appears to be a close relationship between the migration of men, and more especially young men, and the growth and decline of employment at the collieries. In general, males outnumbered females and the magnitude of the imbalance in favour of males varied and changed in line with the expansion of coal production. In the exhausted and unprofitable mining areas where many of the migrant miners had originated there were usually more females. Also, the areas with declining numbers of jobs, most of which had experienced the earliest mining, had older, more 'stationary' populations.[9] Age structures contained more young people as a result of migration and succession. The Somerset coalfield as a whole had a less 'progressive' age structure than St Helens because mining was no longer growing so much by the middle of the century. There are signs that in most of the Somerset

coalfield young people, but more particularly girls, were emigrating by the middle of the century. Young men must have been leaving their homes in the Nettlebridge Basin, and moving from the declining to the growing parts of the coalfield in the process.

8.1 Ages and Sex Ratios

8.1.1 Somerset Coalfield

The Somerset coalfield's age and sex structure in 1851 was not unusual. The age structure was more 'progressive' than in many rural areas, including Somerset as a whole, as well as some areas that had experienced more rapid population growth than the coalfield.[10] Figure 8.1a shows that 40% of the population were aged under fifteen and only 15% were aged over fifty, so that there was a wide base, rapid narrowing and a very high ratio of young to old. Such a population structure was not so uncommon in new urban and industrial areas such as Liverpool, Cardiff and Goole, whereas many small towns and rural areas in the Peak District and Cardiganshire, for instance, had stationary age structures.[11] However, the coalfields did not have a bulge in the five year age groups 15-29. About 40% of the people in the coalfield were aged from fifteen to forty-four compared with 46% in England and Wales as a whole. (Table 8.1) Teenagers may have been leaving home because of slower growth in coal production and a fall in the number of jobs at many of the collieries. For instance, in the coalfield only 78% of the number of those aged ten to fourteen were aged fifteen to nineteen

against 87% nationally and over 100% in coal mining and urban-industrial areas whose populations were growing by migration.

The sex ratio in the Somerset coalfield was not much different from other coalfields. (Table 8.2) In common with coal mining areas in Durham, South Wales and North-east Wales, there were more men than women.[12] But as women could not get jobs in the coalfield this may have been as influential as the growth of jobs in mining in bringing about a surplus of males.[13] More females than males lived in the Nottinghamshire coalfield, and also in and around Wigan, in spite of a more rapid rise in coal production and population than in Somerset, because women could get work.[14]

Throughout the period, 1801-61, there were more males per 100 females in the coalfield than in either Somerset as a whole or England and Wales. (Table 8.2) From 1821 males outnumbered females. This arose between 1811 and 1821 during a rapid growth in coal production and jobs at the pits, particularly at bigger pits in the Radstock Basin. Table 8.2 indicates than an influx of far more men than women coincided with this; for between 1811 and 1821 a much larger rise in the number of males (27%) than females (16%) occurred.[15] However, from this time too, jobs for women were declining, especially in their main employment, hand-knitting, while not many of them could get paid work in the parishes where mining

was growing.[16] In other decades there was a closer balance, although in the 1840's more women were migrating than men.

About 1851 females may have been leaving home before males. There was a surplus of males between the ages of twelve and twenty-four as a large proportion of sons were able to take up their father's occupation. Table 8.3 indicates that it was not as a result of young men migrating to the Somerset coalfield,[17] although before 1851 young men were immigrants. Males outnumbered females in nearly all the five year age groups between the ages of fifteen and fifty-nine with an unusually large number of males between the ages of forty-two and fifty-two and from sixty-five to sixty-nine.[18] A larger number of men than women at these ages may have lived in the coalfield because of abnormal rates of immigration by single males on the expansion of employment at the pits about thirty and fifty years earlier, those occurring in the 1790's and 1800's around Paulton, perhaps, and in the years after 1815 around Radstock.

Tables 8.3 and 8.4 also suggest that females returned to the coalfield and stayed in it to get married. Although there was a sex ratio of 112.8 males per 100 females among children, men and women were more evenly matched in the five year age groups twenty-five to forty-four than between fifteen and twenty-four. About the coalfield and in the rest of Somerset there was no

shortage of women, and some women who were natives of the coalfield may have returned to get married, having only gone as far as Bath and Bristol perhaps to go into domestic service.[19] The coalfield had a high ratio of bachelors to spinsters, 130, compared with 83 in Somerset as a whole, a dearth of spinsters and a relatively high proportion of single men. According to Haines and Anderson, such a shortage of females would be highly correlated with lower average ages at marriage for females and high rates of natural increase if most men managed to obtain a partner.[20]

8.1.2 St Helens

St Helens had a similar age and sex structure to Somerset; a large number of young people, more males than females, more men unmarried than women. But it appears that more immigrants were coming in. These were principally young men, but there were young women as well.

From Table 8.1 and Figure 8.1b it appears that there were a lot more children than in most growing towns. Only 9% were aged over fifty, over 40% were aged under fifteen, and the ratio of elderly (over sixty-five) to children (under fifteen) was even lower than in the Somerset coalfield. Single people who had left home must have been coming into the area in the 1840's since nearly as many people were aged twenty to twenty-four as fifteen to nineteen.

Most of these immigrants were young males. (Table 8.3)

As in the Somerset coalfield and most other mining areas, there were more males than females, but no more than in Somerset in 1851. Males outnumbered females, particularly between the ages of fifteen to twenty-four, again as in both Somerset (a mining district that was not growing much) and Durham (a coalfield that was growing rapidly). In St Helens, however, girls were possibly not finding it as necessary to leave home to get work. Obtaining jobs at pits and factories as well as in service industries, the neck of the pyramid was not as narrow as in Somerset. (Figure 8.2b). By contrast to the Somerset coalfield the number of females between the ages of twelve and twenty-nine was not so small compared with other age groups.

Tables 8.3 and 8.5 suggest that immigration by men followed rising employment at the pits, as in Somerset. Males outnumbered females in St Helens in all five year age groups from ten to forty-nine. In the coalfield as a whole and St Helens itself the sex ratio rose above 100 males for 100 females for the first time in 1831, and remained above 100.[21] The number of men increased at a higher rate than the number of women in the 1820's and 1830's when the most rapid growth of jobs in mining, chemicals and glass was starting and jobs in domestic industries such as textiles were beginning to decline.

By contrast to Somerset, the pyramid in Figure 8.2 and data in Table 8.6 show that the imbalance arose because immigration by men was still going on in the middle

of the century. There are several indicators of this. There were a lot of single males and married men without their wives in the town.[22] Also, far more of the lodgers and children at home over the age of fifteen were males than females in contrast to textile towns to which girls had largely migrated and where girls stayed at home longer than boys.[23] In addition, many more bachelors than spinsters resided in the area. Although the ratio was no greater than in Somerset, proportionately more males over twenty were unmarried.

8.2 Migrants within the Study Areas

Because the areas with sex ratios of over 100 males for every 100 females had growing mining industries, events such as a new colliery opening often occurred at the same time as the sex ratio in favour of males increased. Single men and boys were probably the main immigrants because of rising employment at collieries. Women may have followed only to get married.

8.2.1 Sex Ratios in the Somerset Coalfield

With more males than females, most townships on the coalfield stood out from the non-mining area of North-east Somerset.[24] In Figure 8.3 the coalfield's townships contrast quite strikingly with surrounding ones that largely had people employed in agriculture and domestic manufacturing in 1801 and 1831.[25] Many of the parishes on Mendip and in the Avon, Frome and Chew Valleys had

domestic industries that employed many women, and in most of these there were considerably more females than males than in townships with large numbers of miners around Radstock and Paulton.

In the coalfield in 1831 a broad band of parishes along the Wellow Brook and Cam Valleys had sex ratios well in excess of 100. (Figure 8.3b) Most migrant miners had moved to these parishes, although there were just as many males to females in some parishes west of Paulton where mining was at a standstill. Conversely, the main sources of migrant miners within the coalfield, the parishes of Nettlebridge and the Chew Valley, had sex ratios that were often as low as 90 males for every 100 females.[26] However, all the parishes with a surfeit of men had the least number of jobs for women. But as employment for females in handknitting fell, the differences between Nettlebridge and the rest of the coalfield shrank; and as coal production grew in the Radstock Basin at the expense of the Paulton Basin, the greatest surfeit shifted from townships in the latter to the former, as illustrated in Figure 8.4a-c between 1811 and 1861.

These changes occurred because more men were immigrants to the growing parts of the coalfield and more women were emigrants from the parts of the coalfield without any domestic industries. Often in parishes where coal production expanded and new mines were sunk the number of men was for a short time much greater than the number of women. Ratios increased most after new collieries

opened; for example, rising from 98 to 110 between 1811 and 1821 in Lower Wellow and from 96 to 115 in Upper Wellow between 1801 and 1821. (Table 8.7) In view of the birthplaces of miners, these rose partly because young men moved from other parts of the coalfield and surrounding areas such as the Mendips and the Chew Valley where the number of males was hardly growing at all. Extraordinary increases in the number of jobs at pits occurred at the same time as the number of males rose much more than the number of females in quite a few parishes. After the expansion of mining in Radstock in the 1790's, for example, its sex ratio in 1801 was 112, and after coal production rose about 1815 it became 120 in 1821. After two new collieries began production between 1810 and 1820 in Welton, the sex ratio leapt to 131 in 1821.[28] Conversely, permanent and temporary closures could have been responsible for falls in the ratios in High Littleton (1851;95), Farrington Gurney (1861;94), and Radstock (1811;94) for instance.[29]

The balance was never tilted too far because females migrated into the main mining areas of the coalfield that had the greatest surfeit of young men, in order to get married.[30] Sex ratios would have continued to rise in the parishes of the coalfield where coal production grew for several consecutive decades. Instead Table 8.7 shows that they usually fell back to a steady level and remained unbalanced only because girls continued

to leave home earlier than boys. In general, the sex ratio only increased when collieries opened initially and there was often a brief but acute shortage of labour. It did not rise at other times when production was being raised gradually since by this time a lot more miners whose sons could go underground would have lived and worked closer to the pit.

8.2.2 Sex ratios in the St Helens Coalfield

In South-west Lancashire, too, the number of males increased in some townships between 1821 and 1851 as mining spread, on the one hand, and as employment in domestic manufacturing, especially textiles, declined, on the other hand.[31] With the expansion and extension of mining, sex ratios must have been altered in some townships in the coalfield because relatively more of the immigrants were men. Figure 8.6a shows that near the beginning of the century very few townships had more males than females and none experienced extremely larger increases of men than women. Only in Haydock was there an excess of males because of mining and few jobs for women. Owing to domestic manufacturing industries such as weaving and watchmaking, even townships with a large number of miners such as Whiston and Parr had more women than men. Since new collieries were rarely large-scale and coal production had not begun to grow suddenly in a new part of the coalfield, as it was over the concealed measures of the Somerset coalfield, the ratios are not surprisingly lower

than in the Somerset coalfield in 1811. (Figure 8.4a)[32]

Nonetheless, sex ratios gradually tipped in favour of males in a larger number of townships on the coalfield as men moved to the areas where coal production rose and the scale of production increased. (Figure 8.6b,c) To the east and north of St Helens the sex ratios of men to women in most townships were nearly as high as those in the townships of the Radstock and Paulton Basins of the Somerset coalfield by 1861. It appears from Table 8.8 that the first increases occurred around St Helens; in Windle, Sutton and Parr, 1821-31, following the opening of some new pits, leaping in both the districts of Hardshaw and Blackbrook East during the decade. These townships had over 105 males for every 100 females by 1831 having had less than 100 in 1801 but in between having experienced the greatest increases in coal production. By 1861 townships to the north and east had followed suit. To change their sex ratios from well under 100 in 1831 to over 105 in 1861, males must have migrated into Ashton, Rainford and Billinge. The sex ratio in Blackbrook North-east rose from 99 to 112.5 between 1831 and 1861 at the same time as quite a few collieries opened.[33] However, domestic industries such as weaving and nail and lock making which once employed a lot of women were not growing, so that the sex ratio fell in townships west of St Helens in which employment at the mines was at a standstill and domestic industries remained important employers. As in Somerset,

quite a number of migrant miners in the expanding portions of the coalfield could have originated from the declining parts since the townships where production was no longer increasing maintained a sex ratio in favour of females.

8.2.3 Ages in the Somerset Coalfield

In common with most areas of England and Wales in the middle of the nineteenth century, all the parishes of the Somerset coalfield had progressive age structures. (Table 8.9)[34] Few of the coalfield's parishes had unusually more old or young people to the same extent as mid-twentieth century rural areas and new towns, respectively. But few townships had populations that typified the frontier mining community.[35] Not all the people in Clandown or Shoscombe, which were both relatively new communities, were young. However, like Monkwearmouth, County Durham, and Coalville, Leicestershire, for instance, they had few old people.[36]

There are identifiable differences in age structure. In general, in the districts that had least population growth and declining employment at their pits, relatively more people were aged over fifty and average ages were higher than in the districts where miners had been recruited to the collieries from outside the coalfield and more sons of the miners went down the pit alongside them. (Table 8.9)[37] In districts with large numbers of migrant miners such as Upper and Lower Wellow

and Lower Cam, Tables 8.9 and 8.10 show that there were lower proportions of people aged over fifty, under 15%, and the population had the lowest median ages. The median and upper quartile ages of the people in the growing districts were lower, an upper quartile age of thirty-four in Lower Wellow against nearly forty-two in Nettlebridge. (Table 8.10, Figure 8.7b) Parishes in Nettlebridge that were the sources of migrants and were paying out most on poor relief to their residents had relatively more old people than parishes in the vicinity of Radstock. This is best illustrated by an ageing index of the number of those aged over sixty for every thousand aged under fifteen. (Figure 8.7a) The index ranges from only 120-130 in the Radstock area to over 300 in several parishes in Nettlebridge , about 150 in Lower Wellow and Lower Cam to well over 250 in the East and West Mendip districts of the coalfield.

It appears that miners moving from the exhausted and unprofitable collieries left their mark on the size of other age groups as well. Parishes around Radstock chiefly that had been growing throughout the first half of the century had the greatest number of people aged between fifteen and twenty-nine and lower median ages than the rest of the coalfield. (Table 8.9, Figure 8.7b,c) No parishes had a bulge in the age structure that may have indicated that there were young migrants in their twenties, as in St Helens.[38] But, slightly more young people, particularly males in their teens and twenties,

lived in the Radstock Basin than on Mendip because many sons were able to follow their fathers down the pits and some outsiders could still get a job there while coal production was increasing.[39] By 1851 there are indications that young people had begun to leave parishes where collieries had increased production up to the 1830's like they were from the earliest mined areas.

The sex ratios among young people suggest that young men stayed at home or moved into the coalfield where they could get jobs underground. Table 8.11 shows that in 1841 relatively more adult females lived in the earlier worked but declining parts of the coalfield compared with districts in which mining jobs had grown because more sons had left home than daughters in the absence of jobs at the collieries. There was as few as ninety males for every hundred females in Nettlebridge. Only migrant miners could have brought about high sex ratios in the Radstock Basin, over 110 in Lower Wellow, that were higher than those in, for example, the mushroom mining community of Monkwearmouth in County Durham.[40] Figure 8.8a shows the striking contrasts in 1851 among adults with sex ratios well in excess of a hundred in all but the parishes on the exposed measures of the coalfield. In addition, in most of the coalfield outside Nettlebridge, there were more males than females in the age group fifteen to twenty-four, nearly as many men as women over the age of fifty-five as well, and male lodgers outnumbering female lodgers in a ratio of over four to

one. (Table 8.11, Figure 8.8b)[41] The imbalances of the sexes were greatest in the two eastern districts to which most miners had migrated and more native children found work at the pits.

