ECONOMIC GROWTH IN EIGHTEENTH CENTURY WARWICKSHIRE :

A STUDY

OF THE RISE OF THE WARWICKSHIRE COAL INDUSTRY

WITH SPECIAL REFERENCE TO

SIR ROGER NEWDIGATE (BART.) OF ARBURY

ESTATE OWNER AND COALMASTER

By

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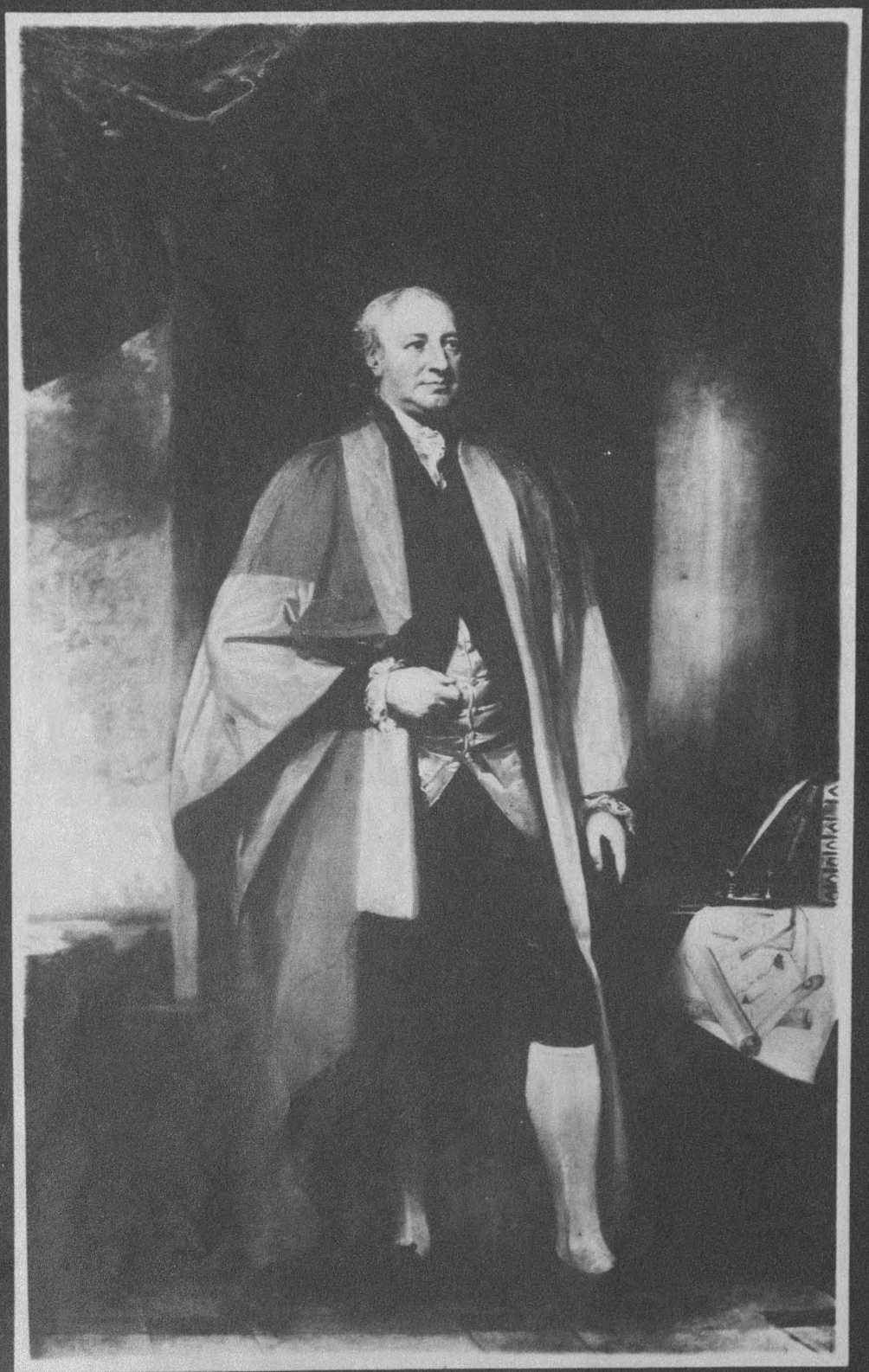

FRONTISPIECE

SIR ROGER NEWDIGATE (5TH BART.)

BY

GEORGE ROMNEY

Synopsis

During the early years of the classical industrial revolution the Warwickshire coal industry was the subject of important developments in mining technology, business organisation and transportation. These, allied to the engineering advances which it had experienced earlier in the eighteenth century, were sufficiently radical to enable it to meet the demands of growing markets and to ward off the more dangerous aspects of West Midlands competition until well into the nineteenth century.

Only a limited number of local men possessed the necessary vision, will and means to effect this transformation. Of these the most important was Sir Roger Newdigate of Arbury whose North Warwickshire estate possessed important mineral deposits. Thrice during the eighteenth century the family undertaking at Griff, midway between Bedworth and Nuneaton, became one of the most technologically advanced collieries on the field and, in some respects, a model for lesser entrepreneurs. Only under the leadership of the last baronet, however, did it become a worthwhile business venture.

Success of this type was dependent upon prior changes in land ownership and estate organisation in order to command the necessary financial and mineral resources. Estate development and inclosure were therefore indispensable preliminaries to the growth of heavy industry. Under the hand of Sir Roger Newdigate the Arbury estates were consolidated and expanded, a large and profitable colliery undertaking was established, extensive markets were cultivated, long-standing debts were eliminated and family fortunes were once more set upon firm foundations.

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PART I

INTRODUCTION

1. General Introduction, Review of Primary Sources and Acknowledgements

A. General Introduction

The Industrial Revolution is properly regarded as the fundamental watershed in the economic development of the United Kingdom. Its appearance during the eighteenth century heralded important changes in the nature of the British economy together with the prospect of higher standards of living for all. No redistribution of the existing national product, however, would have laid the foundations of a long term rise in prosperity. This could only happen by increasing the flow of basic economic resources in which coal was an element of crucial importance. Since this was a period in which the state chose to adopt a passive role in economic affairs the points of departure in industrial development, by which such extra resources could be made available, lay in the initiative and enterprise of a minority of men, who, "seeking no doubt their own narrow ends, had the wit and resource to devise new instruments of production and new methods of administering industry"(1).

This account will show that the Newdigates of Arbury, and in particular Sir Roger Newdigate (5th Bart.), were especially well situated to initiate industrial development in North Warwickshire.

(1) T. S. Ashton: The Industrial Revolution, 1760-1830, p. 161 (1962 Edn. H.U.L.)

The industrial revolution in the Coventry-Nuneaton area, which began with the development of mining in the eighteenth century, owed much of its original impetus to the efforts of a small number of energetic landowners, among whom the baronet was a leader. The centrepiece of this study of the rise of the local coal industry is therefore an analysis of his work as a landed proprietor and coalowner, together with its significance for local economic growth.

The exploitation of mineral deposits on the Newdigate estate was not a momentary affair born of sudden inspiration but the result of mature thought and careful planning. An earlier study(2) has shown that the record of the Newdigates in industrial enterprise was already a long one before Sir Roger Newdigate made his appearance. Business failure, however, was invariably the outcome of their efforts. Given this unfavourable background the most important questions posed in this work are how and why the baronet managed to pluck success from what had thrice proved to have been a bitter disappointment.

Part II of this thesis is concerned with showing how the Newdigate estate, near Nuneaton, developed the capacity to support a large scale industrial venture. Its physical growth and the exploitation of its resources will be taken into account and an analysis will be made of the influence of the Parliamentary inclosure movement in which the baronet himself was keenly interested and which has been the subject of critical debate for many decades.

(2) A. W. A. White: Sixty Years of Coalmining Enterprise on the North Warwickshire Estate of the Newdigates of Arbury, 1680-1740.
(Unpublished M.A. Thesis, 1969).

Changes in the level and composition of estate income and expenditure, and the extent to which his mineral enterprise was a success, will be examined, together with some of the business methods which he and certain other local coalmasters employed during the latter part of the eighteenth century. Sir Roger Newdigate's own attitude to industrial enterprise will also be taken into account: whether his outlook was essentially that of the Renaissance magnate, with diffuse but limited ambitions, or perhaps that of the rising industrial dynast, traditionally ruthless, singleminded and apparently anxious to leave his mark in the world of trade and industry.

Part III is concerned entirely with the development of the Warwickshire coal industry and in particular with the baronet's own colliery at Griff. Important changes in mining technology and organisation took place during this century. Their nature and significance are the main subject of discussion. More specifically, to what extent was the technological lead gained by the earlier baronets maintained by the last of them? Who were his principal competitors? How was a large colliery planned, built and equipped and by what stages did the industry advance to relative maturity by the end of the eighteenth century?

The final part (Part IV) of this work is devoted to a study of the market, capital and the entrepreneur. All industrial enterprise is dependent upon the existence of a market and the most cursory examination of local municipal and private records reveals that there was no shortage of mining venturers in the seventeenth and eighteenth centuries ready to try to meet its requirements. How valuable was this market and what attempts, if any, were made to protect and enlarge it? Where

did entrepreneurs obtain the necessary capital to finance their undertakings? What were the problems to be faced and what qualities of entrepreneurship were indispensable for success? The purpose of this analysis is to shed light on the complex issues involved, to obtain answers to these questions within the limitations imposed by the nature of primary source material, and to indicate some of the reasons why the local coal industry became increasingly oligopolistic with the passage of time.

B. Review of Primary Sources

The growth of public interest in our national heritage during the last twenty five years has conferred many benefits upon the historian. The desire to preserve valuable documentary collections and relics of our disappearing industrial past has resulted in a wider and richer variety of source material being made available for study. The increasing pressure of the State upon daily life, too, has not been without its blessings insofar as the dusty archives of lawyers' strong rooms and private houses are now finding their way into County Record Offices and other places of deposit. One consequence of all this activity is that the writer has been able to draw upon the resources of more than twenty five MSS. collections in the preparation of this thesis, in addition to the more normal run of parliamentary papers, official reports, statutes of the realm and patent specifications.

The principal source of material employed was the Newdigate Collection, deposited in the County Record Office at Warwick, followed by the Stratford-Dugdale Muniments the copyright of which is retained by the owner, Sir William Dugdale (Bt.). Important evidence has been drawn from the Boulton and Watt archives, housed at the Public Library and Assay Office, Birmingham; from the Hand, Morgan, Bourne MSS. and Aqualate Papers at the William Salt Library and County Record Office, Stafford, respectively; from municipal records belonging to the Corporation of Coventry, and from MSS. and other documents in the possession of the Public Record Office.

The variable quality of source material posed special problems from the outset and as research progressed more deeply additional

difficulties which were not always apparent at the beginning began to reveal themselves. To some extent this was a consequence of the nature of many eighteenth century mining records, differences in standards of business organisation and administration during that period and the absence of several important documents. Wherever necessary the attention of the reader has been drawn to these limiting factors in the text.

In several instances it has not been found possible to demonstrate the translation of stated intentions on the part of entrepreneurs into hard fact. It has also occasionally been difficult to draw a line between fact and fiction, especially when legal actions were being threatened or actually taking place. In this respect numbers of maps in the Newdigate Collection have been found to be alien to the family's own records, and a full share of traps for the unwary lies hidden in conveniently elastic memories as recorded in correspondence and memoranda.

A wide mix of material was therefore assembled to prepare a background history of the rise of the Warwickshire coal industry, but given the enormous differences which existed during the late eighteenth century between different mining enterprises a more selective approach was made when dealing with the problems of coal production and technological advance. Where any clash occurred between primary sources preference was given to material recording specific tonnages raised and sold, receipts accruing therefrom and expenditures in which coalmasters were closely involved.

A readily ascertainable and national system of measurement is taken for granted during the present age. No such system, however,

existed for most of the period reviewed in this work and this has posed additional problems. The reader's attention has been drawn to this fact in the relevant parts of the text but standardisation has been effected wherever possible in the presentation of tabular material. The requirements of accuracy, too, have dictated the retention of the traditional system of money measurement in preference to the metric system.

The relevant parts of the Newdigate Collection are listed at the County Record Office, Warwick, under the accession numbers CR 136, CR 270, CR 319, CR 764 and CR 1022. To avoid tedium the prefix "Newdigate MSS." has been omitted from footnotes, these accession numbers alone being used for purposes of identification. With regard to other collections, however, the relevant title has been employed in addition to accession numbers for the sake of clarity.

C. Acknowledgements

The writer was assisted by many people during the course of his researches. It is impossible at this stage to cite by name all those who contributed to this thesis by offering insights or information, and certainly no statement of indebtedness would be complete without reference to the help received from the viewpoints and conclusions of others who have wrestled with aspects of the problems which are the subject of this work. Although there are some who would prefer to remain anonymous it is nevertheless the writer's duty to express appreciation to those who made a special contribution to his efforts by providing access to important documentary material or by stimulating his own thinking.

The first debt of gratitude is to Dr. A. and Mrs. E. A. Gooder, Department of Extramural Studies, University of Birmingham, who, in addition to helping the writer on aspects of local history for many years, advised on the collection of material for this thesis. Another strong, personal debt is owed to the Archivist (Mr. M. Farr) and Staff of the County Record Office, Warwick, whose helpfulness on so many occasions has frequently overstepped the bounds of duty. Likewise the writer is appreciative of the guidance of his tutor, Dr. R. A. Church in matters of organisation and presentation.

Among those who have made available particularly valuable documentary material special thanks are due to Mr. F. H. Fitzroy Newdegate for the use of the Newdigate Collection; to Sir William Dugdale (Bt.) for the Dugdale Muniments; to the Marquess of Anglesey for the Anglesey Papers; to Mrs. John W. Greene for the Aqualate MSS; and to Messrs. Hand, Morgan and Owen for the Hand, Morgan, Bourne archives.

Appreciation is also expressed to officials of the Record Office of the House of Lords, the British Museum and the Public Record Office; the Library of the Royal Society, the Patent Office and the Archives Department of the British Transport Commission; the County Record Office and William Salt Library, Stafford, the Assay Office, Birmingham, and the City Record Office, Coventry; to the public libraries of Banbury, Birmingham, Coventry, Dudley and Nuneaton, and to the Library of the Law Society in Birmingham.

Thanks are also due to the Birmingham Museum and Art Gallery; to Hoare's Bank and Williams and Glyn's Bank Limited; to the Newcomen Society and to contributors to the journals of numerous archaeological and historical societies whose work is acknowledged more specifically in the text.

Finally, to owners who have granted the writer access to private property, persons who have good naturedly tolerated lengthy interrogations on family history and others who have given freely of their time this acknowledgement is offered as a token of thanks.

ABBREVIATIONS

Agric. H. R.	Agricultural History Review
Arch. Ael.	Archaeologia Aetiana
Arch. Cambren.	Archaeologia Cambrensis
A.O.(B.)	Assay Office (Birmingham)
B.M.	British Museum
B.P.L.	Birmingham Patents (Commercial) Library
B.R.L.	Birmingham Reference Library
B. and W. Colln.	Boulton and Watt Collection
B.T.C.	British Transport Commission Archives
Bus. Hist.	Business History
C. and Y.	Caddick and Yates MSS.
C.R.O.	Coventry Record Office
C.W.C.	Coventry and Warwickshire Collection (Coventry Library)
D.M.	Dugdale Muniments
Ec. H. R.	Economic History Review
Ec. Jnl. (E.H.S.)	Economic Journal (Economic History Society)
E.E.H.	Explorations in Entrepreneurial History
G. Mag.	Gentleman's Magazine
H.M.	Hand, Morgan MSS.
H.M.B.	Hand, Morgan, Bourne MSS.
Ind. Arch.	Industrial Archaeology
Jnl. E. H.	Journal of Economic History
J.H.C.	Journals of the House of Commons
L.L.S.(B.)	Library of the Law Society (Birmingham)
L.R.S.	Library of the Royal Society
M.E.	The Mining Engineer

P.C.C.	Records of the Prerogative Court of Canterbury
P.P.	Parliamentary Papers
P.R.O.	Public Record Office
P.S.A.S.	Proceedings of the Somersetshire Archaeological and Natural History Society
Q.S.	Quarter Sessions
R.M.S.	Renaissance and Modern Studies (University of Nottingham)
T. and C.	Technology and Culture
T.B.A.S.	Transactions of the Birmingham and Warwickshire Archaeological Society
T.H.L.C.	Transactions of the Historic Society of Lancashire and Cheshire
T.I.M.E.	Transactions of the Institute of Mining Engineers
T.L.A.S.	Transactions of the Leicestershire Archaeological Society
T.N.S.	Transactions of the Newcomen Society
T.R.H.S.	Transactions of the Royal Historical Society
U.B.J.	University of Birmingham Historical Journal
W.C.R.O.	Warwickshire County Record Office
W.S.L.	William Salt Library (Stafford)
Y.B.E.S.R.	Yorkshire Bulletin of Economic and Social Research

PART II

ESTATE DEVELOPMENT, INCLOSURE AND BUSINESS ORGANISATION ON THE WARWICKSHIRE COALFIELD

Chapter 1

THE GROWTH OF THE NEWDIGATE ESTATE AND THE DEVELOPMENT OF ITS MINERAL RESOURCES

Introduction

Sir Roger Newdigate died, aged 87 years, on the 25th of November 1806, possessed of substantial estates in Middlesex and Warwickshire. His death came at the end of a period in which great changes took place in the pattern of landownership on the Warwickshire coalfield. The multiplicity of individual holdings and mineral rights which had been so common during the first half of the century had gradually been transformed into a small number of large, viable units. The metropolitan speculator, the adventurer from other Midland counties and, in many instances, the lesser proprietor, all yielded place to the established greater landowner and successful coalmaster. Given that "the general drift of property in the sixty years after 1680 was in favour of the large estate and the great lord",(1) this trend accelerated in the county rural areas during the following sixty years. In consequence, the power and influence of a landholding minority, already substantial by 1750, grew steadily, with important consequences for agriculture and industry.

The purpose of this chapter is to examine the work of Sir Roger Newdigate, the most important landowner in the heart of the North Warwickshire coalfield, during this period. More specifically, it aims to consider the part he played in building up the family's North Warwickshire estate, a process which had its roots in the efforts of Sir Richard Newdigate (first baronet); to analyse some of the factors which influenced his policies

(1) J. M. Habakkuk; English Landownership, 1680-1740
Ec.H.R. (Sec. Ser.) X, (1939-40), p.2.

for estate development; and to enquire into the exploitation of his mineral deposits. Additionally, it is hoped to show how far his activities fitted in with the strategy for estate development planned by his predecessors and, as far as source material permits, to consider some of the results of his work in a broader, county setting.

This chapter is therefore divided into two sections: the first examining the growth of the estate from the seventeenth to the early nineteenth centuries, and the second dealing with the development of its resources and the impact of external factors upon the policies of Sir Roger Newdigate.

Section I

(i) The Growth of the Estate, (Phases I and II)

With the death of the fifth and last of the Newdigate baronets the estate passed for life into the hands of a cousin, Francis Parker Newdigate.(2) One of the first tasks undertaken by the latter was to order a survey to be made of the whole Warwickshire estate. From the map which followed we are able to examine the results of over a century and a half of dedicated effort by successive baronets to the task of building a large and valuable agglomeration of landholdings(3) in the county. According to the Kempson Survey of 1807 the estate consisted of 1001 fields and stretches of woodland amounting in all to 5476 acres.(4)

(2) d. 1835

(3) CR136/M/1
"Arbury Estates in the Several Parishes of Arley, Astley, Bedworth, Chilvers Coton and Nuneaton, the property of Francis Newdigate Esq."

See also Map 1

(4) In two small plots of land Francis Newdigate possessed only a half interest.

Apart from small portions of land in Bedworth and near Attleborough, it consisted of a single, large block of property covering four manors and stretching over five parishes.(5) The largest single unit (3913 acres) was held in the parishes of Chilvers Coton and Nuneaton, followed by 1285 acres in neighbouring Astley parish (including Astley Castle) and smaller areas in Arley and Bedworth. Although no details are available of the respective divisions of the estate, it contained a variety of woodland, arable and pasture together with important mineral deposits. The possession and working of the coal established Sir Roger Newdigate as one of the leading coalmasters in the county during the last quarter of the eighteenth century and contributed handsomely to his revenues.(6)

From surveys carried out in earlier years it is evident that Sir Roger Newdigate inherited an estate of no mean order in 1740 but its precise size and extent at that date is uncertain. Nevertheless, additions were made during the course of his long reign at Arbury which had the effect of making the estate larger, more compact and more manageable. The most important of these were the purchase of Lord Coventry's estate at Griff in 1761 and the acquisition of a substantial acreage under the provisions of the Chilvers Coton Inclosure Award of 1765.(7)

The foundation of the Newdigates' Warwickshire estate was laid by an exchange of property in 1586 between Sir Edmund Anderson, then owner of Arbury,(8) and John Newdegate of Harefield, Middlesex. Gambling and

(5) Roughly rectangular in shape and bounded by Nuneaton, Gun Hill, Wood End (near Fillongley) and Bedworth.
See also Appendix A, Table 1, Arbury Estates....the property of F. Newdigate

(6) The subject of estate income and expenditure is considered in Chapter 3.

(7) On the growth of the estate by inclosure see Chapt. 2.

(8) Arbury Hall, near Nuneaton, was built on the site of a monastery seized by the Crown in 1536.

mismanagement precluded any major extensions during the lifetime of his son, Sir John Newdegate, and it was not until his grandson, Richard Newdigate,(9) established himself as a successful lawyer that the family fortunes showed distinct signs of improvement. To what extent he built up landholdings in and around Arbury itself is unknown. That it had become substantial by 1665, however, may be inferred from the fact that in that year Serjeant Newdigate settled his Warwickshire estates on his son(10) together with an annual income of £1500 before returning to London permanently to resume an extremely lucrative practice.

The income involved was sufficient, with moderate care, to establish the young man in the chosen career of country gentleman. Moderation, however, was a quality completely alien to the new squire of Arbury and it was only after a quarter of a century of high living, extravagance and mounting debt that a determined attempt was made to establish the estate on a firm, business-like basis. It is from surveys, schemes and observations resulting from this belated change of heart that we can begin to build up a picture of the size, extent and value of the Newdigate estates in Warwickshire, Leicestershire and Middlesex as they were at the close of the seventeenth century.

"The Sum of my Estate in Chilvers Coton", wrote Sir Richard Newdigate II in 1691,(11) amounted to a little over 2418 acres, worth £1167 per annum.

(9) Richard Newdigate, a Serjeant-at-Law and onetime Chief Justice of the Upper Bench under the Commonwealth, was created a baronet in 1677 for services rendered to Royalist supporters during the aftermath of the Civil War.

(10) The first, second and third baronets bore the same name and are therefore known for the purposes of this account as Sir Richard Newdigate I, II and III respectively. They also altered the spelling of the family name to the form used throughout this work.

(11) CR136/V/183, p.147

The level of accuracy of the baronet's calculations and the standard of his estate administration normally left much to be desired.(12) However, other supporting evidence for this period is available in the form of rentals for 1691(13) and a second survey in 1693.(14) Despite small differences between them it is clear that the Newdigates then possessed holdings in this parish amounting to slightly over 2321 acres.

This was not all. Various closes had been acquired by the first baronet(15) in Thedingworth, near the border between Leicestershire and Northamptonshire, as early as 1632 and by 1691 these amounted to 177 acres. Additionally, of 1500 acres in common field belonging to the village, 1066 were recorded by Sir Richard Newdigate as "mine" in 1698.(16) He also inherited from his father 127 acres of land in Astley, near Fillongly (North Warwickshire)(17) together with the Manor of Long Itchington (South Warwickshire),(18) estimated in 1702 to cover 761 acres. Taking the lowest figure from all his estimates the baronet's landholdings in two counties totalled at least 4452 acres by the turn of the century, and together with receipts from the Middlesex estate at Harefield(19)

(12) A. W. A. White: Sixty Years of Coalmining Enterprise on the North Warwickshire Estate of the Newdigates of Arbury, 1680-1740, pp. 111-113. (1969).
Referred to hereafter as Thesis (Wh.)

(13) CR136/V/183, p.113

(14) Ibid. p.95

(15) Died in 1678

(16) CR136/V/183, p.32.

(17) Purchased in 1652

(18) Acquired in 1663 following a legal settlement.

(19) Repurchased by Sir Richard Newdigate I

almost certainly yielded an annual income of over £4000.

An important characteristic of Newdigate landholdings at the beginning of the eighteenth century, therefore, was wide dispersal coupled with substantial revenues. Nevertheless, income was forthcoming from yet other sources. For many years the small Chilvers Coton estate of the Earl of Coventry had been leased by the Newdigates, principally on account of its valuable coal deposits. This was the main site of the costly coalmining enterprise undertaken by the second baronet between 1700 and 1708 as a means of restoring family fortunes after the extravagance of earlier years. The results of his efforts, however, were disappointing and probably contributed to the mass of debt totalling £56,000 inherited by his son in 1710.

As a consequence of forty-five years of high living by his father the new baronet had little alternative but to sell[20] some of his more distant possessions. Consequently, the estates in Thedingworth and Long Itchington passed into other hands, with a loss of 2077 acres out of a total of 4600 held in the Midlands by the family in 1710. This action opened the third and perhaps darkest period in the history of the family.

(ii) <u>The Growth of the Estate (Phases III and IV)</u>

The phase lasting from 1710 to 1740, when Sir Roger Newdigate assumed control, was inevitably marked by retrenchment and stabilisation, and the

(20) CR136/C1978

Sales of land in Thedingworth and Long Itchington yielded £33,821 14s. 0d. The total acreage lost, allowing for known extensions to the former estate between 1702 and 1705, therefore amounted to approximately 4/9 of the stated holdings.

third baronet's abortive coalmining venture between 1722 and 1727[21] made its own contribution to the need for financial stringency[22] and careful regulation. Nevertheless, as small amounts of land in Chilvers Coton came on to the market, these were eagerly snapped up as part of a long-standing policy for increasing landholdings in that and neighbouring parishes, especially where they lay on or close to known coal deposits. Unfortunately, much of the material recording such transactions lacks sufficient detail to locate each plot accurately.

Sir Roger Newdigate came of age in 1740 and after a slow start gradually established the estate on a firm footing and made it the entity which has lasted to this day. Modern Arbury, as seen by the casual visitor to one of England's stately homes, is one of the memorials to this period of dedicated effort.

The new baronet continued the long standing policy of enlarging the estate in Chilvers Coton. From 1747 onwards an increasing number of purchases of land and cottages was made, rising to a high point during

(21) Sir Richard Newdigate III died in 1727 but his widow tried to keep the colliery going until 1730. See also Thesis (Wh.) pp. 115-116.

(22) An idea of the straitened circumstances of the family in 1731 may be inferred from extracts from a letter written by Roger Newdigate, then aged 12 years, at Westminster School.

"Our cloths (sic) are very threadbare and look very shabby We should be glad to make them last till we come down to you at Christmas but they are worn out so already that we cannot."

Correspondence: CR136/B1993, Roger Newdigate to his mother. 21 Nov. 1731

the 1760s when £9491 were spent on the acquisition of well over 1000 acres.(23) Two factors governed this period of expansion: the need to build up estate income from rents, and incidentally extend estate boundaries in the direction of Nuneaton and Stockingford, and the desire to bring not only all the fertile agricultural land which lay nearest to Bedworth into his hands but to control all the associated mineral deposits which lay between Collycroft (the northern suburb of Bedworth) and Coton Heath.(24) This was the area where substantial amounts of capital had been invested by earlier baronets and lessees,(25) and which in due course was to yield Sir Roger Newdigate himself a moderate fortune from coal mining.

One of the most important transactions which took place during this decade concerned Lord Coventry's 378 acre estate at Griff. Worked together with coal deposits on the baronet's own land to the north and south of it a viable colliery unit could be established. Lord Coventry, an absentee landlord, was by no means unaware of the value of his holding(26) and its importance as an addition to the baronet's existing property. Strategically placed across the coal seams, it held the key to any

(23) Appendix A, Table 2, Property acquisitions.....1748-1795

(24) See Map 2.

(25) Notably Richard and Stonier Parrott, and George Sparrow, who introduced the Newcomen engine to the Warwickshire Coalfield in 1714.

See also: A. W. A. White: Early Newcomen Engines on the Warwickshire Coalfield, 1714-1736. T.N.S. XLI 1968-69

(26) See (i) Map 3
(ii) Map 1

worthwhile colliery undertaking in the area, not least because its position on the long dip slope north of Griff hamlet controlled any attempt at effective mine drainage. In hostile hands it had a potential nuisance value out of all proportion to its mineral worth.

Preliminary discussions between the parties began in 1759 but dragged on for nearly two years. Correspondence reveals that the land in question included a limeworks as well as coal and yielded an annual rent of £180-£200, excluding consideration of woodland and mines(27). An offer of co-operation by Lord Coventry in the reopening of the colliery "for our joint profit" was turned down by the baronet who probably realized the danger of allowing an absentee landlord to participate in his mining schemes. His own earlier offer of £6,000, however, was raised to £7,750 and this was accepted in 1761. Following this deal, Sir Roger Newdigate now controlled all but a small part of the 2800 yard coal strip lying between Collycroft and Coton Heath.

How large was the Newdigate estate in Chilvers Coton at this time? Detailed estimates in 1763(28), immediately prior to the inclosure of the parish, show that the owner then possessed 2845 acres, all "anciently" inclosed, together with 420 acres in the form of open fields, commons and wastes. Additionally small areas of land were held in the adjoining parish of Nuneaton. Taking into account the estimated area of this part of the estate in December 1691, an additional 427 acres of inclosed land, (or land subsequently inclosed), had been added during the

(27) Correspondence: CR136/B1599-1603. Lord Coventry and Sir Roger Newdigate.

(28) Appendix D, Table 3
"Proprietors of the Lands etc. in the Parish of Chilvers Coton".

intervening 72 years. Although no data are available as to the precise date and size of each acquisition the result of this period of growth was that the baronet then owned 70% of all the land in the parish. Following the inclosure settlement in 1765 this rose to 88%, or 3590 acres.(29) Some additional purchases were made during the following thirty years, chiefly in Chilvers Coton, but it is clear that by 1765 the plan for expansion of the estate which had originally been formulated by his grandfather,(30) if somewhat carelessly, had at last become an established fact.