As a result of migration, relatively few unmarried women lived in the areas where there was a large number of single males, and this may have led to an increased number of births.[42] Having a lot more women than men, and boys leaving home before girls, relatively more spinsters lived in Nettlebridge than the rest of the coalfield. (Table 8.12) A lot of young men and few unmarried women could have raised rates of natural increase in the Radstock Basin above those in Nettlebridge.

8.3 Concluding Remarks

Age and sex ratios in the study areas are indicators that single young men were migrants to the areas of the coalfield where and when employment at the coalworks was growing and a shortage of labour existed. They were probably coming from other parts of the coalfield, drawn by rising coal production from the exhausted and unprofitable areas, and almost certainly from outside the coalfield in larger numbers in the short periods when coal production was more buoyant. Young girls were probably emigrating from the Somerset coalfield although they may have been returning to get married or moving from the poverty-stricken areas where there were more

women than men of marriageable age. Men outnumbered women, especially when new collieries opened. Sex ratios were raised as mining and population grew. Women stayed at home only where they could get jobs but, by and large, moved out in greater numbers than young men. Boys only stayed at home because they had better chances of getting jobs and keeping them. No surfeit of unmarried women lived in parts of either study area that had relatively more young men, while the reverse held true in areas from which young men had deserted.

It is now clearer how changes in the mining industry were able to affect the character of migration in the study areas. Large-scale collieries starting production and higher rates of growth in newly mined areas in both of them brought brief but intense shortages of labour. These could only be quenched by migrants. Larger pits and mining areas with larger numbers of relatively big collieries could also provide miners with secure jobs for thirty to fifty years, better wages and jobs for their sons where they worked and held some influence. These changes must have meant that family men may have had less need to move so frequently, but that once collieries became stable employers and production was no longer growing, younger men and boys had to move to obtain a job hewing coal. Young miners had to move to avoid bottlenecks preventing promotion and also to get started on the bottom rung of the ladder. These changes also meant that daughters, in spite of having

more domestic work to do, had to move because there were hardly any jobs for them in the vicinity of the enlarged collieries.[43]

However, it is not crystal clear from the evidence in this Chapter exactly how migration was important to natural increase. It is not possible to distinguish by what mechanisms migration was able to spark off rapid sustained population growth. I have touched upon three ways in which natural increase could have been affected. These are firstly that a rise in the crude rate of fertility was brought about by the age of the population because there were more young married men and women in the coalfields. Secondly, higher age specific fertility was brought about by a lack of unmarried women in the population because there were possibly more women in the younger age groups who were married. Lastly, an increase in age specific marital fertility could have occurred because women were married for a longer time. More women married at a younger age when there was a dearth of young women. To examine these, some measures of marriage and fertility in the two coalfields can be garnered from the CEBs. This is carried out in Chapter 9.

CHAPTER NOTES

1 P E H Hair The social history of British coal miners 1800-1845 DPhil Oxford (1955) 75; D Friedlander Demographic patterns and socio-economic characteristics of the coal mining population in England and Wales in the nineteenth century Economic Development and Cultural Change 22 (1973) 44

2 Hair (1955) 88; J Benson British coal miners in the nineteenth century (1980) 123; A R Griffin The British coal mining industry:Retrospect and prospect (1977) 163. Others are reported in P E Razzell and R W Wainwright ed The Victorian working class. Selections from letters to the 'Morning Chronicle' (1973) 27-29

3 M Walsh The American frontier revisited (1981) 60,63; M Chapman New towns in New Zealand New Zealand Geographer 22 (1966) 43; M W Flinn ed Scottish population history from the seventeenth century to the 1930's (1977) 316; M Barke Census enumeration books and the local historian Local Historian 10 (1973) 261. It was still much the same in 1951, J I Clarke Rural and urban sex ratios in England and Wales Tijdschrift ESG 51 (1960) 302

4 M R Haines Fertility and occupation (1979) 27-28,47, reiterating what was suggested by E A Wrigley Industrial growth and population change, 148 and Hair (1955) 87. A similar process is thought to have occurred in new lumbering areas, A Norberg and S Akerman ed Migration and the building of families Studia Historia Upsaliensis 47 (1973) 89

5 W Foley A child in the forest (1977); also S Chaplin Durham mining villages in M Bulmer ed Mining and social change (1978) 77

6 R Lawton An age of great cities Town Planning Review 43 (1972) 218

7 R Woods Population analysis in geography (1979) 25, quoting P Tillott; H S Shyrock and J S Siegel The methods and materials of demography (1976) 108

8 These can conceal age heaping, Woods (1979) 31. The age ratio scores for males and females under 65 in the Somerset coalfield are only 5.35 and 10.25 respectively. These may be distorted by migration. Problems of age heaping are best overcome by overlapping ten year age groups when comparing age groups, eg. 25-34, 30-39, etc. Lees used five year age groups with the heaped age in the middle, eg. 17-22, 23-26, etc, L H Lees Exiles of Erin (1979)

9 According to Shyrock and Siegel (1976) these were:-

	per 1000 persons		
Age group	Progressive	Stationary	Regressive
0-14	400	265	200
15-49	500	505	500
over 50	100	230	300

10 per 1000 persons

Age group	Somerset coalfield	Somerset	England & Wales
0-14	403	356	352
15-49	446	474	506
over 50	150	170	142

There is a significant difference between age structure (five year age groups) of the coalfield's and Somerset's population (χ^2 = 258)

11 R Lawton The population of Liverpool in the mid-nineteenth century in A R H Baker et al ed. Geographical interpretations of historical sources (1970) 402; A M Williams Migration and residential patterns in mid-nineteenth century Cardiff Cambria 6 (1979) 13; J D Porteous The company town of Goole:An essay in urban genesis University of Hull Occasional Papers in Geography No. 12 (1969) 24. These should be compared with rural areas; J Saville Rural depopulation in England and Wales 1851-1951 (1957) 73-82; M C Storrie The census of Scotland as a source in the historical geography of Islay Scottish Geographical Magazine 78 (1962) 164-165; R Gurney Population change and population structure 1801-61 in the Peak District of Derbyshire PhD Liverpool (1970) 334; and W M Brayshay The demography of three West Cornwall mining communities, 1851-1871:A society in decline PhD Exeter (1977) 167

12 Haines (1979) 156-158; J H Morris and L J Williams The South Wales coal industry (1958) 237; W T R Pryce Migration and the evolution of culture areas Transactions, Institute of British Geographers 65 (1975) 84; and also, D J Rowe Population of nineteenth century Tyneside in N McCord ed Essays in Tyneside labour history (1977) 22, M J Wise Some notes on the growth of population in the Cannock Chase coalfield Geography 36 (1951) 240, Wrigley (1961) 146-147

13 As it was in agricultural areas too, D Bryant Demographic trends in South Devon in the mid-nineteenth century in K J Gregory and W L D Ravenhill ed Exeter Essays in Geography (1971) 131-132

14 H Williams Some comparative notes on the social structure of the Nottinghamshire coalfield, 1860-1920 Bulletin of Local History in the East Midlands Region 14 (1979) 23; J T Jackson Housing and social structure in mid-Victorian Wigan and St Helens PhD Liverpool (1977) 175. There were also more women in the textile and mining areas of the Nord in France, Wrigley (1961) 146

15 This occurred in Durham too, Rowe (1977) 22. As the rate of increase in males was so much greater than females, more of the men may have been recruited from outside the coalfield than suspected in Chapter 6 from just looking at the bare totals

16 The decline of handknitting principally affected women in Nettlebridge. As is clear from Chapter 5 there had long been a paucity of jobs for women in the rest of the coalfield, H Coombs and A N Bax ed J Skinner Journal of a Somerset Rector (1930) 231

17 Whereas similar ratios in other coalfields had arisen because of immigration; Wise (1951) 243, Haines (1979) 158, Morris and Williams (1958) 237

18 Although some of these ratios are possibly distorted by sex specific misreporting of ages and should be treated with caution

19 This is clear from maps in M Ebury and B Preston Domestic service in late Victorian and Edwardian Britain, 1871-1914 Reading Geographical Papers No.42 (1976) 82-83 although they wrongly describe Radstock and Midsomer Norton as among the "agricultural towns and villages in the surrounding countryside", idem 79. Men still living in the coalfield could have courted girls working in Bath and Bristol, if some of Skinner's tales are to be believed. On Saturdays young men from Camerton often went into Bath, H Coombs and P Coombs ed J Skinner Journal of a Somerset Rector (1971) 89

20 Haines (1979) 46-47, M Anderson Marriage patterns in Victorian Britain:an analysis based on Registration District data for England and Wales, 1861 Journal of Family History 1 (1976) 57

21 As it rose above 100 in County Durham as a whole between 1841 and 1851 for the first time, Rowe (1977) 22

22 It was much the same in other places growing very quickly that had a lot of recent migrants; Lees (1979) 48; B Turton Crewe new town in 1851 North Staffordshire Journal of Field Studies 16 (1976) 69

23 Dundee, for example, which has been studied by Brenda Collins. A paper based on this research has appeared in L A Clarkson and L Goldstrom ed Essays in honour of K H Connell (1981). In Cardiff, by contrast, most of the lodgers were males, Williams (1979) 13

24 As the mining parishes did in North-east Wales, Pryce (1975) 84; and the Peak District, Gurney (1970) 336

25 Indeed, all the coal mining areas in Somerset and Gloucestershire stand out, J F Davis The Forest of Dean and Bristol-Somerset coalfields:a comparative study in industrial geography during the nineteenth and twentieth centuries PhD London (1959) 199-200

26 The sex ratios were as low as 66 males per 100 females in Stratton, 1811; 76 in Holcombe, 1801; 78 in Coleford, 1811; and 84 in Ashwick, 1821

27 It occurred most of all where coal production was growing most rapidly, as was also found by S J Swales The growth and origins of the Cleveland ironstone mining population in the nineteenth century BA Diss. Liverpool (1979) 16; Wise (1951) 241, Pryce (1975) 84

28 The new collieries were Clandown and Welton Hill

29 Problems at Greyfield, Farrington Gurney and Middle Pit respectively

30 Because men in good jobs could get married and attract spouses to the places where they had obtained work, a large surplus of males was often short lived in similar communities, Norberg and Akerman (1973) 114 and Walsh (1981) 63

31 Jackson (1977) 46 drew the distinction between mining and textile manufacturing areas in Lancashire

32 Under these circumstances new labour demands should be met by families moving from exhausted and unprofitable collieries so that there was no upsurge in the number of males, I Leister The seal coal mine and the Durham miner University of Durham Geography Department Occasional Publication (New Series) No.5 (1975) 60

33 These were the collieries that opened at the northern end of Rainford and Ashton between about 1845 and 1860. In Newton, the sex ratio may have changed because of new chemical and engineering works rather than the growth of Haydock Colliery

34 As Gurney found in the Peak District, this was in spite of emigration, Gurney (1970) 334

35 Walsh (1981) 63. Communities such as Monkwearmouth and Coalville with their extremely youthful populations were not common, P Spaven Main gates of protest:Contrasts in rank and file activity among the South Yorkshire miners 1858-1894 in R Harrison ed Independent Collier (1978) 204. For Monkwearmouth see G Patterson ed Monkwearmouth Colliery 1851 Centre of Extra Mural Studies Publication, University of Durham (1978) 26-27, and for Coalville see S A Royle The development of Coalville, Leicestershire in the nineteenth century East Midland Geography 7 (1978) 37

36 Patterson ed (1978) 26-27; Royle (1978) 37

37 These distinctions have been noted in Durham, Patterson ed (1978) 28; the Peak District, Gurney (1970) 166,334; Brighouse, Yorkshire, M Barke The population of Brighouse, West Yorkshire 1851 Yorkshire Archaeological Journal 48 (1976) 145; Liverpool, Lawton (1970) 402-404; as well as in Somerset and South Lancashire by S Jackson Some aspects of coal mining in North Somerset, 1750-1900 BA Diss. Liverpool (1974) 35, and Jackson (1977) 30 respectively.

38 The bulge was very pronounced in rapidly growing towns, such as Liverpool and Cardiff; Lawton (1970) 403, Williams (1979) 13

39 The possible connection with succession was mooted by Barke (1976) 145, Gurney (1970) 338, and G J Lewis Mobility, locality and demographic change:the case of North Cardiganshire, 1851-1871 Welsh Historical Review 9 (1979) 351

40 Patterson ed (1978) 26. Men outnumbered women most of all between the ages of 15 and 24, idem 28

41 A surplus of males in Upper Cam, which was a declining part of the coalfield like Nettlebridge by the middle of the century, may have been maintained because there were no jobs for girls even though relatively fewer miners' sons could get jobs than

around Radstock. Barke attributed the surplus of men in Clifton, Brighouse, to a similar cause, Barke (1976) 145

42 Few spinsters probably moved voluntarily into the growing parishes, so that more women of marriageable age in them were married while spinsters stayed in their native parishes 'on the shelf', Norberg and Akerman (1973) 106

43 Friedlander (1973) 44; Hair (1955) 88

CHAPTER 9

MARRIAGE AND CHILDBEARING

Since marriage was the principal means of controlling the number of children being born to fecund women, age specific fertility and gross reproduction rates would rise if the average length of marriage was increasing.[1] According to Anderson, the frequency of marriage by women before the age of thirty-five and the extent they remained unmarried were closely related to rates of population growth.[2] Since miners' wives are popularly believed to have married at younger ages than other women, had "a child in the course of the honeymoon", and had more surviving children than other women in the nineteenth century, their ages of marriage may have contributed to the high rates of natural increase found in the study areas.[3]

There are good reasons why this may have occurred and these are set out in Figure 9.1. First of all, migration could have set off high rates of natural increase. Young girls left home before men in the study areas because they could not get paid work in their teens and twenties as easily as men of the same age while young men were the main immigrants. The result was a dearth of women for eligible men. More women tended to marry and womens' mean ages of marriage were often lower than

average where the number of women did not match the number of men.[4] However, it could have come about because of rational decisions by young women in mining areas to marry earlier than was usual, by young men to marry a bride who was considerably younger, and by young couples to have children and not practise birth control.[5] A few studies suggest that the semi-skilled and unskilled whose work was changing were getting married earlier and having more children in the nineteenth century than before.[6] It is commonly said that miners in the late nineteenth and early twentieth centuries had a propensity to marry and have more children owing to "habits not conducive to chastity" that prevailed in coalfields associated with the abundance of jobs for men, the open ablutions and the relatively high earnings for young men.[7] More realistically, as concluded in Chapter 5, the miners' work and family economies may have made it imperative for them to raise more children than other workers and also permitted them to do so. It appears from the experiences of Somerset and St Helens that jobs for women were falling while work for children was increasing with the extension of deep, large-scale mining, which ousted domestic industries and work for women down the pits. At the same time, children possibly had the chance to graduate more quickly to better paid jobs than before because of the industry's growth, while the greater division of labour underground forced hewers to retire to less well paid jobs at the pits.[8] Nevertheless,

irrespective of structural changes in the industry, changes in the economic structure of coalfields during this period would have caused more women to be married to miners.[9]

American historians have resorted to measures of age at marriage and fertility from census data very similar to that in the CEBs.[10] Child-woman ratios (CWRs) and singulate mean ages at marriage (SMAMs) are fairly standard parameters of marriage and fertility that can be derived from the shape of the ages and sexes of the population.[11] CWRs have been widely used to make comparisons of effective fertility between populations, i.e. fertility after the children who do not survive infancy are excluded. But all these measures are only substitutes for more direct measures of fertility and nuptiality which require vital statistics for their calculation, and they may not be adequate substitutes. To use the CWR as a comparable measure of fertility disregards the effect of differential child and infant mortality. Other problems in using these surrogates should not be glossed over. It has already been mentioned that the age and sex and marital condition of the population in the census may not be very accurate. These were all mis-reported by individuals at the census and they could affect SMAMs.[12] Infants (aged less than one year) were probably the age group most commonly underenumerated by the census and this would affect the reliability of the CWR.[13] In addition, migration can distort the shape of the age structure in small populations and, in turn, the SMAM.[14] Again, in

small populations there is a greater chance that the range of variation in the sex ratios, size and marital condition of age groups will be greater, thus concealing the effect of non-random factors.

By these methods, other studies have found that women often married earlier and more frequently in areas that had migrants, a sex ratio that was in favour of males, and an economy that encouraged young people to marry. Although local studies lead to the conclusion that there is no simple correlation between employment at pits, workshops and factories and early ages of marriage and a progressively lower age of marriage, studies using registration and parish register data have found that women who married earlier were able to have more children, and wives of employees in labouring, wage earning jobs such as coal mining tended to have more children.[15] There were often higher rates of marital fertility in areas with industries such as coal mining and domestic manufacturing.[16] Haines has reported that the wives of miners usually had more children than the wives of most other labourers, including factory workers.[17]

The two study areas had age structures and sex ratios owing to migration that should have produced relatively high rates of natural increase, even given moderate rates of marital fertility. But a high rate of childbearing might have been expected also, because a high proportion of women were married and, in addition, women

married at lower than average ages as a result of male migrants in both districts, but especially in St Helens, and not much regularly paid work for women, especially in Somerset.[18] A high rate of marital fertility might also be expected as well because these areas had labourers who could afford to marry younger brides but whose work and earnings made it essential for their wives to have children.[19] Moreover, age specific marital fertility could have risen above levels in agricultural areas and even other industrial areas because it made economic sense for women to marry and for men and their wives to bring up more children than an earlier generation as a result of changes to working conditions.

9.1 Marriage in the Study Areas

9.1.1 Independence and Setting Up a Home

As a result of work in the study areas, most children grew up without leaving their family and stayed at home until they were married. In Figure 9.2 age differences in household status indicate the transition between leaving home, getting married and having a family. For most individuals these occurred over a short time in their teens and twenties, and leaving home usually coincided with marriage. Over half of both sexes aged twenty to twenty-four were living with one or both of their parents. But in both study areas it appears that more women than men went away from home before they married.[21] This was not surprising since most jobs were for boys, girls often had

to leave home to become domestic servants, and sons of miners were obviously encouraged to stay at home when there was work for them in their father's occupation.[22]

Marriage may have been brought forward rather than postponed because young males who stayed at home were free to marry and young females found marriage as an attractive alternative means of leaving home. By their late twenties, well over half the men and women in both areas were heads or the wives of heads in their own homes. Very few males in their thirties in either area were not married and living independently of their parents, even though single men in their twenties greatly outnumbered single women of the same age. Of the migrants, most of the men who had left home were lodgers, rather than servants or apprentices, and not shackled by obligations to any master.[23]

Couples do not appear to have deferred marriage because of a shortage of homes. In the growing parts of both coalfields, such as St Helens itself and Radstock, there were fewer vacant dwellings than in the declining parishes.[24] In St Helens, and even Camerton, couples frequently overcame this by sharing with relatives, although this was usually only a temporary expedient.[25] In the main, they set up their own home immediately after being wed, and soon started a family. This was expected of couples because family homes were generally small, cramped and overcrowded already, especially if there were still

other children who were not yet married.

9.1.2 Getting Married

As was typical for coal mining areas without domestic manufacturing industries, men and women were generally marrying at earlier than usual ages in the two study areas. In each five-year age group over fifteen (Table 9.1) more men and women were married than in England and Wales as a whole in 1851. In common with areas with larger numbers of people employed in manufacturing and mining and an abundance of males, over 70% of females in the study areas were married at the ages of twenty-five to twenty-nine.[26] Figure 9.3 shows that more females were married at this age and fewer middle-aged women were spinsters in St Helens than in Somerset. But the proportions in the study areas contrast sharply with the numbers married at the same ages in areas with an excess of females, such as the county of Somerset where only just over half of the females were married between the ages of twenty-five and twenty-nine, and textile manufacturing towns.[27] Indeed, considerably more males than females were actually married by the time they were thirty in Somerset as a whole, and possibly 20% remained unmarried, whereas in the study areas under 10% of the women in their late thirties were spinsters. (Figure 9.4a,b) However, there is no evidence in Figure 9.4 that there was an abnormal degree of precocity by either sex, even though it was often alleged to be common in mining areas.

Boys were considered to be independent of parental control because they earned good wages from a relatively early age, and this naturally led to dissipation and imprudent marriages.[28] According to a Poor Law Commissioner, "miners assumed the most important office of manhood at the earliest ages at which nature and passion prompted".[29] Early maturity and independence, even a "fondness for young brides" and "roaring fires" have been put forward as explanations of marriage and fertility.[30] They contain a grain of truth. Ages of marriage in coalfields may reflect the housing and benefit system under which homes and free coal were given to married men, relatively good wages and prospects for men, and the 'low opportunity cost' for women in mining areas who had few chances to get paid work.[31] Haines found that females had low SMAMs in the Registration Districts of Durham and Easington.[32]

Measures of the distribution of ages at marriage in Table 9.2 show earlier ages at marriage and a higher frequency of marriage before the age of thirty, particularly by women, when the measures for Somerset and St Helens are compared with other areas. Over a quarter of females were married by about the age of twenty, considerably more than in England and Wales as a whole. In common with industrial areas throughout Western Europe, females' SMAMs were under twenty-five.[33] But the SMAMs of females were by no means as low as those that Haines found in a mining area of Pennsylvania where there were

large numbers of immigrants from South and East Europe.[34] Moreover, only women were marrying much earlier than was usual. Half of the men were married in the study areas about a year and a half earlier than the average, whereas women were married between two and three years before. Under 20% of wives were older than their husbands. Certainly, the standard index of the proportions of women married devised by Coale (I_m) was very high in both areas.[35] According to the standard marriage schedule, about 25% of females were probably married before they were twenty-one, so that some would have been getting married at about the age of eighteen, which was exceptionally early. In 1900 virtually the only areas with values of I_m above .55 were east of the Leningrad-Trieste divide.[36] A value over .6 was rare in Western Europe, although it often topped .5 in industrial areas of Britain, France and Belgium.[37]

In spite of the support for the popular belief that men were able to marry younger girls in the study areas because their own earnings gave them the wherewithal and women's earnings declined, there are obviously connections with migration and leaving home. In St Helens, the gap between the ages of marriage by women and men could have been exaggerated more than in Somerset because more men were immigrants.[38] Since many of the migrants were single males, they may have had to delay getting married while the chances for females were vastly improved.

9.1.3 Occupational Differences in Getting Married

Set against these patterns, ages at marriage for miners and their wives were distinctly different from men in other industries and their wives, pointing to the importance of work as a determinant of the age at marriage. Figure 9.5 shows that miners were probably marrying a little earlier than other workers in the Somerset coalfield. It appears from Table 9.3 that 25% of the miners were married by the age of about twenty-two, two years earlier than non-miners in Somerset. In addition, miners had a lower SMAM, nearly two years lower than the SMAM for all men in England and Wales. (Table 9.2). Fewer miners seem to have been unmarried than non-miners, at least by the age of thirty.[39] Significantly, workers generally supposed to have often delayed getting married because of poor wages and more obstacles than miners in the way of getting married, more frequently married after the age of thirty. Non-miners in Somerset, many of whom were traditional handicraft workers, did not marry as early as non-miners in St Helens. But as more single men were immigrants in St Helens, more of the men over thirty were unmarried than in Somerset.

What is more significant (because the ages at marriage of men would not have affected natural increase very much) is that more of the wives of miners married at earlier ages than other wives.[40] If most women were marrying when their first child was already on the way "after the Camerton fashion", as the Revd. Skinner put it, an estimate of age at marriage based on the age of mothers

under the age of forty and their eldest child may be an accurate measure of their age of marriage.[41] Table 9.4 shows that more miners' wives probably gave birth to their first baby by the age of twenty than the wives of glass-workers and other manufacturing workers, labourers and building craftsmen, and half of the miners' wives in both areas had their first child at an earlier age than all other women. Hardly 15% of the wives of miners had their first child after the age of twenty-seven.[42]

9.1.4 Ages at Marriage in the Somerset Coalfield

Not unexpectedly, in parts of the Somerset coalfield where there were more males than females, fewer females remained unmarried and more women had married at younger ages. (Figure 9.6a-c) Table 9.5 shows that under 20% of the women aged twenty-five to thirty-four were unmarried in the Radstock and Paulton Basins, but especially in the parishes east of the exposed coal measures. Parishes with larger numbers of males than females stand out. Relatively more married before they were twenty-five in these districts than in Nettlebridge, too. More women in their twenties and thirties were not yet married than in the parishes around Radstock. Whereas over 25% of the females aged twenty-five to thirty-four in Stratton and Holcombe were not married, fewer than 10% were unmarried in Clandown, Dunkerton and Radstock. By contrast, in most of the parishes in Nettlebridge, over 10% of older women were spinsters. Figure 9.6c illustrates that more than twice

as many women over forty-five were unmarried in Nettlebridge as in the rest of the coalfield.

It is difficult to disentangle the independent effect which work may have had on these ages. Earliest ages at marriage of women and their greater frequency of marriage before the age of forty-five also coincided in the main with the parts of the coalfield in which the collieries were larger and better equipped, and employment for men was steadier and growing. But women may have been encouraged to marry in the areas where production was growing because their husbands were prepared to take a wife, establish a home and start a family.[43] Nevertheless, women in St Helens who had more chances of finding a job were marrying earlier than in Somerset.

Work does not appear to have produced differences in the age at marriage of men in the Somerset coalfield to the same extent as it did womens'. Marriage may have been deferred by men who had the poorest job prospects. Compared with the Radstock area, more men in Nettlebridge were unmarried in their late twenties and thirties. (Table 9.5) But it seems more clearly from Table 9.5 that no more men were unmarried in Nettlebridge after the age of thirty-five than in growing areas except Lower Cam. If anything, miners may have had to delay getting married in the growing parts of the coalfield, such as Radstock, because of a lack of potential spouses. (Table 9.6) Not as many miners could find a bride where women were not

plentiful, so that more miners in the Radstock Basin married at slightly later ages than in other parts of the coalfield. In Nettlebridge they managed to marry at a lower than average age, implying that the state of work at the collieries had little discernible effect if an abundance of females allowed more of the miners in Nettlebridge to marry when they wished, whereas in areas to which miners had emigrated they had to wait a little longer.

The occupation of their husbands appears to have been of more significance than the relative number of women to the ages at which miners' wives married. Few differences existed in the ages they gave birth to their first child. (Table 9.7) More of the miners' wives had their first child by the time they were twenty in Lower Wellow and Lower Cam than in other parts of the coalfield; but, miners' wives in Nettlebridge had not married at a considerably later age than other miners' wives in the rest of the coalfield, even though there was obviously no pressure to marry young women since there was no shortage of them.

9.2 Childbearing in the Study Areas

With a consistent tendency towards early and more universal marriage as mining grew, it is likely that fertility would be higher than expected in both mining areas, and would be higher in the areas where the coal mining industry had grown.

9.2.1 Child-Woman Ratios

By the standards of the mid-nineteenth century CWRs in both study areas were high, and age specific CWRs for married women were also high. (Table 9.8) The ratios of women aged fifteen to forty-nine to children from 0 to four matched and exceeded ratios found in several other industrial and mining areas in England and Wales and abroad.[44] For married women the ratios were well above those found in towns with textile manufacturing and handicraft industries where there were later ages at marriage.[45] Married women in the mining areas of County Durham and Pennsylvania had similar numbers of children aged under five.

High marital CWRs did not arise entirely because women in the study areas had been married longer during the previous five years. Childbearing was probably not being controlled to any great extent, even though infanticide and birth control were not unknown in Somerset's villages.[46] The shape of the age distribution of childbearing is an indicator of other factors which may have influenced fertility.[47] At all ages married women in the two study areas had more children aged 0 to four than might have been expected. (Table 9.8) Women aged twenty-five to twenty-nine had a particularly large number, which may reflect the fact that more of them were married at twenty-five. But women aged about forty had a ratio of over 1000. These were much higher than the CWRs of textile workers' wives of the same age. A convex shape after the

peak usually signifies similarity to the model fertility schedule which is based on the childbearing of wives who did not control the number of children they had.[48] Such differences as there were between Somerset and St Helens may have arisen from infant mortality, but work and marriage appear to be better explanations.

9.2.2 CWRs of Miners' Wives

The occupations of husbands in the study areas may account for the distinctive CWRs and the differences between them. Table 9.9 shows that many of the wives of labourers had relatively high CWRs, but the wives of miners had more children than most other wives in both areas. They had similar standardised marital CWRs to the miners' wives in the Registration Districts of Durham and Easington, Co. Durham.[49] However, miners' wives appear to have CWRs that were only a little higher than the wives of other labourers and manufacturing workers, such as glassworkers.[50]

Miners' wives could have continued to bear children longer than other women because it made economic sense for them to do so. The wives of miners would have boosted their completed family sizes by not practising birth control. They had a larger number of children after they had reached the age of thirty-five than most other labourers' wives in both areas, and did not begin to slow down their rate of childbearing until their forties. (Table 9.10) Haines found that more of the miners' wives had their last child after the age of forty, and compared to other wives in

Somerset in particular, miners' wives tended to have more of their children after the age of thirty-five in spite of having had the first at earlier ages.[51] (Table 9.11)

However, much of the difference between miners' and non-miners' wives must be attributed to miners' wives' earlier ages of marriage than other wives. Others have remarked that the wives of agricultural labourers and some factory workers must have had similar levels of marital fertility as miners, but their completed family sizes were reduced by their being married for a shorter time.[52] Table 9.10 also shows that miners' wives in their twenties and thirties had very high numbers of children aged 0 to four, far more than the wives of other workers, fewer of whom were probably married throughout the previous five years. Miners' wives had their highest CWRs at the ages of twenty-five to twenty-nine, whereas women married to non-miners usually had their greatest number aged 0 to four at the age of thirty to thirty-four.[53] A small difference between the marital CWRs of the wives of miners in Somerset and St Helens may have resulted from the earlier marriages of miners' wives in the latter.

9.2.3 Childbearing in the Somerset Coalfield

Marriage is not surprisingly also the key to most of the differences in effective fertility within the Somerset coalfield. Figure 9.7a shows that there were invariably larger numbers of children aged 0 to four to women aged fifteen to forty-nine in the parishes that had fewer

spinsters and a greater tendency for their female inhabitants to marry earlier. Typically, in parishes with a surplus of males, such as Radstock, Dunkerton, Clandown and Clutton, there were more children aged 0 to four than in those with a surplus of women of marriageable age, chiefly on Mendip.