How did the acquisitions of Sir Roger Newdigate during the eighteenth century compare with those of other important proprietors along the coal belt between Nuneaton and Coventry?

To the south of the Newdigate estate the most important landholdings containing mineral deposits belonged respectively to the Nicholas Chamberlaine Trust of Bedworth, the Hawkesbury Colliery undertaking of Francis Parrott and Company, the Sir Thomas White Charity, administered by the Corporation of Coventry, and Lord Craven. That of Lord Craven accounted for 9903 acres in 1778(31), excluding his estates in Northamptonshire. Of this

(29) Infra. Chapt. 2. (Section II) passim.
See also (i) Map 1 (ii) Map 4. Only part of the inclosed area is shown on this estate map.

(30) Both Sir Roger Newdigate (5th Bart.) and Sir Edward Newdigate (4th Bart.) were grandsons of Sir Richard Newdigate II.
See also Appendix Z (Genealogical tables).

(31) Craven MSS. CR8/184
Survey of the Craven Estates in 1778, by Matthias Baker W.C.R.O.

total 2640 acres situated in the parish of Sowe(Coventry) and 1448 acres in Binley contained coal deposits. Parrott's area in 1761[32] amounted to 333 acres, a comparatively small estate measured against its giant neighbours. No reliable figures are available for either Sir T. White's Charity or for the Nicholas Chamberlaine Trust except that the latter was slowly disposing of its mineral rights for much of the century.[33] Sir Roger Newdigate's total acreage therefore placed him in the topmost bracket of landowners in that particular area.[34]

Calculations of importance according to acreage, however, can be mis-leading and do not necessarily reflect degrees of ambition to be the greatest supplier of Warwickshire coal to the Coventry market. Curiously enough this title could be applied more appropriately to Richard and, later, Francis Parrott and their partners.[35] The baronet attached little importance to extending his holdings along the coal belt, south of Collycroft, (where the principal seams lay much closer together), even when opportunity presented itself. In point of fact he made only one large addition to the estate after 1771. Possibly this may have been due to his sobering experiences regarding the expense involved in reopening Griff Colliery. Shortage of detail on this point makes any sort of conclusion impossible. Whatever the reasons for his reluctance to continue

(32) Hand, Morgan, Bourne MSS. H.M.B.31.
A Survey of Lands and Grounds belonging to Richard Parrott and John Bourne in 176(1), by Geo. Salmon. S.C.R.O.

(33) It probably covered no more than 400 acres of land of all types when the Charity Trust was set up in 1715.

(34) Appendix A, Table 3, Major estate holdings.....in Warwickshire, 1780-1874.

(35) Infra. Part III, Chapt. 3, passim

expanding, however, lack of finance was certainly not one of them. Lack of opportunity may also be ruled out, considering the periodic advertisements made by the Trustees of the Nicholas Chamberlaine Charity. Granted that, indeed, the baronet was keen to enlarge his mineral enterprise, certain purchases elsewhere in Chilvers Coton and Astley cannot even be considered to have been "best buys". The only conclusion which remains, and one for which corroborative evidence exists, is that unlike his grandfather Sir Roger Newdigate possessed a strong streak of caution. Limits were set to territorial and industrial ambitions. Life was to be enjoyed(36) and not used principally to maximise income after the style of the model entrepreneur of economic theory. Apart from occasional combination with other interested parties to thwart the ambitions of coalmasters from other fields, the baronet was content to work his own mineral deposits and leave those nearer to Coventry to be exploited by other men.

By contrast Parrott and Company were eager to purchase coal-bearing land south of Bedworth, as far as this policy was consistent with easy access to turnpike and canal connections with Coventry. Apart from a few minor considerations Francis Parrott had little social interest in the area, preferring to spend most of his time elsewhere. His policy, therefore, was reflected in the shape and distribution of the Company's landholdings. Instead of embracing a wide variety of interests in order to produce a well-balanced estate, as Sir Roger Newdigate was doing,

(36) By way of example, increased emphasis was placed upon rebuilding and embellishing Arbury Hall during the last quarter of the century.

efforts were concentrated on the acquisition and working of coal-bearing land alone.(37) The long, narrow pattern of the Company's holdings, stretching from Bedworth to Foleshill,(38) therefore had an importance out of all proportion to the impression gained from its comparatively small acreage.

Section II

The Development of Estate Resources, 1748-1795

(i) Farming

"Being greatly affected by the Misery and Distress, under which our Poor at present labour, by the excessive Price of Provisions....."

This excerpt from an open letter published in 1766(39) and addressed by the "Mayor, Magistracy, Gentry and Clergy.....", to the Members of Parliament for Northampton, was but one of many protests voiced in the south Midlands at this time against the high price and scarcity of food and fuel, and which led on one occasion to outbreaks of violence on the coalfield.

The response of Sir Roger Newdigate to market forces, however, was a divided one. To meet the increasing demand for coal during the 1760s plans were made, with some hesitation, to reopen his colliery. Likewise to meet long term timber requirements many acres of woodland were planted. To a lesser extent meat supplies from the estate were

(37) Saving only the building of extensions to Hawkesbury Hall and the laying out of ornamental gardens.

(38) See Map 5

(39) Jopson's Coventry Mercury 17 November 1766

gradually increased but no substantial effort was made to raise the output of grain with a view to meeting the needs of the market. In fact, during the period for which detailed statistics are available (1748-1796), the gap between purchases and sales of farm produce and animal foodstuffs gradually widened,(40) the estate remaining a net buyer throughout the second half of the century. Despite his interest in wheat yields and (belatedly) new farming methods, the baronet's activities in this sphere made no worthwhile contribution to estate revenues and it is hardly surprising that his name is not to be found on the list of "principal improvers" in Warwickshire compiled in 1794.(41)

A wide range of cereals, legumes and root corps was nevertheless sown every year. These included barley, wheat, buckwheat and oats, clover and tares, turnips, "Scotch cale" and potatoes, peas, beans and hops. No steps, however, appear to have been taken until 1796 to develop a system of convertible agriculture with the alternation of arable and grass in place of the ancient division of areas between permanent arable and permanent grass.(42) In that year it was planned to adopt "Flemish husbandry in eight (alternating) divisions".(43)

(40) Chart I

(41) J. Wedge: General View of the Agriculture of the County of Warwick..... p.11

(42) A practice which tended to undermine the fertility of both. J. D. Chambers and G. E. Mingay: The Agricultural Revolution 1750-1880, p.4.

(43) CR136/Diary (note). 1. Wheat, 2. Turnips, 3. Barley, 4. Peas, beans, tares and potatoes, 5. Wheat, 6. Turnips, 7. Barley, 8. Clover.

Likewise it was not until 1790 that experiments were made tentatively with deep ploughing(44) or that sowing by drill was introduced. Although the yield from drilled wheat in 1791 exceeded that from wheat sown broadcast fashion by 15%, experiments were still in progress two years later when a strong defence of the older method was made.

There was no shortage of inducements to improve arable farming at this time. From 1760 to 1772 the prices of wheat and rye rose substantially in the London(45) and Birmingham markets. This was inevitably reflected in higher payments made by the estate, then and in later years, for barley and animal foodstuffs. The price of oats also increased, especially between 1770 and 1772. Nevertheless, only 17 loads of oats were harvested in 1772 and only 12 acres of winter wheat were sown. In later years, however, a limited response to higher prices was made, possibly at the expense of producing fewer animal foodstuffs such as root crops, for by 1786 barley requirements for maltmaking were met entirely from estate production and two years later wheat purchases were brought down to an insignificant level.(46)

Sales of farm produce between 1748 and 1796 show that a bigger response to market pressures was made in animals and animal products. The most important during the earlier years were wool, sheepskins, hides and tallow, followed by cattle, cheese and hides after 1776. The very

(44) CR136/Diary: 8 Oct. 1790.
"Ploughing Two depths with Double ploughs, both shears in the same furrow."

(45) See Chart II

(46) Appendix B, Table 1, Purchases of produce, fuel and livestock, 1748-1786

nature of these commodities, however, suggests that most of the livestock were reared for consumption on the estate, and that many of the sales were more of the nature of occasional surpluses rather than the result of any desire or plan to supply an external market.(47)

The correlation(48) between purchases of animal foodstuffs and livestock suggests strongly that the baronet preferred to buy livestock rather than breed his own in any quantity. Between 1759 and 1769 sheep were purchased in modest numbers, mainly from Wiltshire. Thereafter, more and more were bought in Wales, the high point being reached in 1776 when 160 ewes and lambs were acquired for fattening.(49

Cattle seem to have been more difficult to obtain during the 1750s and 1760s, possibly because of the lingering effects of cattle diseases which had ravaged the countryside in earlier years. This probably explains occasional visits to fairs to buy bullocks. From 1768 onwards, purchases of "Scotch" bullocks began to be registered in his accounts, followed two years later by an increasing number of entries of Welsh cattle.

It has been claimed(50) that an essential function of land during the period 1750 to 1880 was to support a body of landowners who, with the urban middle classes, constituted the governing class. Thus, biggish landlords (like Sir Roger Newdigate)(51) would control Parliament and dominate

(47) Appendix B, Table 2, Sales of produce and livestock 1748-1796

(48) Appendix B, Table 1, (As for footnote 46)

(49) Sheep prices which had been as low as five shillings in 1761 ranged between ten shillings and £1 by 1781.

(50) Chambers and Mingay, op. cit. p.17.

(51) He represented the University of Oxford in Parliament for thirty years until 1780.

government whilst lesser landlords and the gentry played a useful supporting role. This judgement seems to fit the baronet eminently for, apart from his colliery undertaking, little real effort was made to meet the growing requirements of the community by becoming either an "improving" landlord or by expanding farm production on a large scale until the closing years of the century. Such increases as did take place were made to meet estate requirements, and these imply a steady growth in his own establishment. More attention was paid to the needs of his stables,(52) to experiments with the growing of exotic fruits, to society relationships and to the rebuilding and embellishing of Arbury Hall than to maximising his income from all possible sources.

(ii) Mining

Over a period of a hundred and twenty years seven separate undertakings were formed to mine coal on the estate, four of which were under the control of the Newdigates and three (unimportant ones) under that of lessees.(53) Only three of the eighteen seams which outcropped were worked commercially during these years but in Sir Roger Newdigate's time this total was reduced to two. The choice of seams to be worked was inevitably determined by their thickness, ease of operation and quality, the latter factor being one to which more attention was paid during the fifth baronet's ownership of the estate than in subsequent periods.(54)

(52) He also kept a large number of horses for work at the colliery.

(53) (i) 1684-1689 (Sir R. Newdigate II); (ii) 1689-1699 (T. Stratford and J. Ludford); (iii) 1700-1709 (Sir R. Newdigate II); (iv) 1711-1720 (R. Parrott, S. Parrott and G. Sparrow); (v) 1722-1729 (Sir R. Newdigate III followed by Lady E. Newdigate); (vi) 1736-1740 (G. Sparrow and J. Pickard); (vii) 1770-1806 (Sir Roger Newdigate).

(54) Coal, iron and clay deposits were found on the estate but of these the extraction of iron ore was left until later in the nineteenth century.

The earliest workings for which precise data are available[55] were situated principally at the lowest part of the estate, near to a stream which ran through Griff Hollows (by the present Griff Arm Canal) into the Wem brook.[56] Thereafter, as pumping machinery became more sophisticated, workings moved southwards, up the field, towards Griff hamlet. By 1709 these had crossed Griff Lane[57] and had reached the highest point along the strike of the seams before Sir Richard Newdigate II decided to cease operations. Between 1711 and 1720, when the first atmospheric engines were introduced to the field[58] coal was being extracted mainly between the site of the former Sudeley Castle[59] and the parish boundaries of Chilvers Coton and Bedworth which marked the south-eastern edge of the estate. Between 1722 and 1729 nearly 67,000 tons of coal were raised and sold by the Newdigates from this area which had already been well worked by the previous lessees. The losses[60] sustained by this effort, together with the growth of competition, however, caused them to close Griff Colliery and abandon further large-scale mining activities for forty years. Not until 1769 did Sir Roger Newdigate decide the time was ripe for reopening it.

By 1770 pumping machinery for coal pits had become bigger and considerably more powerful. Consequently coal could be extracted from

(55) Thesis (Wh.), Chapt. 4, pp. 110-111

(56) See (i) Map 2
(ii) Map 1

(57) Isolated working had taken place in this area during the early seventeenth century, resulting in a legal dispute in one particular instance. CR136/c566a.

(58) Thesis (Wh.), Chapt. 3, page 90 et seq.

(59) Marked as "Old Hall Yard" on Map 2

(60) Thesis (Wh.) Chapt. 4, p.109

lower levels to the westward of, and parallel to, the old workings. Operations therefore turned northwards, beginning at the Collycroft end of the estate, where Sir Roger Newdigate "opened" his mine in 1774,[61] and proceeded fairly rapidly towards Temple Park, north of Griff Hollows. This latter point was reached shortly before the death of the baronet in 1806. Thereafter workings were extended northwards and westwards for substantial distances underground, the pivotal point for many years being the Griff "Caroline" foundation near to the wharf at the end of Griff Hollows Canal.

To what extent did the baronet respond to marked pressures on the supply of coal?

Correspondence between himself and Lord Coventry in 1760[62] on the subject of purchasing the latter's estate in Griff proves that he was keenly aware of new demand. Possibly Lord Coventry was equally aware of this fact when he made his offer of cooperation only eight days later but delayed coming to a conclusion about the sale of his land for nearly a year. By 1762 Bedworth coal was retailing at the pit mouth for 7d. a hundredweight[63] but the baronet's interest waned when the price dipped to 5d. two years later,[64] and as a result plans for reopening the colliery were shelved.

(61) The planning and construction of this colliery are dealt with in Part III, chapter 2.

(62) Correspondence: CR136 (i) Bl599, Sir R. Newdigate to Lord Coventry. 13 Feb. 1760

(ii) Bl600, Lord Coventry to Sir R. Newdigate. 21 Feb. 1760

(63) This fact was employed by opponents of the Bedworth monopoly to enlist Parliamentary support for the proposed Whitacre-Corley-Coventry turnpike by which coal costing only 4d. per cwt. could be brought from the north-western extremity of the coalfield into Coventry.

(64) Jopson's Coventry Mercury, 27 February 1764.

By 1768 prices had moved upwards again and were particularly high in towns well away from the coal belt. Travelling in Northamptonshire and Bedfordshire the baronet was sufficiently struck by prevailing coal prices to make a special note in his diary. Coal was being retailed in Northampton itself (32 miles from Coventry) at 15d. per bushel,(65) or expressed in Griff terms, at the rate of nearly 20d. per hundredweight. Coal had long been supplied to Northampton from Warwickshire pits in exchange for supplies of malt and barley sold in Coventry.(66) Griff itself had a history of meeting some of the fuel requirements of customers in Leicestershire, Northamptonshire and Oxfordshire.(67) It is no coincidence therefore that fresh plans for reopening the colliery coincided with schemes for building the Coventry and Oxford canals. By 1770 Coventrians were obliged to pay 8d. "an hundred" for coal, which included a delivery charge of 33⅓%.(68)

Allowing for seasonal variations, bad weather, and occasional periods of surplus owing to over-production, the general price of coal had moved markedly upwards during the previous seventy years. Accurate figures for the whole of the 120 year period are difficult to obtain, particularly in view of the fact that measures of coal for sale during earlier years were notoriously variable(69) even though prices between Nuneaton and Coventry remained nominally the same for any given year. Nevertheless,

(65) From his own figures a local bushel then was equivalent to ·77 of a hundredweight.

(66) Exchequer Depositions by Commission, 36 Chas. II Mich. 43 (1684) P.R.O.

(67) Thesis (Wh.) (Part II) Chapt. 1, Sections B. and C.

(68) Jopson's Coventry Mercury, 14 May 1770

(69) Thesis (Wh.), pp. 195-198.

Griff coal retailed at the pits for an average of 6/-8d. per load in 1687, 8/- in 1701 and 10/- in 1725.(70) The first supplies of Griff coal in 1779 were sold for prices ranging between 8/-4d. and 10/- per ton of 21 hundredweights, according to quality.(71)

Despite the upward movement in prices of staples, which became very marked during the 1760s, and the weakening of the system of official wage rates(72) for rural workers, established by the County Justices, coal prices of this order were obviously too important for Sir Roger Newdigate to ignore. Given also the growing demand of the Coventry market, supplemented by that of South Warwickshire and North Oxfordshire as a result of canal building, the prospect of making a fortune as a coal-master must have been hard to resist.

Brick and tile making, to judge from passing references in the Newdigate Papers, was a less important estate activity during the eighteenth century. Clay pits and coal workings lay very close together and facilitated the production of fairly large quantities(73) of building materials such as bricks, tiles and guttering. Unfortunately, as with many details of the problems encountered with mining in later years, Sir Roger Newdigate did not maintain a comprehensive record of all the activities which took place on his estate during his lifetime. Income from brickmaking and mining more often than not disappeared into his

(70) Per load, nominally of 30 cwts.
For these years coal prices averaged 2·6d.; 3·2d. and 4d. per cwt.

(71) Fractionally under 5d. and 6d. per cwt., excluding all delivery charges.

(72) Appendix E, Table 1, Records of Proceedings in Quarter Sessions, (Warwickshire) 1763-1776.

(73) Average annual production, 1767-1770, was 250,000 bricks.

general accounts under the heading of "casual receipts". This tendency reinforces the impression gained that he was more concerned with establishing himself as a member of the aristocracy than in pursuing the goal of industrial success.

It was to individuals cast in the mould of Francis Parrott that the nascent industrial revolution in Warwickshire looked for leadership rather than to landowners like Sir Roger Newdigate who so often appeared to be gazing nostalgically after a vanishing era.

Summary and conclusion

Faulty execution of the policy of the Newdigate family for building up their estates in the Midlands resulted in four distinct phases of development during the seventeenth and eighteenth centuries. The first ended in 1665 when the then Serjeant Newdigate, having both inherited and purchased landholdings in Leicestershire, North and South Warwickshire, settled them on his son and heir, the future second baronet. The second phase, of much slower growth, closed in 1710 when the latter died, leaving a massive burden of debt to be liquidated by his son, Sir Richard Newdigate III. The third period, which lasted until 1740, was marked by the sale of lands in Leicestershire and South Warwickshire together with a period of financial stringency, in order to preserve the more important estates in Middlesex and North Warwickshire. The last period, which ended with the death of the fifth baronet (Sir Roger Newdigate) was characterised by expansion and limited, but important, industrial activity.

Sir Roger Newdigate's efforts were concentrated on the Arbury estate, near Nuneaton. Divided landholdings were gradually consolidated in a single, large unit, important mineral deposits were brought under the exclusive ownership of the family, and substantial additions were made

as a result of the Chilvers Coton Inclosure Act of 1764 and of continuing the earlier policy of buying local property whenever it came on to the market.

Self sufficiency was the keynote of the development of the estate and this was reflected in the diversification of its activities. Receptiveness to market pressures as a guide to the formulation of policy was distinctly limited. The baronet displayed no marked desire to become an entrepreneur in the mould of classical economic theory, and indeed until very late in the eighteenth century, was more typical of the conservative great landowner whose estates existed to provide for conspicuous consumption and to support his social and political roles. Not even his coalmining activities which netted him a sizeable fortune within the space of a quarter of a century have the stamp of a captain in the new Industrial Revolution.

During Sir Roger Newdigate's lifetime the family estates were placed on a firm financial basis. Resources were developed and revenues increased substantially. Nevertheless, the impression is gained that in placing too narrow a set of limitations upon general policy, opportunities for really substantial estate growth were either ignored or cast aside. And this cannot be attributed to a shortage of the necessary financial resources. Possibly this was due to memories of hardships experienced during childhood as a result of the family's efforts to repair damage done by his grandfather's ruinous living. More likely it was the consequence of his inheritance and upbringing which limited his horizons and placed a premium upon caution and survival.

Chapter 2

PARLIAMENTARY INCLOSURE ON THE WARWICKSHIRE COALFIELD DURING THE EIGHTEENTH CENTURY

Introduction

The Newdigate estate in north Warwickshire benefitted substantially from the Parliamentary inclosure movement of the eighteenth century. As a result of three private Acts,(1) two of which were sponsored by Sir Roger Newdigate himself, immediate and outright ownership was secured of 813 acres of open field, common land and waste, some of which lay very close to the line of the outcrop of the Warwickshire coalfield. These acquisitions, especially that resulting from the Chilvers Coton Act of 1764,(2) had important implications for the development of his mineral estate, his income from farm and cottage rentals, and for the future extension of his landholdings in the vicinity of Nuneaton.

The Newdigates, however, were not alone among local owners of important mineral rights to gain substantially from the inclosure movement, and it is noteworthy that no less than ten private Acts were obtained within an eighteen year span, beginning in 1756, by landowners situated between the Manor of Sowe(Coventry), at the south-eastern edge of the coalfield, and Wilnecote (Tamworth), near the border between Warwickshire and Staffordshire.

Not all of the Acts, however, dealt specifically with the problem of ownership and disposal of mineral rights. All of them dwelt upon the

(1) (a) 1731 - Attleborough and Nuneaton:- 17 acres
(b) 1764 - Chilvers Coton:- 744 acres, 30 perches
(c) 1769 - Bedworth:- 52 acres

(2) 4 Geo. III c9. See also Appendix D, Table 7 The Commissioners Award to Sir R. Newdigate

importance of inclosure as a means of improving agriculture and many emphasised the futility of making new investment in the prevailing conditions of sub-divided ownership and intermixed landholdings. Nevertheless, ownership of, and access to, coal deposits were important features of inclosure legislation, not least because the obscure wording of the legislation conceals their importance.

The purpose of this chapter, therefore, is to attempt to show how far landowners succeeded in achieving their objectives, to examine some of the factors which favoured inclosure during this period, to test the provision made for the redress of grievances, and in particular to analyse the influence of Parliamentary inclosure upon the Chilvers Coton estate of Sir Roger Newdigate. To this end the chapter is divided into two sections: the first considering the wider implications of the movement insofar as it affected landowners on or close to the working edge of the coalfield, and the second dealing more specifically with the Inclosure Act of 1764 for Chilvers Coton.

Section I

(i) Inclosure on the Coalfield, 1756-1774

Prior to 1750 inclosure of open fields, common lands and wastes proceded more generally by way of inrolment in the Court of Chancery, where the consent of all parties had previously been obtained, or by private Act of Parliament. For the rest of the century inclosure by private Act became the favoured method, partly on account of the problem of objectors and partly because of the need to settle well in advance any possible ground for dispute

arising out of the commutation of tithes.(3)

A total of 7594(4) acres of land of all types was the subject of nine of the ten private Acts listed,(5) ranging from 1591 acres for the parish of Sowe, in the then County of the City of Coventry, to 365 acres for Exhall. In several cases the amount of land surveyed and allocated under the provisions of each award varied slightly from that mentioned in the parent Act or in the initial Petition presented to Parliament. This was particularly the case in Chilvers Coton where the final difference amounted almost to 100 acres. Nevertheless, allowing for these fine distinctions, a substantial amount of coal-bearing land, and land carrying important access rights, was the subject of busy inclosure during this eighteen year span. Given the growing importance attached to mineral deposits and rights in the 1760s, principally on account of new demand for coal in Coventry and the surrounding districts, this total must be regarded as a particularly valuable portion of the 116,919 acres claimed(6) as having been inclosed in Warwickshire between 1726 and 1802. This is all the more so since the price of provisions locally rose substantially during the same decade, placing a premium upon efficient and profitable farming in the same localities.

(3) Where clergymen were involved in tithes an Act was thought necessary to establish the compensation in land beyond revocation.

H. Homer: An Essay on the Nature and Method of Ascertaining the Specifick Shares of Proprietors upon the Inclosure of Common Fields 1766. p.43.

(4) Excluding Bulkington where the area of land to be inclosed was reported as 36 yardlands.

(5) Appendix C, Table 1, A Chronology of Parliamentary Inclosure on the Warwickshire Coalfield, 1756-1774

(6) G. Slater: The English Peasantry and the Enclosure of Common Fields, Appendix B.

What were the reasons for so concentrated a period of inclosure?

In all of the Acts examined standard criticism was made of the fact that landholdings lay intermixed and dispersed and could not be farmed advantageously in existing circumstances. In the case of the Sowe inclosure,(7) for example, it was claimed that land was incapable of general improvement, that little profit was gained from investment and that trespass and disputes were a commonplace. Petitioners in Atherstone,(8) at the opposite end of the coalfield, complained inter alia that cattle drovers along the Watling Street on the way to London ruined their efforts, whilst the centrally-placed Sir Roger Newdigate (Chilvers Coton) claimed for himself and his supporters that common land and wastes were but of "small advantage".(9) It is evident from all the relevant sources that the most important reason advanced for inclosure was the desire to improve agriculture and, incidentally, to take advantage of the rising prices for cereals, meat and coal.

The importance of coal deposits and rights, however, was a subject in four of the ten Acts,(10) of which the most important was that for Wilnecote in 1758(11). The principal petitioner (Lord Weymouth) in this instance subsequently met serious opposition, both active and passive, from owners

(7) 29 Geo. II C36

(8) Compton-Bracebridge MSS: HR 35 (Unnumbered papers) W.C.R.O.

(9) J.H.C. XXIX, p. 693

(10) Wilnecote, Chilvers Coton, Bedworth, Foleshill.

(11) 31 Geo. II C34

of land directly over the coal seams. As a result, a supplementary private Act had to be obtained nine years later to compel the recalcitrant occupiers to fall into line with his plans for a major new colliery undertaking in the area. In his Petition to Parliament,(12) on this occasion, complaint was made that neighbouring proprietors, being careful to observe the letter but not the spirit of the 1758 Act, prevented him from digging soughs and carrying levels "without which the Coal Mines cannot properly be worked"; that roads and tracks were in a ruinous condition and should be repaired; that wayleaves should be made "by the several Persons who ought to make and support the same" and that his lordship had so far expended nearly £4000 and had little to show for his efforts. It is evident, therefore, that whereas the division and allocation of land could be determined accurately and finally by the normal inclosure procedure, dissentients could prolong their opposition in a variety of ways where the working of minerals was concerned.

Further to the south-east less trouble was encountered where mineral deposits were concerned because nearly all of them were either owned or controlled by substantial landowners. The independent mining "companies" of the earlier years of the eighteenth century, who had sometimes been able to purchase or lease single coal pits and work them in their own way, had virtually passed into history.(13) Where coal was mentioned in particular Acts, this was largely done to confirm existing proprietors in possession.

Under the provisions of the Chilvers Coton (1764) Act, for example, coal-bearing land was reserved to the current owners, which effectively meant Sir Roger Newdigate. In Bedworth (1769), division and allocation was ordered

(12) J.H.C. XXXI, pp. 102-3

(13) Thesis (Wh.), pp.36-37

to be made "with a just Regard to any Mines or Delphs of Coal, Lime or Stone.....", again with the intention of confirming the current owners in possession. Additional provision was made for them to cross newly-inclosed land in order to enter any coal pit or pits to search for signs of trespass by any one proprietor on the coal deposits of another. As in the case of Chilvers Coton this meant that the hold of the one major coalowner in the locality, the Nicholas Chamberlaine Trust, was strengthened by the relevant clauses of the Act.

In the case of the Foleshill inclosure Award (1775) the allocation of common field land in Little Sydnall Field(14) also affected the ownership of important coal deposits. Coal bearing land was ordered to be divided into distinct lots "by Metes and Bounds" and granted to existing proprietors according to the value of their holdings, together with access "at their free Wills and Pleasures" to any pit for the purpose of checking infringements. In this case also the interests of the greater landowner (the Hawkesbury Colliery undertaking of Parrott and Company) were protected.

(ii) General factors influencing the Parliamentary inclosure movement

The increase in the local price of coal during the period 1754 to 1774 was undoubtedly one reason why owners of mineral rights showed special interest and were ready to take advantage of inclosure procedures to squeeze the few remaining small proprietors who had any claims to ownership of, or access to,

(14) See Map 5

the coal seams[15]. It would, however, be an error to suppose that it was the sole or even the main factor behind the rash of inclosure Acts during this period.

Frequent complaints at that time in the local newspaper[16] about the rising price and growing scarcity of provisions are supported by an analysis[17] of the movements of cereal prices in the London market and quoted by that newspaper for the guidance of local farmers and merchants. Four of the ten Acts listed[18] were passed during a five and a half year period when wheat prices at times more than doubled, and barley, rye and oats prices moved in sympathy. The dates of three later awards[19] coincided with a fresh upward movement in cereal prices which began in 1770. It is fair to suppose, therefore, that the criticisms of open field and common land farming, voiced so clearly in the Petitions for all these Acts, reflected a desire by landowners in general to improve the condition of agriculture in order to take advantage of market conditions.

Many of the factors which influenced the inclosure movement more widely in Warwickshire were reflected in Leicestershire at this time.[20] The

(15) The importance of any small plot of coal-bearing land could not be gauged by the estimated value of any minerals it contained. Its position in the middle of a working area, together with the ability of a troublesome owner to deny wayleaves or prevent soughs or levels being driven through his land, could raise its value disproportionately.

(16) Jopson's Coventry Mercury (1760-1774) passim.

(17) See Chart II

(18) In this case Exhall, Atherstone, Mancetter, Chilvers Coton. See also Appendix C, Table 1, A Chronology of Parliamentary Inclosure on the Warwickshire Coalfield, 1756-1774.

(19) For Bedworth, Bulkington and Polesworth.

(20) H. G. Hunt: A Chronology of Parliamentary Enclosure in Leicestershire Ec. H. R. (Sec. Ser.) X, (No. 2) 1957.

decline in cattle diseases which had ravaged the countryside in earlier years, and which very possibly had been noted by protagonists of inclosure in Atherstone(21), together with a widespread rise in meat prices, promised a better return on capital expended on pasture than for many years previously. That indeed cattle and sheep farming did increase and improve following inclosure in the southern and eastern parts of Warwickshire was confirmed by a local observer who was keen to note the "principal improvers" in all parts of the county(22).

Additional factors favouring inclosure in both Warwickshire and Leicestershire included the availability of finance at low rates of interest to those who could offer good security. This, together with the fact that to be successful inclosure Petitions required the support of a majority of landowners(23), helped to strengthen the hold of a select body of relatively well-off proprietors of agricultural land and mineral rights.