However, differences in completed family sizes are not so closely correlated with marriage.[54] In no district did women have considerably larger or smaller numbers of children than in other mining areas.[55] Table 9.12 and Figure 9.7b show that while some of the highest marital CWRs occurred in Nettlebridge, they were lowest in Upper and Middle Cam around Paulton and Welton. Nevertheless, some of the growing mining areas where women tended to marry earlier had relatively higher standardised averages as expected. Wives in Lower Wellow had the highest CWRs, those under thirty-five, in particular, having very high CWRs in Lower Wellow and Lower Cam, comparable to wives in St Helens. A mixed economy of employment in agriculture, handicrafts and mining in Nettlebridge could have encouraged high rates of marital fertility for much the same reasons as a growing mining industry around Radstock, and to a lesser extent around Paulton.[56] Perhaps births were not controlled once the number of jobs for children fell. For, there were plenty of jobs in coal mining close by and supplementary contributions to family incomes remained just as important.[57]

Because it is not easy to associate the variation with the economy in the coalfield, either child mortality or deficiencies in the data could account for the pattern. Marital fertility in some parts of the coalfield where the population was expanding rapidly could have been reduced by infant mortality instead of any conscious birth controls.[58] Nucleated communities such as Paulton, Welton and Clandown had very squalid conditions. They had developed rapidly and most of the people lived in jerry-built rows of cottages that had not been provided by a benevolent coal-owner, as at Radstock and Camerton, for example. They were reputed to have had several visitations from the cholera epidemics that swept the country as well as a greater prevalence of smallpox and TB.[59]

It appears from the marital fertility of miners' wives in Table 9.13 that to a large extent differences mirror ages at marriage (see Table 9.7), and possibly infant mortality also; but not birth control. Miners' wives in Lower Wellow and Nettlebridge had higher CWRs in their late twenties than wives in the other districts. There were smaller average CWRs in Middle Cam, in which miners' wives had married at later ages than in the other districts. In the districts where miners' wives had married earlier, the wives in their thirties and early forties had slightly more children than the others. However, the differences were not great, so that it is arguable whether miners and their wives had more children

after perceiving that there were likely to be more jobs for their children where the industry was still expanding into the 1840's, as it was around Radstock, and where pits were more primitive, as in Nettlebridge, than in the rest of the coalfield; even though not so many jobs were obtained by children in Nettlebridge in the middle of the century as in Radstock.

9.3 Concluding Remarks

The evidence here implies that migration rather than rising rates of marital fertility may have been responsible for high rates of natural increase. Because ages and sexes of people could have yielded relatively high rates of natural increase, migration can account for rapid and sustained population growth in Somerset and St Helens and the differences in marriage and childbearing between them and within the Somerset coalfield. The greater frequency of marriage, earlier ages of marriage for women, and relatively high crude CWRs in each coalfield could have derived from the characteristics of the people who moved because of mining; by men coming into the coalfield, by men moving about the coalfield, and by men and women having to leave.

It seems likely that as the mining industry grew in each area men soon outnumbered women, a larger number of young men had the means to marry, and a lot more men were able to marry and support a family. A shortage of

unmarried women may have been the only obstacle. The age at marriage for men was not much earlier than the norm although more of them eventually got married. But, as one consequence of migration and the growth of mining, women tended to marry earlier and more frequently; higher proportions were married in districts whose population was younger and whose women past the age of thirty were seldom unmarried. A lack of jobs for women, however, should not be discounted as a factor since this may have given many women no alternative but to marry and have children. This implies that women succumbed to marriage to achieve some independence rather than as a result of gaining it. But from whatever cause, by being in wedlock for a longer time than was usual, especially those marrying miners, women in the study areas were having comparatively more children than other women who got married.

There is little evidence to support a commonly held opinion that miners and their wives entered into unusually early and 'imprudent' marriages and subsequently became saddled with large numbers of children.[60] There are good grounds for arguing that because of the organisation and pay of their husband's work it was rational for women to leave home as soon as possible and have children. Their husbands' high earnings at an early stage of their career and the receipt of wages from sons at about the same time as these began to fall could be valid reasons. Haines would agree with this explanation although I have misgivings

about making it a generalisation as these features were not solely associated with miners, nor were they common to all coalfields.[61] Miners' wives never had a significantly greater rate of childbearing than other labourers' wives.[62] In neither area were the miners' families able to supply recruits at the rate of twenty to twenty-five sons a year to the pit for every 125 families, widely quoted from Redford.[63]

There is not sufficient evidence to suggest that marital fertility was increasing because of developments in mining. A rising rate of natural increase and a falling age at marriage could have been achieved by the growth of employment in coal mining; for example, if marital fertility went up because more women were marrying miners and fewer women remained spinsters. More women were married in the growing parts of the coalfield. There is no evidence that it rose because miners' wives were having more children than their mothers. Changes in mining might not have been of the same magnitude as in other industries since the status of miners only altered gradually. Nevertheless, miners' wives would have been consistent with the wives of some other semi-skilled and unskilled labourers if their marital fertility was rising. Along with most agricultural workers, building workers, iron and steel workers, and domestic and factory manufacturing workers, it may have been a rational response to their own incomes; the potential benefits of starting

a family and having supplementary earners at an early age and until old age.

One avenue remains unexplored which may substantiate some of these arguments. A number of studies, as well as the findings in this chapter, indicate that the timing of events such as leaving home, moving away and getting married influenced vital rates; that couples were able to balance the number of children they had with their circumstances before mechanical methods of birth control became widespread, and that marriage was the most common means of regulation.[64] Using the household relationships of individuals in the CEBs it is possible to investigate how they may have been related. In Chapter 10 I will look at the correlation between the characteristics of households and families and working conditions in the two coalfields.

CHAPTER NOTES

1 F F Mendels Notes on the age of maternity, population growth and family structure in the past Journal of Family History 3 (1978) 239

2 M Anderson Marriage patterns in Victorian Britain:an analysis based on registration district data for England and Wales, 1861 Journal of Family History 1 (1976) 58. He was confirming a statement sixty years ago byT H C Stevenson The fertility of various social classes in England and Wales from the middle of the nineteenth century to 1911 Journal of the Royal Statistical Society 83 New Series (1920) 413

3 A Redford Labour migration in England 1800-1850 (1926) 49; H Coombs and A N Bax ed Revd. John Skinner Journal of a Somerset Rector (1930) 248,269; M R Haines Fertility and occupation (1979) 168-171

4 Anderson (1976) 61-62

5 M R Haines (1979) Chapter 2. J Holley The two family economies of industrialisation:factory workers in Victorian Scotland Journal of Family History 6 (1981) 66 and R Burr-Litchfield The family and the mill:cotton mill work, family work patterns and fertility in mid-Victorian Stockport in A S Wohl ed The Victorian family (1978) 181 also explain the marital fertility of wives of other workers in a similar fashion. The approach is summed up by Easterlin in C Tilly ed Historical studies of changing fertility (1978)

6 D Levine Family formation in an age of nascent capitalism (1977) 62; M Yasumoto Industrialisation and demographic change in a Yorkshire parish Local Population Studies 27 (1981) 20-21; D Glass Changes in fertility in England and Wales,1851 to 1931 in L Hogben ed Political arithmetic (1938) 174

7 Redford (1926) 49; J R Leifchild Our coal and our coal pits (1853) 221. D Marshall Industrial England 1776-1851 (1973) 107 made a fantastic statement but one nonetheless that is not out of tune with impressions given by other historians; B Trinder The Industrial Revolution in Shropshire (1973) 332; S Chaplin Durham mining villages in M Bulmer ed Mining and social change (1978) 63. There is a remarkable quotation about miners' communities and habits from a Manchester newspaper in R Challinor The Lancashire and Cheshire miners (1972) 254 "Yet we have in our midst an amount of vice, profligacy and brutality which would astonish a South American Indian".

8 I Leister The sea coal mine and the Durham miner University of Durham Geography Department Occasional Publication No.5 (New Series) 46 imagined that these trends, particularly in the work for children which is discussed in Chapter 4, might have caused a rise in childbearing; A R Griffin The British coal mining

industry:retrospect and prospect (1977) 82; A Campbell and F Reid The independent collier in Scotland in R Harrison ed Independent Collier (1978) 58-61

9 R Lestaeghe The decline of Belgian fertility 1800-1970 (1977) 15-16,92 and D J Loschky and D F Krier Income and family size in three eighteenth century Lancashire parishes:a reconstitution study Journal of Economic History 29 (1969) 446. Jackson suspected that a rise in the completed family size of married women in the parish of Timsbury in the Somerset coalfield in the late eighteenth century coincided with the growth of mining because the population contained more miners, S Jackson Population and change:a study of the spatial variation in population growth in North-east Somerset and West Wiltshire, 1701-1800 PhD Liverpool (1979) 278-280

10 Examples are: T K Hareven and M A Vinovskis Marital fertility, ethnicity and occupation in urban families: an analysis of South Boston and the South End in 1880 Journal of Social History 8 (1975) 69-93; T K Hareven and M A Vinovskis Patterns of childbearing in late nineteenth century America:the determinants of marital fertility in five Massachusetts towns in 1880 in T K Hareven and M A Vinovskis ed Family and population in nineteenth century America (1978) 85-125; L A Tilly The family wage economy of a French textile town:Roubaix, 1872-1906 Journal of Family History 4 (1979) 381-394. These studies have not passed without some criticism because of their "vaunted claims" and "self-obvious statements" R T Vann Review of "Transitions" ed T K Hareven Journal of Social History 14 (1980) 305

11 Child-woman ratios were devised by W H Grabill and L-J Cho Methodology for the measurement of current fertility from population data on young children Demography 1 (1965) 50-73, and the singulate mean age at marriage by J Hajnal Age at marriage and the proportions marrying Population Studies 7 (1953-54) 118. The CWR is discussed in H A Shryock and J S Siegel The methods and materials of demography (1976) 297-312

12 If married women gave lower ages the SMAM would be smaller

13 Shryock and Siegel (1976) 298. Haines (1979) 121,183 has taken steps to overcome this when using American and British census data

14 R Wall The age at leaving home Journal of Family History 3 (1978) 184; Anderson (1976) 57. For example, in urban areas with a large number of migrants the SMAM was often later because many of the migrants were single. Measures from the distribution of ages at marriage would not be distorted.

15 L A Tilly and J W Scott Women, work and family (1978) 93,95

16 M R Haines Fertility, nuptiality and occupation:a study of coal mining populations and regions in England and Wales in the mid-nineteenth century Journal of Inter-

disciplinary History 7 (1977) 258; Glass (1938) 208; D Gaunt Pre-industrial economy and population structure Scandinavian Journal of History 2 (1977) 203-204; Levine (1977) 62; Yasumoto (1981) 20

17 Haines (1979) 168

18 E A Wrigley Industrial growth and population change (1961) 155; P E H Hair The social history of British coal miners 1800 to 1845 D Phil Oxford (1955) 86; D Friedlander Demographic patterns and socio-economic characteristics of the coal mining population in England and Wales in the nineteenth century Economic Development and Cultural Change 22 (1973) 44; Haines argued that the dearth of work for females was probably significant (see, S H Preston and A H Richards The influence of women's work opportunities on marriage rates Demography 12 (1975) 210-211)

19 This is discussed in Chapter 5 and follows Haines (1979) Chapter 2

20 This contrasts with earlier centuries; J Gillis Youth and history:tradition and change in European age relations 1770-present (1974) 55-60; N McKendrick Home demand and economic growth:a new view of the role of women and children in the Industrial Revolution in N McKendrick ed Historical perspectives:Studies in English thought and society in honour of J H Plumb (1974) 184. The length of time might have shrunk because of industrialisation; M Anderson Family structure in nineteenth century Lancashire (1971) 124, A Foner Age stratification and the changing family in J Demos and S S Boocock ed Turning Points (1978) 349

21 Obviously, as a result of work as found by O Saito Who worked when:Lifetime profiles of labour force participation in Cardington and Corfe Castle in the late eighteenth and mid-nineteenth centuries Local Population Studies 22 (1979) 28, L H Lees Exiles of Erin (1979) 148, Wall (1978) 192

22 Family ties were clearly strengthened by succession, Gillis (1974) 56, and as reported in Razzell and Wainwright, these ties were invariably not broken until marriage, P E Razzell and R W Wainwright ed The Victorian working class:Selections from letters to the "Morning Chronicle" (1973) 231

23 L Davidoff The separation of home and work? Landladies and lodgers in nineteenth and twentieth century England in S Burman ed Fit work for women (1979) 68; M B Katz and I E Davey Youth and early industrialisation in a Canadian city in Demos and Boocock ed (1978) 88

24 J T Jackson Housing and social structure in mid-Victorian Wigan and St Helens PhD Liverpool (1977) 81 and information contained in the Census Reports 1801-51, G R Lucas Uninhabited houses in England in the nineteenth century in R W Steel and R Lawton ed Liverpool Essays in Geography (1967) 257-270

25 Skinner (1930) 240, J Benson British coal miners in the nineteenth century (1980) 107. Burr-Litchfield has

stated that about 30% of young married couples in Stockport lived with their parents but it declined once they began to have children, Burr-Litchfield (1978) 189

26 In the areas studied by Haines over 60% of females were married at the ages 25-29, Haines (1979) 191-192. More women were also married in Monkwearmouth, Co. Durham, than in other communities in the county, G Patterson ed Monkwearmouth Colliery 1851 Centre of Extra-Mural Studies University of Durham (1978) 26. By contrast well under 60% were married between the ages of 25 and 34 in agricultural areas as defined by Anderson, Anderson (1976) 65

27 M Hewitt Wives and mothers in Victorian industry (1958) 40, Gaunt (1977) 204, Lees (1979) 260, J M Martin Marriage and economic stress in the Felden of Warwickshire during the eighteenth century Population Studies 31 (1977) 526, W M Brayshay The demography of three West Cornwall mining communities, 1851-1871:a society in decline PhD Exeter (1977) 342-344

28 A good example of this was a registrar's remarks on the population growth of Paulton, BPP 1833 xxxvi 536. Similar comments are made in A Smailes North England (1960) 161; B F Duckham A history of the Scottish coal industry Vol.1 1700-1815 (1970) 280; J Knodel The decline of fertility in Germany (1974) 112-127; P Ariès Histoire des populations françaises et de leurs attitudes devant la vie depuis le 18ème siecle (1948) 202-267

29 Quoted in Haines (1979) 258 from BPP xxxviii 125

30 In a discussion of Stevenson's paper, Stevenson (1920) 433, J Brownlee mentioned roaring fires as a joke; Outhwaite either failed to appreciate this or acknowledge it properly, R B Outhwaite Age at marriage in England from the late seventeenth to the nineteenth century Transactions, Royal Historical Society 5th Series 23 (1973) 69

31 Benson (1980) 23 refers to the free coal and M Daunton Miners' houses:South Wales and the Great Northern coalfield, 1880-1914 International Review of Social History 25 (1980) 173, mentions the value of homes, although they must have only become important as miners' standards of living dropped in the late nineteenth century. Women without jobs were not sacrificing much by getting married, Haines (1979) 47

32 Haines (1979) 191-192. In general, females in mining areas, as defined by Haines, had a SMAM of 23, idem 101

33 Lestaeghe (1977) 97; Haines (1979) 191-192; M Schomerus The family life cycle:a study of factory workers in nineteenth century Wurttemberg in R J Evans and W R Lee ed The German family (1981) 184

34 M R Haines Fertility, marriage and occupation in the Pennsylvania anthracite region 1850-1880 Journal of Family History 2 (1977) 49

35 A J Coale Age patterns of marriage Population Studies 25 (1971) 193. The indices for the standard marriage

schedule were:

	a_o	C	K
Somerset	15.2	.98	.843
St Helens	14.6	.92	.773

36 R I Woods Population analysis in geography (1979) 132

37 Anderson (1976) 65; Lestaeghe (1977) 49; Haines (1977) 259. It was over .7 in some other mining areas, Haines (1979) 47

38 There were parallels in Germany, J Knodel Town and country in nineteenth century Germany:a review of urban -rural differentials in demographic behaviour Social Science History 1 (1977) 362

39 As they were also in 1880 and 1911, Benson (1980) 121

40 The extraordinarily long delay of marriage by men in Ireland in the late nineteenth century did, however, affect marital fertility

41 Skinner (1930) 242,248,257,269. "There was a wedding this morning after the Camerton fashion, I find, as the woman has already produced" (February 23rd 1831). On another occasion the bride was "as round as a barrel" and it was a "rarity for a girl to be married comme il faut". The surrogate measure from the CEBs is only comparable if the wives of all working class men were far gone with child when they married

42 But, as others who have looked at the Registrar General's Survey, 1880, and the Census of Marriage, 1911, the wives of miners were only marrying a little before the wives of men in building trades, general labouring and the iron and steel industry; Haines (1979) 192, Friedlander (1973) 43, Stevenson (1920) 411, Benson (1980) 121

43 According to Wilcox, "as a variable affecting the age of the bride" her occupation "is more important than either her social origin or her choice of husband", P Wilcox Marriage, mobility and domestic service in Victorian Cambridge Local Population Studies 29 (1982) 28. This may have affected miners' wives, H Williams Some comparative notes on the social structure of the Nottinghamshire coalfield 1860-1920 Bulletin, Local History in the East Midland Region 14 (1979) 23-24

44 Brayshay (1977) 143; Tilly and Scott (1978) Table 5.4, 100; Holley (1981) 61

45 L Tilly Occupational structure, women's work and demographic change in two French industrial cities, Anzin and Roubaix 1872-1906 in J Sundin and E Soderlund ed Time, space and man (1979) 121; Tilly and Scott (1978) 95; Haines (1979) 168-171; Burr-Litchfield (1978) 181; Hewitt (1958) 87,94

46 A McLaren Women's work and regulation of family size: the question of abortion in the nineteenth century History Workshop Journal 4 (1977) 70; Skinner (1971) 488

47 J Knodel Family limitation and the fertility transition: evidence from the age patterns of fertility in Europe

and Asia Population Studies 31 (1977) 221

48 Half of the Mormon women, for example, had married by the time they were 20, G Mineau et al Mormon demographic history II:the family life cycle and natural fertility Population Studies 33 (1979) 432-433

49 As a consequence, they were a little higher than miners' wives elsewhere; Merthyr, Haines (1979) 168-171; Anzin, Tilly (1979) 121

50 Haines idem

51 Haines (1977) 46

52 Stevenson (1920) 411; Loschky and Krier (1969) 442

53 As did the miners' wives in Pennsylvania, Haines (1977) 46, but not the wives of textile workers in Roubaix, Tilly (1979) 122, nor the wives of Irishmen in Buffalo, L A Glasco The life cycles and household structure of American ethnic groups: Irish, Germans and native-born Whites in Buffalo, New York, 1855 Journal of Urban History 1 (1975) 357, who married later than miners' wives

54 It is recognisably difficult to explain CWRs at a small scale, P Spagnoli Population history from parish monographs:the problem of local demographic variation Journal of Interdisciplinary History 7 (1977) 427-452

55 See note 49

56 Lestaeghe found that there was high marital fertility in Flanders but a lower propensity for women to marry, Lestaeghe (1977) 97

57 Holley (1981) 97 drew a similar conclusion from a comparison of the marital fertility of the wives of paper and textile factory workers

58 Worse housing conditions in St Helens than Somerset may have reduced the effect of lower ages at marriage on marital fertility, since the CWRs are very similar, Jackson (1977) 29,97; T C Barker and J R Harris A Merseyside town in the Industrial Revolution (1954) 301. Bad housing was common in mining areas; Benson (1980) 124-126, Griffin (1977) 158-159, A Burton The miners (1976) 92

59 Skinner (1930) 296-304

60 Hair (1955) 253 believed that this was a redherring. Anderson has stated that the Victorian middle classes married later than the working classes and had a poor understanding of the working classes, Anderson (1971) 69

61 The characteristics of coalfields varied a great deal. Some had women who worked and some had men who worked in traditional industries. In his paper in the Journal of Interdisciplinary History, Haines only selected Registration Districts with a large number of miners. This left out mining areas that had mixed economies, in which more jobs for women would be expected, and mining areas that had smaller and perhaps declining numbers of miners who lived alongside workers in traditional industries. He also neglected to remark that non-mining Registration Districts had few groups of workers able to exert such an influence on marriage and fertility.

Miners are one of the few occupational groups concentrated at this scale. Williams (1979) has noted that classic features such as low ages of marriage were more obvious in Aberdare than in Nottinghamshire, a mining area in which women could get work

62 See Notes 42 and 49

63 Redford (1926) 49. The rate he mentioned would have required a very abnormal age structure or an abnormally large number of immigrants. In the Somerset coalfield 125 families could have sent 8.75 sons aged 10 about 1851; in St Helens, 9.21 sons

64 Friedlander (1973) 50

CHAPTER 10

FAMILY STRUCTURES

It would be logical to look finally at the family and work after finding some evidence that when people were getting married and having children may have depended on work, especially the work carried out at the collieries.[1] One of the reasons why wives of miners had more children than other wives may have been because their children stayed at home longer between going out to work and getting married. A relationship of this kind between family, fertility and work is borne out in a number of studies where the family and work are closely considered, so that people's child-bearing and marriage are placed in the context of their families and the work they were doing.[2] Hareven has lately stated that "family behaviour", which can be taken to mean how many children people had, when they left home, and when they set up a home with a spouse, can be better understood "in relation to the workplace on which the family's survival and success depend".[3] Other studies of families engaged in particular kinds of work and the effects of their work on family structure have discovered what may also be true about miners and the population changes in mining areas: that the families of labourers and manufacturing workers in both factories and workshops were adjusted by the organisation of their work, their pay and careers, and their working conditions, partly because their work could determine the formation and composition

of their households through marriage and the number of children they had.[4]

This is illustrated in Figure 10.1. If circumstances at work such as the wages and methods of recruitment and promotion were reflected in family sizes and structures, the composition of the family would invariably be influenced by marriage and rates of childbearing as well. General characteristics of work in the Somerset coalfield and St Helens discussed in Chapter 4, such as the relative prosperity of the collieries, the risks of injury underground and the abundance of jobs for boys with good prospects of promotion, yet few jobs for girls, would have affected how large families were.[5] Families should have been relatively big in the coalfields because many children were staying at home until they were married. The ups and downs of the work at collieries for young lads and the fact that many of them worked with close relatives might have discouraged miners' sons from leaving home as long as the pit remained in production or they could earn promotion without having to go far away.[6] If a large number of workers more than balanced a larger number of consumers within a household, the result should be a greater family income.[7] Nevertheless, families could have become relatively big solely because women married at relatively early ages. By being married for a longer time than usual most women would have given birth to more children.[8]

This tendency to marry young brides and have

children for more than twenty years could have occurred because there were benefits to miners' families in rearing sons but persuading daughters to leave home to get married. The economic rationality of miners and their ability to balance the odds should not be underestimated. Having boys at home who were earning could have been a considerable boon to the standard of living of miners' families as it steered them clear of poverty. Without their earnings very few miners might have been able to avoid the difficulties that faced most labourers because of age and infirmity. As was shown in Chapter 5, the first sons started earning when their fathers were still fairly young and their mothers were still having other children, continuing in residence as wage earners for a relatively long time. Sons could compensate their families for the uncertain wages at the pits of all members but particularly their fathers whose prospects dimmed past the age of forty. The earnings of sons were a better guarantee than any other potential supplementary sources of income to a family from lodgers, seasonal work, secondary jobs and, ultimately, poor relief.[9]

Using information from the CEBs to test this is not straightforward.[10] The problems of artificial cohort analysis have already been raised. But the biggest difficulty is trying to unravel the various causes of differences in family structure from each other.[11] Statistical problems add to the confusion; averages are

misleading because of differences in age structure. These can only be smoothed out by standardisation or by comparing families with heads of the same age. Definitions of what constitutes the household and the family have to be made and these are not easily applied to the information about individuals in the CEBs.[12] This is discussed in Appendix A. Even so, it is difficult to disentangle the factors which may be influencing family structure. The size and composition of families could be affected by vital rates since they were dependent on factors such as age at marriage for women and birth control. But family sizes are also by-products of work through migration.[13] By linking age differences in the number of earners to age differences in family sizes and structure, which Lindert and subsequently Hareven have tried out, there is a way of comparing work with bringing up a family.[14]

10.1 Households and Families in the Study Areas

In general, households in the Somerset coalfield and St Helens contained large families that had a relatively large number of sons and older children in them. This commonly distinguished households in newly industrialising areas from households in earlier times.[15] Family structures also reflected work inasmuch as the extent that children of both sexes moved away or stayed at home and the extent that families were augmented was affected by jobs and earnings. Most households were nuclear as sons, and to a lesser extent daughters, stayed at home until they got

married.

Families generally consisted of husband, wife and children only. More households consisted of simple nuclear families in Somerset and St Helens than was usual in the middle of the nineteenth century.[16] (Table 10.1) A relatively large number had children. Not many couples were childless, as few as 7.9% in St Helens, and few people lived alone. Households in St Helens, however, were more like those in other rapidly expanding urban-industrial areas, such as nearby Preston and Bolton, since many more migrants lodged with relatives and strangers than in the Somerset coalfield.[17] St Helens had about the same proportion of households that had kin as these towns, and also over 5% consisted of a nuclear family and a subsidiary one. Complex households were not usually so common, unless people had difficulty obtaining a home.[18] But for a rural area in which apprenticeship was no longer customary, households in Somerset did have quite a lot of boarders.

As to size, more children lived in the study areas' households and families than was usual, even in similar areas with a population that had grown rapidly. (Table 10.2) The number of children had generally become the main difference in household sizes by the nineteenth century, and they distinguish households in Somerset and St Helens.[19] About half the people in their households were children and the average sizes were large.[20] These account for the larger number of families that had more than six people

than was common, and also average numbers that were as big as in other rapidly growing areas.[21] However, a large number of lodgers did distinguish families in urban areas as well, and St Helens was no different.[22]

A few relationships between these features and work are obvious. Families could have been large because of high rates of succession in the two coalfields, more sons being able to earn some money without having to leave home.[23] In addition, many families might have taken in migrants seeking work. Households in St Helens had many more inmates who were not related to the head than Somerset, which was hardly surprising when the number of jobs was growing faster.

Many of these features of family structure must have been a result of coal mining. Miners in both areas more often headed nuclear families than other workers. (Table 10.3) Fewer of their families also just consisted of a husband and wife on their own, while very few miners lived alone. Then, not many households headed by miners, or other labourers either, lacked children or contained servants. But in common with other working-class householders, the miners and other labourers did have a large number of lodgers and relatives living with them. Miners had lodgers, kin and secondary families in their households as frequently as most other wage workers in both areas. Not unexpectedly, men in no occupation in Somerset had as many lodgers or relatives as their counterparts in St Helens, and miners were no exception.

Children mark out the sizes of the families of miners from other workers, although they distinguish them from factory workers and labourers to a lesser extent. (Table 10.4) Miners had relatively greater numbers of children, about three in Somerset and nearly three and a half in St Helens, than all non-miners. These averages were unusually high.[24] Well over half of the people in their households were children. Also, more miners had families with over seven members. Except for general labourers in St Helens, miners had roughly the same number of lodgers and kin as other workers.[25]

These differences are probably not unrelated to the number of workers in each family, as Levine found in his study of Bottesford and Shepshed.[26] As pointed out in Chapter 5, miners had most sons who took up their occupation after them, and also considerably more children from the age of ten into their late teens and early twenties who were working. It is clear from Table 10.4 that miners had more children living with them as a consequence.[27] But some of these characteristics must have arisen from marriage, miners' wives low average age at marriage and their high numbers of surviving children, as much as their children's later ages at leaving home. Since miners' wives had married at a younger age, more of them would have had children after their husbands reached middle age than other women.

10.2 The Life Cycle of Households and Families

10.2.1 All Households in the Study Areas

Age differences in family structure bear out some of the various connections between family and work. Householders possibly had simple family households for most of their lifetime because they had children at home, shortening what Chudacoff and Hareven have described as the "empty-nest stage" in the family's life cycle. (Table 10.5, Figure 10.2)[28] In both areas over half the households contained a nuclear family with children until the head was aged over sixty. Many householders had probably not taken in outsiders because their own children were at home and earning money.[29] However, kin tended to be present more frequently in households that had smaller incomes. More families of older men and women contained relatives, over 20% having an assortment of in-laws, grandchildren and nephews and nieces, and in St Helens as many had secondary families. A rising number of the households with heads of the same age were couples without children.

Some characteristics may reflect differences in local conditions between Somerset and St Helens. For example, more households of older people in St Helens had secondary families, perhaps suggesting that couples had more difficulty getting their own home as soon as they got married.[30] Not so many people managed to live on their own in St Helens either.[31] Instead they must have taken in relatives or went to live with their own children. Young couples had a relatively larger number of old people

than those in their middle-ages.[32] But in both areas higher rates of childbearing as well as the ages that children left home could have deterred extension at both ends of the family's life cycle.

Age differences in the number of members in Table 10.6 suggest that various configurations of the family were a consequence of work in the two coalfields. Lodgers and relatives could have been substitutes for working children because their number only grew as the number of children fell.[33] Among household heads aged over sixty, most of them had no children left at home. Kin and lodgers possibly replaced them since they were most numerous in the households of older people. Relatively few were residing in the households of younger couples; a lot less in those of couples approaching middle-age who generally had more children and some of their offspring out to work.[34] Children were the biggest group in the household until the head was in his mid-sixties. (Figure 10.3) When the head was aged between thirty and fifty-four children were over half of the members of the household in Somerset. The number of children was very large too, rising to just over an average of four in St Helens for heads aged forty to forty-four.

For sons and daughters the crucial decision that affected family size was not whether they went away from home on marriage but whether or not to stay at home between starting work and getting married, and how long

that period was to be.[35] Owing to work, boys and girls must generally have left to get married rather than to take up their first job, which they could have done in their teens. This produced relatively big numbers of children living in the households headed by people aged over fifty and sixty. Nevertheless, families reflect what was early marriage and large numbers of surviving children by nineteenth century standards in both areas. Large numbers of children were also present in the families of younger householders and the number contined to rise until the head was aged about forty-five, confirming the evidence in the last chapter that women in the two mining areas were having more children and also giving birth to them for a longer time, and possibly making conscious decisions to marry early and have children instead of practising birth control or delaying marriage.

As a consequence of marriage and childbearing, householders who did not usually have anyone but themselves regularly bringing home any wages had a rising dependency ratio as they reached thirty-five. (Table 10.7) With children growing up and soon going out to work, however, it fell but rose again when most of them had left home. In both areas it began to fall at quite early ages, and remained low for some time, up to and beyond the retirement or death of the main breadwinner. Possibly because more children stayed on at home and older household heads had more relatives living with them, the ratio was smaller in St Helens. A rise in old age was not occurring either.