The psychological effects of neighbouring inclosure also should not be discounted for this was undoubtedly taken into account by the supporters of inclosure in Atherstone(24). Likewise, the development of turnpikes and, to a lesser extent, canals effectively widened the market to enterprising proprietors.

(21) Compton-Bracebridge MSS., supra, footnote 8.

(22) J. Wedge: General View of the Agriculture of the County of Warwick, with observations on the means of its improvement (1794) pp. 11; 20-21.
Wedge was Agent to Lord Aylesford, at Packington.
A later writer (A. Murray in 1815) enthusiastically, and perhaps with pardonable exaggeration, claimed that "land that formerly kept a few half-starved sheep is now yielding abundance of both grass and corn."
A. Murray: General View of the Agriculture of the County of Warwick, (1815) p. 62.

(23) Calculated on the basis of acreage or by value reflected in Poor Rate and Land Tax payments.
In the case of Chilvers Coton calculations were made on the basis of the Land Tax assessments for 1762.

(24) "The Manor is on every side surrounded by inclosed Lordships." Compton-Bracebridge MSS; HR.35

(iii) Dissent and Appeal

According to J. M. Martin:

"Very commonly, the social consequences of enclosure (in Warwickshire) in the eighteenth century were both considerable and painful"(25). Whilst there is some evidence from inclosure along the coal belt to support this claim, much of the hardship which the very small owners experienced stemmed from shortcomings in the legal provisions of the relevent Acts rather than from action subsequent to inclosure. In the appointment of Commissioners; in the apportionment of costs consequent upon each award; in the requirements for hedging, ditching and inclosing individual allotments, and in the provision for appeals against the findings of the Commissioners, the lesser farmer, the smallholder who could not prove his claims and the peasant who possessed right of common but no title to land all tended to fare badly. It must be remembered that the general setting of inclosure was facilitated by a Legislature in which the landed interest was paramount. The appointment of Commissioners was weighted in favour of the larger proprietors by virtue of a right of nomination. And since the latter paid the piper it was perhaps inevitable that they would call the tune in good time. This sorry picture, however, has often been the subject of serious exaggeration by historians of the inclosure movement who have "found it hard to describe the landowner as anything but the villain of a social melodrama"(26) and who have tended all too frequently to concentrate upon the problems of a minority(27) (albeit a sizeable one) whilst conveniently ignoring the growing food and fuel

(25) J. M. Martin: The Cost of Parliamentary Enclosure in Warwickshire, U.B.J. IX, (1963-64), p.144

(26) D. Spring: English Landed Society in the Eighteenth and Nineteenth Centuries, Ec.H.R. (N.S.) XVII, (1964-65), p.147.

(27) G. Slater: op. cit. p.266

"An increase in the quantity of human life is attained at the expense of a degradation in its quality".

requirements of the community in general. Nevertheless, the process of inclosure did result in serious injustice which was sometimes to be found even where appearances suggested the contrary.

In the records of Parliamentary procedure leading to five[28] of the listed Acts no objectors appeared before the relevant Select Committee. This would appear to suggest that such objections as might have been made earlier in each case had collapsed for lack of support. Nevertheless, in each instance objection, some of it strenuous, had indeed been made. For example, in the case of the first Wilnecote Act (Wilnecote I), seven proprietors of 84 acres were listed in the Petition[29] as opponents of the Bill. Six persons fought against the proposed 1767 Act (Wilnecote II) whilst four absented themselves out of a total of twenty seven interested parties. Two years earlier the owners of one and a half yardlands in Sowe (Coventry) dissented[30] but failed to press their objections. In the Chilvers Coton Petition[31] four objectors were mentioned but only two of them continued to oppose the Bill actively in the neighbourhood. In this case the attitude of all persons directly concerned with the Bill was noted by Sir Roger Newdigate, together with a careful estimate of the size of their holdings.[32] Finally, in Bulkington the owners of four and a half yardlands refused to sign the Petition.

(28) This does not include the second Wilnecote Act of 1767 (Wilnecote II) which had been stoutly opposed locally. The five Acts concerned were for Sowe (1756); Wilnecote (1758); Exhall (1761); Chilvers Coton (1764) and Bulkington (1770).

(29) J.H.C. XXVIII p.202

(30) J.H.C. XXVII p.500

(31) J.H.C. XXIX pp.852-3

(32) Appendix D, Table 3, "Proprietors of the Lands in the Parish of Chilvers Coton".

How far should non-appearance before an important Committee be regarded as a collapse of opposition? Given that the inability of many in Chilvers Coton and Bedworth to read and write or even sign their names properly[33] be regarded as the rule rather than the exception for a large part of the county, it is probable that the vast majority of small objectors were incapable of presenting a case properly[34]. Except for those engaged in trade or the professions, many spoke a different language - that of the peasant proprietor, and were almost certainly too poor to afford legal representation.

More serious criticism may be lodged against provisions for appeal against the findings of the Commission of Inclosure. The Chilvers Coton Act decreed that all persons entitled to any part of the newly-enclosed land "shall accept his.....respective Allotment and shares within.....six months after the execution of the Award and upon notice". Those who neglected or refused were to be "totally excluded from having or receiving any Benefit..... Cottagers and small proprietors were to have allotments (with their consent and as the Commissioners thought proper), or a "reasonable Sum of Money" to be paid by the baronet who would thereby become the new owner of such allotments. Whilst there is no firm evidence for assuming that the baronet took undue advantage of his position as dominant landowner in the parish to put pressure on smallholders, his keenness to purchase land locally was widely known at the time. It may well have been the case

(33) Reports Commissioners on the Employment of Children and Young Persons in the Mines of Warwickshire.....(1842), Evidence (No. 62) of Benjamin Stratton.

(34) As the "punch line" following a list of grievances, objectors at Atherstone added rather pathetically that inclosure would lead to "depopulating the Town whereby the Lord will also be a sufferer".

that pressure was indeed applied in some cases, to judge by discrepancies between his own list of proprietors before the Act[35] and then those mentioned in the Award in 1765[36].

Redress in the courts was severely curtailed. Generally speaking appeal was limited to sittings of Quarter Sessions in the areas affected, which tended to ensure that the interests of the major landowners would be given a sympathetic hearing by the Bench. In certain cases no adequate provision for appeal beyond the Commissioners was even made. In others, however, emphasis was placed upon restriction. In the more extreme cases[37] even the right of the courts at Westminster to intervene by the exercise of prerogative remedies (specifically by Writ of Certiorari) was carefully excluded by the provisions of the Act.

In summary, the nature of Parliamentary representation, the Parliamentary inclosure procedure and existing legal machinery all combined to make life difficult for those small owners who cared to dispute the findings of the Commissioners. It is from these facts, together with over-dependence upon the goodwill of the greater landowners, that real social injustice stemmed rather than from the desire of landowners to improve the profitability of their holdings.

(35) Appendix D, Table 3, "Proprietors of the Lands in the Parish of Chilvers Coton".

(36) Appendix D, Table 6, Chilvers Coton Inclosure Award, 20 Sept. 1765.

(37) e.g. for Wilnecote (1767) and Nuneaton (1802).
It was expected that any disputes would, in fact, be settled by the Commissioners themselves who therefore constituted both Committee of Assessment and Appellate Tribunal.

Section II

(i) The inclosure of Chilvers Coton (1764)

The growth and development of the Newdigate estate in the north Warwickshire parish of Chilvers Coton (Nuneaton) benefitted more from the process of Parliamentary inclosure during the eighteenth century than from any other single cause. As a result of the Award promulgated by the Commissioners of Inclosure under the provisions of the 1764 Act(38), Sir Roger Newdigate's landholdings were increased by 744 acres (26%) to a new total of 3590 acres, representing 88% of the entire acreage for the parish. Together with additional land went access to important coal deposits which had previously been controlled by the Trustees of the Francis Stratford estate, but which is not immediately apparent in the wording of either the parent Act or the subsequent Award.

Chilvers Coton was already substantially inclosed by 1763 when the first proposals were made for a private Act of Parliament. Seven proprietors, according to Sir Roger Newdigate's own estimate, owned a total of 2926 acres in the parish, of whom the most important by far was the baronet himself.(39) Of his 2845 acres of land "anciently" inclosed, 1636 were distributed between three manors(40), 831 were covered by

(38) 4 Geo. III C9.

(39) Appendix D, Table 1, Proprietors and land holdings in.....Coton already inclosed by 1763.
Fractions of acres have been excluded from the narrative but included in the relevant tables.

(40) (i) Arbury Moorbarn (ii) Griff and Coton (iii) St. John in Jerusalem

woodland and 378 represented the estate formerly belonging to the Earl of Coventry which had been purchased in 1761 for £7,750. The remaining six proprietors owned very small portions, ranging from 35 acres in the case of the lessees of the Stratford estate to 2 acres for the representative of the Trustees of the Nuneaton Meeting House.

According to the baronet's own estimates(41), which differed by more than a hundred acres from the area actually surveyed and divided by the Commissioners, the open field, commons and wastes of Chilvers Coton in 1763 amounted to 1125 acres. Of this total 640 acres belonged to three fields on the northern edge of the estate(42), 141 acres were situated in Ciney (or Sinney Field) an extra parochial field west of Attleborough, and 343 acres were devoted to commons or waste land. Altogether forty nine persons laid claim to 3719 acres of land in the common fields and ancient inclosures.(43) Only three of these, one of whom was the baronet, possessed more than 50 acres each, forty one had portions which never exceeded 10 acres apiece and twenty three(44) shared 5 acres.

No data are available for the numbers of persons who exercised the common rights of pasture, estover or turbary(45), whether by inheritance or propinquity, and who might be thought to have had a claim upon the commons or wastes. Nor is there any evidence to suggest that numbers of squatters

(41) See Appendix D, Table 2,
Common Lands and Waste Grounds in the Parish of Chilvers Coton in 1763

(42) Map 1 and Map 4

(43) Appendix D, Table 3,
"Proprietors of the Lands in the Parish of Chilvers Coton".

(44) Included in the list of those who held less than 10 acres.

(45) (i) Common of estover: the right to take wood from the wastes or forests of the manor for sundry purposes.

(ii) Common of turbary: the right to cut peat or turf.

might be involved in the proposed changes. Sir Roger Newdigate was evidently content to confine his attention to those with specific claims to land, however small, and to rest his case upon the strict application of the law. That this was to result in a number of "casualties" is clear from the clauses of the 1765 Award which allotted the land in question to thirty two proprietors(46).

Proposals for inclosure were initially made by the baronet in 1763(47) and it is clear from the tenor of his recommendations that he had already given lengthy consideration to the matter and was prepared to take an inflexible stand on what he imagined to be his rights. Two Commissioners were suggested by him, one to be appointed by himself as Lord of the Manors involved, impropriator of great tithes and chief proprietor in the parish. The remaining forty eight interested parties were to have one. Substantial demands, most of which were eventually accepted by the other proprietors, were also made by him for land in the open fields, commons and wastes (infra) in commutation of tithes as well as for an additional allotment in view of his existing holding of 420 acres therein.

The proposals met heavy opposition. In the first place the Trustees of the Francis Stratford estate, led by Mrs. Stratford, objected to the claim for $\frac{1}{7}$ of the commons and wastes since this would, by implication, prejudice their own right to "a Mine of Coal now in lease to Mr. Fletcher"(48). "As you cannot be entitled to any part of the Mine", wrote the correspondent,(49)

(46) Appendix D, Table 6, Chilvers Coton Inclosure Award, 20 Sept. 1765

(47) (i) CR136/B5239
(ii) CR136/C1239

(48) This was Richard Geast's mine leased to John Fletcher, the production totals of which are recorded in Appendix O, Table 1, "An Account of Coals got and sold.....at Analey and Nuneaton, 1757-1768".

(49) Correspondence: CR136/B5336, R. Geast to Sir R. Newdigate, 22 Feb. 1763.

and "it w'd be very difficult to ascertain the value", it might be considered solely as land and divided accordingly in favour of the baronet, which "w'd be inconvenient to both parties". The Trustees were evidently taking no chances. It was suggested that the status quo regarding the 35 acre site be preserved and that a clause to this effect be inserted in any inclosure Bill. Unfortunately, the outcome of this particular dispute is not clear from subsequent records. Nevertheless it is one example of the means by which access to mineral rights could be cloaked in the disguise of a fair division of surface land, especially where the coalworks in question were apparently profitable and where the right to control exit and entry could itself yield a useful wayleave rent.

That other objections were lodged at this early stage in proceedings is evident from a lengthy answer drafted(50) by the baronet in reply to critics. Their suggestion for three Commissioners, doubtless to place a majority on their side, was turned down with disdain. Were three to be appointed, he himself would, considering the "Weight of Property.....then name two of the three". By way of compensation in the case of disputes he offered the right of the two Commissioners to name a third, which would, in any case, have kept effective control over the division and allotment of land in his favour.(51)

A crafty attempt by the opposition to eliminate his claim to 1/7 of the acreage of the outwoods and commons by virtue of his right as

(50) CR 764 (unnumbered paper)
"Answer to Queries with regard to the Proposals for enclosing of Chilvers Coton."

(51) In the final event five Commissioners were appointed.

impropriator of great tithes, on the grounds that common land was uncultivated and that he therefore received nothing[52], was given short shrift. Disputed use of the 1762 assessments for Land Tax was met with the claim that, "it is the most reasonable method in this case, as the small Freeholders are generally higher taxed than the Large Ones, the weakest goes to the Wall, their prosperity is better known and more easily valued"[53]. Criticism of his claim to 1/7 of the inclosed as well as the uninclosed land in the common field by virtue of his position as impropriator of great tithes was countered by an assertion that ¼ or even 2/7 of the whole acreage therein would have been entirely reasonable to maintain his profits. Complaints about arrangements for the isolated Ciney Field were met with an offer to buy out any dissatisfied proprietors, and a resolute claim was made by him to the herbage of all the new highways.

This reply apparently had a cool reception from most of the other parties concerned for a further set of proposals[54] was made by him, rather more conciliatory in tone although conceding little of substance where his personal interests were concerned. Beginning with a defence of earlier, old inclosures, he agreed to relieve the respective proprietors of the common fields, the commons or wastes, the old inclosures and of the wastes "from all Demands of

(52) He did in fact receive £51.10s 6d. in great (rectorial) tithes in 1763 - some of which were taken in kind.

(53) Supra, footnote 50

The baronet's attitude towards the weaker members was somewhat ambivalent. Whether or not he was dismissing these proprietors or merely implying that any alternative method to the Land Tax assessment would result in their ruin is uncertain. To judge from the Award and later protests by the Vicar of Nuneaton, however, it would appear that little real attention was in fact paid to the interests of the small man.

(54) CR136/C1240

Small as well as Great Tythes and will be at the Expence of Ringfencing and will pay his share of the Expence of the Act and for such allotments both of which are commonly paid by the Proprietors" in return for their conceding the demand for $^1/_7$ of the acreage of each of the areas concerned. Such generosity, however, was more apparent than real. Inclosure commissioners invariably apportioned the costs of obtaining the necessary Act and producing the Award between all of the proprietors with due regard for the size of individual allotments.

Consent was also given by the baronet in the same set of proposals for specific exchanges of land and to the inclusion of a clause in a possible Bill to impower all proprietors to make further exchanges on completion of an award. A final warning was given that the baronet considered "his demands as Lord of the several Manors.....to be reasonable and no more than Usual" and that if his proposals were not accepted he was "determined to think no more of Enclosing the Parish of Chilvers Coton".

Opposition to the proposed Bill appears virtually to have ended after this formidable threat since no inclosure was possible without the active support of the Lord of the Manor and chief landowner in the parish. According to the Petition(55) drawn up by the supporters of the Bill only four objectors cared to be listed, two of whom refused to sign but were content to leave it at that, and two who thought inclosure "would hurt the Poor"(56). As in the case of the other inclosure Bills concerned with land in the mining area, no one appeared before the Select Committee to state and explain his

(55) Appendix D, Table 4, Chronology and Summary of Chilvers Coton Inclosure, 1764-65

(56) The steward of one absentee landlord (H. Aston) was prepared to offer no objection on his master's behalf.

objections. All four of the objectors mentioned[57], however, survived the Commissioners' findings, although in three cases out of four did so with reduced landholdings.

A similar experience awaited most of the remaining proprietors when the Award became known[58]. Thirty one persons shared 259 acres, ranging from 110 acres at one end of the scale to 7 perches at the other. No direct reference was made to mineral deposits or to rights of access of any sort compared, for example, with the Bedworth Inclosure Award. This implies that some sort of settlement had been reached between the baronet and the Trustees of the Francis Stratford estate during the course of the previous two years. The detailed clauses whereby the baronet secured ownership to 744 acres, however, reveal the extent to which his original demands and conditions had in fact been met.

"In right of his Royalty as a compensation for his ownership, right and interest in and to the soil of the s'd Commons or waste ground....." he received all cottages,[59] gardens, orchards and encroachments thereon together with adjoining plots, totalling 21 acres. 91 acres of common (open) fields were received as compensation for great and small tithes, 277 acres followed for his share in the town lands and as proprietor of lands with commons, and a further 14 acres were granted in lieu of tithes in part of the old inclosures. The remainder of Chilvers Coton Common (239 acres)

(57) Appendix D, Table 3, "Proprietors of the Land.....Coton".

(58) Appendix D, Table 6, Chilvers Coton Inclosure Award, 20 Sept. 1763

(59) Some of which he already owned.

together with a small heath (3 acres) also passed into his hands, the final result being the addition of a block of land totalling 646 acres to the northern part of the estate.(60) Finally, a further 97 acres in the isolated Ciney Field, east of Nuneaton, were allotted to Sir Roger Newdigate, partly for a share in the town lands.(61) Provision was also made for the setting out of twenty six public(62) and private roads and footpaths.

(ii) The Costs of Inclosure

The financial costs of inclosure may be divided into two parts: that imposed by the Commissioners(63) which more generally had to be paid within a very short space of time, often only a month, and those arising from the physical burden of securing each individual allotment.

The Commissioners' bill of costs for the parish amounted to £786, an average of 15·7 shillings per acre,(64) whilst the baronet's share totalled

(60) Map 1

(61) Fractions of acres have been excluded from the narrative but included in the relevant tables.
See also Appendix D, Table 7, "The Commissioners' Award to Sir R. Newdigate"

(62) Appendix D, Table 5, Public Roads required to be built.....Coton.

(63) Based upon the cost of obtaining the parent Act, for surveying, dividing and allotting lands, for preparing and inrolling the Award and for "all other charges and expenses in, about and belonging to the premises."

(64) By comparison the average cost of inclosing 1591 acres in the parish of Sow in 1757 came to 13 shillings.

According to J. M. Martin the average costs for Wilnecote, Exhall, Bedworth and Foleshill, all situated along the coal belt, were respectively (in shillings) 20·6; 15·5; 39·7 and 26·7.

J. M. Martin: Warwickshire and the Parliamentary Enclosure Movement, (unpublished Ph.D. thesis) Birmingham 1965.

£548.10.4d. (14·6 shillings per acre). That for many of the other proprietors, however, was proportionately very much higher. Phillips Farmer, for example,[65] was called upon to pay £4.2.10d. for slightly over 2½ acres, an allotment which, to all intents and purposes, was only half in size to that credited to him by Sir Roger Newdigate himself in 1763.[66] Likewise, William Paine[67] was charged 16·75 shillings for a plot which covered less than three quarters of an acre, whilst Henry Buswell had to pay a bill of two shillings for ten perches of land. In the latter case the real cost worked out at the rate of thirty two shillings per acre, more than double that which was charged to the principal beneficiary under the Award. A more accurate assessment of the true financial burden of costs for each proprietor, however, is impossible on account of the apparently arbitrary method employed by the Commissioners in their assessments.[68] Nevertheless, the fact remains that Sir Roger Newdigate was one of the more fortunate proprietors insofar as his own bill was, in terms of proportions, one of the lowest on the final list.

Being presented with a bill for payment is one thing: being granted little time in which to pay it tends to increase the imposition. The Chilvers Coton Award was promulgated on 20 September 1765 and the Commissioners required payment to be made by the first day of the following October.

(65) See Appendix D, Table 6, columns 6 and 7 (Inclosure Award)

(66) Appendix D, Table 3, item 10. Proprietors of the lands.....Coton.

(67) Appendix D, Table 6, item 16. Chilvers Coton Inclosure Award

(68) Possibly this sort of thing was borne in mind by the Rev. Henry Homer of Birdingbury, a Commissioner in more than twenty Warwickshire awards, when he inveighed against the system of selection of Commissioners which often resulted in "Persons of mean Education" being given responsibility for "the adjusting of Property of forty or fifty thousand Pounds Value".

H. Homer: An Essay..... . (1766) p.vi

Possibly this was an error in this case, and proprietors were to be allowed until the autumn of 1766 in which to make their payments. According to the letter of the law, however, the Commissioners were clearly in a position to enforce payment within the space of eleven days had they so wished, and in any case were amply impowered by the provisions of the Inclosure Act itself to levy distress and sale, where recalcitrant owners were concerned,(69) and to make such extra charges as they thought fit for all costs attending such action.

A further requirement of inclosure awards was that allotments were to be hedged and ditched within a period of one year. Herein lay a further source of difficulty for the smaller proprietor since not only did he frequently have to bear a proportion of the cost of hedging and ditching the vicar's allotment(70) in addition to his own but the very smallness of his portion obliged him to fence and ditch on at least two sides. The larger landowner, on the other hand, would frequently discharge his obligations by ringfencing.(71) Additionally, the cost of inclosing open field land could, in certain cases, be substantially higher than for commons and wastes.(72) Given all these variables the real financial cost of inclosure in the parish will probably never be known. Nevertheless, in the case of

(69) Excepting only the Vicar of Chilvers Coton and the local Overseers of the Poor.

(70) And in the case of Chilvers Coton maintain it for the first seven years after inclosure.

(71) A local observer calculated the cost of inclosing a single acre of land as £1 2s. 4d., a sum which became proportionately less the larger the area to be inclosed.

Compton-Bracebridge MSS. H.R.35.

(72) W. E. Tate: The Cost of Parliamentary Enclosure in England, Ec.H.R. (Sec. Ser.) V (No. 2) 1952. p.265

Sir Roger Newdigate the cost of hedging, ditching and fencing the new extensions to his estate are known[73] to have more than doubled[74] the initial inclosure charges, amounting to £606 7s. 7¼d. spread over a period of four years, and averaging 16.4 shillings per acre. Thus, if one ignores expense possibly incurred in the building of new farm houses[75] his average cost per acre in the final analysis amounted to 32 shillings.[76]

The general impression is gained that the provisions of the Chilvers Coton Award were harsh in many respects in comparison with those for neighbouring Bedworth, Foleshill and Sowe. Possibly this may be explained by the power and influence of the baronet and by the desire of the Commiswioners to please the most important landowner in the area. The fact remains that of the forty nine proprietors listed by him in 1763 barely two-thirds (including himself) survived in the Award. Of twenty three

(73) CR136/V/119. See also Appendix D, Table 8. Sir Roger Newdigate's own estimate .....cost of inclosure.

(74) J. M. Martin's claim, based largely on an analysis of inclosure in south and east Warwickshire, that "the expense of actually making the enclosures normally doubled at least the total (i.e. Commissioners) costs" is entirely reasonable for the coalfield area.

(75) Many landowners built new farm houses, a common item in enclosure expenditure, writes J. M. Martin. "It would therefore be quite misleading to consider that the total cost of enclosure.....was represented by the sums recorded in the Commissioners' accounts." Whilst these claims themselves are perfectly valid, it is nevertheless unwise to include new building under the broad heading of inclosure costs. Decisions to build or not were dictated by individual farming policies and such building expenditure as was incurred should more correctly be imputed to subsequent new investment.
J. M. Martin: The Cost of Parliamentary Enclosure in Warwickshire, loc. cit., p. 155.

(76) The Chilvers Coton Act did make provision for borrowing in order to meet inclosure costs up to a limit of £3 per acre.

persons stated[77] to be holding "tenements with gardens or small parcels of land, some of which have right of common", totalling 5 acres, seventeen are named in 1765. Likewise, all the cottages, orchards grounds and encroachments in the wastes amounting in all to 21 acres were handed to the baronet[78] by virtue of his right of "Royalty of the soil", as Lord of the Manor. No provision was made for the preservation of common rights where these were not linked to ownership of land, however small. Likewise no new building of cottages proceeded as at Foleshill, to provide housing for displaced persons. Similarly, no allowance was made, as in the Sow Inclosure Award,[79] for the allocation of land to the local poor to keep a few animals.

(iii) Inclosure, Rents and Profits

What effect did the addition of 744 acres of land to the estate have upon the rents and profits of Sir Roger Newdigate?

A number of important factors require prior consideration. In the first place none of the land in question should, strictly speaking, be regarded as a "gift". Prior to inclosure 420 acres in the open fields, commons and wastes were either worked or leased by the baronet. The remaining acreage was received in lieu of rectorial (great) tithes,

(77) Appendix D, Table 3, "Proprietors of the Lands.....Coton".

(78) But see footnote 59, supra.

(79) 30 acres of land were allotted to the "poor of the said parish of Sow", to remain uninclosed and in common, so that each (poor) person could keep one cow, or two yearling calves or four sheep "and no more".

admittedly low on account of the current level of cultivation and often taken in kind, and as a composition for vicarial (small) tithes for which he himself had to pay an agreed annual sum to the Vicar of Chilvers Coton.(80) Secondly, 1765 was a year when rents tended to rise over the whole estate, affecting areas both long and newly inclosed,(81) but with notable results where the latter were concerned. Thirdly, it is impossible to say when and where specific rent increases were the result of additions of land to the holdings of existing tenants, which would, in many cases, have improved their earning capacity. It is nevertheless an indisputable fact that farm, cottage and small rents did rise considerably over the space of two to three years.(82)

Receipts from farm rents rose sharply from £312 in 1764 to £504 in 1767 whilst small rents jumped from £105 in 1764 to £168 in 1768. In both cases yields then settled down at a new high level. By comparison farm rents in the Manor of Arbury rose at a rate barely 25% of that which obtained in Chilvers Coton, whilst small rents moved upwards only half as fast as the Arbury farm rents.(83) Total incomes from all sources for the manors of Chilvers Coton and Arbury increased from £641 and £891

(80) £35

(81) See Chart III

(82) At the same time, county Justices (of whom Sir Roger Newdigate was one) made a resolute attempt to hold wages at the level fixed in 1730 for a wide range of rural workers. No adjustments were made to the official rates until 1777 and even then these were by no means comprehensively reviewed.
See also Appendix E, Table 1, Records of Proceedings in Quarter Sessions (Warwickshire) 1763-1776.

(83) Situated in the central and more southerly part of the estate, away from the inclosure area.

respectively in 1763 to £908 and £1028 by 1770.(84) Quite apart from any longer term benefit which might have accrued from planning estate activity on a larger scale, it is clear that Sir Roger Newdigate did gain immediately and substantially in terms of income as a result of the Chilvers Coton Inclosure Act of 1764 and the subsequent Award.

Summary and conclusion

Parliamentary inclosure was an undoubted boon to ambitious and energetic landowners. It also operated to the advantage of the coalmasters, tending to reinforce the already markedly oligopolistic structure of mine ownership in the county. And in the task of extending estates and consolidating their hold upon valuable mineral deposits, Parliament, inclosure procedures and the machinery of the law all favoured the greater proprietors. Nevertheless if it seemed that these were united in a common approach to the object of enlarging their possessions, their profits and their rents, it is clear that appearances were not always coincident with realities, especially where coal was concerned.

Sir Roger Newdigate benefitted from local inclosure perhaps more than any other single owner, not least because his landholdings increased immediately by more than a quarter. The concern which he displayed in harmonising support for the inclosure of Chilvers Coton should not distract us from the fact that he was a powerful landowner and influential leader of society,

(84) Appendix F, Table 2, Gross Receipts from all Warwickshire Sources.

apparently well able to take a strong line with objectors yet shrewd enough to recognise the importance of co-operation where possible to reduce such opposition as existed to an impotent minority.

Many small proprietors undoubtedly suffered from the provisions of the Award. It is also possible that the position of those who were granted allotments of land by the Commissioners grew worse in some cases until, in due course, shrunken holdings which earlier had been marginally viable were put up for sale.(85) But the question how far inclosure itself can fairly be blamed for the distress which followed implies a measure of support for the continuation of a system of inefficient and fragmented peasant ownership prejudicial to the welfare of the community in general.

"But times are alter'd; trade's unfeeling train
Usurp the land and dispossess the swain."(86)

Given the social, economic and political conditions of the day this was perhaps the only way in which the growing food and fuel requirements of a nascent industrial society could be assured.

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(85) No marked increase in insolvencies followed inclosure in Chilvers Coton. The baronet's own figures for the years 1763 to 1773 were as follows:- 1; 3; 1; 2; 3; 1; 1; 3; 2; 0; 2.

(86) Oliver Goldsmith: The Deserted Village.

Chapter 3

PROFIT - OR LOSS?

Introduction

The existence of a market is the prime raison d'etre of all business activity. Yet is is a truism that the progress of the market over a lengthy period of time, and of the competing firms within it, is generally far from smooth. The business methods of the fat and the lean years are not necessarily identical and what suffices to reap success and profit during years of expansion may indeed prove to be quite inadequate to prevent disaster during a recession. "Factors which prevent economic decline and shrinkage are often just as important as those which make for growth."(1) Where these include sophisticated techniques of cost control and careful attention to the art of selling, business prospects are immeasurably brighter than when reliance is placed by firms upon public shortages and artificially contrived situations of short duration to being them prosperity.

The first task of this chapter is to analyse the accounting methods employed by Warwickshire coalmasters, especially those of Sir Roger Newdigate, and to see how far they contributed positively to success or staved off failure. The second is to examine the estate accounts of Sir Roger Newdigate during the second half of the eighteenth century, his principal sources of income and the manner in which he disposed of it.

(1) N. McKendrick: Josiah Wedgwood and Cost Accounting during the Industrial Revolution.
Ec.H.R. (Sec. Ser.), XXIII No. 1. 1970

Section I

Methods of accounting used on the Warwickshire Coalfield, 1750 - 1810

Data on business methods employed locally exist for three colliery undertakings; Griff, Hawkesbury and Nuneaton (Haunchwood). Those for Sir Roger Newdigate at Griff are fairly substantial and are summarised in an impressive-looking book of estate accounts which closes at 1796.(2) Distinctly different records are available for Francis Parrott and partners at Hawkesbury(3) and for the Geast family who were concerned with Haunchwood Colliery.(4) Both of these are considerably smaller than the Newdigate records but nevertheless sufficient evidence has been made available to show that business methods varied widely and that standards of administration between different concerns had little in common. A wider sample might, given available primary material, confirm the impression gained from existing sources that the Warwickshire coal industry stood very much at the crossroads of development at this time. Technologically, great advances were being made, and there was no lack of enterprise displayed in developing certain aspects of mining to the highest levels then possible. And yet it was in terms of business methods,

(2) CR136/V/119

(3) Principally Hand, Morgan, Bourne MSS. 31 W.S.L.

(4) Dugdale Muniments, passim. Temporary deposit, 1971. W.C.R.O.

especially cost accounting, that the greatest differences occurred.

Sir Roger Newdigate employed the traditional master and steward system of running estate business, a method which developed in the Tudor period and which served many landed estates for a period of over two and a half centuries. Under this arrangement a suitably experienced individual would be appointed to put policy decisions into effect, hiring and discharging labour as occasion demanded, selling the product and making periodic returns to the owner. He would also supervise the day to day details of the business venture concerned and discharge such other duties as the owner indicated from time to time. On a large estate where several different types of undertaking were in simultaneous operation, several stewards might be employed under the overall supervision of an agent. The system of management on the Newdigate estate conformed closely to this pattern during the time of Sir Roger Newdigate, in contrast to that which existed during his grandfather's lifetime (Sir Richard Newdigate II).(5) An agent was employed in a general capacity whilst a steward, (Thomas Hutchins) was appointed to take care of the estate "limeworks" and Griff Colliery.

The precise relationship between the agent and the mine steward was never recorded in any of the estate accounts and it appears that Hutchins operated with a considerable degree of freedom, making his reports directly to the baronet who, in turn, summarised his information in the appropriate volumes. Unlike Sir Richard Newdigate II, the fifth baronet appears

(5) Thesis (Wh.) Chapter 3 (Part IV) p. 142 et seq.

rarely to have intervened at first hand whenever matters displeased him except insofar as the steward was occasionally unable to control his labour force, or output came to a halt because of rockfalls or breakdowns in machinery.

None of Thomas Hutchins' books of accounts have come to light unfortunately, although it is evident from the baronet's diary that some indeed were kept. The results of his work, in terms of payments and receipts, are, however, available to us. Principally these consist of the summary of accounts, assorted sheets of calculations and a small notebook(6) compiled by the baronet himself.

By order of the owner a crude double-entry system of accounting was used to record all receipts and payments. Such a system obviously possessed certain advantages. At a glance a general impression could be gained of the progress of the estate. The level of debt and the size of current income could be readily determined. Limited comparisons could also be made between expenditure and receipts for specific ventures over a period of time and might also indicate, with luck, some of the results of "improving" policies. At a time when reliable, efficient and literate stewards were scarce it possessed an additional merit: since many landed estates employed the same system it was perhaps not unduly difficult to find a replacement in an emergency. In the baronet's case, however, the same steward was employed for over thirty years, supplementing his salary(7) as mine steward with profits as a tenant farmer on the estate(8) and from

(6) CR136/A247. See also Appendix F, Table 6, Griff Colliery: Receipts and Payments Account, 1776-1800.

(7) Paid a basic sum of £60 per annum as from January, 1776.
CR136/Diary, 27 Jan. 1776.

(8) He farmed 36 acres of land for an annual rent of £50.

occasional gratuities given by a grateful master.(9)

The master and steward system, however, possessed weaknesses. Not serious enough, perhaps, to perturb a proprietor with limited ambitions, content to draw a good income on a rising market, but sufficient to conceal major shortcomings which might not become apparent until the onset of a recession, and then perhaps too late to effect remedial action. General procedures, for example, tended to become static in practice, and this was particularly well marked in the case of Sir Roger Newdigate. No attempt was made during the course of nearly half a century to alter methods put into effect during the 1740s, despite the fact that a superior method was being employed by a rival coalmaster.

Incomes and appropriate expenditure were not always closely linked so that it is frequently impossible to relate particular accounts satisfactorily to specific ventures. Likewise balances apparently complete in themselves clearly lack items of expenditure which lie buried under other headings, sometimes inextricably mixed with payments for luxuries. Capital expenditure was commonly regarded as part and parcel of the year's outlay and no distinction was made between returns on investment and other income. No mention is made of sales on credit, and given the experience of coalmasters north-west of Nuneaton(10) it is difficult to believe that this was neither sought nor given at Griff, considering the growth of competition after 1776. Similarly no record has come to light of periodic checks on

(9) For example, when the original colliery outlay of £20,000 was repaid by January 1789, Hutchins received £100 for his efforts.

(10) Infra, Part III, Chapt. 3 (SectionII) passim.

stock levels, to determine whether they were static, rising, falling, high or low, except for an occasional reference in the baronet's diary. Whilst the steward may well have kept day books and produced these for examination when he handed over the proceeds of sales (net of wage payments) each month, the level of the baronet's own summaries(11) imply a startling degree of casualness on his part towards the affairs of a major industrial undertaking. If the master demanded little detail it was probably never recorded by the steward.

Sir Roger Newdigate's mine venture, it must be stressed, was not the outcome of a snap decision nor the consequence of poor planning. Careful attention was initially paid to the state of the market, to the condition of rival collieries and to the problem of transportation. Rough preliminary calculations were made of the cost(12) and possible yield of the undertaking, especially with regard to its construction and the purchase of important items of equipment. Nevertheless estimates of variable costs received little attention. There was an apparent presumption that production would continue at all times at constant cost irrespective of the fact that his mineworkings progressed steadily from high ground levels, conveniently situated for easy access to the Coventry canal and turnpike, to a lower, more distant(13) area which had a notorious history of flooding and expense.

Under his variant of the master-steward system of estate accounting some attention, however, was paid to the distinction between interest, rent and profit, albeit imperfectly. Interest was treated as a cost but computed

(11) For example, CR136/A247. Colliery Receipts and Payments Book.

(12) See Appendix L, Table 5, "An Estimate.....of Expence".

(13) Map 2.

upon the original investment rather than on current capital values. Thus, as the original capital was borrowed from a London banker,(14) interest allowances from gross receipts declined as the debt was repaid. Capital was therefore treated very much "as an auxiliary to entrepreneurship"(15) instead of as an important motive force behind the firm, possessing a continuous, even autonomous, existence alongside other factors of production which jointly made profit possible.

In common with many other businessmen of the period, the baronet did not appreciate the importance of using a proper accounting system as an aid to greater efficiency. Hence there was no demand on his part for at least partially effective cost-control techniques which, in fact, were available at that time had he cared to use them. Contentment on his part to pay wages, maintain liquidity to meet bills and receive a high and steady level of income precluded any desire to cross-check the efficiency of his farm and mining ventures with those of other landowners. Nor was any attempt apparently made to draw comparisons between practices at his own colliery and those at rival undertakings. Only with regard to establishing prices at some of the more distant markets(16) or trying to check some of the more blatant practices of invading Staffordshire producers(17) does evidence of a long term, wider interest in colliery affairs come to light. And yet some of his competitors were indeed alert

(14) Robert Child.

(15) S. Pollard: The Genesis of Modern Management, p.271.

(16) E. G. Banbury.
W.H.B. Court: A Warwickshire Colliery in the Eighteenth Century.
Ec.H.R. VII (No. 1), 1936-37, p. 225.

(17) The hotly disputed differential tonnage rate system favoured by Staffordshire producers, by way of example.

to the value of making occasional comparisons. The Hawkesbury Company, his most serious rival, for example, took a keen interest[18] in such matters as wage rates, special charges and chalter payments in neighbouring coalworks and appear to have made fine adjustments periodically[19] in order to make employment at their pits more attractive.

The master-steward system was no doubt relatively simple to operate, cheap, and whilst business was good, gave little anxiety. Nevertheless it masked the route to greater efficiency and, incidentally, higher income, and also possessed serious flaws. It could cover up for the moderately competent servant. It was probably of little effect in prohibiting embezzlement by a skilful and determined steward although in Sir Roger Newdigate's case he seems to have been singularly well served. Given the state of some of the baronet's own accounting it undoubtedly concealed simple errors of occasionally great magnitude.[20] In more serious circumstances this highly simplistic method of accounting could result in the prolongation of the life of an existing business venture beyond the point where radical changes should have been made.

With the benefit of hindsight, and given the complexity of cost accounting procedures employed in many successful firms today, the shortcomings of the master-steward system are obvious.[21] At no time could a

(18) W. H. B. Court: loc. cit.

(19) Caddick and Yates MSS, 81/1 B.R.L.
Notebook "1791".

(20) E.G. Failure to record properly the full cost of a replacement engine in 1790-91.

(21) See Appendix L, Table 2, ("Griff Colliery," Monthly Receipts, 1779-1805) entries for August and September 1790.

proprietor be accurately informed as to the truestate of his business affairs. Lack of knowledge invariably leads to a lack of power to deal with potentially profitable or dangerous situations. That the baronet was able to survive the disastrous impact of imported Staffordshire coal in 1790 and to fend off the danger from growing competition between Nuneaton and Coventry at the end of the century was due not to any particular skill on his part but simply to the steady growth of a market able to absorb rising output from all sources. The impression is gained, therefore, that the Griff mine venture might have fared badly had demand become noticeably less inelastic, or worse, had demand actually fallen to new, lower levels. In such circumstances the Hawkesbury undertaking might well have proved an even more formidable competitor.

Unlike the Griff enterprise, which was owned and directed by a single proprietor, the Hawkesbury undertaking was a partnership consisting of a doctor, a manufacturer of china and ceramics, a divine, and a coalmaster who had formerly operated in Bedworth, fallen on hard times but knew the area and its problems intimately.(22) Between them they controlled virtually the whole mining belt between Bedworth and Foleshill by 1775. Only the ex-coalmaster remained in regular attendance, the others being resident in Birmingham or Newcastle under Lyme for much of the time. The system of accountancy employed, therefore, had to grapple with the affairs of a large concern, supervised for most of the time at a distance by men of varying talent and different upbringing, anxious to partake in profits according to the value of their individual stakes. The method adopted had, at the very least, to permit analysis of major areas of expenditure

(22) Dr. Francis Parrott of Birmingham; Thomas Whieldon and John Fernyhough of Newcastle under Lyme; and George Taylor of Bedworth, respectively.

and indicate strengths and weaknesses as well as apportion dividends, a task probably quite beyond the capacity of a part-time tenant farmer[23] of the calibre of Thomas Hutchins at Griff. For this work the Hawkesbury firm employed an accountant[24] who drew up balances twice a year after the manner practised in mercantile circles.[25]

A few of these balance sheets exist, mostly in fragmentary forms,[26] but in sufficient quantity to show that the accountancy methods employed by the firm were rather more sophisticated than anything used at Arbury. They were, however, not without their own limitations. Fundamentally the double entry system was used to record receipts and payments, to which was added a list of the expenses incurred during the relevant period. These show chalter (wage) payments, heading charges, the cost of providing fuel for the engines and fodder for horses, and the outlay upon timber and ropes. Special contingency charges are shown. Incidental receipts are also listed together with a figure for stock in hand, and a distinction is made between the values of coal and slack.

In addition, an analysis was made of expenditure under different

(23) Unlike his master, Hutchins was listed as one of the principal "improving" farmers in Warwickshire in 1794. See footnote 22, Chap. 2. supra.

(24) The accountant was provided by the second partner, Thomas Whieldon, described in the 1760s as an "Earthpotter" of Little Fenton, near Newcastle under Lyme. Whieldon, "one of the most fertile and invfntive potters of his day", built up an extensive business and made a fortune estimated at £10,000 from his trade. Both Josiah Spode (the elder) and Josiah Wedgewood owed much of their artistic and business success to the influence of Whieldon.

(25) Plate I.

(26) H.M.B. 31 W.S.L.

heads to show the degree of profit, as a proportion of the value of each ton of coal sold.(27) Thus, chalter charges for the six months' period ending June 1785 amounted to £2378.17. 6d. in toto, or 3 shillings and 11 pence per ton. Likewise heading charges and full costs were listed respectively at £794.15. 1d. or 1/3¾ per ton, and £104.15. 5d. or 2d. per ton. Rent, the smallest item recorded, came to £31.19.10¾ or ½d. Colliery payments totalled £4896. 3. 5¾ or 8/2d., leaving a residual profit of 1/11½ per ton. A more detailed fragment for 1787 goes even further, to the extent of splitting differences between values of a farthing, to obtain exact proportions. Small "farm" receipts and payments are also included, being part and parcel of the colliery business complex.

A noticeable absence from these records is any reference to returns on capital investment, or any hint of periodic evaluations de novo of the worth of the enterprise.(28) They are simply concerned with an assessment of expenditure, income and profit for a limited period of time. Whilst little can safely be read into the absence of data it is not impossible, given the layout of existing records, that separate sheets were prepared dealing with the capital account. Until such documents are found, if indeed they are still available

(27) "Best" coal prices fluctuated between 10 shillings and 10/6d. per ton of 21 cwts. The Hawkesbury group appear to have sold all their coal at a single price whereas Sir R. Newdigate sold that of poorer quality for 8/4d.

(28) Unlike the Newdigate accounts there is no confusion here between capital and current expenditure.

in the darker recesses of a lawyer's strongroom, further judgement must be deferred. It is sufficient to note, however, that the accountancy practices of two close rivals were vastly different. Those of the baronet were little more than a roughly assorted jumble of figures which could, at least, have been no aid to increased managerial efficiency. Those of the Hawkesbury partners display evidence of an awareness of the importance and possible value of a periodic analysis of outgoings and receipts, and it is upon this basis that an assumption is made that the Hawkesbury firm was in fact the more efficiently managed of the two.

The third example to be considered is the Haunchwood Colliery of Nuneaton which, together with associated coalworks in Ansley, Baddesley and Mancetter, was owned by the Geast family(29) of Blyth Hall, near Coleshill. It appears to have been rarely the practice for them to work their own mines. Preference was given to leasing, for which operators came from as far afield as Derbyshire and Oxfordshire. In the circumstances a method was required which would enable a check to be made upon coal raised and sold, and on the rent (if any) of their equipment. Since there was little fixed capital worthy of note provided by the owner and therefore no real problem of costs varying with output, and no technical innovations of a major type to be tested for relative profitability, his problem was substantially different from those of Francis Parrott and Sir Roger Newdigate. In certain respects such a business approached more nearly to the putting-out system employed by silk masters in Coventry at that time and was

(29) See footnote 52, <u>infra</u>, Chapt. 3 (Part III)

probably the one most commonly in use on the northern half of the coalfield.

Some of the Geast leases[30] stipulated a minimum annual production by lessees, in order to secure a guaranteed income, together with a sliding scale of charges for tonnage sold over and above a given level. Returns, therefore, had to be produced regularly to show how far targets had been approached. During the eighteenth century record books were compiled by hand but by 1804 specially printed forms were in use at Haunchwood, to be checked carefully against the owner's own assessments of coal sold and rents[31] due. If maintained carefully such a system would give little trouble to the owner. Unfortunately this seems not always to have been the case, especially where long, rigidly-composed leases containing no "break" or variation clauses were effected, and where little prior thought was given to the various ways in which an unscrupulous lessee might vary the measure of coal offered for sale, to his own advantage and to the loss of the owner.[32]

These different methods of business management, then, were in simultaneous operation at these colliery undertakings on the Warwickshire coalfield. Of these, only that of the Hawkesbury partnership can be said to have been capable of aiding management and contributing towards success. The business methods of Sir Roger Newdigate were designed to show total payments and total receipts, preferably with a

(30) D.M.1478 Badgley Coalwork Accounts, 1730-1770 MSS (In private ownership)

(31) i.e. rent for equipment and land, and mine rent per stack of coal.

(32) Appendix G, Measures and Weights: some local problems.

balance to the latter. Those of Francis Parrott and Thomas Whieldon laid greater emphasis upon maximising income by the use of partial cost analysis, but imply a weakness in general analysis, whilst the final example is in many instances reminiscent of the system employed by the immediate predecessors of the factory owners.

That three business concerns should display such widely different methods of controlling their affairs and yet thrive is an indication of the uneven nature of progress on the coalfield during this period.(33) Although substantial technological progress had been made by all these firms by the end of the century the attitudes of top management to business control could hardly have been greater. The baronet looked to the safety of the past and eschewed new techniques. The squire trusted to the vigilance of his steward and was badly let down. The partners were the only ones to show awareness of the need for special controls and were probably the only ones who might have coped successfully in a recession.

Section II

Sir Roger Newdigate

Sir Roger Newdigate's estates in Middlesex and Warwickshire jointly brought him an annual income which averaged nearly £7,000 between 1763

(33) And also of the roseate market conditions in which they operated.

and 1779, rising to over £10,000 between 1780 and 1796.[34] Figures such as these[35] placed him comfortably among a wealthy elite of great families whose combined estates are said to have[36] covered approximately six million acres, or about 20% of the cultivated area, in the England of the 1790s.

Wealth on this scale differentiated the greater landlords sharply from other classes in society. For many of them there was, in addition to their vast landholdings and industrial enterprises, the conspicuous consumption of great houses which served as centres of political and social influence. Additionally there followed patronage of the arts, music and the turf, the ritual of the London season - so essential for the transaction of important legal, financial and political business, together with a seat in the House of Lords. Into their ranks, however, came the occasional baronet, of whom Sir Roger Newdigate was a good example, and who compensated for his having no seat in the Upper House by representing the University of Oxford in the Commons for a spell of thirty consecutive years. Even untitled commoners like the Geasts of Blyth Hall, near Coleshill, could, by virtue of their high incomes near the end of the century, be ranked among the more wealthy[37]

(34) Satisfactory data for the years before and after this period are unavailable, but present evidence suggests that the high average of the 1780s and early 1790s was largely maintained during the last decade.

(35) Appendix F. Table 1,
Total Annual Receipts from Estates in both Middlesex and Warwickshire.

(36) G. E. Mingay: English Landed Society in the Eighteenth Century, p.22.

landlords of the day.

The estates of some of them were not dissimilar to small but prosperous communities, and in this respect that of Sir Roger Newdigate, near Nuneaton, was fully representative of his class. Large staffs were required for the running of households and the maintenance and upkeep of stables and gardens. Gamekeepers and labourers were required in no small numbers to care for the rest of the estate.(38) As and when these needs were combined with those of industrial undertakings, great houses such as Arbury played an important role in the local economy. They baked their own bread, brewed their own ale and fattened their own stock. They supplied their own fruit,(39) fish and game,(40) met their own timber requirements and, in a few cases, even mined their own coal. They commonly provided employment for many years for architects and teams of builders, carpenters and plasterers. Men like the baronet additionally commissioned paintings by leading artists, scoured London and foreign cities for books for their libraries, and purchased exotic plants and shrubs for their gardens and parks. Having access to public canals besides the water network on his estate, Sir Roger Newdigate also built barges for the delight of himself, his family and friends on warm summer days. And

(38) In addition to building nearly six miles of narrow waterways through his estate the baronet constructed ornamental waterfalls and pools in profusion.

(39) The baronet experimented with the growing of oranges for many years.

(40) Woe to any poacher caught on the Newdigate estate because he could expect short shrift.

once a year, into this Elysian setting, came large numbers of tenants for their annual "feast" and dance in the stables - specially prepared for the occasion.

Whence came the income to support this apparently idyllic station in life?

Despite certain discrepancies in his own statistics, approximately 80%[41] of his income during the middle years of the century came from Arbury, the remainder from Harefield in Middlesex. Thirty years later income from the former had risen to over 90% of the grand total, principally on account of the baronet's success with Griff Colliery.[42]

The principal source of income between 1750 and 1769 came in the form of rents from the manors of Astley and Arbury/Moorbarn, followed closely by the manors of Chilvers Coton (Griff) and St. John's in Jerusalem,[43] all of which rose substantially in the years immediately following inclosure.[44] "Wood land" receipts, which often included small rents, generally provided the smallest annual increment, whilst "Casual" receipts, a category which often included items which should more correctly have been included elsewhere, frequently moved outside the limits attained by other classifications.

(41) Appendix F, Table 2,
Gross Receipts from all Warwickshire sources.

(42) Appendix F, Table 6,
Griff Colliery, Receipts and Payments Account, 1776-1800.

(43) Adjoining the Manor of Chilvers Coton and centred on Temple Park - See Map 2.

(44) Supra, Chapt. 2, Section II (iii) and Chart III

Generally speaking, the same pattern of income was repeated for the following decade except that by 1779 both the colliery and two separate woodland accounts[45] began to make substantial contributions, the latter until 1790 and the former continuously and beyond the life-time of the baronet. From 1780 onwards colliery receipts[46] easily became the most important single source of income, rarely falling below 40% of total income, often exceeding 50%, and reaching a high peak in 1789 when £9,200 was received from the sale of 32,595 tons, amounting to 64·6% of receipts from all sources for that year.[47] During the course of thirty four years, (1763-1796), the period for which fairly comprehensive statistics are available, gross income received by Sir Roger Newdigate from both of his estates amounted to slightly over £294,000. To this may be added a further probably £90,000 for the following decade.[48]

The requirements of the baronet's estates inevitably meant heavy annual expenditure which exceeded gross income in twelve out of the

(45) (i) "Woodland" of Chilvers Coton.
(ii) "Spring Woods and timber."

(46) Appendix L, Table 2.
"Griff Colliery" Monthly Receipts, 1779-1805.

(47) In the following year Staffordshire coal began to arrive in Coventry by canal whilst in 1791 Wyken Colliery (Coventry) was opened in a bid to share the local market.

(48) Statistics for specific categories in 1796 bear distinct signs of haste and omission, and thereafter decline swiftly in both quantity and quality. Curiously enough this trend began shortly after the death of the young relative in 1795 who apparently had been designated by the baronet as the heir to Arbury. Although he married twice, the baronet left no issue.

thirty four years between 1763 and 1786. The three largest categories listed general household expenses at Arbury, Harefield and the Town house in Spring Gardens, the requirements of his manors in Warwickshire and Middlesex, and the calls of creditors. All three of them rose substantially after 1760. That of the "House", for example, virtually tripled the stated 1761 outlay within a span of twenty years, that of the "Manors" rose fourfold,(49) whilst "Dues" increased three times, occasionally even more. Part of the increase incurred by the house was due to the rising price of foodstuffs, especially after 1770, and to taxation, but more often it was caused by a growing taste for luxury.

House expenditure, like that classified by "Cellars", "Stables" and "Gardens", fluctuated considerably during the early part of this period. Unlike some great estates, that of Sir Roger Newdigate was never self-supporting, especially during the third quarter of the eighteenth century. Consequently substantial sums were spent on butcher's meat, poultry, wheat and flour.(50) Coal not yet being available, supplies were purchased in Bedworth or, more commonly, Nuneaton. The cost of entertainment and keeping a Town house were also not inconsiderable, a sum of £695 being recorded for a thirteen week period in 1752. The years 1755, 1763, and 1770 were characterised by unusually heavy outlays, coinciding with much rebuilding and redecorating at Arbury. In the latter two cases, however, these peaks of expenditure were quickly followed by a return to modest levels. Nevertheless from 1777 total house expenditure rose sharply and

(49) The 1761 statistics for "Manors" were inflated by £7750 laid out on the purchase of Lord Coventry's estate at Griff.

(50) Supra, Chapt. 1, Section II, passim.

remained steadily at over £1000 per annum thereafter.(51)

Wage increases made little impact upon general house expenditure during these years. Not until 1778 were modest (but selective) additions granted to house staff(52), a year in which official pay scales for rural workers were belatedly revised by the County Justices in a bid to preserve the system of wage control which had existed since 1563.(53)

The second major category of expenditure, that headed "Manors"(54) fluctuated between £249 and £754 over the first ten years,(55) after which it rose swiftly to over £1000 a year, occasionally exceeding £3000. Here, the most important Warwickshire items were colliery and canal building on the estate (but recorded incompletely), "estate purchases" and game, and a wide range of building expenses. This was the beginning of the period when Arbury Hall was transformed into an outstanding example of the Gothic Revival style for which much of the finance in later years was provided out of the profits of Griff Colliery.(56)

(51) At this time increased quantities of china, glass and silverware were being purchased. Over £1658 were spent in 1779 on house bills alone.

(52) The house and coach servant-establishment at Arbury averaged twenty persons.

(53) Appendix E, Table 1.
Records of Proceedings in Quarter Sessions, (Warwickshire) 1763-1776.
But see also Thesis (Wh.), p.179

(54) Expenditure under this category was by no means closely associated with its income. See also Appendix F, Table 5.
Expenditure by the "Manors" in Middlesex and Warwickshire, 1763-1796.

(55) Appendix F, Table 4.
"Totals of Payments" in both Middlesex and Warwickshire, 1750-1796.

(56) Other nearby coalmasters also embarked on house building and decoration schemes, notably the Ludfords at Ansley Hall and the Parrotts at Hawkesbury Hall. Merevale, however, was not rebuilt until 1840 by the Dugdale family.

A third category of expenditure, which became particularly important after 1768, was that listed as "Casual" expense. Into this division passed outlays which, under a more rigorous system of compiling estate accounts, would have been classified more correctly under other headings. These include investments in the Coventry and Oxford canals and, from 1784 onwards, occasional purchases of bank and government stock. Loans were also made to relations from time to time. These and other outlays were grouped together with expenses incurred in travelling on business and pleasure(57), all of which were particularly heavy during the 1770s.

How did Sir Roger Newdigate compare with other nearby coalowners in terms of wealth?

Available evidence suggests that the gap which existed between them in the 1750s was steadily reduced, and in at least one case was eliminated altogether. Richard Geast of Blyth Hall, for example, who inherited estates belonging to Francis Stratford by marriage and who later adopted the name of Dugdale, started from a much lower point in the income scale(58). Between 1761 and 1766 his annual receipts barely averaged £1400 per annum. During the next six years, however, his income doubled and from 1772 to 1779 it never dipped below £3000 in any single year. From 1781 onwards it doubled again and during

(57) Sir Roger Newdigate's second Grand Tour of southern Europe, which lasted from July 1774 to January 1776 and took him through Switzerland, present day Italy and France, cost over £2275, excluding purchases for Arbury.

(58) Appendix F, Table 7.
The Household and Estate Accounts (General) of Richard Geast, 1761-1799.

the following eighteen years exceeded £10,000 per annum on five occasions. Although details of the sources from which it derived are unavailable two characteristics are worthy of note: it increased more rapidly than that of the baronet and it tended to fluctuate rather less from year to year. It is known that Richard Geast received a fairly substantial income from mine rents in Nuneaton, Ansley, Baddesley and, for at least part of the time, in Mancetter, but the smoother progression from one year to the next suggests that a rather larger proportion of it came from dependable sources, such as rents and legal fees, than was the case with the baronet(59).

Details of the annual income of the baronet's closest rival, Francis Parrott, are unavailable. However, given that the statistics produced by the Hawkesbury partnership for 1785(60) were fairly representative for each half year period of that decade, the mine must have yielded at least £4000 a year. Given also the fact that Parrott personally owned virtually a half of the undertaking and that he had inherited from his brother additional and exclusive rights to other mining interests in nearby Foleshill, his annual income from

(59) Geast was a barrister.
A further factor of possible significance is that between 1761 and 1799 his income regularly showed an excess over expenditure.

(60) Plate I
This may, however, have been a bad year for the mine in which case his income would have been higher. Production and sales of coal in 1770 and 1774 were reported to have been at the rate of 1800 and 2000 tons per month.

Warwickshire coal sources alone may easily have reached £2500 per annum[61].

What effect did national taxation have upon Sir Roger Newdigate?

Recorded payments suggest that it was not until income tax was introduced in 1798 that national taxation became a noticeable burden.[62] This was so because unlike many lesser landowners[63] his income was not derived principally from rents. Important though this category was, in terms of size relative to other sources, his revenues were drawn from a wide variety of activities throughout the latter half of the eighteenth century, of which mining was the most important after 1778.

A second factor to be considered is that whereas the burden of such lesser imposts as coach, plate and window taxes was borne exclusively by the owner, the impact and incidence of the Land Tax could be, and were, shared[64] between him and his tenants, thereby reducing the final effect on his tax liabilities. Although it might

(61) Parrott also owned property in, and drew rents from, Oldbury and York.

(62) Appendix F, Table 8.
Recorded tax payments by Sir R. Newdigate, 1763-1805.

(63) G. E. Mingay, op. cit., p.82.
Even with Land Tax at 4/- in the £ it would have been a singularly unfortunate landowner who paid a fifth of his gross income annually to the State.

(64) See note (iv), Appendix F, Table 8. (footnote 62)

be finely argued that the proportion of the tax paid by tenants represented a loss of potential rent, this was unlikely to have been the case in practice[65] and might in fact have been a spur to greater efficiency and higher productivity by smallholders so affected on the estate. At least one of these was regarded in 1794 as worthy of inclusion in the County list of "improving" farmers,[66] but how far the burden of taxation exercised any influence in this case it is impossible to say. Likewise no information is available, save in one instance, as to how the tax was shared by landlord and tenants.

Total taxation tended to be lighter during the middle years of this period than at any other time. Sir Roger Newdigate's own statistics, admittedly variable and incomplete, reveal that whereas 6·7% of his income was paid in taxes in 1763, this declined to 5·3% in 1773, to 3·9% in 1783 and to 2·4% in 1793. Part of this was due in earlier years to the 25% reduction in the rate at which Land Tax was levied between 1767 and 1776, and part to the sale of his London property with its associated liabilities in 1792. In reality this gradual reduction was a reflection of the widening sources from which non-taxable income was shown. Allowing for faulty records between 1763 and 1783 it would appear that his total disbursements did not vary substantially from year to year, and therefore cannot be regarded in any way as having been a personal burden or of having exercised a distorting effect upon the pattern of estate development. A similar

(65) The baronet does not appear to have regarded it as lost rent.

(66) Supra, Chapt. 2, footnote 22.

conclusion is reached for the following fourteen years despite the introduction of a large number of small taxes in 1784 and 1785.