These age differences may explain how marriage and marital fertility could have been related to working conditions in the two areas.[36] In the prevailing circumstances, householders may have drawn benefits from having children, as Easterlin has often said, because they stayed at home in the coalfield either as independent wage earners paying for their keep and more, if they were boys, or as additional family labour, if they were girls.[37] Most parents must have known that few of them would go off to take up a job or be able to support themselves, whereas they could yield a profit from the age of about twelve when they stopped at home. Moreover, if daughters then got married at relatively early ages, they were not only less of a burden to their parents for so long, but also able to give birth to more children in their own families.

10.2.2 Miners' Households in the Study Areas

The composition of miners' families offers some clues to the reasons for incomes and budgets affecting marriage and marital fertility. Compared with almost any other workers very few miners did not have children and very few had to take in relatives, so that children's earnings were compensating for the household head's falling earnings as he got older. They usually had big families in middle-age and these lasted until they were comparatively old. As pointed out in Chapter 5, they had sons who could generally go down the pit, be promoted during adolescence and have the chance to earn good wages. They could also afford in

their twenties and thirties to bring up a larger brood of children.

Table 10.8 shows that miners' families were predominantly nuclear at all ages, most obviously because they more frequently contained children than non-miners. Compared with other workers they tended to take in slightly fewer relatives when their children were growing up and starting to work. In Somerset, not as many older miners and newly married ones took in kin as handicraft workers and labourers. The widows and children of miners may have stood a better chance of being independent even though married miners were rarely provided with housing as they commonly were later in the century.[38] But, of course, more immigrants had settled in St Helens and, not surprisingly, more miners had single relatives or another family living under their roof with their own.

Larger numbers of children were by far the most distinctive difference between the families of miners and other men's, larger numbers characterising the households of workers whose children worked for them or with them. (Table 10.8)[39] Between the ages of thirty and fifty-four well under 10% of miners were childless, far fewer than all but factory workers in St Helens, so that fewer nuclear families headed by miners consisted of just married couples on their own. At the ages when children were most likely to be leaving home fewer miners in both areas were left without any at home than labourers and handicraft workers

whose children were less likely to get work unless they moved. Among heads aged fifty to fifty-four only about 10% of the miners in Somerset were childless, whereas about a third of the agricultural labourers had none. Their presence may have delayed the rise in extension until miners were in their late fifties and sixties. Other men in their forties and fifties had more outsiders and fewer children.[40]

Altogether more children and a greater number of older children lived in the families of miners over the age of forty than in non miners'. These account for most of the differences in size. (Table 10.9)[41] Miners headed larger families and households than men in other occupations at nearly all ages in both areas. The difference was particularly great between the ages of forty and fifty-four, reaching its largest size at about forty-five. While miners aged about forty-five had larger families than those aged forty, some workers such as agricultural labourers had already begun to have smaller families by the time they were aged forty-five.[42]

Children were obviously not leaving miners' homes so early or so frequently as from agricultural labourers', manufacturing workers' (traditional and modern) and building craftsmen's. At the age of fifty to fifty-four, for instance, miners had larger numbers of offspring present than other workers. In Somerset 21% of the miners had more than six children against only 2% of agricultural

labourers and 10% of craft workers. (Table 10.10) More miners also had children who were aged over twenty living with them than other householders.[43] In St Helens nearly half the miners aged forty-five to forty-nine did against about 30% of the men in manufacturing work of some kind and only a fifth of the labourers.

Sons of miners must have been present in greater numbers than other workers' sons because they found work at the coalworks through their fathers. Figure 10.4 shows that miners' daughters, as well as sons, stayed at home longer than other workers' offspring. However, not surprisingly the greater length of time between miners' sons starting work and leaving home produced the main difference between the sizes of the families of miners and other workers aged from thirty to fifty-nine. Some daughters may have remained at home to do an increased amount of domestic work because their brothers worked at the pits.[44]

Because there was more work for girls in the area and fewer miners' sons probably had to go very far to get a job at a pit, more children of miners in St Helens must have stayed at home than in Somerset. The earlier ages at marriage in St Helens do not appear to have had any effect. Differences in the number of boys and girls in their families largely appear between men in their forties and fifties. Miners in St Helens aged forty-five to forty-nine had the biggest families, and not those aged

forty to forty-four as in Somerset.

Nevertheless, the divergence in family size between miners and other workers did not begin at forty when the first children were reaching their teens but when the head was younger. (Table 10.9) By marrying younger women miners should have had larger family sizes when they were in their prime and as they got older. Miners in St Helens, for example, had two children at twenty-five to twenty-nine whereas other workers had about 1.7-1.8. Possibly the gap widened in successive five year age groups, because their younger wives could have more children while they were married.

Other inmates may have only filled the gap left by children in most families. Miners were no exception, for they were only very numerous in the households of miners aged about sixty or over. (Table 10.9) Then they hardly matched the number of children who had left, as they did in the households of older and probably poorer labourers in St Helens, for instance. In the households of miners under fifty outsiders were not a large component (5-10%) and they were more significant members of the households of handicraft workers and labourers. But miners with families may have been more willing to take in lodgers and relatives when they had a lot of children and no other wage earner but themselves.[45]

As a consequence, between the ages of twenty and

thirty-four miners in both areas generally had a higher dependency ratio (DR) than other workers. (Table 10.11) At the ages of thirty to thirty-four both sets of miners had a ratio of consumers to workers of over four, which was in excess of most other men's. But miners aged thirty-five to fifty-four had considerably lower DRs.[46] These were maintained into old age. Was this the objective of having more children? It would not be odd for the marital fertility of miners' wives to be related to their husbands' careers and incomes in this way.[47] Households depended a great deal on the earnings of their children, so that ultimately having a larger family must have potentially reduced the risks to them of old age, increasing physical infirmity and illness. They may have achieved security by getting a lower DR after the age of forty than other men in return for supporting more dependants in the first few years of marriage.[48] When they were young they probably had less fear of falling below the poverty line. As suggested in Chapter 9, while there was little point in women postponing marriage, there was no impediment for miners in their twenties either, since they were capable of earning an adequate income to set up a home. If they had a son before they were twenty-five, they would be sure to have an additional earner before they reached forty; and if their wives also continued to have children once they could place some children at work down the pit, they could expect to benefit from their children's earnings until their sixties.

10.3 Households and Families within the Somerset Coalfield

It would strengthen the argument that marital fertility arose from work if working conditions within the Somerset coalfield affected family sizes and household structure. Any correlation between the growth of large-scale mining and higher marital fertility should be reflected in larger family sizes.[49] On the evidence below only a relationship between family structure and migration appears convincing, supporting the conclusions drawn in Chapter 9, since all the indications are that differences in family size and composition of families reflected economic trends, succession and migration.[50]

10.3.1 All Households

From Figure 10.5 it appears that the larger households of over five persons (mean size) occurred mainly in the parishes around Radstock. Not unexpectedly, families increased in size from about 1821 when coal production along the canal and wagonway grew. The main mining areas had bigger households in 1811 when the coalfield as a whole had an average size no greater than the average for England and Wales. They had grown larger by 1841 and families were bigger in the parishes in the Radstock Basin that had experienced most immigration and the opening of the most successful, new collieries. (Table 10.12)[51] Households were smaller in Nettlebridge, and also by 1861 in the Upper Cam district where jobs in mining were not increasing much. As jobs in the mining industry grew, more immigrants

and young couples may have become lodgers, few widows were left to live alone and more children stayed at home. Mean household sizes (MHSs) increased suddenly in Radstock, 1811-21, for example when the population also grew quickly. They invariably remained relatively bigger in and around Radstock where children possibly had least need to leave home. Families may, of course, have begun to bring up more children.

In general, though, differences in the composition of households in 1851 display only a little sensitivity to marriage and childbearing. In Figure 10.6a, households with people living alone were most common on the fringes of the mining area in the Mendips and Upper Cam, from which people had migrated. As many as 15% of householders in Ashwick and Coleford were solitaries.[52] There were none in Clandown. By way of contrast more families with children lived in the parishes where mining had grown and where there had been greater MHSs after 1821. (Figure 10.6c) In Nettlebridge only around half of the male household heads had children against 70% in the vicinity of Radstock. Table 10.13 shows that about twice as many householders in the Mendip districts were without children as in Lower Wellow and Lower Cam. Most significantly, more men over the age of fifty in Nettlebridge did not have any children, over a third, than in the heart of the coalfield around the largest pits. These parishes had families with more people working, especially more sons.

Migration must also account for most of the variations in extension and in family size. The need to take in kin and lodgers may have increased because of immigration in parishes such as Radstock and Dunkerton, as it did in St Helens. Table 10.13 does show that households in the Radstock area had most outsiders, but possibly a few parishes in Nettlebridge had large numbers of families with relatives as well as solitaries and relicts, because so many sons and daughters had left the area. The number of children, especially sons, are the main differences in size, and not the number of relatives.[53]

Larger families lived in the foremost mining areas and principally where there was also more work for them to do. (Figure 10.7) Families on the concealed parts of the coalfield had nearly as many children as families in St Helens, a mean number of 2.6 in Lower Wellow. (Table 10.13) On the exposed portion, especially in Nettlebridge, families had about two children, which by general standards was not very high. In and around Radstock too there were a greater number of bigger families than in Nettlebridge, as many as 20% having more than seven members.

It is conceivable that these differences may have been brought about by the growth of mining and a rise in marital fertility as well as migration; only, the effect of migration is clearer. It would seem from Table 10.14 that children stayed at home longer in the Radstock Basin than in Nettlebridge, and this included daughters, who did

not usually go out to work, as well as sons who could obtain work at the pits. Differences between family sizes in the coalfield arose mainly about the age of forty which implies that more children continued to live with their parents where more of them could get work. Since differences did not occur to such a great extent among younger households, whatever differences there were in the ages of marriage by wives and how many children they had, could not have affected population growth as much as migration, unless some of the differences in family sizes arose from longer marriages in the better-off parts of the coalfield because the men married younger brides.

As a consequence of the differences in the ages that children left home, high marital fertility did not pay off to the same extent in all parts of the coalfield. Families in the Radstock and Paulton Basins had lower DRs than those on Mendip at most ages. (Table 10.14) In their thirties when they had a lot of children and few workers they had a ratio of under four dependants for every worker. For men in their forties and early fifties the ratio had fallen to a lower level too. It was lowest in Lower Wellow where there was more work at the collieries, under three for men in their forties and under two for men in their fifties and early sixties.

10.3.2 Miners' Households

Much the same can be said about the miners. Most of the differences in their families can be attributed to the

number of children they had who stayed at home and not the number of surviving children borne by their wives. Miners in the areas where coal production was expanding had more children and sons who lived at home and went to work like their fathers down the pits.

Ostensibly miners in Somerset had very similar households from one part of the coalfield to another. (Table 10.15) In all the districts about 80% had children and 90% were nuclear. Around 10% of the families of miners had relatives living with them in all but the Middle Cam district. However, more persons who did not belong to the family lived with the families of miners in the growing parts of the coalfield, although nowhere near as many who lived with the families of miners in St Helens.[54] Bigger families and larger households lived in the Lower Wellow district too. Fewer of the miners (hardly 10%) were childless in parishes such as Radstock and Clandown where there were plenty of jobs than in other parts of the coalfield (18% in Nettlebridge). (Figure 10.8) As Table 10.16 shows, miners' households that had the greatest number of children and non-family members were in parishes with growing numbers of miners, the youngest workforces and the collieries recruiting miners' children. Miners in Radstock had about the biggest families and MHSs, and Lower Wellow had by far the largest MHS (5.8) with more children as well as kin and lodgers than other areas.

Most of the differences clearly arose from the age at which their children left home. In the district of

Lower Wellow only about 5% of the miners in their thirties and forties did not have children. (Table 10.17) In their fifties and early sixties too only about a fifth were childless against over a third in Nettlebridge and the Upper Cam district of the Paulton Basin. It was remarked in Chapter 5 that more sons of miners usually found work at the collieries in the Radstock Basin than in those districts, although young children in Nettlebridge were not entirely deprived of work.

Table 10.18 shows some of the effects of marriage as well as leaving home on age differences in family composition. The numbers of children miners had at twenty-five to thirty-four and thirty to thirty-nine did not vary so much as at later ages, but what differences there were do mirror differences in the CWRs of their wives, noted in Chapter 9; for example, miners in Upper Wellow had smaller families than those in Nettlebridge. If the causes were ages at marriage, since miners' wives in Nettlebridge were younger than in Middle Cam and Upper Wellow when they had their first surviving child, the effects may have been cumulative and only become obvious among older men because their younger wives continued to give birth. But of all the miners, those in Nettlebridge had most children when they were aged between thirty-five and forty-four and not when they were aged forty to forty-nine. No doubt their children must have been leaving home earlier than the children of miners in the rest of the coalfield since in other parts miners aged forty to forty-nine had most children. Miners in Lower Wellow had the largest families,

with 4.9 children at this age. They also, not surprisingly, had considerably larger numbers of children at older ages when, in fact, they had most sons working underground. About 23% aged fifty to fifty-nine had more than five children, and more than 30% aged forty-five to fifty-four had children over the age of twenty; at the same age they had more daughters as well as sons than miners in the other districts, even though it did not appear that more of their girls were working outside the home. (Table 10.18, 10.19)

Even though all the miners raised larger families, the rewards measured by a lower DR at older ages were probably greater in the growing parts of the coalfield where their children stayed at home for a longer time. (comparing Table 10.14 with Table 10.20) Miners in Lower Wellow also had the advantage of a lower DR when they were rearing their children. Table 10.18 shows that they were able to take in relatively more lodgers and relatives than miners in the rest of the coalfield of the same age. Their earnings would have helped out when the head was the only wage earner. Older miners also had a lower DR in the areas where the mines were doing best of all as more children lived at home. By going to work the older children obviously helped their parents to support younger children. Significantly, no more miners over sixty in Lower Wellow took in outsiders than younger men possibly because children were still present in larger numbers, whereas in other districts older miners had far more.

10.4 Concluding Remarks

The careers of miners and the earnings of their sons may be reasons why the households of miners in general were distinctive; why their wives were young when they married, why they were having children for a longer time; why they had more children at home while they were older, and why they did not always take in so many outsiders. On the strength of the DRs, I would agree with some of the conclusions of Hareven, Holley and Tilly that, in general, family incomes may have been considerations that affected marriage and marital fertility largely because children could compensate for falling and uncertain incomes and stave off less palatable adjustments. But I do not detect that local differences in their family incomes as a result of economic changes greatly affected marriage and completed family sizes. Family structures did reflect work but largely because jobs and earnings affected the extent that children of both sexes stayed at home or moved away.

It can only be surmised that the consequences of marrying younger women and not being concerned about birth control were a risk that most miners took. They were not alone.[55] The outcome could not have been foreseen and it may have taken some time for what had become accepted rather than rational behaviour to change.[56] Couples were probably influenced by the potential as much as the actual benefits likely to accrue from having children and these may not have changed. Changes taking place in the mining industry were possibly not producing changes in marital

fertility that were sufficient to alter the course of population change. Otherwise, more discernible differences in fertility (even from these crude surrogate measures) among the wives of Somerset's miners might have reflected the development of mining. Lee has asserted that changes in industry were not usually of the kind to alter families drastically.[57] Miners' wives at other times had relatively high marital fertility and miners had large families when mining was far more primitive.[58] Either the growth of mining was sufficient or all the miners saw the increasing value of children and the diminishing value of wives except for childbearing and housekeeping, and decided to bring up children. As it was, discernible differences in migration and the effects of migration affected population growth and more closely mirrored the development of mining.