By the early years of the nineteenth century, however, the burden of taxation had become significantly heavier, and in 1803 the eighty-four year old baronet was not at a loss for words to express resentment and bewilderment(67) at his income tax bill. Matters had been made worse by the fact that his high annual income of former years had suffered a sharp fall to approximately £8000, out of which over £1000(68), or 12·6%, was paid in taxes of all types to the Treasury in 1802.

In common with many other landowners Sir Roger Newdigate was beginning to experience the increasingly heavy hand of the State upon his private world. For him, however, there was the compensation and satisfaction of having achieved his material ambitions in a brighter age.

Summary and conclusion

Did Sir Roger Newdigate's many estate activities, then, result in overall profit - or loss?

Taken together it is clear that he gained handsomely in terms

(67) Correspondence: CR136/B2637, (Draft)
Sir R. Newdigate to H.M. Commissioners of Taxes (Coleshill) 27 Dec. 1803.

(68) Appendix F, Table 8,
Recorded tax payments by Sir R. Newdigate, 1768-1805.

of gross income, long before national taxation became a burden. Nevertheless across many of the pages of his voluminous but tightly-written records is inscribed the legend: "Missed chances". The baronet had, in point of fact, set his sights too low considering all the opportunities at his disposal. In common with many other land-owners of his class the twin purposes of all his activity were the creation of an important estate and the building of a magnificent country house. Unlike many of his contemporaries he was successful(69) in both, and furthermore creditably attained his objectives without leaving a crushing burden of debt for his successor.

Nevertheless, it is not only to the modern eye that such sccess might justifiably be regarded as something less than complete. The baronet was already well established when opportunities presented themselves in profusion for a really vigorous plan of expansion and efficient management. By taking them he might so very easily have become the dominant coalmaster on the Warwickshire field as well as being an influence in social and political circles. He lacked neither personal finance nor sound borrowingfacilities. The market beckoned: he made but a limited response. Opportunities to acquire mining sites were left to be snapped up by rivals. Superior accounting procedures as an aid to efficient management and forward planning were virtually ignored, preference being given to a system which, by his day, was already overlain with a history of shortcomings and inadequacy.

(69) The growth of his estate had virtually reached its limits by 1772 and his house was largely complete by 1796.

It was not by men of the calibre of Sir Roger Newdigate that industrial dynasties were forged. Like many others in eastern England he was, to a large extent, "still thinking in terms of the Renaissance magnate, and industry was to him (them) no more than a convenient means of supplementing his (their) rent rolls in order to provide the wherewithal for the conspicuous consumption of his (their) class and age".(70)

Fortunately for the growth of the national economy, these characteristics of some of the great landowners of Warwickshire and Nottinghamshire were by no means universal. In Lancashire(71) and in the West Midlands landowners on many points of the social scale had come to look upon real estate not just as a store of wealth and a symbol of social prestige but as a means to gain more of both. This was the breed of men on whose efforts large-scale industrial change was hinged, but whose relentless pursuit of wealth and power during the nineteenth century in so many cases left a deep scar upon the landscape and the social conscience.

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(70) J. D. Chambers: Economic Change in the Vale of Trent, 1700-1800, R.M.S. II, (1958).

(71) B. L. Anderson: Provincial Aspects of the Financial Revolution of the Eighteenth Century, Business History, XI, (No. 1) 1969, p.14

PART III

MODERN COLLIERIES IN THE MAKING

Chapter 1

DEVELOPMENTS IN MINING TECHNOLOGY, 1740-1810

Introduction

"To pose the question of what needs to happen before self-sustained economic growth can develop is to search for a Holy Grail of explanation for the secrets of economic growth....."[1]

No single element can provide the answer to that question since real growth is a highly complex problem. Yet, in any final equation the general level of technology is a factor of crucial importance. It is no accident that the period of history generally called the "Industrial Revolution" coincided with important innovations in the field of mining engineering. Without them, coalmining would have retained its early eighteenth century characteristics, and the wider industrial development of the nineteenth century which depended so heavily upon it for success might possibly have been delayed indefinitely.

Considerable importance was attached to the existing level of technology by coalmasters between Coventry and Nuneaton during the eighteenth century, and the emphasis which they placed upon raising existing standards reflected some of the most acute problems which they had to face at that time. The solution of these problems was vital to the establishment of the industry on a relatively modern basis. It was, furthermore, the hinge upon which so much other industrial activity turned, not only because of growing dependence upon coal

(1) P. Mathias: The First Industrial Nation..... p. 7. (1969 Edn.)

for fuel, or even on account of the wider adaptation of machinery originally intended for mine work to manufacturing processes, but because the very fact of their solution itself generated a series of further industrialdevelopments with a life and vitality of their own.

It is the purpose of this chapter to examine developments in mining technology in Warwickshire during the second half of the eighteenth century, with special reference to the problems of pumping water, winding coal and ventilating the coal workings, and to show when and how widely these changes were adopted on the coalfield.

It is claimed that "during the period 1700-1825 water - and heat - power technologies advanced pari passu".(2) Whilst this accurately(3) reflects machine development and employment in north-eastern England to the turn of the century, the use of water power in Warwickshire was always distinctly limited, and in any case ceased to have any importance after 1788. Two factors account for this: the inadequacy of local water supplies for most collieries and, more important, developments in mechanical engineering which made it possible to employ atmospheric and steam engines for an increasing variety of tasks. It was by no means the case that "only deep mines carried out on a large scale would justify the use of the engine(s)

(2) D. S. L. Cardwell: Power Technologies and the Advance of Science 1700-1825
Technology and Culture VI, No. 1. p.192 (1965)

(3) J. Carr: The Coal Viewer and Engine Builder's Practical Companion pp. 33-35

at all"[4], since the biggest in this county never approached the greatest undertakings in northern England in terms of size or output. The principal determinant of large-scale investment in these mining ventures was the state of the local market. Given the right conditions - price and the level of effective demand - owners of much smaller undertakings were not only willing to invest heavily but also keen to seek out acknowledged leaders in the national field of mining engineering for their advice. By employing their skill and experience local coalmasters placed themselves for a while in the van of progress in the Midland coal industry.

Section I

The Application of Steampower in Warwickshire Mines

During the years 1747 to 1813 at least sixteen[5] atmospheric and steam engines were built on the Warwickshire coalfield for pumping and winding purposes, the most important period of activity lying between 1770 and 1796.[6] Of this total eleven were fundamentally Newcomen engines, some of which incorporated features to adapt them for winding purposes, and five were Boulton/Watt machines. Of the

(4) J. R. Harris: The Employment of Steam Power in the Eighteenth Century.
History LII (175), p.139 (1967)

(5) Appendix H, Table 1.
The Employment of Steampower in the Warwickshire Coal Industry, 1714-1813

(6) This period coincided with the building and opening of the Coventry Oxford Canal Navigation companies. Water-borne Staffordshire coal did not begin to disturb the local market until 1790.

latter, one was a very large pumping engine and two were rotary machines. Present evidence also shows that a further two engines of the common (atmospheric) variety were possibly erected for winding purposes.(7) This list must, however, be regarded as a provisional one since accurate information on the technical equipment employed at two collieries, one in Nuneaton and the other in Coventry(8), is unavailable at present. Nevertheless, even on this imperfect basis, sufficient is known to prove that in terms of the employment of the latest machines the years 1770 to 1796 were fully comparable with that other period of intense activity in this county which lasted from 1714 until approximately 1736.

(i) Pumping Engines

The first of these machines was employed in the 1750s by John Bourne and Richard Parrott, partners in a colliery undertaking which stretched intermittently from Exhall to Hawkesbury.(9) It appears to have been one of the survivors(10) of that ill-starred venture of the Staffordshire undertaker, Stonier Parrott, which promised so much during the 1720s and yet collapsed in utter failure in 1732.(11) It was also the first of seven successively more advanced engines

(7) This list excludes engines known to have been used on canals, and for textile manufacturing in Warwick.

(8) Wyken Colliery.

(9) Map 5.

(10) Marie B. Rowlands: Stonier Parrott and the Newcomen Engine T.N.S. LXI

(11) A. W. A. White: Men and Mining in Warwickshire IV, passim.

which established beyond all doubt the technological lead held by later members of the Parrott family in local mining by the close of the century.

By 1774, a year important for market changes[12] as well as for experiments in machine building by the greater coalmasters, the Hawkesbury Company[13] had acquired two more, larger, "fire engines".[14] These were set out along the line of their undertaking which by now stretched for about two miles from Hawkesbury into Bedworth.[15] In May of that year Sir Roger Newdigate's first large machine[16] at Griff Colliery "began to work", the novelty and excitement of the event drawing nearly 400 spectators.

A common feature of some of the late eighteenth century pumping engines in this county was their size[17] and power. Both Griff and Hawkesbury main engines in 1774 were designed to pump from depths of over 300 feet through multiple lifts, and each was fed by two

(12) For an analysis of market growth, see infra, Part IV, Chapt. 1.

(13) See footnote 22, Chapt. 3 to Part II, supra.
For a description of the rise and fortunes of this important Company, see Appendix J, The Rise of the Hawkesbury Colliery Company.

(14) Both Newcomen and Boulton/Watt engines were loosely called "fire" engines during these years, whether used for pumping or winding purposes.

(15) W. H. B. Court: A Warwickshire Colliery in the Eighteenth Century, p.223 Ec.H.R. VII (No. 1) 1936-37.

(16) Plate III

(17) In terms of cylinder diameters (respectively 60 and 61 inches), these were the largest atmospheric engines to be built and operated at Warwickshire collieries during the eighteenth century.

large boilers. By contrast, the first atmospheric engine to be erected anywhere on the Warwickshire coalfield had a single boiler feeding a small (16 inch diameter) brass cylinder, and pumped from a depth of no more than 135 feet.(18)

Of more importance than questions of pure engine size, however, were the different policies adopted by rival proprietors at these, the two most important local collieries at this time, towards the type of engine to be employed. Sir Roger Newdigate persevered with common (atmospheric) engines throughout the century whilst Francis Parrott and his partners experimented with the latest Boulton/Watt machines. Consideration was certainly given by the baronet to "Bolton's" engine(19), i.e. James Watt's engine, but evidently the terms demanded by the Soho Company, together with the cost of building such machines, did not compete with those offered by the Carron Iron Company of Falkirk. Even when the next important Griff undertaking was opened in 1836 the preference of the Newdigates was still for the latest version of the atmospheric engine rather than for the more powerful Watt, or still more recent, Cornish, steam engine. On the other hand, Parrott and Company adopted their first Boulton/Watt machine in 1776, and after initial controversy, became important customers of the Soho Company for the rest of the century.

(18) Thesis (Wh.), p.95
See also, A. W. A. White: Early Newcomen Engines on the Warwickshire Coalfield, 1714-1736. T.N.S. LXI

(19) CR136/C637

Such was the importance attached by Parrott and Company[20] to the use of Boulton/Watt machines, that the remainder of this Section is centred upon the technological progress made at Hawkesbury during the 20 years ending in 1796, since this set the pattern of development for the rest of the field.

Within two years of becoming the senior partner[21] in the Hawkesbury Company Francis Parrott realised that the three common engines erected by his brother were inadequate for the task of keeping the mine dry. In 1776 he wrote to Matthew Boulton and James Watt and followed this up by visits to the first three engines built under their direction at Soho, New Willey, and Bloomfield Colliery, near Tipton. Recalling this occasion in bitter correspondence with one of the junior Hawkesbury partners in later years, Boulton recorded that an agreement was made:

"with Mr. Watt and me in the presence of Mr. Wilkinson that an engine of our construction should be erected at Hawksbury (sic) under our directions and at the expence of the (Hawkesbury) company." With regard to payment, "the profit we should receive for granting you a licence for the use of our Engine.....should be a yearly sum equal to.....one third of the value of the Coals which should appear by trials made on the Old and New Engines to be saved".[22]

(20) CR136/C637.

(21) (Dr.) Francis Parrott, a Birmingham surgeon, succeeded his brother Richard in 1774. See also Appendix J, The Rise of the Hawkesbury Colliery Company.

(22) Correspondence: B. & W. Colln. Letter Book (Office), Matthew Boulton to Rev. J. Fernyhough, 1 Jan. 1779. B.R.L.
In view of the issues raised in this letter, it is reproduced fully in Appendix J, item 2. Correspondence.

This, the fourth and largest engine of the new type to be planned by James Watt, and the second to be employed at any colliery, was in operation by March, 1777[23] but for some time it failed to give satisfaction. Complaint was lodged first about the cost of building the machine and, later, about the rate of fuel consumption. How far these complaints were justified, or were used merely to disguise the mining troubles experienced during these years by Parrott, is difficult to say. These issues were, however, made occasion later for delaying payments and for humbugging the Soho Company for a period of two years.

Protracted correspondence between the parties during that time throws much light upon the efficiency of the Boulton/Watt machines compared with the older, common, ones. It also indicates how far some mine owners were prepared to go, at this date, with this form of investment. Answering a complaint by Parrott and Company about high building costs, the Soho Company replied in 1777[24] that engines less powerful than the one recently erected at Hawkesbury cost £4,500 each and went on:

"When you compare the expence of erecting your Engine with others you should consider that there is no Engine in England that is equal to it in power or which can do so much work."

(23) Caddick and Yates MSS. 81/1
See also Plate II

(24) Correspondence: B.& W. Colln. Letter Book (Office), Boulton and Watt to Messrs. Whieldon, Parrott and Taylor 6 July 1777 B.R.L.

Further reference was made to the "desperate situation your colliery was often in last winter (1776) for want of such a machine, and the security you now work in".

Considering that the Bloomfield Colliery engine cost approximately £2000 to build[25], and that Sir Roger Newdigate's slightly larger atmospheric engine at nearby Griff was estimated at £2500[26], the expense incurred by the Hawkesbury Company to obtain the latest pumping engine for their colliery would appear to have placed them, for a while, in the topmost ranks of coalmasters for this form of investment.

Why did Parrott prefer to erect a fire engine of the latest design, admittedly expensive, in preference to the tried and widely trusted common engine? A hint is given in James Watt's letter to Samuel Garbett[27]. Flooding, the problem which had plagued mine-owners between Coventry and Nuneaton for so long until the introduction of the first Newcomen engines, was again assuming critical proportions. Given the implied inadequacy of the existing three fire engines of common design, which would not in any case have been helped by the known incompetence of Parrott's maintenance engineers, together with the fact that, "your new engine cannot have cost more than an Engine

(25) Correspondence: B & W Colln. Letter Book (Office).
James Watt to Samuel Garbett, 10 Feb. 1776. B.R.L.

(26) Griff Colliery estimates (I) CR136/C627 1770 W.C.R.O.
See also Appendix L, Table 5,
"An Estimate of Expence".

(27) Supra, footnote 25

of the old sort would have done of equal power"[28], the Hawkesbury Company had every incentive to experiment with engines whose designer claimed that they were considerably more powerful whilst being at the same time more economical. Indeed, the only charges made by Boulton and Watt for licences to erect and use their engines were based exclusively upon fuel savings. If, to this recital, is added the further fact that both Newdigate's and Parrott's older atmospheric engines consumed an average of 55 tons of coal per week, some of which might conceivably have been sold on the market, the use of a machine of the old pattern[29] would have represented an unnecessarily heavy charge on receipts. Nevertheless, despite the many causes of friction which existed between Parrott and the Soho Company between 1777 and 1779, the experiment with the new machine[30] did eventually turn out to be a success[31], and justified the purchase of more advanced Watt steam engines, this time for winding purposes, later in the century.

Although the Hawkesbury Company partners were the first to employ such advanced machinery in this county, they were not alone in their choice for very long. Sir Roger Newdigate might persevere with

(28) Supra, footnote 22.

(29) Watt declined to allow the separate condenser, a new feature on his own machine which was largely responsible for economy in the use of fuel, to be incorporated in the common engines at this time.

(30) Plate IX (Hawkesbury Engine Tests and Findings)

(31) This was the second occasion this century when the Parrott family scored a triumph which was later followed by other proprietors in Warwickshire. The first was in 1714 when Stonier Parrott and his partners introduced the first Newcomen engine.

engines of the older type[32] but at least one smaller proprietor in Nuneaton, Alexander Donald, followed the local path trod by Parrott. Developments in the market for second-hand Watt machines resulted in the purchase of a medium-sized engine[33] from Shropshire[34], through the good offices of the Soho Company. As in earlier years[35] there appears to have been a flourishing trade in second-hand pumping machines, a factor of which account must be taken when ascertaining the employment of steam engines in any one area as a gauge of local industrial growth. And limited evidence exists to show that whilst Boulton and Watt were reluctant to adapt common engines for colliery work, they were by no means unwilling to act as intermediaries for second-hand models, or to supply trained mechanics, where necessary, to rebuild them on new sites. In this respect Parrott employed the Soho Company to help in the disposal of at least one, possibly two, of the Boulton/Watt engines which his company had sold by 1796.

Thus, before the turn of the century, some of the largest and most advanced forms of pumping engine then in existence were being employed to drain local collieries. That this took place in mines of only moderate size, by a national scale, is a testimony to the

(32) A second one was "set a going" in July 1778. - CR136/Diary.

(33) B & W Colln. (i) Boulton and Watt Catalogue of Old Engines, pp. 288-290. B.R.L.
(ii) Folios 563; 627.
See also Plates IV, V.

(34) J. Western of the Bog Mine, Shropshire. This engine was possibly re-erected at Haunchwood Colliery.

(35) Supra, footnote 18.

value of the market which their owners were seeking to exploit. Such was the standard attained by the improved Newcomen and Boulton/Watt machines during these years, that it sufficed for more than half a century of coalmining enterprise in this area before further important changes were required.

(ii) Winding Engines

The use of more powerful pumping engines solved one set of problems but created others. Chief among these was that of raising the coal now being won at new depths swiftly and efficiently to the surface. In this respect both Newdigate and Parrott abandoned the traditional horsegin, which however remained in favour at collieries between Nuneaton and Mancetter until well into the following century, and experimented with new devices. For the baronet these consisted initially of a large, overshot waterwheel, superseded later by whimseys[36] whilst the Hawkesbury Company eventually changed to Watt rotary steam engines.

Waterwheels, as a means of raising coal, never became a marked feature of mining in this county, unlike north-eastern England where, for example, they were reported to be, "greatly in use in the neighbourhood of Newcastle on Tyne".[37] The reason for this was the absence of suitably located rivers and streams, so common a feature in many other mining areas. Nevertheless, one of the greater Warwickshire coalmasters, Sir Roger Newdigate, did possess the nucleus of a canal network on his estate, and between 1771 and

(36) Common engines specially adapted for winding purposes.

(37) J. Curr: The Coal Viewer..... p.34

1774 he cast around for a means of employing a wheel to take advantage of a 42 foot difference in the levels of two of his canals adjacent to his new colliery.

One of the earliest schemes to be examined concerned the menzy, a device whereby a tub of water, filled at the surface from a stream, was designed to overbalance a loaded coal skip and haul it to the top of the shaft.(38) The opportunity cost of drawing a loaded skip, therefore, was the unloading of upwards of 72 gallons of water into the pit which then had to be pumped out by another method.

This plan was soon discarded and the baronet called for the assistance of John Barnes, the Newcastle "Viewer", currently engaged to supervise(39) the construction of his new colliery. As a result of these efforts(40) the advice was sought of John Smeaton, the engineer whose improvements to the basic Newcomen engine and experiments with large overshot waterwheels and windmills had already established him as an engineering consultant. Little appears to have been done, however, until December 1773 when, the initial stages of the new "foundation" nearing completion, the baronet's attention was drawn to a London advertisement for the "Gunnislake Engine".(41) This was a winding mechanism, lately patented by a Devon engineer(42), which employed a double (reversible) water wheel.

(38) CR136/B2508, (A-G)

(39) Infra, Chapter 2

(40) Correspondence: CR136/C640, J. Barnes to Sir R. Newdigate, 29 April, 1771

(41) Abridgement of Patent Specifications (1617-1865), Vol. XXXII (Hydraulics), No. 1044, p.68. B.P.L.

(42) Christopher Gullett of Tavistock.

This machine seemed initially to meet all the requirements "to fit a great undertaking in which I am engaged", as the baronet described his colliery in correspondence[43] with the "inventor". The latter claimed that his engine could draw from a depth of 40 yards in less than one and a half minutes, would raise the equivalent of nine tons of coal per hour and could be adapted to draw boats of "any weight up inclined planes" to save canal lockage. Within three months of opening correspondence between Newcastle, Tavistock and Nuneaton, thanks to a fairly speedy postal service, this idea had been discarded. The "Gunnislake Engine" patent was exposed[44] for what is was worth - little more than a copy of similar machines long in use in northern England and Scotland.

A month later a list of specifications was dispatched to Smeaton whose final design[45] included a large 36 feet diameter overshot wheel with a maximum lifting capacity of 200 tons of coal per twelve hour working shift. This was the machine which Sir Roger Newdigate used successfully at Griff until 1787 when it was offered to the lessees of the proposed new Bedworth worsted mill as part of a scheme to establish new industries in that area.[46] No data are available,

(43) Correspondence: CR136/C646, Sir R. Newdigate to C. Gullett. 29 Dec. 1773

(44) Correspondence: CR136/C647, J. Barnes to Sir R. Newdigate, 17 Jan. 1774.

(45) (i) CR136/M50

(ii) Engineering Designs III, Folios 99v-190, by J. Smeaton. L.R.S. See also Plates VI, VII.

(46) Infra, Part IV, Chapt. 1.

unfortunately, about the performance of this water engine, save that "it did its work very well"(47), nor about construction costs to enable comparison to be made with whimseys and Boulton/Watt rotary machines. The lifting capacity stated by Smeaton, however, suggests that in this respect it compared favourably with the winding engines employed later by Parrott and Company at Hawkesbury.

Precisely how the Hawkesbury Company coped with coal winding until 1791 is uncertain, but in response to overtures from Parrott, proposals(48) by James Watt for a small engine,(49) designed to draw 50 tons in twelve hours from a depth of 114 to 120 yards, and costing "about £200 to make", were accepted in that year. The machine was built and put into operation but curiously enough was soon found to be inadequate for the task, suggesting that ability to calculate the power and efficiency of these early Boulton/Watt engines was extremely imperfect. It was replaced(50) by a larger, double-acting rotary engine the success of which justified its use by the Hawkesbury Company as a pattern when ordering their third winding engine from Birmingham in 1796.(51)

With regard to the distribution of the older Newcomen engines adapted for winding purposes, an early nineteenth century Newdigate

(47) B. & W. Colln. Folio 20 (Paper). B.R.L.

(48) Recorded in Caddick and Yates MSS, 81/1, Notebook "1791". B.R.L.

(49) Ibid, and
B. & W. Colln. Notebook N.B. 61 (1792) A.O.(B)

(50) B. & W. Colln. Boulton and Watt Catalogue of Old Engines, pp. 40-41 and 1340135, B.R.L.
See also Plate X

(51) Correspondence: B. & W. Colln. (Box 4 "T"), F. Parrott to Boulton and Watt, 31 Aug. 1796 B.R.L.

estate map shows a whimsey working at the revived Collycroft end of Griff Colliery, whilst the proprietors of Baddesley Colliery, near Atherstone, were actively using an example in 1813.(52) Little reliable evidence has so far come to light about the existence of these machines elsewhere on the coalfield during the closing years of the century, although the expiry of the crank patent (Pickard's) in 1794 would have facilitated cheap conversions of Newcomen pumping engines. Nevertheless, considering the general increase in working depths and the increasingly widespread use of common pumping engines, it seems highly possible that, in fact, a larger number were in use by 1800.

The conversion of common engines was generally achieved by the addition in each case of a heavy flywheel, a crankshaft and a connecting rod. Despite their mechanical inefficiency(53), and high rate of fuel consumption compared with the later double-acting Watt engines, they were used commonly for winding purposes on this and other coalfields until late in the nineteenth century, possessing the special merits of cheapness, simplicity and ease of operation.

In summary, substantial efforts were made by the leading Warwickshire coalmasters during the last 30 years of the eighteenth century to make use of the latest advances in water and heat power

(52) Dugdale Muniments, 1408.

(53) Winding work required a heavy starting torque to haul up the chain which lay in the pit shaft, in addition to lifting the load. Single cylinder engines of this type were poor for that sort of work.

technologies. Nevertheless, there was a strong correlation between degree of adoption of the latest devices and proximity to the chief market. The more northerly parts of the coalfield persevered with the traditional horse gin and only belatedly experimented with whimseys when the Birmingham Canal Navigation linked them with east Warwickshire and Oxfordshire markets. By the close of the century, however, the more important coalworks in this county were using atmospheric or steam engines for winding, and water engines had been consigned to history.

Section II

Ventilation and Illumination

(i) Mine Ventilation

An additional important problem faced by mineowners as underground workings deepened and spread more widely was that of ventilation. Fire and gas had been encountered at Griff as early as 1603[54] and although no fatal accidents are known to have resulted from them, Sir Roger Newdigate's pits were occasionally put out of action for several days at a time. Large fires were generally extinguished by the simple expedient of stopping the pumping engines and allowing the water level to rise. With gas a different solution was required.

(54) CR136/V/147 *passim*.

No important mechanical developments in ventilation are recorded for Griff until 1791, when a brief but undated letter from the baronet's mine steward indicated that a device, described simply as "White's Air Machine" had been installed at a new sinking pit[55] and had cleared it of chokedamp[56] in half an hour. Apart from this letter[57] and a brief entry in the baronet's diary for 1790, no further mention of a ventilating machine is to be found in the Newdigate Collection for this period. Nevertheless, this device had been tested successfully in a gassy mine in Somerset, and held out promise of affording relief in pits in which chokedamp was becoming increasingly prevalent.

Patented in 1789[58] and described as:

"A machine for expelling noxious air from any mine.....and introducing fresh, cool air", it consisted simply of a cylindrical drum in which was fitted a shaft mounting radial blades. With the use of branched, interlocking tubes it could be used to exhaust foul air from several places simultaneously, by either blowing or suction. Plate VIII[59] shows that this device was manually operated but apparently provision could be made for it to be worked mechanically.

(55) Infra, Chapt. 2.

(56) Unlike those of the South Staffordshire coalfield, pits in this county were troubled by chokedamp (carbonic acid gas) rather than firedamp (methane).

(57) Correspondence: CR136/B1772, Thomas Hutchins to Sir R. Newdigate --- June 1791.

(58) Abridgement of Patent Specifications (1632-1866) Vol. LII, No. 1681 B.P.L.

(59) See also Appendix K, White's Specification.

As in so many other cases, however, regarding the use of new or improved equipment in Warwickshire mines, no reliable information is available as to price, and the extent to which local engineers made their own improvements or adaptations.

Elsewhere on the Warwickshire coalfield, little is known about the problem of gas dispersal during the second half of the eighteenth century. Slight evidence suggests that a form of furnace ventilation was in use at Baddesley by 1790, whilst nearer Coventry Parrott and Company may possibly have incorporated an air pump in their Bedworth engine.(60) Otherwise they pinned their hopes on a "strike of unslecked lime with 6 pail fulls of water upon it (which) is found very serviceable in removing Damps in Pits--Proved".(61)

(ii) Illumination

Virtually no steps were taken during these years to make improvements upon the use of candles to illuminate the workings. Indeed, candles were used in Warwickshire pits until recent times, the absence of serious threats from outbursts of methane gas being, no doubt, regarded as sufficient justification.

(60) Correspondence: B. & W. Colln. (Box 6, /Bundle "Bedworth 2/), A. Mitchell to -- Southern (Soho). 9 Sept. 1794 B.R.L.

(61) Caddick and Yates 81/1, Notebook "1791" B.R.L.

Section III

Transport, above and below ground

Few records exist to show how local mineowners coped during the latter half of the eighteenth century with the problem of shifting coal. Unlike his father and grandfather, Sir Roger Newdigate concerned himself almost entirely with matters of general policy, leaving the minutae of pit organisation to his steward and to the butties (miners' leaders) who were becoming a power to be reckoned with during this period. There is, in consequence, a dearth of that type of source material which is so abundant for the first quarter of the century. Such data as do exist are culled almost entirely from correspondence, entries in the baronet's diary, and reflections of earlier mining conditions contained in the 1842 Report.(62) Therefore, whilst it is possible to chart progress in many departments of colliery life in this county for the 140 year period ending 1841, it is impossible to show how quickly many changes took place in, for example, the fields of transport and labour relations. Nevertheless despite the paucity of information directly relevant to the years 1740 to 1810, it is possible to show that, bad as conditions were in 1841, they were to some extent an improvement on those which obtained during and after the Napoleonic Wars. The evidence recorded

(62) Children's Employment Commission: Report on the Employment of Children and Young Persons in the Mines of Warwickshire (1842). Recorded hereafter as 1842 Report.

below, therefore, should be regarded as a picture, albeit incomplete, of the conditions faced by mining labour as it began to enter the darkest period of its history as well as an illustration of how unevenly developments in technology were applied to mining on this coalfield.

In a draft letter to Christopher Gullett in December 1773[63] on the subject of the latter's water engine, Sir Roger Newdigate revealed that the hauling of heavy skips from one part of the workings to another was carried out almost entirely by colliers. "What you call buckets and kibbals we at our Colliery call Skips", he wrote. "They are of rough wood and a drawn by the Colliers both above and below ground with an iron hook in the bottom which is made as a sledge. The weight of them loaded may be 6 or 7 hundredweight."

Small quantities of coal were similarly hauled during the time of Sir Richard Newdigate (II) but on account of the winding gear then employed it is unlikely that skips exceeded four hundredweight. Given the larger skips and considerably greater distances to be covered underground the drawer's life had necessarily become harsher by the 1770s. This system was still in operation at the colliery seventy years later when the inspector for the Children's Employment Commissioners examined working arrangements at Griff. By 1841, however, skips were being pushed along railed ways and hauled up

(63) Correspondence: CR136/C646. Sir R. Newdigate to C. Gullett. 29 Dec. 1773.

inclines mechanically[64], with the result that children under ten years of age, it was stated, "could not be useful now", as a result of this particular measure of progress.[65]

At this particular colliery, however, the strain of drawing long distances was, in all probability, relieved by the fact that mainways ran downhill to a drainage channel, or "underground canal". A bleak entry in the baronet's diary for 18 July 1777 records "Underground boat began building" suggesting that it was his intention that coal destined to be hauled to the surface by the waterwheel should be boated to the bottom of the main shaft. Such a scheme would have been entirely feasible considering that the underground canal measured eight feet high by four feet wide[66] (during its early stages) and ran north to south the complete length of the workings.[67] An additional merit of the scheme would have been to reduce demand for unskilled labour since the canal was linked directly with the winding shaft, quite apart from the fact that during the 1770s at least, labour was difficult to obtain.

At the higher levels of the mine, where drawing was sometimes done via basset shafts, matters were different. The gradient of the seams varied between 9° and 15° and the loaded sledges had to be

(64) 1842 Report, paragraphs 10-17.

(65) Infra. Chapt. 3.

(66) Correspondence: CR136/C639. J. Barnes to Sir R. Newdigate (in Venice) 27 Feb. 1775.

(67) Infra. Chapt. 2. Section I. Planning the Venture.

dragged up the incline. The use of such "old-fashioned" drawing methods implies that the underground roads linking the pits were narrow, and this possibly explains the absence of direct references in the Newdigate Papers to horses being used for this purpose. That indeed, they were introduced some unstated time later is proved by a passage(68) from the 1842 Report which, noting that their use had lately been discontinued, quoted older miners' description of "the work with the horses as having been most dreadful".(69)

Above ground the coal was pushed for short distances or taken in horse-drawn waggons to loading stages, there to be weighed(70) and loaded into canal barges or sold directly to local customers. To what extent these waggons were actually drawn along a railed way in the baronet's lifetime is uncertain. No records have come to light indicating the purchase, use or sale of plain or angled, wooden or metal rails, or flanged wheels. The terms "rail", "railed-way" and "horse-rail" were undoubtedly used during the eighteenth century to refer to wooden fencing which commonly surrounded pitheads and was used also to corral livestock. During the tenure of Sir Roger's successor, Francis Parker Newdigate, however, an inclined railway was used at the colliery and recent archaeological research(71) has confirmed the existence of a former rail bed along part of this course.

(68) 1842 Report. Para. 10.

(69) The ending of the use of horses underground probably coincided with the opening of Griff "Caroline" in 1835.

(70) Sir Roger Newdigate was one of the earliest proprietors to sell by weight rather than measure.

(71) Field Survey and Report (1971). See Bibliography.

Conclusion

During the period 1740 to 1810 important technological advances took place at two of the largest mines then supplying the local market. The process of making modern collieries on this coalfield, adequate for many years of large-scale production, however, was uneven and incomplete. A satisfactory solution to the problem of flooding in deep mines was put into effect but mechanical winding was only partially adopted. Attempts to deal with ventilation problems now that the pits were getting deeper made much less progress. Nothing at all appears to have been done to improve traditional methods of faceworking and haulage underground.

That such changes as were made were far from being universal may be ascribed principally to the rate of growth of demand. This failed to mount sufficient pressure upon existing methods of supply to result in wholesale change and reorganisation. One outcome of this muffled reaction was a steady deterioration in the conditions in which labour earned its bread.

Nevertheless, the importance of those developments should not be underrated. They enabled local mines to play an important part in meeting the local requirements of domestic and industrial users for a large part of the nineteenth century.

Chapter 2

THE WINNING AND WORKING OF AN EIGHTEENTH CENTURY COLLIERY

Introduction

Unlike the Newdigate coalmining enterprise of the first quarter of the eighteenth century that of Sir Roger Newdigate in 1774 was the outcome of mature calculation, embracing an analysis of markets, the development of local communications and an examination of the state of those rival collieries which lay between Griff and Coventry. Two other factors distinguish his scheme from that of earlier Newdigate baronets, collaboration and competition as opportunity arose; collaboration with landowners, leaders of local industry and other interested parties to secure the benefits which would flow from the building of turnpikes and canals, and competition with neighbouring coalmasters to secure a major share of coal sales in Coventry and the surrounding districts. It was no accident, therefore, that the first positive steps to reconstruct Griff Colliery in 1770 coincided with the completion of the Nuneaton-Coventry turnpike, the building of the Coventry-Southam turnpike, work on the Coventry canal navigation and, most important of all, a sharp increase in local demand for coal. It was this same series of facts which caused the

proprietors of the Hawkesbury group of collieries[1] to make such spectacular progress with the latest developments in mining technology.

The decision to reopen the mine after a lapse of forty years came at the end of a decade during which local market conditions had steadily become brighter for coalowners. Correspondence with Lord Coventry on the subject of land purchase in Chilvers Coton showed that as early as 1760 the baronet was aware of this trend and had from time to time been weighing the possibility of exploiting it. Seeking to persuade his lordship to sell his local estate the coalworks of which formed a substantial part of the proposed Griff undertaking, and which had been the subject of successive leases[2] by the Newdigates since the seventeenth century, he wrote in February, that year, with surprising candour considering the real purpose of the correspondence:

"The Bedworth Colliery the only one now lying between us and the great sale I am told can last but a short Term and the demand for Coals increases daily. If it should rise very big it may tempt the owners of Wyken Colliery, 3 miles nearer Coventry, to set it on foot again which will never be worth the while if Griffe Colliery is now opened".[3]

(1) Three names, Hawkesbury, Exhall and Bedworth, crop up when identifying the mines of Parrott and Company, the first two being used by local people interchangeably until quite recent times. For the purpose of this thesis the term "Hawkesbury" should be interpreted as applying generally to all the company's possessions which, by 1770, stretched from central Bedworth to north east Foleshill.

(2) Thesis (Wh.) Part II, Chapter 3, passim.

(3) Correspondence: CR136/B1599, Sir R. Newdigate to Lord Coventry.

The baronet's view of market possibilities was proved correct by the progress[4] made at Hawkesbury from 1758 onwards but his assessment of the competitiveness of the mines lying south of Griff seems, on existing evidence however, to have been faulty. Far from weakening, Parrott's undertaking grew steadily in size and importance as time went on. Although nothing is known as yet of the plans of the proprietors of Wyken Colliery, the only other rival south of Griff the baronet apparently thought worthy of notice, it is extremely unlikely that the successes of the Hawkesbury mines would have gone unnoticed. Mines at Ansley, Baddesley and Nuneaton (Haunchwood),[5] north of Griff were in temporary decline but, in any case, the scale of operations there, then and for many years to come, would have caused him little anxiety. Nevertheless, although Lord Coventry was successfully persuaded to part with his estate in Chilvers Coton, thereby enabling Sir Roger Newdigate to consolidate his coal holdings, plans to reopen Griff remained in abeyance for a further eight years.[6] By 1769 the market displayed signs of substantial and sustained growth, and a more convenient method of transporting large quantities of coal was becoming an established fact.

(4) On the rise and fortunes of Hawkesbury and the Parrott family see -
  (i) Appendix J.
  (ii) A. W. A. White: Men and Mining in Warwickshire, IV and V.

(5) Dugdale Muniments (D.M.): 973(c)-999 passim.

(6) Even then (1769) he had doubts about the advisability of embarking upon a traditionally hazardous enterprise and, instead offered to lease his mine to another operator. Memories of his grand-father's ill-starred adventure may have prompted this.

The planning and construction of Sir Roger Newdigate's colliery undertaking being such a landmark in the exploitation of the mineral wealth of his Warwickshire estate, and owing so much to the influence of mining methods in north eastern England, the purpose of this chapter is to examine the plans and reconstruct the progress of the venture during its early years, and to attempt to place certain aspects of local mining development in both county and regional settings.

Section I

Planning the Venture

Entries in the baronet's diary show that the first positive steps were taken in October 1769, in consultation with a local coal-master whose own colliery in Nuneaton had seen better days(7). Unfortunately no record exists of these plans, if indeed they were ever committed to paper in detail. Sketches, correspondence and recommendations dating between 1770 and 1776 indicate, however, that radical alterations were made from time to time in the light of geological tests and discoveries of the state of old workings. The final plan showed several fundamental changes from the methods practised in earlier years, in particular the scheme pursued by Sir Richard Newdigate (II) between 1700 and 1708(8). This may be ascribed to the influence of the baronet's adviser, J. Barnes, an experienced colliery "Viewer" from Durham, and one of a small elite group of

(7) D.M. 1478. Coal Account Book, 1730-1770.

(8) Thesis (Wh.), Part III, Chapt. 1, passim.

managers and mining consultants from the North-East whose professional competence excited the admiration of less fortunate mineowners.

The area chosen for initial development lay at the extreme southern edge of the estate[9] where it joined the Bedworth suburb of Collycroft, much of the coal bearing land of which belonged to the Nicholas Chamberlaine Charity Trust. Between the two estates the land dips eastwards in a narrow valley which in 1771 became the site of the baronet's Communication Canal, which in turn linked his colliery to the Coventry Canal Navigation.[10] Immediately north of the boundary coal had been won in earlier years, and documentary evidence suggests that Sir Roger Newdigate intended to reopen these same workings and use them as a basis for future expansion northwards in the direction of Nuneaton.

One of the earliest plans[11] showed that two separate shafts were to be used to reach the Two Yard, Bare and Ryder coal seams which, near the strike, dipped 15° from east to west. The proposed working area measured 165 yards horizontally (east to west) and the shafts, situated at either end, were to be respectively 56 and 106[12] yards deep. A deep sough, or underground canal, already existed below the old workings and the plan suggests that this was to be brought into use for the new areas as the project went forward.

(9) See Map 2.

(10) Infra, Part IV, Chapt. 1.

(11) CR136/C629. See also Plan 2

(12) The original estimate was for a main shaft of 120 yards. This was changed in the light of fresh discoveries as to the dip of the seam.

Although unusual at Griff and in the collieries north west of Nuneaton,[13] workings of this and even greater depths were increasingly common nearer Coventry and elsewhere in England during the latter half of the eighteenth century. The engine pit at Hawkesbury in 1771, for example, was 126 yards deep,[14] whilst some of the giants of Cumberland (Whitehaven)[15] and Durham (Walker on Tyne)[16] attained 200 yards. An important consequence of the greater expense of deep winning in Warwickshire and elsewhere at this time was the limitation of the number of shafts sunk at each colliery. Larger underground areas were worked by each establishment and coal was conveyed over greater distances from the coal face to the eye of the pit. With this development the problem of safety became more acute, especially in those mines with no efficient method of ventilation.

Shafts at Griff, Hawkesbury and Ansley (immediately north-west of Nuneaton) were circular in shape and, in the case of the first two collieries at least, it was intended that they should be lined with bricks throughout. These designs, made possible by the large-scale use of bricks instead of wood, were by no means general in the coal industry nationally. In Lancashire, for example, different shafts

(13) D.M. 76; 173; 2270.

(14) Caddick and Yates 81/1. Colliery Notebook "1791".

(15) J. Chevalier: La Mission de Gabriel Jars dans les Mines et les Usines Britanniques en 1764.
T.N.S. XXVI, 1947-49.

Whereas the extent of Griff could be measured in yards, even as late as 1788, Whitehaven Colliery already, reputedly, extended for a distance of four miles - under the seabed - by 1764.

(16) R. L. Galloway: A History of Coal Mining in Great Britain, p.105

at Blundell's[17] big collieries near Wigan were circular, oval and rectangular in shape, the only common denominator being the bricking of the first few yards of each coal shaft.

Estimates in 1770 of the expense[18] of setting up the "new foundation"[19] show that the engine shaft was intended to be an extremely large one, divided by an oak and deal brattice into two compartments which would permit simultaneous drawing and pumping. This unusual and potentially dangerous scheme[20] called for a shaft with a diameter of ten feet whereas the more common "provincial method of sinking" in the Midlands then, and for some time during the nineteenth century, called for shafts only eight feet across, sometimes less.[21] Nevertheless, although the baronet's plan for a multi-purpose shaft in 1770 seems on existing evidence, to have been rather rare at this date, similar features had become more common in Staffordshire[22] and Derbyshire[23] within a few years, whilst in north-eastern England (from which this idea had been imported by

(17) D. Anderson: Blundell's Collieries: Technical Developments 1776-1966. T.H.L.C., CXIX, 1967, p. 117.

(18) CR/136/C627. See also Appendix L, Table 5, "An Estimate of.....Expence".

(19) "Foundation" - a term used interchangeably with "colliery".

(20) R. L. Galloway: Annals of Coal Mining and the Coal Trade I, p. 408, (1970 Edn.)

(21) T. J. Raybould: The Development and Organisation of Lord Dudley's Mineral Estates. Ec. H. R. (2nd Ser.) XXI, No. 3 (1968) p. 531 et seq.

(22) T. J. Raybould: ibid.

(23) J. E. Williams: The Derbyshire Miners: A Study in Industrial and Social History, p. 26.

Sir Roger Newdigate's mines consultant[24]) even larger double, triple and quadrant shafts had become "the usual custom"[25] by the turn of the century.

Another new - but short-lived - scheme of Barnes was to drive a horizontal drift, or level, from the upper seams in the dip of the mine eastwards to cut the under seams in the rise, whereby the Ell and Slate coal could be worked without incurring fresh, expensive sinking charges.[26] This was frustrated, however, by the belated discovery that the dip of all the coal seams gradually levelled out from 1 : 3 to 1 : 5 as the mine deepened. In its place it was recommended[27] that at a future date the engine shaft be sunk a further 21 yards to the underlying Ell and Slate seams and a "Stonehead" be cut across the measures in the opposite direction (i.e. to the west) to link all the seams to be worked.[28] In this way 200 yards of new coal could be won with the existing shafts.

The last report was made by Barnes in July 1776[29] when, the engine shaft having been completed, entry was obtained into the old workings. The deep sough, or underground canal, intended to be an important feature of the Colliery, was located " 5 Yards West from

(24) J. Barnes, a colliery "Viewer" from Newcastle on Tyne. Curiously enough Richard Parrott was also acutely interested in mining developments in the North-East, and laboriously noted details of Walker Colliery - with which the Barnes family were closely associated-in his travel diary in 1765. Diaries "18". C.R.O.

(25) R. L. Galloway: Annals.....I pp. 389-390.

(26) Plan 1

(27) Report: CR136/C639. J. Barnes to Sir R. Newdigate, 27 Feb. 1775.

(28) Plan 4

(29) Report: CR136/C 638 J. Barnes to Sir R. Newdigate, 26 July, 1776.

the Shaft 77 Yards to the North and 47 Yards South." Working had originally been done on two seams only (the Two Yard and Rider seams) which were separated by a band of intervening rock two yards deep. The condition of the older workings, however, was such that a fresh set had to be prepared to the north, with the addition of extra shafts. Documentary and archaeological evidence indicate that these recommendations were adopted.

The final blueprint(30) bore little resemblance to earlier ones and resulted in two new, rectangular-shaped pits each measuring 132 yards by 40 yards, with their own basset(31) shaft and underground roads. These were to be served by two large shafts (one bratticed) in the deep of the mine. Provision was made for extending the workings gradually northwards and a scheme was drawn for deepening the mine at a convenient date in order to link all the principal working areas. Finally, it was expected that the completed undertaking would yield at least 300 tons of coal per week, an estimate which events were to prove unduly cautious.

(30) Plan 3

(31) The basset shaft was intended, inter alia, to be an emergency escape route for miners. Evidently Barnes was uneasy about the use of one or even two shafts, at any given depth, from the point of view of safety.

See also Thesis (Wh.), Plan III

Section II

New Winnings: the opening phase, 1770-1778

"Thus the grim One,
Here useless, like the Miser's brighter Hoard,
Is from its Prison brought, and sent abroad,
The frozen Hours to cheer, to minister
To needful Sustenance, and polished Arts
Mean while the subterraneous City spreads
Its covert streets, and echoes with the Noise
Of Swarthy Slaves, and Instruments of Toil." (32)

Nearly six years elapsed between the formulation of the earliest schemes and the opening of the mine at Griff, and a further two years passed before it came into full production. Part of this delay appears to have stemmed from shortage of labour but the biggest single cause was undoubtedly a series of mishaps during construction. Some of these emphasised problems faced by pioneers of industrialization and caused the baronet at one time to have serious doubts about the success of the venture.

Initially work proceeded smoothly enough. John Barnes(33) arrived from Newcastle on Tyne in October 1770, in response to Sir Roger's invitation and within a fortnight preliminary details of the pits, shafts, fire engine and water wheel sites had been settled. In the following month the associated Lower "Arbury Canal from the

(32) Richard Jago: Edge-Hill, or, The Rural Prospect delineated and moralized. p.108 (1767 Edn.) C.W.C.

(33) Supra: Section I

Fire Engine scite (was) begun upon"[34] and in December the line of a "Communication Canal" to link the pits with the new Coventry Canal Navigation was set out.[35] At the same time Sir Roger wrote to the Coalbrookdale Iron Company for details and prices of fire engine materials. During 1771 work proceeded swiftly on the canal network, by which not only was the estate and the Coventry market to be served but also the Stockingford area to the north-west of Nuneaton, but curiously slowly on the details of the colliery itself. Not until January of the following year were the sites of the engine and "sinking pits"[36] finally chosen. Why progress should have been so slow at this time is not clear. There was no lack of demand for coal nor was there any question of shortage of finance. A clue may be gained from the fact that after some delay the order for the fire engine went not to Coalbrookdale but to the Carron Iron Company of Falkirk. This delay implies that, despite the lucrative[37] nature of the coal market at this time, an extremely careful assessment of the relative costs of different items of equipment was being practised, a possibility strongly borne out by bills and correspondence on related matters. Even so, the baronet was able to record in his diary in December 1773 the following details of solid progress:

"Fire Engine House built and cover'd in. Regulation beam

(34) CR136/Diary. 27 November 1770.

(35) On canals, see infra, Part IV, Chapt. 1

(36) "Sinking pits" were made simultaneously with the main shaft(s) in order to draw off accumulated water. Work could thereby proceed more swiftly.

(37) The Exhall portion of Hawkesbury Colliery claimed a daily output of 150 tons in March 1770. - Advertisement: Jopson's Coventry Mercury. C.W.C.

hung. Cylinder hung and Receiver (piston). Injection Pipes laid to the Arbury Canal bank. Engine Pit sunk and bricked 40 yard from the Grass Edge 10 yards of which is open'd the whole width for the gins[38] and the 2nd pit just about 8 yds. Chimney rais'd to the height of the House."

The year 1774 began brightly enough. John Smeaton began to plan the waterwheel and in May, " 3 or 400 spectators" came and watched as the "Fire Engine began to work".[39] On the following day the first of a series of misfortunes occurred which culminated in the proprietor eventually despairing of success. A dam in the new branch of the colliery broke and as a result the Engine pit shaft had to be sunk afresh. To add to his cup of troubles his wife died in July. To escape from the scene he immediately undertook a tour of the continent (his second) and apart from occasional correspondence with Barnes and with his mine steward little more is heard of the colliery until January 1776.

1777 was a year equally beset by difficulties. Labour troubles were followed closely by the discovery of a series of clever forgeries by his Coventry attorney. Nevertheless, work continued on the mainways and levels and an inspection of the whole system was made by the baronet himself on the 10th June. Within a week, "the roads below (had) fallen in" and the miners were again lodging complaints,

(38) Despite the use of the word gins, Sir Roger made it clear in correspondence with Christopher Gullett that he had no intention of using a horse gin for drawing the coal up the main shaft.

(39) CR136/Diary. 9 May 1774.

this time about "want of room" and pay losses incurred through variations in the size of stackloads.(40) Coal production was reduced to a trickle and the baronet was mortified to see barges queueing in the forlorn hope of being able to get supplies for the market.

Worse was yet to come. In November the new waterwheel broke down and within four days the pits were flooded. Sir Roger walked to the colliery, discovered that the water level had reached the wheel itself, that pumping machinery was damaged but that nobody appeared to be doing anything about it. Before the year ended the pumps in the engine pit had sunk out of reach and the whole undertaking had come to a standstill. Thomas Hutchins, the steward, was left begging for "a few days more"(41) to try to rescue the mine from what appeared to be complete disaster.

Two important factors deserve consideration in searching for the causes of these mishaps. The first was the absence of skilled mechanics, fully conversant with atmospheric engines, waterwheels, and pit construction on this coalfield. Ignorance and sheer carelessness(42) by persons in charge of machinery, together with the

(40) Sale by weight instead of by measure was not introduced immediately. On this problem and its implication for receipts see Appendix G, Measures and Weights: some local problems.

(41) CR/136/Diary. 30 December 1777.

(42) After his visit to Hawkesbury in 1779 to arrange a date for engine trials, Matthew Boulton noted:-

"Went to Hawkesbury....saw the engine....beam cracked, Stuffing box Slided. The fire doors full of holes, the fire too much ....Scattered and dead at the front and the air damper of Chymney shut....."

This was the machine that three years earlier had been the most powerful engine in England.

Boulton & Watt Colln. (A.O.) Notebook 18. 4 Feb. 1779.

apparent inability to make or repair the simpler working parts caused the whole system to break down periodically besides adding to costs. Time was lost whilst agents were despatched to Staffordshire and Yorkshire to obtain replacements, or letters were sent in haste to mining engineers in other fields to come and tender their advice. The need for trained mechanics fully able to service machinery and for a resident body of men conversant with deep mine construction was a lesson painfully learned by some of the pioneers of industrialization.

The second factor concerns quality of work alone, and was itself a reflection of investment. Despite the fact that over £20,000 was spent "opening" the mine(43) and building the associated canal network, the overall impression gained of estate accounting and cost-control is of simplicity bordering on carelessness. In this respect Griff compared unfavourably with the Hawkesbury undertaking. Design and quality of workmanship in most departments left much to be desired even though the degree of supervision exercised by Parrott over his own company's affairs was far from perfect. Pit and canal building seem all too often to have proceeded on the basis of trial and error. Underground dams and workings periodically collapsed. Important lengths of estate canals frequently gave way, and the frequency with which they were being widened, deepened or repaired demonstrates the inadequacy of prior thought as to their function and construction.

(43) Memorandum: CR136/V/147, "The Case of Sir R. N."

In matters of vision Sir Roger Newdigate, like his grandfather at the beginning of the century, was second to no man in this county; in strategic planning he was fully conscious of the need to integrate his mining schemes with those of other industrialists, and to search for the best expert advice of the day; in matters of execution, however, he was to learn the painful lesson of "cutting corners".

Section III

New Winnings: Phase II (1779-1806)

The second and last phase of the Griff undertaking, during the lifetime of Sir Roger Newdigate, lasted sixteen years, after which it passed into the hands of Francis Parker Newdigate, a distant relative. The series of pits which had been opened at Collycroft in 1776 was gradually extended northwards during the course of the next thirteen years. A short waterway, or "New cut" was also dug from the Lower Arbury Canal, near the site of the original water engine, in order to reach the most northerly shafts. Three landing stages, or wharves, were constructed at different times for the easy loading of barges.

By 1788 it had become apparent that the pits at the eastern (Collycroft) edge of the mine were nearing exhaustion and if the venture were to continue on an efficient basis it would be necessary to shift the centre of operations to the northern part of the estate. Accordingly, the main "fire" engine, together with other important items of equipment, was moved to a site close to the present Bermuda Village[44] and this remained the principal coal mining area on the

(44) Map 2.

estate until 1830. The Communication Canal began to lose its importance as the main link between the estate waterway system and the Coventry Canal, as a result of this move, and its place was taken by the newer Griff Hollows Canal,(45) situated threequarters of a mile to the north and roughly parallel with it.(46)

Source material describing how work progressed during this phase is extremely scanty, apart from records of annual tonnages and receipts from sales. Nevertheless, scattered diary entries make it clear that four pits were usually in operation at any particular time, some of which were regularly plagued by chokedamp, but give no indication of the average "life" of each one. This dearth of material, however, is not to be interpreted as a loss of interest by the owner in everything but the size of monthly receipts. The opening of new pits in Griff Hollows and the building of new engines was an occasion for celebration and proud display to important visitors.

Conclusion

What was so special about Sir Roger Newdigate's colliery undertaking?

It was the only large colliery in the latter half of the eighteenth century to be planned and operated by a single owner-entrepreneur.

(45) Opened in July 1787.

(46) Mining at Collycroft did not cease finally in 1788. The "Seven Foot" seam, rarely worked during the baronet's lifetime on account of its allegedly poor quality coal, was exploited during the tenure of Francis Parker Newdigate.

All the others, south of Nuneaton, were owned and run by partnerships, except those in Bedworth which were controlled by the Nicholas Chamberlaine Trust. To the north-west of Nuneaton mining was undertaken by lessees who concentrated on much smaller-sized units.

In contrast to those of earlier baronets, the Griff Colliery of the period 1774 to 1806 was planned on a large scale. It combined some of the latest advances in mining technology with methods of tried and proven worth and lasted until 1830. The coal enterprises of the second and third baronets had lives of barely eight years each, whilst the venture which was opened in 1684 worked fitfully for only five years. Earlier undertakings had even shorter life spans.

Like the Dudley mines of Staffordshire, at a later date, the Griff enterprise was the product of several minds. Along with the proprietors of the Hawkesbury Company, the baronet displayed a marked receptiveness to ideas from other coalfields, and the outcome was an undertaking capable of sustained, large-scale production for many years.

Chapter 3

THE DEVELOPMENT OF THE WARWICKSHIRE COAL INDUSTRY DURING THE SEVENTEENTH, EIGHTEENTH AND EARLY NINETEENTH CENTURIES

In many respects the Warwickshire coal industry had undergone substantial change by 1800, and as a result the more important colliery undertakings on this field were recognisably modern, being well organised and capable of sustained, large-scale production lasting for many years. In several departments, however, progress was made extremely slowly, so that practices which were already hallowed by tradition by Sir Roger Newdigate's day continued unaltered into the middle years of the nineteenth century. Yet again, certain aspects of the industry appeared to be distinctly modern in 1842 but in point of fact originated in the early days of the eighteenth century, if not before.

To this picture of uneven advance must be added further imperfections caused by the lack of uniformity of progress between different collieries lying along the coal belt from Mancetter to Coventry. The eighteenth century was a period of dramatic change for some undertakings, yet it is clear that by the time of the Napoleonic Wars many others at the northern end of the field were still more representative of the early eighteenth century rather than the early nineteenth century.

The object of this chapter is to analyse the general progress made by the Warwickshire coal industry over the course of a hundred years showing, as far as source material permits, the stages by which pit working developed, and the extent to which various bottlenecks were overcome and production grew. Particular attention will be paid in

Section II to changes in mining organisation, with special reference to the condition of labour, whilst Section III will be devoted to a review of the scale of investment in local mines, and the progress of technological change on the coalfield over a span of nearly two and a half centuries.

A caveat may be entered at this early stage to say that the records necessarily represent the interests of the greater coalmasters and leave aside the work of the few remaining small proprietors. Be it so. It is from the recorded efforts and aspirations of such men that one may learn how and when the industry underwent change since they were the only ones with the necessary combination of both will and wealth to instigate it.

Because of the uneven distribution and variable quality of data, material has necessarily been drawn from estate records of the seventeenth and nineteenth centuries, much of it for purposes of contrast. Nevertheless, despite these limitations, this chapter will seek to demonstrate that the advances that were made during the eighteenth century were substantially greater than anything which had occurred during the previous 100 year period, and were in many respects sufficiently radical and far-reaching to serve the industry into the second half of the nineteenth century. This is the test of the extent to which Warwickshire coalmining can be said to have experienced revolutionary change in the years between 1714 and 1796.

For present purposes this chapter is divided into the following sections:-

I. Pit working and the Growth of Production

II. Developments in Mining Organisation

III. Investment and Technological Advance, 1600-1842.

Section I

Pit working and the Growth of Production

The scale upon which coal was raised at Griff between 1782 and 1805 was substantially greater than that which obtained at the same colliery during the early part of the eighteenth century. Only once during these twenty three years(1) did it sink below 20,000 tons per annum, despite competition from the much larger Hawkesbury Company, the invasion of the local market by water-borne supplies from Wednesbury from 179 onwards, and the establishment of Wyken Colliery in Coventry in 1791. In its best year (1789) 32,575 tons of coal of all grades were raised and sold, yielding Sir Roger Newdigate a total of £9200.(2) By contrast, the best that Sir Richard Newdigate III could manage in any single year(3) between 1722 and 1729/30 was 13,516 tons. The production and sale of 10,000 tons annually, the absolute minimum

(1) Appendix L, Table 1,
"Coal sold at Griff Colliery", 1775-1805.

(2) Appendix L, Table 2,
Griff Colliery: monthly receipts, 1779-1805.

(3) From September 1725 to September 1726.
See also Thesis (Wh.) Appendix J, Table 2 to Part III

for the viability of his colliery and less than half the total regularly recorded by his son, was exceeded by him on only three occasions. Further, it is extremely doubtful whether Sir Richard's own father[4] made better progress between 1701 and 1708 except that a sale of 10,681 loads (16,291·5 tons[5]) was claimed for one isolated year.

On the other hand production figures at Griff during the first half of the nineteenth century[6] showed little difference from Sir Roger Newdigate's early totals until 1835. In this year the Griff "Caroline" foundation of C. N. Newdigate began to function properly and quickly produced 33,669 tons, yielding £15,623.[7]

Innovations in mining technology were greatly responsible for improvements in output after 1780 at Griff, insofar as they permitted deeper and more extensive underground working. Credit, however, is also due to the fundamental soundness of pit designs which had been used on the Newdigate estate since the seventeenth century, and to the method by which coal was being won as early as 1701. Despite the amendments suggested by the baronet's mining consultant between 1770 and 1775, the pits of these latter years were sunk, headed and worked fundamentally

(4) Sir Richard Newdigate II, d. 4 January 1709/10.

(5) CR136/V/56, p. C- 24 (1705).

(6) (i) CR136/A247.
(ii) Report: CR136/B3068, J. Twigg to F. P. Newdigate, Sept. 1830.

(7) Appendix L.
(i) Table 3
Annual Production and Sales of Coal at Griff Colliery, 1831-1836.
(ii) Table 4
Weekly Account of Coal raised for sale, 1832-1833.

in the same way as that which had been practised during the first decade.[8] In this respect, therefore, no basic change was made, or even required, during the period under review. The increase in working depths and the scale of investment required at this time, however, imposed their own set of limitations.