CHAPTER NOTES

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4 R J Evans and W R Lee ed The German family (1981) 25

5 J Benson British coal miners in the nineteenth century (1980) 126

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41 As they also did in Hamilton, Ontario, Katz and Davey (1978) 101, and in the parishes that Wall compared, Wall (1978) 190

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50 As found in Brayshay (1980) 32, Gurney (1970) 314, Preston (1977) 14-15
51 Other studies have found that mining areas had larger household sizes, Gurney (1970) 314,328; Martin (1977) 17; J T Jackson Housing and social structure in mid-Victorian Wigan and St Helens PhD Liverpool (1977) 407; D Gaunt Household typology:problems, methods, results in S Akerman et al ed Chance and change (1978) 75. Although the census definition of the household was not the same at all the censuses 1801-61, for these purposes the household can be taken to be comparable
52 Such a high proportion was not common, but there was relatively as many in other declining communities, Tranter (1974) 45
53 The median rather than the mean differences shown in Table 10.13 illustrate this. The median number of servants in each parish ranged from 0.26 per household to 0.33 and of kin from 0.27 to 0.31, but of children from 1.44 to 2.49, with parishes in Nettlebridge such as Stratton and Ashwick having the smallest and parishes around Radstock having the largest; Camerton (2.49), Radstock (2.39), Clandown (2.36)
54 Nor as numerous as in a rapidly expanding mining community, Monkwearmouth, Patterson ed (1978) 54
55 Medick (1976) 305, Holley (1981) 60
56 Lestaeghe (1977) 144
57 W R Lee Family and industrialisation:the peasant family and social change in nineteenth century Bavaria in Evans and Lee ed (1981) 92
58 Gaunt (1978) 75

CHAPTER 11

DISCUSSION AND CONCLUSIONS

The principal objective of this dissertation has been to find out how the economies of two coal mining areas stimulated population growth. To examine the similarities and contrasts that might have arisen from their different experiences of coal mining, a detailed local comparative study was the logical means of focusing more closely on the issue. Without repeating much that has already been said, the wider significance of what has been found can be briefly treated by discussing how far the methods used in the study and the conclusions drawn in each section have fulfilled some of the expectations of a study of population and coal mining in the Somerset and St Helens coalfields carried out in this way.

There are two matters set out in broad terms in Chapter 1 that the study raises in particular. The first concerns how far the demographic characteristics of miners and coalfields derived from their industry. The second concerns what changes were taking place in the economy of the two coalfields and how these affected population growth. These matters lead to a final discussion of what should be learned from the methods used in this investigation.

11.1 Coal Mining and the Mining Population

From the accounts of mining in Somerset and St Helens coal production, jobs at the pits, and underground methods of working owed much to the profits and losses obtained by the colliery proprietors. As a consequence, events in mining were closely tied to immediate circumstances in the local economy (the market for coal, geological conditions, investment by owners, cartels and transport rivalries); and the growth of the coal industry and changes in its structure, although not peculiar to Somerset and St Helens, were nonetheless not the same. These appear to have had consequences for the miners; the number of jobs, the kinds of collieries at which they had to work, the wages they could earn, and the potential dangers that they had to endure. Moreover, the livelihoods of miners varied. Because of the uneven manner in which changes occurred, the demand and supply of labour, the organisation of the pits, working conditions and wages were by no means the same across the coalfields. This meant that even though features of collieries, such as their large-scale, complicated organisation and risks, were standing miners apart from other workers, and the conditions rubbed off on the standard of living enjoyed by miners' families, because children particularly large numbers of sons who worked at the pits and augmented the miners' incomes and the paucity of jobs for women distinguished them from other workers, the work equally produced differences in family economies among the miners.

Putting the focus on work and the family in the relation between population change and mining begs the question how far can the demographic characteristics of coalfields and miners be generalised. Although it subsequently becomes clear from the demographic characteristics of miners and people in coalfields that the population changes in them are related to mining, it does not follow that there were common demographic characteristics and a common course of population change in all coalfields then or at any other time either.

In Somerset and St Helens population characteristics and many of the population changes depended on local circumstances, such as the jobs for women as well as men, the supply of labour from other backgrounds and conditions at pits that required labour to boost production, that were not necessarily common to all coalfields. If conditions in the industry were possibly never the same, there are limits to how far generalisation can extend unless, of course, many of the similarities in mining which are also dwelt on can override the variations.[1]

Generalisations about miners and mining which fly in the face of this study's findings abound.[2] Stereotypes of miners supposedly derived from mining are built upon assumptions that economic and social conditions did not alter or vary significantly between coalfields; that common forms of industrial work produced similar characteristics of social life and similar communities.

Too many myths probably stem from observations by outsiders, particularly those contained in the Parliamentary Reports and the press, and the faith placed in their remarks.[3] Many myths that have arisen in this way have been demolished in the last few years.[4] Unfortunately, images of miners obtained from twentieth century literature have been transferred to the past.[5] Miners, not least the Trade Unions, have been partly responsible for creating a refractive image of themselves.[6] Drunkenness and lechery were often spoken of in the same breath as early marriage, as if they were all "bad habits" derived from their demoralised way of life and by association with their grimy work, radical activities and physical isolation in some parts of the country.[7] The logic is often tenuous, a somewhat muddled nineteenth century vision of cause and effect. Malcolmson's recent statement is a prime example of a colourful picture of miners who "lived apart from other men cut off by the blackness of their skin ..... and peculiarities of their manner" when he attempts to explain the attacks on turnpikes by miners near Bristol partly in terms of their lawlessness and working conditions.[8] He makes little reference to the work at the local mines at the same time.

Analogous conditions, it should be remembered, were also facing other workers.[9] As Nef states, "It would perhaps be futile to point out that these kinds of behaviour were not entirely peculiar to the mining population."[10] But, the evidence here should be added to

the small chorus who have argued that some of the accepted views about miners and the society and work of miners in the past are false. These include inflations of their independence, their corporate identity, their indiscipline, proletarianism, fecklessness and social isolation.[11] Moreover, the exact forms of any experience for miners and mining inevitably "varied with the direction and timing of change" in the coalfields in which they lived.[12] Since the exact dimensions of development owed much to the regional economy, and changes made slow progress and were never fully accomplished in all sectors of an industry, it should come as no surprise that population change in coalfields reflected variations in the factors that influenced the economy.[13] The implication is that generalisations about work and the industry cannot provide the explanations of population change, if population change was related to prevailing working conditions.

Excessive generalisations about the relationships between coal mining and coal miners should be avoided as there are no generalisations that can be made about work at a scale which make them applicable to the individuals concerned. It is dangerous to draw inferences about relationships between work and population without reference to their context. It is evident from the first half of the thesis that characteristics of work in the study areas, such as the number of jobs, pay and chances for miners to earn promotion, were not the same as elsewhere nor the

same throughout all parts of these mining areas. Then, it becomes clear that because the peculiar economic circumstances affected family economies which, in turn, influenced events such as leaving home, marriage and childbearing, the course of population change owed much to what was happening at the pits in Somerset and St Helens. Not all coalfields or portions of them had a growing demand for the labours of miners and their children that was sustained throughout the nineteenth century, nor did all of them have large collieries, few jobs for women and relatively better standards of living for miners compared with other workers. Consequently, the relationships identified here between mining and population change should only be extended with caution beyond the boundaries of the two mining areas, even though population growth can be considered as an outcome of the relationship between the mining population and the work that supported them.

11.2 Mining and Population Change

The effects of work on the components of population change were obvious in both areas; for, as expected, miners' occupation underground influenced family structure, the frequency and length of marriage, ages at marriage, childbearing, leaving home, the age and sexes of the population and migration in the study areas at all scales. It is significant for the contention that population rose from natural increase that first of all, at an aggregate level, curves of population size, baptisms and rates of natural

increase marked time with economic growth and the expansion in particular of a modern mining industry, echoing trends in other areas undergoing similar changes in the eighteenth and nineteenth centuries. Natural increase was invariably the main component. Second, the younger age at marriage of miners' wives and the tendency not to practise birth control, so that they had more children than other women, appear to be explained by the family economies of miners; their need for children in middle and old age, the greater value of sons than daughters, and their best wages from the ages of twenty to forty.

As touched upon at various points in the text, there are many hypotheses about relationships between, on the one hand, industrial activity and work, aspects of what has been loosely termed "modernisation", and on the other, the rise of population in the industrialising era which has included the interdigitation of work and family.[14] The discussions figuring miners should therefore concern how economic changes in mining areas were linked to population growth rather than whether they were or not. Two different perspectives of the process are illustrated in Figure 11.1.[15] They show two ways in which population and economy may be linked in coal mining areas that have been discussed in Chapters 6-10.

In the first of these the high rates of population growth in mining areas occurred solely because of the kind of work occupying men and their families at the collieries at the time. There is ample evidence here, and also

expressed by Haines, that early marriage for women and higher marital fertility could have arisen from the amount of work down the pit, the conditions of work underground and the wages to be gained.[16] High rates of succession, graduation for the able-bodied to better paid jobs without parental guidance, and a lot of jobs for boys secured jobs for children. Young girls, to the contrary, had little alternative but to marry or leave home. For older miners the uncertainties in the industry remained; vicissitudes of trade seasonally and cyclically and hazards to health and safety. Increasing chances of redundancy, the vagaries of earnings, and the relinquishment of hewing in middle age would have reduced the advantage of a career in mining over other jobs, so that miners had to fall back on their family's earnings to support them and their dependants. Fortunately, more men, but especially more boys, were employed to raise coal production. In larger collieries the division of labour increased so that the amount of work for children increased rapidly, although a large-scale, long-term shortage of skilled adult male labour did not necessarily occur because of improvements in underground haulage. Children had to stay at home because they still largely depended on their families for work underground; position, promotion, and for some their pay as well. Men could earn their best wages by their early twenties but could not expect to sustain them beyond their forties. Earnings suffered violent differences week by week. Women by contrast could not hope to get paid work. It was gradually denied to them at most collieries, while the

increasing number of jobs for men at mines, and for their children also, may have squeezed out work that families did together.[17] In these circumstances, men and women would not have gained much by prolonging courtship. Advantages could have accrued to miners if they did not delay marriage and in having a relatively young wife, as long as they did not practise birth control.

My misgivings about this version are twofold; first, assuming that these changes may be a key to understanding how extraordinary rates of population growth arose then and not before, and second, assuming that what may be consistent at an aggregate level will also be true at the parochial scale. Wrigley has lately queried the role of proletarianisation, largely discounting hypotheses put forward by Levine to explain population change in terms of new relationships between men and their work, such as those that are suggested above, for coal mining.[18] To Wrigley and Schofield the striking and sustained increase in the real wages of labourers may explain falls in ages at marriage for women and rising completed family sizes.[19] These could have accompanied the expansion of coal production as this took place across a broad front at some time during the eighteenth and nineteenth centuries in most coalfields; in Somerset, perhaps, in the late eighteenth and early nineteenth centuries and in St Helens certainly in the middle of the century when shortages of labour occurred for brief periods.[20] But nationally these changes do not appear to have been very great, nor were intense shortages

of labour in either coalfield long-lived because redundancies at some pits were invariably occurring at the same time as new jobs became available, and a relatively poor standard of living to be obtained from other work remained unaltered. At the same time, though, some of the characteristics of mining which may have boosted population growth by affecting marriage and childbearing were not necessarily new to miners and mining, at least in Somerset and St Helens. Changes associated with lower ages at marriage, such as a decline in real income putting an increased value on the earnings of children, might not have had much impact in this short time.[21] Falls in the relative value of the miners' wages as the number of unskilled jobs at pits grew and the miner's diminishing control over training and promotion as the scale of coal working increased, were taking place gradually.

Mining in Somerset and St Helens had long been an industry that employed semi-skilled labourers. Since the sixteenth century at least most of the men had been labourers; waged employees whose earnings then depended on the state of trade.[22] The ownership of workable minerals at any time was vested in relatively few hands and the investment of capital was beyond the range of miners themselves because of the costs.[23] Jobs in mining had also been always affected by fierce competition, providing miners with a precarious existence. Owners and proprietors had formed cartels and been motivated to make a profit, so that the miners' immediate prospects were often insecure, as much when they depended on pit work for their entire income as

when they worked part-time or seasonally. Miners drew some advantages from a steadier demand for coal because collieries had new markets and better access. These were outweighed by cyclical turns of fortune and competition raging between coalfields and collieries to gain these markets and retain them.[24]

For a long time before many other industries, mines had been large businesses operated at a large scale that required some degree of supervision as well as a division of labour, even if miners managed to retain, in effect, closed family recruitment.[25] The independence of many miners was lessened by the extension of workings underground and the division of labour, and this was clearly occurring in Somerset in the early nineteenth century. Work was rationalised, horses and machinery were slowly introduced to carry out most haulage work, and unskilled labour, particularly children, were used to perform many jobs.[26] The coal proprietors had to directly employ more of the workforce under these circumstances. Yet much of the traditional organisation survived into the nineteenth century and beyond. Miners in the middle of the century were in the main still masters of their pace of work, even in Somerset.[27] Manual skills were needed to cut the coal and for the most part to move it also. Adult miners could also take on and train their own family, so that they preserved a means of controlling their children whether they paid them themselves or not.

Changes in technology and the organisation of work at the pits in Somerset and St Helens that could have had a significant effect on miners, such as scale and the division of labour, were only gradual, occurring mainly at new pits and gaining ground only as new collieries replaced old, so that they were confined to relatively small parts of every coalfield. Fundamental changes on the scale and breadth of those occurring in some branches of textile manufacturing, such as mechanisation, were only rarely happening in a miner's lifetime.[28] Only under the special circumstances of the Forest of Dean's mining industry were changes in ownership, organisation of work and management speeded up.[29] By the same token changes too in real wages and the amount of work for women do not appear to have been great.

It is doubtful whether many changes in mining in the early nineteenth century would have altered the relationship that almost certainly existed between miners' family economies and childbearing to increase marital fertility.[30] Some critics have begun to question striking evidence of downward trends in their age at marriage as a general feature, even if a small change would have had a significant effect on completed family size.[31]

If changes in the industry were significant, more distinctive differences in marital fertility and the ages of marriage of miners' wives that reflected work for women, modernisation of the pits and jobs for children should have

been found in the Somerset coalfield and been responsible for differences between Somerset and St Helens. This was not so. As Haines found, the similarities are more striking than the differences; consistently higher CWRs for miners' wives than non-miners' wives.[32] Miners' wives did not have higher marital fertility in the areas where coal was worked at a larger scale and the workers no longer had so much influence over recruitment, supervision and training.[33] As a consequence, the growth of population in these coalfields accelerated because changes in the economy altered the characteristics of geographical mobility. Changes in the mining industry influenced intervening variables, such as who left home, when people migrated and how many could get married. The tendency to marry and have a large family remained relatively unaltered whereas migration became a catalyst for rapid population growth and natural increase at all scales.