Sir Roger Newdigate's pits in 1774 shared a common series of shafts,[9] and as work progressed coal had to be drawn longer distances underground than hitherto. In all probability it was this development which was responsible for the increased employment of children and young persons during the latter part of the eighteenth and early nineteenth centuries.[10] The pits of Sir Richard Newdigate in 1703, by contrast, each possessed its own shaft, very similar in design to those planned for working the estate's mineral wealth a century earlier still.[11] Pits in the early seventeenth century were rectangular shape, 36-40 yards wide, up to 32 yards deep at the lowest point[12], and possessed a "scope" (i.e. working length from east to west) of perhaps 30 yards. A century later depths were half as great again, - the scope had increased to

(8) Thesis (Wh.) Part III, Chapt. 1(B).

(9) Plan 3

(10) Children's Employment Commission: Report on the Employment of Children and Young Persons in the Mines of Warwickshire (1842) passim. Referred to hereafter as 1842 Report.

(11) CR136/C489.

(12) CR136/C495.

97½ yards but the average breadth was virtually unchanged.(13) By 1728 working levels had reached approximately 60 yards, thanks to the introduction of the Newcomen atmospheric engine. In 1775, however, Sir Roger Newdigate planned(14) to work coal from depths of up to 127 yards, on both sides of the main shaft, in rectangular pits measuring 132-165 yards in scope and 80 yards in breadth.(15) In short, whilst the same, well-tried basic pattern was used, it took 125 years (from 1600) for coal pits to double in size but rather less than half a century to double again.

The method employed to win coal in mid-twentieth century collieries in this county is, in principle, the same as that used at Griff 130 years ago. And the method which appears to have been relatively new in 1842(16) was, in fact, little different from that which existed at the same colliery 140 years earlier still. At that time headings and levels were driven the full extent of each pit prior to "getting", which was done by using the longwall "retreating" principle (i.e. upwards from the deep)(17). However, whereas the scope of Griff pits in 1701 measured less than 100 yards during the early stages of "getting", it

(13) Rental considerations plus the need to guard against wasteful working were responsible for this.

(14) Plan 4

(15) Plan 3

(16) 1842 Report, para. 13

(17) Longwall "advancing" was occasionally used to the eye of the coal pit shaft at Griff as well as elsewhere on the field.
Bree of Allesley MSS. CR1300/66/EM3. W.R.C.O.

had multiplied fivefold by the time Her Majesty's Commissioners had reported in 1842 on the state of child employment in local mines.

How did mining practices at Griff during the eighteenth century compare with those at other collieries on the field? A plan of mine-workings between Chilvers Coton and Ansley, drawn by Henry Beighton in 1731[18], reveals long lines of pit shafts situated on three separate coal seams, much the same as on Sir Richard Newdigate's estate a few years earlier. This implies that each coal pit worked a single seam, a practice which was common enough at that time and which was still in operation after mid-nineteenth century at Baddesley Colliery[19], five miles to the north-west. A survey of the number and rentals of coal pits on Lord Uxbridge's Nuneaton estate in 1746[20] confirms the generality of this practice.

After mid-century the methods employed on the coalfield south of Nuneaton began to differ from those in vogue elsewhere. Sir Roger Newdigate abandoned the multi-shaft single seams mode of operation for his new colliery and was almost certainly followed, possibly preceded, in this change by the Hawkesbury Company. Both of these collieries were working at much greater depths by 1775 than those north-west of Nuneaton and additionally both were single working entities operated

(18) H. Beighton: CR136/C691. A Mapp of the Mines and Veins of Coal... ...gotten to the Year 1731.
See also Map 6.

(19) Dugdale Muniments, (D.M.) 174. Testimony of Edward Shilton. 21 July 1827.

(20) Anglesey MSS: D(W) 1734. Uncatalogued Surveys. W.S.L.
See also Appendix M.

entrepreneurially rather than the assortment of fragmented undertakings which appears to have been so common between Nuneaton and Mancetter during these years. Additionally, both the baronet and (earlier) Richard Parrott were conversant with the more modern methods practised in the North-East, an advantage probably not possessed by lesser proprietors in the county. Pits on Ansley Common(21) in 1768, however, followed the same pattern as that traced by Henry Beighton thirty seven years earlier, and separate pits working different seams was still the rule at Baddesley (Badgley) at about the same time.(22) To the north-west, further away from the Coventry market, pits at Mancetter in 1807(23) were even less advanced in size and design than those described by Beighton in 1731, and in fact were more representative of those at Griff in 1603.

On the South Staffordshire coalfield, by comparison, pits on the estates of Lord Dudley appear for much of the eighteenth century to have been planned on similar lines to those for Sir Richard Newdigate (II). No important changes were recommended until 1797. In that year, following in the footsteps of Sir Roger Newdigate over a quarter of a century earlier, Lord Dudley employed a distinguished mining engineer(24) from Newcastle on Tyne to review the working and organisation of his

(21) D.M. 2270: Sketch of pits worked by J. Barber at Ansley. 27 Oct. 1768.

(22) D.M. 176: Testimony of Samuel Walker. 20 July 1827. Like a number of other local men, Walker began work at Ansley at six years of age and after two years' service as a gin boy moved into the pits.

(23) D.M. 76: A Plan of the Pitts on D. S. Dugdale's Estate at Mancester Now Getting by Mr. Okeover.....Taken up Dec. 14, 1807.

(24) Charles Beaumont, engaged by Lord Dudley's London agent, Jeans, in March 1797.

mines. The report and recommendations[25] followed the same pattern as those made by John Barnes at Griff between 1770 and 1774.

Lord Dudley's pits in 1797 were described as small, the "utmost extent of the workings" not exceeding 100 yards. Each one was served by a pair of shafts after the style of the "provincial method of sinking". The adoption of pit design favoured in the North-East would, it was claimed in the consultant's recommendation, result in production being multiplied eightfold at a quarter of the original expense. Possibly the same advantage was pointed out to Sir Roger Newdigate by John Barnes in 1770 although no written evidence has come to light confirming this. Nevertheless, these are examples of the way in which two important Midland coalowners sought to modernise pit workings on their respective estates. By way of contrast, however, whereas the baronet's colliery only once exceeded a production level of 30,000 tons during the eighteenth century, Lord Dudley's pits were spoken of in 1797 as being capable of an annual output ten times as great. Even the Hawkesbury Company, Warwickshire's largest mining undertaking at this time, probably never exceeded 50,000 tons, even in its best year.

Collieries elsewhere in Warwickshire, between 1750 and 1810, recorded vastly inferior annual tonnages despite the advantages to be enjoyed as a result of canal building. Coal raised at Haunchwood (Nuneaton) between 1804 and 1805[26] hardly rose above 4000 tons and even in 1823/24,

(25) P.R.O: Dudley Papers: C110/170

(26) Appendix N, Table 1
Weekly Coal Production and Sales (Haunchwood), 1804-1805.

its best years between 1815 and 1826, it was not substantially more than 18000 tons.(27) Between 1757 and 1768 Ansley and Haunchwood collieries jointly produced less than 4500 tons at their peak(28), whilst nearby Baddesley Colliery averaged little more than half this total annually between 1732 and 1768(29).

At the other end of the field, Wyken Colliery, leased from the Trustees of Sir Thomas White's Charity (Coventry), fared slightly better than Haunchwood during a similar period of time, but only on two occasions did sales exceed 16,000 tons in any one year between 1812 and 1828, and this total was made possible only after investment exceeding £60,000(30).

In summary, the size of coalpits and the scale of production in the larger mines between Nuneaton and Coventry accelerated swiftly during the last quarter of the eighteenth century. This was justified by the growth of the Coventry and district coal market, new access to south-east Warwickshire and north Oxfordshire via the canal network, and made possible by the incorporation of ideas from Durham mining practice into the well-established local design. Undertakings north west of Nuneaton

(27) Appendix N, Table 2,
Haunchwood Colliery: Coal Production, Sales and Mine Rent, 1809-1826.

(28) Appendix O, Table 1,
"An Account of Coals got and sold.....at Ansley", 1757-1768.

(29) Appendix P, Tables 1 and 3
Badgley Colliery Production Records.
See also Thesis (Wh.) pp. 262-272.

(30) Appendix R, Table 1
Coal Sales and Mine Rent paid by Messrs. Inge and Stanton to Sir T. White's Charity, 20 May 1811 - 3 April 1828.

appear not to have begun to change noticeably until the period of the late Napoleonic Wars, but even so had advanced far from the days of the bell pit mode of operation. The basic pattern of coalpit construction used on the Newdigate estate as early as 1603 continued fundamentally unchanged into the middle years of the nineteenth century whilst the longwall method of winning coal, used locally as early as 1700, continues to find favour, albeit with modifications, with the coal industry even today.

Section II

Developments in Mining Organisation

"Butties want hanging by hundreds....."(31)

Thus was one witness quoted in evidence given to the Midland Mining Commission on the occasion of its enquiry into the state of the coal industry in South Staffordshire. Despite the fact that the organisation of mining at certain Warwickshire collieries undoubtedly underwent change during the period 1687 to 1842, not always for the better as far as labour was concerned, local conditions never deteriorated to the level which apparently justified the Staffordshire outburst quoted above. That this was so is due in large measure to the fact that the Warwickshire branch of the coal industry had attained a relatively high level of maturity long before 1843. By the end of the eighteenth century local

(31) Parliamentary Reports: Midland Mining Commission (S. Staffordshire) First Report, (1843), p. XXXIV. (Hereafter referred to as M.M.C. (S.S.) 1843.

mineowners had, in many instances, invested heavily in their undertakings and were consequently quite unwilling to see the well-being of their collieries prejudiced by adventurers principally concerned with short-term gain.

The source material on which this Section is based falls into two parts: estate records, which become notably sparse for the latter part of the century, especially for the Newdigates, and the 1842 Report(32) supplemented by contemporary newspaper accounts of industrial unrest on the coalfield. Fortunately, important sections of the Report were devoted to the evidence of colliery officials and old miners who jointly made frequent reference to social and industrial conditions thirty years earlier; that is to say, to the local coal industry during the period of the Napoleonic Wars. Taken together these sources reveal a high degree of continuity in the general organisation of some of the major undertakings over the course of nearly seventy years, although a number of modifications were made to particular areas of responsibility within this framework.

By 1800 both the rentier and the owner-entrepreneur were substantially represented on that part of the Warwickshire coalfield which lay between Coventry and Mancetter. The distinction between these two classes was not, however, made on the basis of scale of investment or of sheer size. In the Coventry-Nuneaton section four major undertakings

(32) Children's Employment Commission: Report on the Employment of of Children and Young Persons in the Mines of Warwickshire (1842). P.R.O.

Referred to hereafter as 1842 Report.

dominated the field, three being operated by owners on their own account[33] and one being under lease.[34] North-west of Nuneaton it appears that most of the principal sites for a distance of seven miles were controlled by the Dugdale family[35] who preferred to lease them rather than conduct operations directly. Thus south of Nuneaton, owner-enterprise characterised mineral working whilst the rentier took pride of place elsewhere on the field. A similar arrangement applied in both areas in 1842.

To judge from the activities of the proprietors of the Griff and Hawkesbury companies, owner-entrepreneurs provided the necessary fixed and most of the working capital, determined the size, depth and extent of working areas and formulated general policy for the undertaking. Under them an agent (called the mine steward at Griff) exercised a wide-ranging superintendence over day to day activities. In the case of Griff Colliery this included selling the coal, paying the charter-masters, travelling on relevant business for the estate and representing Sir Roger Newdigate at many official enquiries and canal navigation meetings.

Below the agent (steward) a ground bailiff was appointed with

(33) Griff (Sir R. Newdigate); Hawkesbury (F. Parrott and Partners); Bedworth Charity (Trustees of the Nicholas Chamberlaine Charity).

(34) Lease: Council Minute Book (Coventry), A14 (K), pp. 477-490. Coventry Corporation (as Trustees of Sir T. White's Charity) to John Stanton and Edward Inge (Jnr.). 21 March 1790.

(35) Richard Geast of Blyth Hall, Coleshill, descended in the female line from Sir William Dugdale, married Penelope Bate, co-heiress of F. Stratford of Merevale near Atherstone, and adopted the name of Dugdale in 1799.
The present Dugdale Muniments, are therefore, a collection of Geast, Stratford and Dugdale Papers.

special responsibility for ensuring that the seams were properly worked, with due consideration for safety and economy. Individual pits were worked by butties, locally called charter-masters, who organised the getting and raising of the coal, receiving a fixed amount per ton which varied from seam to seam with which they in turn paid the men and boys under[36] their control.

A similar arrangement continued throughout the period of the Napoleonic Wars until 1842 although there is evidence to suggest that the role of the charter-master had, if anything, become rather more important by this date. Nevertheless, these men, the natural successors of the "Company" leaders of the time of Sir Richard Newdigate (II), never attained the level of power and, incidentally, public execration attaching to the more infamous butties at mines in West Bromwich and Wednesbury.

With regard to the second class of mineowner little positive is known about the form of organisation adopted by their lessees, or indeed about the business relationship subsisting between the two parties, until 1842. From the evidence of the 1842 Report and contemporary newspaper accounts[37] of labour troubles in the industry, however, it would

(36) No women or girls were employed underground at any colliery on this field in 1842, according to the Report (footnote 32), nor indeed at Griff during Sir Richard Newdigate's time. A single reference to a woman working in the pits was recorded, however, in 1783[1]. This suggests that, although rare, it was not unknown in the latter part of the eighteenth century.

[1]CR136 Diary (i) 24 Dec. 1783
(ii) 10 Feb. 1784

(37) Aris' Birmingham Gazette, August-September 1842, passim.

appears that there was little to choose in this respect between the systems adopted by them and their lessees, on the one hand, and those of the owner-entrepreneurs, on the other.

Graded divisions of responsibility on the scale outlined above suggest that levels of management, each with its own demarcated sphere of action, were an important feature of local mining organisation in the last quarter of the eighteenth century. This perhaps, was inevitable at the larger collieries, considering the increasing complexity of operations. However, local agents never approached the "Viewers" of the North-East in terms of fame and broad, professional competence. Nevertheless, multi-level forms of organisation were by no means an exclusive characteristic of the local coal industry from 1775 onwards. As early as 1701 the Newdigates operated a fairly sophisticated system of management, to be vitiated largely by Sir Richard Newdigate (II) himself in his attempts to achieve rapid success.

To what extent did the organisation and management of the Newdigate coal enterprises undergo change during the period 1687 to 1842?

The second baronet undertook mining operations twice during his lifetime; between 1684 and 1689, and again between 1700 and 1709. During the former period a rudimentary system was adopted whereby a pair of "Overseers of the Coalpit Field" discharged all immediate responsibility for equipment, payments and sales, aided by a clerk who kept account books. Coal "getting" was undertaken by small teams of miners called "companies".

In 1700[38], hard pressed by mounting debts and desperately anxious to restore family fortunes, his second and much larger enterprise was organised on a more elaborate scale. Reserving to himself the functions of an interfering managing director, two senior bailiffs[39], aided by a variable number of lesser bailiffs, were appointed, the former to act in much the same way as the fifth[40] baronet's mine steward, and the latter to superintend the working of individual pits, make returns of sales and generally ensure that directives emanating from Arbury were obeyed. As before, the responsibility for getting and raising coal rested with eponymously named miners' companies.

Coal working was organised on a triple basis. Companies operating the choicest areas were hired directly by the estate, paid a basic day rate and given sundry allowances in cash and kind when and where appropriate. Others operated on a simple sub-contract basis, purchasing the right to work stipulated lengths of particular seams, using such equipment as was provided by agreement and selling their product to the estate. "Subsistence" money was generally advanced to the leaders and deducted at the final reckoning from such moneys as were due to them. The third group, apparently much rarer, hired the right to work specified pits (usually the nearby exhausted ones) and appear, themselves,

(38) The organisation and management of the Griff undertaking in the time of Sir Richard Newdigate (II) is analysed in Thesis (Wh.) Part IV, Chapt. 3, passim.

(39) The basic pay of these men was not substantially above that enjoyed by the "getters" during periods of full employment.

(40) Sir Roger Newdigate.

to have provided such working capital as was necessary. It is from the two latter groups that the charter system almost certainly grew in later years.

The fifth baronet was a relatively prosperous mineowner and probably felt no need, if indeed he ever had the inclination, to intervene frequently at all levels of management as had his grandfather. The charter system was fully operational at Griff by 1780 but the butty himself still appears at this date to have retained some of the elements of equality with his fellow faceworkers which existed earlier in the century. How far this was true of butties in other collieries in the field at this time it is impossible to say. It is, however, beyond dispute that the baronet exercised a paternal hold over the activities of his men and this may well have restrained the more ambitious charter masters in his pits. Scattered entries in his diary confirm this although they are too sparse to enable a detailed view of his policy regarding the welfare of labour to be formed. Whenever the steward was unable to deal satisfactorily with charter groups the baronet himself was fully prepared to settle disputes with the colliers by means of a personal confrontation, or to harangue them as occasion demanded. This suggests strongly that the local butty at this time was far from being the tyrannical employer implied by his reputation in certain parts of the Midlands.

With regard to the Hawkesbury Company, the charter system appears not to have been widely adopted there until after the death of Richard Parrott, in 1774. His brother, Francis, coming from Birmingham and being conversant with mining organisation in the Black Country, evidently made the necessary change in 1775, for an entry in the colliery memorandum

book[41] for July of that year records the replacement of coal money by an allowance of coal itself as part of miners' wages. This action was consistent with a change from the direct-hire, day wage system favoured by the company in 1770[42]. By 1791[43], if not earlier however, the charter system was as fully operational at Exhall (Hawkesbury) as at Griff and Wyken.

During the following fifty years the same mixture of rentier-lessee and owner-entrepreneur dominated mining enterprise on this part of the field, and the same broad system of middle and lower level management continued to exercise responsibility for getting, raising and selling coal. Nevertheless, on closer examination, the sharp, perhaps over-simplified view of different classes of senior employee dissolves into a more complex series of overlapping lines involving several groups of people. Nowhere was this clearer than among the ranks of the butty class by 1842. Whilst at Griff the latter continued to be kept in their place as charter masters, responsible only for recruiting, training, directing and paying their men, this policy was by no means universal. At the several collieries belonging to the Bedworth Charity[44] and again at the "Kettlebrook coalfield"[45],

(41) W.H.B. Court: A Warwickshire Colliery in the Eighteenth Century, p.227. Ec.H.R. VII, (No. 1), 1936-37.

(42) Advertisement. Labour for Exhall Colliery, Jopson's Coventry Mercury, 26 March, 1770. C.W.C.

(43) Caddick and Yates MSS. 81/1 Notebook "1791".

(44) Nicholas Chamberlaine Trust.

(45) 1842 Report, para 76.
This mining area was situated less than a mile from Tamworth, and at the extreme north-western point of the Warwickshire coalfield.

a single butty took charge of a complete coalwork. In such circumstances his duties approximated more nearly to those of the butty class on the South Staffordshire field. At other collieries, however, butties worked together under the supervision of a ground bailiff or other senior official. There was no single, simple pattern of sub-contracting. On the one hand there was the low grade employer(46) concerned with basic functions, ever-ready to absent himself with his men to go and see a fight as occasion arose, and on the other the general manager(47) of an important undertaking.

Many of the butties supplemented their income by running local "beer shops" where the men came "to draw and reckon". Woe to the man who did "not take his beer. The other workmen think him a poor devil and do not like him"!(48) Worse for his wife who, receiving her husband late from the pit, often the worse for drink at the miners' "hovel" after working hours(49), was at pains to settle accounts with tradesmen before going on credit for another fortnight. The evils of excessive drinking coupled with the hardship of pit life contributed greatly to the squalour and evil reputation of the Bedworth area

(46) 1842 Report: Evidence (No. 65) of John Lawrence of Grove Colliery, near Nuneaton.

(47) Ibid: Evidence (No. 63) of Thomas Pearson of Bedworth Charity,

(48) Supra.
Footnote 46

(49) Ibid: "The men drink the ale in the hovel after they come up..... After the drink.....the men go home as lively as larks"(!)

during the 1830s.(50)

> "Here were powerful men walking queerly with knees bent outward from squatting in the mine, going home to throw themselves down in their blackened flannel and sleep through the daylight, then rise and spend much of their high wages at the alehouse with their fellows of the Benefit Club; here the pale faces of handloom weavers, men and women, haggard from sitting up late at night to finish the week's work, hardly began till Wednesday. Everywhere the cottages and small children were dirty, for the languid mothers gave their strength to the loom."(51)

Why were working conditions generally depressed at this time? Part of the reason is to be found in the decline of local silk ribbon weaving after the Napoleonic Wars, a process hastened on by the introduction of more sophisticated textile machinery in Coventry which made competition in the silk ribbon industry distinctly one-sided. Part of it is also due to the waning power of the traditional landowner.

(50) Alfred H. Lawrence: Bedworth Church and its Rectors, p. 12.
"Cock fighting, bull-baiting, drinking, gambling and disorders of every description had full sway; fights among men were incessant, and even women stripped in the streets to fight, and the surpassing grossness and degradation of the place obtained for it the proverbial designation of 'Black Bed'orth'."
Description of the scene greeting the new rector in October 1830. Similar ones were not unknown during the previous century.

(51) George Eliot: Felix Holt: the Radical, p. 4, (Everyman 1966)

The last of the Newdigate baronets - a keen and stable influence in local affairs, had long since passed away, to be replaced by a distant relative whose interest in the estate was for life only, whilst the Hawkesbury Company, some of whose later proprietors cultivated an interest in local affairs for many years, broke into distinctly separate parts by 1828. In these circumstances it was perhaps inevitable that the power of the greater butties should grow, and with it their malignant hold upon mining society.

Matters were worsened by a recession in the textile industry in the 1820s which made itself felt in the coal industry throughout the county(52). By 1842, however, recognisable improvements(53) appear to have been made in the quality of social life even though much remained to be done. In this respect the patient efforts of ministers of several church denominations over the course of many years had at last begun to bear fruit.

How did the Warwickshire butties compare with their Staffordshire counterparts in terms of power and importance?

Of the latter's origin and role in Staffordshire at the end of the

(52) There was a severe shortage of coal throughout Warwickshire, Leicestershire and Staffordshire in 1825.

Report: D.M. 2546; J. A. Twigg to Dugdale S. Dugdale 6 June 1825.

Much of the Warwickshire coal was raised for landsale and whenever textile workers were on short time this reduced the demand for coal. Matters were often made worse in the Bedworth area by unemployed weavers tending to drift to the mines in search of work.

(53) 1842 Report: Evidence (No. 62) of Benjamin Stratton, agent to Charles Newdigate.

period under review it was stated:

> "They must be raised from the ranks; they first become doggies and when they have saved a little money, for they must have some capital, they are made butties.....
>
> "The butties are generally two in partnership and one of them is usually down at a time the other is looking out upon the bank.....
>
> The butty supplies the horses, the candles, the powder, the picks, and sharpens them, and lays down the railways, and finds timber for propping up the coal; the proprietor finds the rails and the trucks for transporting the coal; he also finds the coals for the engine, and the butty brings it at his own cost and delivers at the coke hearth."(54)

The hold of these middlemen over both masters and men was sometimes strengthened by the fact that they themselves often possessed substantial investments in the mines.(55) Thus the butty system in the Black Country was an important consequence of the undercapitalisation of many mining enterprises in that area. The plethora of safer, and sometimes more profitable investment opportunities elsewhere diverted savings which

(54) Report by Thomas Tancred (Kingswinford No. 2), M.M.C.(S.S.) 1843.

(55) Investments of £1000 and more by some of these men often made it difficult for many of the smaller owners to get rid of them when they were no longer required, or when their presence had become an embarrassment.

N. Boyd: Coal Pits and Pitmen, p. 114.

might otherwise have been sunk in mining. Additionally the absence of an efficient and skilful managerial system was reflected in difficulties encountered by owners, some of them strangers to the industry,[56] in organising and directing a recalcitrant labour force. In such fertile soil did the butty system take root and thrive.

Despite the apparent position of power enjoyed by the Warwickshire butty at, for example, the Bedworth Charity Collieries, he was nevertheless a pale shadow of his relation in Kingswinford, Wednesbury and West Bromwich. It is doubtful whether it could be said of him that he "knew" how to work "the marrow out of a man's bones". Control over his activities was exercised much more stringently by owners who, on account of their own heavy investment, had too much to lose by granting him a considerable measure of independence, except in rare instances.

In both areas many of the butties were men of little education[57], having been brought up in the trade and risen to a position of authority

(56) Appendix to the Report, p. 23.

Many of the mine owners in the West Bromwich area were men who had "made their money in the iron trade and purchased the property". M.M.C.(S.S.) 1843.

(57) Inability to read and write was no bar to keeping acceptable accounts. Thus, Thomas Arrott, once a butty and then (1841) a working collier, stated in evidence:

"The butties keep their accounts of the coals delivered on sticks, and they go and see if the clerks have entered the right quantities, the same as on the sticks. If there be a dispute, and they go before a magistrate, he will believe a butty if he swear to the correctness of his stick. He has a fresh stick for every day of the week. When I was a butty I kept my accounts on sticks from quarter to quarter, and had never a book at all".

1842 Report: Evidence (No. 64), T. Arrott, accompanied by S. Shelton.

by force of character and by virtue of accumulated savings which they could put to use as working capital.

The raison d'etre of the Warwickshire butty stemmed principally from environmental rather than investment factors. Working in thin, sloping seams necessitated collective action at the pit face. Available evidence for both Newdigate and Parrott enterprises indicates that whilst owner-entrepreneurs might occasionally find it difficult to obtain the necessary capital for their undertakings this was rarely the case for long. In addition the collier labour force was smaller and less exclusive than in many other parts of the country, making it easier for employers, aided by magistrates, to exercise control.

It appears, too, that the "little butty system" in this county was a much more fluid one, with room for demotion as well as promotion. Nevertheless, the very nature of the system inevitably gave rise to abuse and in no small measure probably accounted for much of the bitterness which marked relations between masters and men for decades to come.

The butty's "turn", or profit, was made by taking the difference between the charter price determined by the coalowner and the rate which he himself paid to the men. When the local supply of labour increased, as it did after the Napoleonic Wars with the return of discharged soldiery, and during the recession of the 1820s higher profit margins could be squeezed and more substantial "buildasses" (free work) could be enforced. The coalowner, however, did not entirely avoid responsibility for pay and for conditions of work by merely delegating the task to the butty. When he cut the charter or resisted attempts to increase it, pressure was indirectly increased

on the men. And lest it might be thought that ex-faceworkers risen to positions of authority might be more considerate of their fellows than outsiders, it was this very class of employer who, it is alleged, knew how to "cut keenest and closest" when[58] opportunity arose.

The butty system had its advantages for the more backward coal-owner. The latter divested himself of responsibility for finding and organising a traditionally turbulent group of workmen. It also introduced a measure of stability and predictability[59] into his labour and general costs. The Warwickshire butty, for example, commonly had to meet the cost of providing timber (except at Griff), maintain the roof, pay a proportion of the fuel bills for the mine engine and meet blacksmith's charges for sharpening and repairing tools.[60] By imposing this responsibility, coalowners, during the eighteenth and early nineteenth centuries, ensured not only that their share of working capital was kept down to a minimum but that operations were conducted, as far as they personally were concerned, with greater economy. Nevertheless, as mines generally became larger and investment deepened even the newer class of mineowner began to find that there was less and less room for the traditional butty in his organisation.

To sum up, the "Little butty system", so characteristic of much of the Warwickshire coal industry as early as 1701, gradually increased in

(58) Appendix to the Report, p.5. M.M.C.(S.S.) 1843.

(59) A. J. Taylor: The Sub-Contract System in the British Coal Industry in Studies in the Industrial Revolution presented to T. S. Ashton, p. 221 et seq.

(60) 1842 Report: Evidence (No. 64) of T. Arrott.

importance during the eighteenth and early nineteenth centuries. Whereas its power and influence was kept under control at the more heavily capitalised undertakings, such as Griff, it grew in those mines north-west of Nuneaton where cost and price problems became more acute with the rise of competition.

The broad pattern of mine organisation in 1842 was largely established during the previous century. Despite changes in the nature and origin of certain proprietors in the later period, many of the features of their system of management can be traced back to the coalmining enterprise established by Sir Richard Newdigate II over a century earlier.

Section III

Investment and Technological Advance, 1600-1842

(i) Investment

An important feature of colliery undertakings during this period was the rise in the scale of investment. This is apparent from the increased size of undertakings, both above and below ground, the growth of productive capacity, and the rapid use made by many coalowners in the southern part of the field of the latest forms of machinery at their pits.(61)

(61) (i) Supra, Chapt. 1.

(ii) A. W. A. White: Early Newcomen Engines on the Warwickshire Coalfield, 1714-1736, T.N.S. XLI, (1968-69).

To judge from the work of the Newdigates, the only coalmining family for which records are available for the greater part of this period, the initial outlay for a major undertaking multiplied ninefold during the course of three quarters of a century. That of Sir Richard Newdigate (II) in 1700, for example, was estimated to cost a sum ranging between £2,200 and £2,400[62]. However, had this incorporated a scheme[63] devised five years later to build an overshot waterwheel, complete with connecting water channels over a mile long, in order to facilitate winding, the total would have risen to approximately £4,500. Henry Beighton's estimate for a "new foundation"[64] at the same place in 1729/30, was given as £2,000 (plus or minus £300)[65] provided it were possible to incorporate the old shafts and pits in the new design. Otherwise the cost of a completely new coalwork would be almost double.

By the second half of the century investment levels had jumped substantially. For example, it cost Sir Roger Newdigate £20,000 "to open"[66] his new Griff Colliery at the Collycroft end of the estate in 1774. No detailed estimates are available for the Hawkesbury ventury, Griff's closest rival of note for many years, but it would appear from the size of that undertaking, the problems which its

(62) Thesis (Wh.), pp. 62-64.

(63) Ibid. p.215, An Increase in Capital Costs.

(64) Ibid. Appendix C to Part III, pp. 209-212, The Present State of the Coalwork at Griff, 4 Feb. 1729/30.

(65) Including the cost £650) of a new "fire" engine.

(66) (i) CR136/Diary, 18 Jan. 1789.
(ii) CR136/V/147, Memorandum: "The Case of Sir R. N."

proprietors were obliged to overcome, and their predilection for even more expensive and advanced forms of mine equipment[67] than the baronet was prepared to consider, that the total outlay by 1779 could not have been less than that claimed for Griff five years earlier. Nearer Coventry, the promoters of Wyken Colliery, opened in 1791[68], had already expended £60,000 by 1811 and, subject to the agreement of the Corporation of Coventry to renew the lease under which they operated, were willing to go still further.