A demographic revolution may have followed from an industrial one in the coalfields, but not in the way Mendels, Medick and Levine linked economic growth to family formation. The distinctions within coal mining, between coalfields and parts of them, as well as the changes that were occurring in the industry's location and scale and the the number of jobs, and changes taking place in coalfields' economic structure would have influenced population changes, the rate of population growth and the demographic characteristics of the people in these coalfields.[34]

The demographic characteristics of miners could have spread as miners slowly emerged from being a minority group and the number of jobs for women dwindled, so that in coalfields such as Somerset and St Helens this only occurred during the nineteenth century with the expansion of jobs for miners and other kinds of labourers at the expense of the self-employed and handicraft workers.[35] As the economies of mining areas became dominated by coal mining its influence on the population must have increased. If more women were eventually married to miners and fewer women were left unmarried, and if more women married at an earlier age because they were marrying miners, and mining reduced their job prospects in the process,[36] marital fertility would have risen in the early nineteenth century over earlier decades just because women would have been married for a longer time.[37] It appears that in Somerset and St Helens miners' wives did marry earlier than the wives of men who worked on the land and self-employed traders and craftsmen, and few were unmarried especially where mining had grown.

The effect of people moving because of mining should not be neglected either. Migration, as shown in Figure 11.1B, could have produced a population that was younger and male dominated as well as men and women who were prepared to marry and wanted children, during the time that the industry was growing.[38] The kind of migration that may have occurred because of mining could have initiated extraordinary population growth. The distinctive features of mining

influencing migration appear to be the number of jobs for men increasing in coalfields as a whole and large parts of them; new collieries that had large demands for labour which could not often be met unless men (miners and non-miners) moved to new homes closer to the pit; and jobs for adult men that were becoming more secure while new jobs offered the best chances for young men looking for their first job down the pit, promotion and better earnings. Because of these trends the migrants associated with mining - their origin, direction, age and motives for moving - could have incidentally helped to raise the rate of population increase in the coalfields of Somerset and St Helens. Usually the demand for labour at new collieries was sudden, and often in spurts rather than the gradual rate at which it occurred at established collieries, so that migration at times was dominated by men alone and most probably single young men, not all of whom had experience of mining or would have been moving from within the coalfield. As a consequence, more men than women were looking for a partner and fewer men were lacking the wherewithal by the time they were in their early twenties. At other times migrants had less effect on the age and sex structure of the population.[39] Any demand for labour at existing collieries could be more easily met by the local population. As a pit aged and required more children than men, for example, the population was more equipped to provide what labour was needed from within the coalfield.[40] The labour to raise coal production at a steady rate could

have come from a rate of natural increase and marital fertility that was raised by the fact that few women were left unmarried and more were married by their early twenties. As a consequence, migration did not have to be an important component of population growth to have stoked higher rates of natural increase and population growth.

11.3 The Way Ahead

The direction of future research should be guided by the failings as much as any of the achievements of this study. My initial intentions are not entirely fulfilled. Among other faults I would pin-point the choice of areas without some better mining records, not making enough use of the parish registers and other parochial records, not collecting census data for a larger area of the coalfield around St Helens, and perseverance with administrative boundaries,[41] as decisions which have limited the conclusions I have been able to draw.

In community studies such as this I think that being able to investigate how making a living may have influenced population change is more satisfying than studying general trends of economic and demographic change. The strength, I am sure, is that population and the people involved, the miners, are not being discussed in a vacuum, or treated as 'the miners' but as the miners in the Somerset coalfield, and just as often more specifically as the men who lived in Radstock and worked at the Waldegrave's collieries. However, I find that I have still had to infer relationships

about miners as a group and not as individuals;[42] for at this scale and with information about the miners largely from the CEBs and a few colliery records, it is only possible to speculate about the miners' socio-economic circumstances and the connections between them in the broadest of terms however much I might deprecate this practice in other studies. At its worst it is what Anderson scornfully describes as listing a set of economic variables against a set of demographic ones and doing no more.[43] The sources for a discussion of the miners' work are scanty, so that my hypotheses of what may have been the effect of work at the pits on their families may not stand comparison. Moreover, by using this as evidence in a consumer theory of fertility I could be accused of assuming too much rationality by couples and indulgence in lifetime optimisation.[44] I would be taking inference too far if I imagined that what may be valid explanations for population changes in the Somerset coalfield in the early part of the nineteenth century are any basis for making universal generalisations about coalfields in other parts of the world.

For the future I believe that there is now some need for corroborative analyses of miners in other coalfields at the same time, and perhaps earlier on rather than later in the nineteenth century. Comparative analyses of miners in other coalfields about whom the conditions of work can be discovered could substantiate or refute my more generalised conclusions and the wilder assertions made in

this chapter.[45]

Several speculative hypotheses could be tested if different data were used. With the oral or written testimony of miners or more complete company records of mines, such as wage and labour books over a year or so, there would not have to be so much speculation about connections between working conditions and family characteristics such as the standard of living of miners and their careers and family economies, the reasons why they moved, and perhaps why they married and had children when they did.[46] It would be most sensible to find some mining records first as these are rarer and more valuable, and then consult the sources of demographic information about miners and coalfields, the parish registers and CEBs, as these are more generally available and of a less variable quality.[47] Possibly the best means of finding some answers to the quandaries that remain would be by linking information about individuals in parish registers, censuses and mining records, and even in poor law records, such as casual payments and settlement papers.[48] Parish registers could be used to more effect, too, especially in areas where occupations are recorded consistently before 1813. Reconstitution studies may be worth undertaking as these could overcome one of the main problems that have arisen here; the difficulty of inferring how and what changes were occurring from censuses.[49] It would be helpful in this quest to discover if changes in ages at marriage and marital

fertility, for instance, were occurring at the same time as changes in the mining industry, or if changes in mortality were possibly significant.

I believe it is now worth running the risk of becoming immersed in the minutiae of parochial trends and of observing what was happening to people. Although this might have to be at the expense of looking at the wider implications of general trends, it would avoid one of the biggest pitfalls. Studies of miners or any other group of people for that matter overlook their significance if they are devoid of any context. It is as true for demographic studies today, once the theories have been aired by their proponents and opponents, as it is for those of the past.

CHAPTER NOTES

1 M Bulmer Sociological models of the mining community Sociological Review New Series 23 (1975) 72-73; M Bulmer Social structure and social change in the twentieth century in M Bulmer ed Mining and social change:Durham County in the twentieth century (1978) 33

2 J Benson British coal miners in the nineteenth century (1980) 2,28

3 Benson (1980) 1-3. Benson stated that they have "scarely changed", idem 3. The Parliamentary Papers are quoted most widely and not usually with as much caution as P E H Hair The social history of British coal miners D Phil Oxford (1955) 253 Together with the accounts of social explorers, such as Leifchild and Engels, opinions of outsiders are recounted with relish; D Marshall Industrial England:1776-1851 (1973) 107, B Lewis Coal mining in the eighteenth and nineteenth centuries (1971) 185-186, A Burton The miners (1976) 34-35, B S Trinder The Industrial Revolution in Shropshire (1973) 332,359

4 See Benson (1980) 81-82, C Storm-Clark The miners:the relevance of oral evidence Oral History 1 (1972) 72, and M Daunton Down the pit:work in the Great Northern and South Wales coalfields, 1870-1914 Economic History Review 2nd Series 34 (1981) 596-597. Since Thompson's study, E P Thompson The making of the English working class (1963) myths about other labourers as well as miners have been uncovered; E Hopkins Working hours and conditions during the Industrial Revolution:a reappraisal Economic History Review 2nd Series 35 (1982) 59,65-66

5 R Colls The colliers rant (1976) 16-18,55. The works of Zola and Llewellyn are prime examples, D Smith Myths and meaning in the literature of the South Wales coalfield - the 1930's Anglo-Welsh Review 25 (1976) 24,28,33

6 Colls (1976) 16. A good example appears to be M Benney The legacy of mining in Bulmer ed (1978) 57

7 Marshall (1973) 107; F Engels The conditions of the working class in England (1845) ed E J Hobsbawm (1969) 275-277

8 R W Malcolmson "A set of ungovernable people":the Kingswood colliers in the eighteenth century in J Brewer and J Styles ed An ungovernable people (1980) 183

9 P Stearns National character and European labour history Journal of Social History 4 (1970) 95

10 J U Nef The rise of the British coal industry Volume 2 (1932) 175

11 J Benson The thrift of English coalminers, 1860-1895 Economic History Review 2nd Series 31 (1978) 410-418, R Harrison ed The independent collier (1978. Because of migration and recruitment from outside coalfields, miners were not socially isolated nor "a race apart" from other workers

12 R Q Gray The aristocracy of labour in nineteenth century Britain c.1850-1914 (1981) 9, D Gregory Regional transformation and Industrial Revolution: a geography of the Yorkshire woollen industry (1982) 260

13 Gregory (1982) 24. He conjectured that differences in experiences among woollen textile workers ensued from the "cyclical nature of the progress of factories" owing to capital and markets, idem 188; a conclusion also drawn by Hopkins (1982) 52

14 E A Wrigley The process of modernisation and the Industrial Revolution in England Journal of Interdisciplinary History 3 (1972-3) 232. The latest conclusions of the Cambridge group are neatly summarised in E A Wrigley The growth of population in eighteenth century England:a conundrum resolved Past and Present 98 (1983) 126,136

15 These are developed from the model discussed in E A Wrigley Population and history (1969) 109. I am afraid that because of the data available the importance of mortality cannot be considered. If the standard of living of miners improved, infant mortality and the number of miscarriages might have declined, the chances of conception would have risen and the average length of marriage could have increased to raise the rate of population growth in mining areas.

16 M R Haines Fertility and Occupation (1979) Wrigley suggested that marriage would obviously be much more closely linked to the economy than childbearing, Wrigley (1983) 136

17 L Tilly and J Scott Women, work and family (1978) 66-68. Handknitting may have survived in parts of the Somerset coalfield, as it did in the Nottinghamshire coalfield, because it employed women alone

18 D Levine Some competing models of population growth during the first Industrial Revolution Journal of European Economic History 7 (1978) 508-510; Wrigley (1983) 133-136

19 idem, 137

20 P H Lindert and J G Williamson English workers' living standards during the Industrial Revolution:a new look Economic History Review 2nd Series 36 (1983) 2-3, Table 4

21 R Samuel The workshop of the world History Workshop Journal 3 (1978) 7-10, 21-23; Hopkins (1982) 59,65-66. Both provide a survey of new labour habits and mechanisation which question the advance of capitalism and the arrival of changes in industry until the late nineteenth century

22 Nef Volume 1 (1932) 347-349. It was earlier in other branches of mining; J Hatcher Myths, miners and agricultural communities Agricultural History Review 22 (1974) 61, I Blanchard Labour productivity and work psychology in the English mining industry 1400-1600 Economic History Review 2nd Series 31 (1978) 9

23 It was not just the cost of the initial investment but also the cost of sustaining losses, Nef Volume 1 (1932) 347-448

24 Cycles of booms and slumps that affected wages and living standards are believed to have distinguished capitalist systems of production from the traditional system; J Foster Class struggle in the Industrial Revolution (1974) 19-21, Gregory (1982) 216-217

25 Some traditional forms survived until this century, D Douglass The Durham pitman in R Samuel ed Miners, quarrymen and saltworkers (1977) 205-296, although few of them lasted beyond the early nineteenth century in Somerset

26 These are cited as evidence of change by A Campbell and F Reid The independent collier in Scotland in Harrison ed (1978) 61; J W Scott The glassworkers of Carmaux (1974) 53-54

27 Samuel (1977) 21-23; Nef Volume 1 (1932) 428; E Hopkins Working conditions in Victorian Stourbridge International Review of Social History 19 (1974) 414; A R Griffin Mining in the East Midlands 1550-1947 (1971) 118. It is the main reason why Thompson chose to disregard miners, Thompson (1963) 231-232

28 Hopkins (1982) 65-66

29 C Fisher The free miners of the Forest of Dean, 1800-41 in Harrison ed (1978) 18

30 That is the relationship with women's age at marriage as well as the age at which women had their last child, which Flinn has suggested has been overlooked, M W Flinn The population history of England, 1541-1871 Economic History Review 2nd Series 35 (1982) 453

31 Flinn (1982) 452-453; K Gaskin Age at first marriage in Europe before 1850:a summary of family reconstitution data Journal of Family History 3 (1978) 29. F Mendels Notes on the age of maternity, population growth and family structure in the past Journal of Family History 3 (1978) 236-237

32 Haines (1979) 240

33 Although, as pointed out in Chapter 9, differences in infant mortality may account for this, Levine (1978) 499-500

34 Haines (1979) 36,197. Unfortunately, Haines does not fully carry out what he recommends ought to be done about relating the distinctions of social and economic life to demographic patterns

35 A R Griffin The British coal mining industry:retrospect and prospect (1977) 156. It occurred more dramatically than in Somerset in parts of newer coalfields such as South Wales

36 M Anderson Marriage patterns in Victorian Britain:an analysis based on registration data for England and Wales, 1861 Journal of Family History 1 (1976) 55-79. Williams suspected that women's work was the cause of differences in their ages at marriage between Nottinghamshire and South Wales, H E Williams Some comparative notes on the social structure of the Nottinghamshire coalfield, 1860-1920 Bulletin, Local History in the East Midlands Region (1979) 14,23

37 Wrigley (1983) 144-147

38 There is no support for Shorter's hypothesis that lower ages at marriage and higher marital fertility arose from the social breakdown that was supposed to have occurred at the same time, E Shorter Capitalism, culture and sexuality:some competing models Social Science Quarterly 53 (1972) 338-339. The possibilities are discredited by the resilience of households and families, M Anderson Approaches to the history of the family (1980) 82

39 With the exception of times when women emigrated in greater numbers than men

40 An 'ageing' community could more easily provide the labour needed, unless considerably more new coal faces or pits were worked

41 I did not delineate the working districts beforehand and only afterwards constituted them from whole townships (see Appendix A)

42 Thereby not entirely avoiding the ecological fallacy; C Hamnett Area-based explanations:a critical appraisal in D T Herbert and D M Smith ed Social problems and the city (1979) 244, A J Lichtman Correlation, regression and the ecological fallacy:a critique Journal of Interdisciplinary History 4 (1974) 417-433

43 Anderson (1980) 65

44 Described as the household economy approach, idem 65 et seq. Criticisms of these are made in B Turchi Micro-economic theories of fertility:a critique Social Forces 54 (1975-6) 109,115

45 The potential benefits of this approach are evident in M J Daunton Miners' houses:South Wales and the Great Northern coalfield, 1880-1914 International Review of Social History 25 (1980) and Daunton (1981). The work by Sill, when published, should be of interest

46 As Holley and Hareven have tried to do, in particular; T K Hareven Family time and industrial time (1982) and J Holley The two family economies of industrialisation: factory workers in Victorian Scotland Journal of Family History 6 (1981)

47 The parish registers would not be as consistent as the CEBs (see Appendix A). It may be worth pursuing Scottish studies because Registration District and census data are available up to 1901, and many of the archives are assembled at one site

48 A method of broadening the social context advocated by Levine and Macfarlane but which has been criticised for its efforts to draw generalisations from very particular circumstances and the time and effort required, D Levine Family formation in an age of nascent capitalism (1976), A Macfarlane et al Reconstructing historical communities (1977). A singular more limited study by Mills is a better example, D R Mills A social and demographic study of Melbourn, Cambridgeshire, c.1840 Archives 12 (1976) 115-120. Macfarlane and also Hareven had the benefit of considerable assistance

49 G Hoppe and J Langton Countryside and town in

industrialisation:a microlevel approach to development in nineteenth century Sweden Kulturgeografiskt Seminarium (1979) 1; A Pred The choreography of existence:comments on Hägerstrand's time geography and its usefulness Economic Geography 53 (1977) 209-211