Whereas it is impossible to chart the outlay and subsequent expenditure at Wyken Colliery, it is evident that in the case of Griff the greater part of the difference in levels of investment between early and late eighteenth centuries reflected the greater cost of pit construction (admittedly unusual because of the use of a waterwheel for winding purposes), and the need to build more sophisticated forms of heavy machinery for drainage purposes. Nevertheless, the Griff undertakings of 1700 and 1774 were in each case extremely large for the Warwickshire coal industry of those times. These estimated outlays, therefore, should be regarded as having been at, or very near to, the maxima for the county in those

(67) (i) Infra, Appendix J. Item 2.
Correspondence: B. and W. Colln. (Office Letter Book), M. Boulton to J. Fernyhough, 1 Jan. 1779

(ii) Correspondence: B. and W. Colln. (Office Letter Book), Boulton and Watt to Messrs. Whieldon, Parrott and Taylor. 6 July, 1777.
See also Chapt. 1 (Section 1, passim) supra.

(68) Supra, footnote 34.

years. Investments on these scales were justified in each instance by the rising value of the Coventry, Warwickshire and (later) north Oxfordshire coal markets, to which local collieries had virtually exclusive access until the summer of 1790.

(ii) Technological advance

The following account of technological progress made on the Warwickshire coalfield over the course of two and a half centuries is centred on the efforts of different proprietors at Griff, near Nuneaton. Although this colliery gradually declined during the latter part of this period from the position of pre-eminence which it enjoyed during the early years of the eighteenth century to one of more modest proportions, it was nevertheless at all working periods an important undertaking. It was, moreover, the site of successful experiments in labour organisation and mining technology, some of the results of which were adopted by other collieries on the field.

For the sake of convenience this study is divided into three sections, to coincide with the periods of new development and subsequent consolidation which marked progress in the county.

Period I (1602-1713)

The first period covered a span of little over a hundred years during which time at least four separate coalmining enterprises were established, the last and most important of which operated between 1700 and 1709. Progress made during these years was extremely slow, the most important feature of it being the increasing scale upon which machinery brought into operation by 1602 was employed to deal

with the problem of recurrent mine flooding. By contrast the period beginning in 1714[69] should be viewed as the introduction to the modern period of coalmining. This is principally because advances made in mining technology between 1714 and 1720 constitute a watershed in local mining history. Changes effected later in the eighteenth and early nineteenth centuries were, in many respects, improvements, additions to or adaptations of, the invention that was tried and tested during these years. The late seventeenth and eighteenth centuries, therefore, had this in common: they were periods of consolidation and innovation following brief years of successful experimentation.

The recurrent problem of water intrusion was the prime reason for this uneven record of progress, the second being the need to devise more efficient methods of winding coal as pit shafts became deeper. Twice flooding reached initial proportions, to be solved only by means of radical departure from accepted practice. The first of these occasions occurred in 1601 or 1602 when the then lessee, Jeffrey Foxe, spent substantial sums of money in an attempt to solve it. According to his own testimony in 1602 Foxe did (at Griff):

> "there fix and make bothe a watermill and a horsmill with ingens thereunto belonging which before weare never invented for the continuall draining of the said colemines",

adding by way of postscript that "before he (Foxe) could effecte the same, your poor orator did disburse vere neare 800 Li" (£800).[70]

(69) Sir Richard Newdigate's colliery came to a standstill in 1709, shortly before his death, and operations under the direction of lessees did not begin again until 1711.

(70) Bill of Complaint: Jeffrey Foxe v Gifford, Beaumont et al. 3 May 1602. Chancery Proceedings (Series I), C2/Jas. I. F4/53 P.R.O.

That in fact Foxe did build a horsemill and a watermill and used them successfully was confirmed(71) by one of his adversaries but before Foxe could reap the benefits of his enterprise he was imprisoned for debt. Important parts of his machines, however, passed eventually into the hands of the Beaumont brothers(72), undertakers in other nearby mines who, by that time, had established a virtual monopoly of all coal production within a six mile radius of Bedworth.(73) Conceivably these may have been included among the "many rare engines"(74) which Huntingdon Beaumont, the younger of the brothers, introduced into mines near Blyth and Newcastle on Tyne in 1605, in a forlorn attempt to make his fortune(75) by controlling the source of supply for the London coal market. Nevertheless, they did, in point of fact, form the basis upon which further progress was made possible at Griff for the rest of the seventeenth century.

As stated earlier, the principal characteristic of technological progress between 1602 and 1709 was the increasing scale upon which these inventions and their many variants were employed. Thus, by 1709, pit drainage was effected by an assortment of "rag pumps",

(71) Answer of Walter Gifford to the Bill of Complaint, ibid.

(72) Sir Thomas and Huntingdon Beaumont.

(73) Replication of Jeffrey Foxe. ibid.

(74) William Gray: Chorographia, reprinted in Harleian Miscellany, III, p. 280.

(75) (i) Richard S. Smith: Huntingdon Beaumont: Adventurer in Coal Mines, Renaissance and Modern Studies, I, 1957.

(ii) A. W. A. White: Men and Mining in Warwickshire (I) pp. 15-18

chain and barrel gins, worked mainly by horses, together with "pulley engines", undershot waterwheels and windlasses. Of all these devices the most powerful appear to have been developments of those inventions first used by Jeffrey Foxe and his contemporaries. To this number, however, as flooding once more became a serious problem with the increasing depth of mineworkings, was added a windmill by 1701, whilst after 1705 there is the strong possibility that an overshot waterwheel(76) was built and put into service. Of all the items of equipment available in 1709 only the waterwheel and, for a few years, the horse gin were retained for use in the second period of expansion which began five years later.

Very little information is available about developments in other departments of colliery organisation during the course of the seventeenth century. Certainly by 1704 drawing underground was done by means of man-hauled sledges, whilst a crude form of ventilation was effected between 1700 and 1709 by the use of wooden pipes and bellows worked by boys. Coal was dislodged by the use of gunpowder(77) and broken up by the use of iron-tipped picks and wedges. At the surface, drawing was carried out by human labour, oxen and horses, whilst carts and packhorses were commonly used by customers to carry their coal away from the pit bank.

(76) Thesis (Wh.), Appendix E (i), to Part III, p. 215.

(77) Ibid. Part II, Chapt. 1 (B), passim.

Period II (1714-1775)

The second period of technological progress opened in 1714 with the substitution of a mechanical form of power - the Newcomen atmospheric engine - for the vast array of human and animal sources which had characterised operations during the late seventeenth and early eighteenth centuries. The new change, however, was more revolutionary than that pioneered by Jeffrey Foxe and others over a century earlier insofar as it was capable of almost infinite refinement. The inventions of Period I were, by their very nature, capable of only limited development: those of Period II were bound only by the limits to which engineering science and metallurgy were subject at any particular time, and by considerations of expense. The machines for both winding and pumping used by Sir Roger Newdigate at the opening of his mine in 1774 were, in fact, little more than very large and very expensive adaptations of those devices available to Messrs. Parrott, Parrott and Sparrow(78) and Sir Richard Newdigate III in earlier years.

The contrast between Period I and Period II at Griff, as a result of the introduction of the atmospheric engine, was substantial when measured in terms of labour, capital and time savings. No longer was it essential to lock up capital in a wide range of inefficient machines and horses(79) or to employ a large number of workpeople, both full and

(78) The lessees who operated the colliery between 1714 and 1720.

(79) According to J. T. Desaguliers, one atmospheric engine at Griff did the work performed earlier by fifty horses, costing "not less than 900 L a Year". The fire engine did its job for only 1/6 of this expense.

J. T. Desaguliers: A Course in Mechanical and Experimental Philosophy, Vol. II, p. 482

part-time[80], on basic duties. Work could proceed more evenly and swiftly, subject at first only to fluctuations in the demand for coal, and furthermore the proprietor himself was released from almost complete dependence upon the vagaries of the weather. Recognition of the value attached to the "fire" engine is to be measured by the speed and extent to which mine operators on an eight mile strip of the coalfield adopted it between 1714 and 1736[81]. Although a costly item of equipment its employment exemplified the growing substitution of capital for labour and ushered in a notable period of innovation. The overall result was that scarce labour in the second and third decades of the century could be diverted to other tasks and that a higher and steadier level of production become feasible.

Improvements began to be made to the atmospheric engine almost at once by proprietors closely acquainted with the requirements of Griff Colliery. These included a system of automatic water injection[82] and the substitution of riveted, iron salt-pan plates for copper and lead in boilers[83]. The latter innovation was particularly important as a means of substantially reducing engine-building costs.

(80) Thesis (Wh.) Part IV, Chapt. 2, passim.

(81) At least nine new "fire" engines were built in this area between these dates.
See A. W. A. White: Early Newcomen Engines on the Warwickshire Coalfield, 1714-1736, T.N.S. Vol. XLI (1968-69)

(82) J. Farey: A Treatise on the Steam Engine..... p. 133.

(83) "Parrot's (sic) improvements in riveting iron-plates was leading to the disuse of copper and lead in boiler roofs. 'They last much longer and cost five times less', says Desaguliers."
Abridgement of Patent Specifications (1618-1859), Vol. 49, (Pt. 1), p. 49.

Few changes, however, were made in other departments. Tools and techniques of coal-getting remained the same as in Period I, and indeed were to remain so for much of Period III. Ventilation and haulage both above and below ground did not begin to experience any profound change until Period III and even then seem to have proceeded slowly and imperfectly. The reason for so lopsided a picture of technological progress in Period II is quite simple. Collieries by this time were quite capable of large annual tonnages and, with one exception, existing designs and methods were fully equal to the task of meeting the requirements of the market.

Period III (1775-1842)

A consequence of the progress made between 1714 and 1775 was that shortcomings became increasingly apparent in other departments of colliery life. The growing size and depth of mineworkings, for example, indicated a potential bottleneck in the transportation of coal from the face to the pit bank. Coal winding was once more reaching the stage where a swifter and more powerful means of hoisting heavy skips became essential if higher levels of production were to be reached and sustained(84). Likewise clumsy and inefficient methods of measuring coal needed to be replaced by something more accurate and more convenient. Now that the pits were getting larger and faceworkings

(84) The waterwheel used at Griff when it opened again in 1774 was employed for only fourteen years before being replaced by a converted atmospheric engine.

were becoming separated by greater distances from the shafts, there was a need to improve ventilation. Flooding, the problem which had bedevilled operations so much in the past(85), and which had been the immediate cause of so much costly experimentation, now began to be replaced at Griff as the major nuisance by gas. In short, instead of one headache, local proprietors simultaneously began to face a formidable selection, more or less in rapid succession. This, in turn, introduced the third period of technological progress of which innovation rather than invention was the prime feature. How quickly solutions were found to every one of these problems is impossible to say, on account of the uneven quality and quantity of source material. Existing evidence proves, however, that the fairly rapid changes were effected during the first twenty five years of this period(86), the most dramatic of them taking place at Hawkesbury rather than Griff. It also shows that equally substantial progress had been made by 1842. No indication is given, however, as to when and in precisely what circumstances specific technical advances took place between 1799 and 1842. Nevertheless, the impression remains that much of the additional progress reported in 1842(87) was, in fact, comparatively new.

(85) Sir Roger Newdigate was more fortunate in this respect than his rivals at Hawkesbury. Their four atmospheric engines proved to be unsatisfactory and they were obliged to turn to the Birmingham firm of Boulton and Watt for assistance.
Supra, Chapt. 1 (Section I).

(86) Supra, Chapt. 1. (Sections I and II)

(87) Ibid. Section III.

The problem of raising large quantities of coal swiftly was solved by the adoption of rotary steam engines, the first for which we have distinct records being introduced in 1792. Prior to this horse gins appear to have been in general use throughout the coal-field[89], with only one (known) exception. This occurred at Griff where the owner successfully combined machines[90], examples of which had been used independently in earlier years. The experiment, however, was discontinued in 1788 when the centre of mining operations was shifted to the northern end of the estate and never repeated. The use of steam winding to haul coal from the deep of the mine was delayed until some time during the nineteenth century[91] for although it was reported as being in use in 1842, and given as a reason why fewer young people were being employed underground, horses had been used for hauling for much of the intervening period. Railways, both above and below ground, which had come into fashion by the opening of the nineteenth century also permitted the movement of heavier loads. Used in combination these innovations eliminated the bottleneck which had threatened to place severe limitations on the capacity of collieries to raise coal.

(89) Judging from oblique references in the different collections from which material has been drawn for the Hawkesbury Colliery, and from direct references in the Dugdale Muniments for collieries in and north west of Nuneaton.

(90) Supra, Chapt. 2.

(91) Probably when the Griff Caroline foundation was opened in 1835. This was the colliery which featured so greatly in the 1842 Report. See also footnote 62, Chapt. 1, supra.

The problem of the accurate measurement of coal was resolutely tackled at Griff and Hawkesbury, and given the disputes which arose in 1786 at mines in and to the north west of Nuneaton, probably in some of those places too. The fact remains, however, that progress north of Griff in this respect was made much more slowly than in collieries to the south, for the problem of weights and measures(92) remained a bone of contention at Haunchwood Colliery, owned by the Dugdale family, until the second quarter of the nineteenth century. The introduction of weighing machines at Griff by 1784 meant that estate interests, customers and miners together were more efficiently served than the multitude of measuring devices had hitherto permitted.

Gas intrusion was imperfectly dealt with at Griff and Hawkesbury until the early nineteenth century. The introduction of a manually operated ventilator(93) at the former colliery could not have been adequate for the whole underground working area, despite the extravagant claims of Sir Roger Newdigate's mine steward(94), whilst the use of slaked lime at Hawkesbury may well have caused more problems than cures. However, by 1842, a system of "coursing the air" was in operation at at least one colliery on this field, aided by furnace ventilation as occasion demanded(95).

(92) Infra, Appendix G, Measures and Weights: some local problems.

(93) See Appendix K, "White's Specification" and Plate VIII.

(94) Supra, Chapt. 1, (Section II [(i)]).

(95) 1842 Report: Evidence (No. 62) of Benjamin Stratton, agent to C. N. Newdigate, (Griff).

The range of progress had broadened considerably by the end of the third period but important sectors of the industry displayed still little real difference from that which had existed nearly a century and a half earlier(96). It must also be recorded that although important technological advances permitted the demands of the market to be met, and confirmed the gulf which separated Capital from Labour, the condition of working men in the industry had experienced some deterioration(97) since the halcyon days of Sir Richard Newdigate (II)s venture. This was partly due to factors outside the immediate influence of mining, such as the long term decline in the fortunes of the local silk ribbon industry after 1815, and partly due to the nature of the industry itself.

Conclusion

The "Industrial Revolution" of the late eighteenth and early nineteenth centuries should be regarded as the last, and perhaps most important, of a series of movements rather than a single period of

(96) Others became static after 1792. For example, the engines which were in use at Griff in 1833 were fundamentally the same as those originally built by Sir Roger Newdigate, despite the fact that more efficient Boulton/Watt type engines had long been available. Possibly the invasion of the market by Staffordshire coal supplies from 1790 onward may have acted as a depressant rather than a stimulant.

(97) The judgement of T. S. Ashton on the decline in the condition of labour on other coalfields during the eighteenth and early nineteenth centuries is sadly applicable to Warwickshire.

time in which all technological advances worthy of note took place. Accordingly no single group of factors was likely to have held the central position at all times and no single key, therefore, is likely to unlock all its secrets. Even to try to show within strict geographical limits how and why Warwickshire's many industries attained their level of development by 1850 would necessitate a search for many keys.

Nevertheless, since the object of all industry is to produce and distribute for sale articles of consumption not provided by nature, it requires no special degree of imagination to show that few, if any, manufactured goods can be produced without fuel. The industrial movement which began in the eighteenth century relied heavily upon steam power; it was in fact the steam engine which did so much to give Britain early economic superiority. But this, in turn, was entirely dependent upon abundant supplies of cheap coal.

The foregoing chapters have shown that technological advances on the Warwickshire coalfield began early, were important long before the traditional advent of the Industrial Revolution, but that progress was uneven. Nevertheless, colliery undertakings between Coventry and Nuneaton attained a level of maturity not matched by the rest of the field until the nineteenth century. The industry continued, even after 1800, to use methods in some departments which were not substantially different from those in vogue at the end of the seventeenth century. Nevertheless, the level of technological progress achieved by the greater coalmasters deserves to rank with the efforts of more celebrated nineteenth century industrialists. As a result of their

work, the division between the first and last decades of the eighteenth century appears, on the basis of existing evidence for this county, to have been greater than for any comparable period of the seventeenth century, or for the first half of the nineteenth century.

> "The eighteenth and early nineteenth centuries were rich in entrepreneurs, quick to devise new combinations of productive factors, eager to find new markets, receptive to new ideas."(98)

By all these tests the coalmasters Sir Roger Newdigate and Richard and Francis Parrott are worthy of inclusion among the ranks of pioneers of the industrial revolution.

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(98) T. S. Ashton: The Industrial Revolution, 1760-1880. p. 11 (1962 Edn. Home University Library series)

PART IV

THE MARKET, CAPITAL AND THE ENTREPRENEUR

CHAPTER 1

CANALS, COMPETITION, AND THE GROWTH OF THE MARKET

Introduction

Given that the Warwickshire coal industry underwent radical change during the eighteenth century in terms of scale of investment, size, technology and output, we must now consider the extent and nature of that market for coal which had been the subject of much time, effort, expense and ingenuity.

The scope of this chapter is therefore necessarily wide. The first task is to estimate what changes, if any, took place in the geographical extent of the market as a result of the building of local canals. Following this an enquiry will be made into the capacity of the market, its relationship to production at local collieries, and the extent to which prices reflected the presence of competition. Given also that Coventry was predominantly a textile-manufacturing centre for the whole of this period an analysis will be made of the peculiarities of that market and its bearing upon the fortunes of the local coal industry.

Primary source material for the latter part of the century indicates that combination among the coalmasters was well known in the 1780s and suggests two additional questions: what factors facilitated its growth, and what influence was exerted upon this state of affairs by the arrival of regular supplies of Staffordshire coal?

Finally, given that colliery output and sales fluctuated greatly at Griff during the late seventeenth and early eighteenth centuries[1], an attempt will be made to discover the extent to which production and sales cycles were still a marked feature of the local industry during the early years of the classical industrial revolution.

Section I

The Warwickshire Coal Market during the Eighteenth Century

The Geographical extent of the Warwickshire coal market changed little during the hundred years which ended in 1778, being located within a pentagon-shaped area stretching from Tamworth in the north to Banbury in the south, the bulk of the sales taking place within the growing industrial belt running southwards from Nuneaton to Coventry. Municipal and private business records, however, prove that limited quantities of local coal had occasionally been bought in Leicestershire and southern Oxfordshire prior to this period, and also suggest very strongly that it had found its way into parts of Northamptonshire[2]

(1) Thesis (Wh.), Part III (i) Appendix J, Table 1 (a and b): Chilvers Coton and Nuneaton Common Collieries, 1687-88.

(ii) Appendix J, Table 3 Sales, Receipts and Expenses.....Griff 1722-29

(2) (i) Thesis (Wh.) - Part I, Chapt. 1, Sections A and B, passim

(ii) Dugdale Muniments: D.M. 174, Testimony of Edward Shilton.

Nevertheless, before the advent of the Midland canal network(3) the more distant areas played only a small part in the calculations of local coalowners. It was upon the level of demand in the Nuneaton-Coventry area that decisions to invest in colliery undertakings depended, and many of the sales to places outside this locality were in fact made to traders who brought supplies of grain and wool to sell in Coventry(4). By contrast, once the Coventry and Oxford Canals were cut Warwickshire coalmasters set out actively to exploit the potentially rich market which lay southwards towards Rugby and Banbury. This policy was justified in that within a few years over 60% of the annual water-borne tonnage in the area was being shifted along the Oxford Canal(5).

The first positive steps by the Newdigates to stake a claim in the local market for their newly-opened colliery were taken in June, 1775(6). In a letter to his master, then spending his vacation in Venice, the mine steward reported the delivery of the first six boatloads of Griff coal to Coventry, two of which were distributed as

(3) Insufficient evidence exists to show the importance of sales by land carriage during the period under review.

(4) Coventry was an important market and focal point for traders in the South Midlands.

(5) CR764/264/1: "Case of the Warwickshire Coal Owners, stated from the Evidence given at the (Parliamentary) Committee," 1785.

That is to say, south of its projected junction with the Coventry Canal at Longford.

(6) Correspondence: CR136/B1771, R. Hutchins to Sir R.N. 22 June, 1775.

free gifts. Three years later[7] their market had already widened to include Banbury, and by 1783 it was claimed that the Banbury Wharf could dispose of up to 9000 tons of (Warwickshire) coal annually[8].

The failure of the Oxford Canal Navigation Company to build southwards beyond Banbury between 1778 and 1786[9] imposed no bar on the attempts of local suppliers to break through the southern boundary of the market in order to reach the Thames. Between 1778 and 1790[10] coal was shifted first by barge to Banbury and thence by "land carriage of 24 miles through very bad roads to Oxford"[11]. Such was the fear, for much of this time, of London dealers and their associate suppliers from Northumberland and Durham of the strength of possible competition from Warwickshire pits that legislation banning[12] water-borne coal

(7) William A. Potts: A History of Banbury, p.197.

The first cargo of coal was sold to local inhabitants at 12d. per cwt., but as an inducement to carriers who had come at least 14 miles to the Wharf a reduction was made of 1d.

The first Griff coal was sold in Banbury in May, 1778.

(8) CR764/264/1: "Facts relating to the Equality of Tonnage on the Oxford and Coventry Canals".

(9) On account of financial difficulties. On problems associated with the early financial history of both Coventry and Oxford Canals, see Appendix 4(2).

(10) It was not until the passing of the third Act governing this venture (26 Geo. III C20) that the proprietors were able to raise the necessary finance to continue the canal as far as Oxford. This waterway was opened for traffic along its entire length on 1 January 1790.

(11) CR764/264/2: "The Case and Papers relative to the Navigable Canal intended to be made from.....Wednesbury to Fazeley," 1782.

(12) Oxford Canal Navigation (First Act) 1769, 9 Geo. III C70.

below Oxford from the Midlands was not, in fact, amended until 1786[13].

On behalf of the Warwickshire coalowners in 1783, in their struggle to obtain this reform, it was claimed[14] inter alia that at that time their undertakings supplied the market "in all the country round" Coventry, by land and water, for "40 or 50 miles distance". Allowing for some exaggeration it is a fact that in addition to being sold between Tamworth and Oxford it was also being retailed in the county town[15] in the face of fierce competition from the Staffordshire product[16]. Nine years later, in opposition to the proposed scheme to cut a canal from Ashby de la Zouch to Griff[17], it was demonstrated that Warwickshire coal was also being supplied northwards to Hinckley and nearby settlements in Leicestershire. Nevertheless, despite competition on both their eastern and western flanks, it is apparent that as the century drew to a close the still tightly-knit Warwickshire coalowners regarded the area south of Coventry as a particularly important market. This found expression in their support for the

(13) Oxford Canal Navigation (Third Act) 1786, 26 Geo. III C20

(14) CR764/264/1: "Facts relating to the Equality of Tonnage.....".

(15) Kenilworth Parish Records: DR296/116/2-6.
Coal supplied to Kenilworth Workhouse was often higher in price although the journey was shorter by four miles.

(16) CR764/264/1: "Case of the Warwickshire Coal Owners.....".
Notwithstanding the fact that Warwickshire coal was 3½d. cheaper per cwt., it was admitted that "The Staffordshire carry the Market Forty to One at Warwick".

(17) CR1022/2: "Objections to the Canal proposed to be made from Ashby de la Zouch to Griff (Calculation)".

proposed Grand Junction Canal scheme whereby it would be possible for them to "furnish the inhabitants of Northamptonshire, Buckinghamshire, Bedfordshire and Part of Middlesex with Coal at a Cheap and easy Rate," where, it was alleged, "the Price is now so very high, that but few are able to purchase this Necessary of Life"(18).

To judge from fragmentary accounts of coal traffic on the Coventry and Oxford Canals in 1800(19), the major local coalowners regarded south-east Warwickshire as more important for them than the Coventry market. This trend, however, was reversed, at least temporarily between 1803 and 1807, when recorded annual shipments from Warwickshire pits to the Oxford Canal fell slowly from 30,000 tons to 21,000 tons per annum and yet increased each year to Coventry during the same period from 22,000 tons to 27,000 tons(20).

By the end of the Napoleonic Wars the drive to extend the market for Midland coal south-eastwards had successfully reached London, and by 1816 substantial quantities of coal from Warwickshire and other Midland counties had displaced exports from the north-east in the capital(21).

(18) Ibid. "Public Utility Unmasked". 1792

(19) (i) Appendix S, Table 3: Fragment of Canal Coal Shipments observed by the (Exhall) Hawkesbury Colliery Company.

(ii) " " Table 4: Fragment of Production and Sales Distribution by the (Exhall) Hawkesbury Colliery Company, 1800.

(20) (i) Appendix S, Table 1: Coventry Canal Navigation: half yearly Shipments to Coventry (1803-1807).

(ii) " " Table 2: Coventry Canal Navigation: half yearly Shipments to the Oxford Canal (1803-1807).

(21) P.P. Reports: Committees, of the House of Lords, Session 1830, Vol. VIII, p.59.

According to a deputation from collieries on the Wear in 1816, Warwickshire had taken 162,962 chaldrons (27 cwts.) of trade from the Newcastle area. Staffordshire coal accounted for a further 300,000 chaldrons whilst Derbyshire took over 350,000 chaldrons.

Section II

The Size of the Market

Given the type of material available for present analysis, two methods may be used to determine the size of the market for coal between Nuneaton and Oxford at the end of the eighteenth century. One may employ either estimates of the effective demand of the population within a given area, or statistics of the known tonnages shifted thereto and sold over a period of time. Ideally, both methods should be used in conjunction to obtain as realistic a figure as possible. Unfortunately no evidence exists for precisely the same years for either of these avenues of approach. Nevertheless, given approximate figures of the population for Coventry and the affected areas for 1801 and 1811[22], and also the size of annual shipments along the Coventry and Oxford canals between 1803 and 1807, a rough figure should be available to estimate the size of the market at which the coalmasters were aiming at the turn of the century.

The population of the City of Coventry in 1801 consisted of 16,034 persons, a figure which rose slowly to 17,923 by 1811. Thereafter the rate of increase accelerated to reach a total of 21,242 in 1821, and then rose even more rapidly to 27,070 by 1831[23]. An important feature of population increase between 1801 and 1831, therefore, was that the rate of change was relatively low during the first ten years,

(22) (i) Appendix V, Table 1: Population Statistics for the City and County of Coventry, Bedworth, Chilvers Coton and Nuneaton (1801).

(ii) Appendix V, Table 2: Population Statistics of the Principal Areas served by Warwickshire Collieries (1801-1831).

(23) During this decade the well-being of both local textile and coalmining industries plunged to abysmally low levels.

considering that employment opportunities in the city were rising to a climax for the greater part of the Napoleonic War period[24]. The increases of later years were closely associated with economic depression. In 1801 an additional 5547 persons lived in the surrounding county of the same city which, together with the added populations of Bedworth, Chilvers Coton and Nuneaton, gave a grand total of slightly over 31,000 people living either on or close to the principal part of the coalfield.

Given that the population of Coventry rose fairly steadily from 1801 to 1811, it is assumed that it reached a level of 17,000 by 1806. Coventry Canal shipments[25] between 1803 and 1807 also rose, 31,000 tons being transported in 1806, giving a rough consumption per capita in that year of 1.8 tons[26]. This, however, disregards the importance of land carriage from Wyken Colliery to the neighbouring eastern end of the city which would add to the annual tonnage and consumed by the city's inhabitants. True annual consumption of coal, therefore, was probably nearer to two tons per head of the population, taking into consideration both industrial and domestic requirements. On this basis, then, there was a market for coal in both city and county of Coventry in 1801 of 43,000 tons. This could be regarded as a conservative figure, considering

(24) The zenith of the fortunes of the local silk ribbon industry (or "Great purl time") came in 1812.

(25) Appendix S, Table 1

(26) Domestic per capita consumption (not per household) in Leeds in 1771, a textile city similarly situated on a coalfield, is given as 1.7 tons.
- G. Rimmer: Middleton Colliery, near Leeds (1770-1830).
Yorks. Bulletin of Economic and Social Research VII (No. 1) 1955, p.50.

that production at Griff Colliery alone, even in its more modest years during this period, was frequently more than half this total, and that this was but one of five collieries situated between Nuneaton and Coventry, competing with the product of pits elsewhere on the Warwickshire coalfield together with that from Staffordshire.

On the basis of an annual consumption of two tons per head of the population for all purposes(27), the market along the coal belt between Coventry and Nuneaton in 1801 accounted for 62,000 tons(28); that for Rugby, Southam and Banbury and the intervening settlements on or near to the line of the Oxford Canal raised the total to 75,000 tons per year. Land carriage to the Warwickshire county areas lying in a wide arc from the south to the north-west of Coventry, together with sales in the direction of Lutterworth(29), is estimated to have brought the total to 80,000 tons. Finally, since the population of the city (and University) of Oxford in 1801 was reported to have been just over 11,000 people, the full scope of themarket from Nuneaton to Oxford would, on a per capita basis, amount to 102,000 tons in that year(30).

(27) "The decrease in timber in the county has been great, within living memory", wrote W. Marshall, circa 1785. This would tend to increase demand for coal as fuel in eastern Warwickshire.
W. Marshall: The Rural Economy of the West Midlands, II, p.319 (1796 Edn.)

(28) From population account, Appendix V, Table 2.

(29) Griff coal had been sold in the Lutterworth area very early during the century.

(30) Although coal was being produced at several small collieries lying between Nuneaton and Tamworth, at the same time, insufficient evidence is available to show how much of it was sold in that area or to indicate how successfully it competed with coal from Wednesbury.

Such a tonnage might appear at first sight to be remarkably high, especially since consumption has been calculated on a per capita rather than on a household basis. Nevertheless, recorded canal tonnages shipped southwards from Exhall, Bedworth (Charity), Griff, Nuneaton (Haunchwood) and other collieries in North Warwickshire and Staffordshire, past Hawkesbury Junction(31) and down both Coventry and Oxford Canals between 1803 and 1807, varied annually between 96,000 tons and 111,000 tons(32). It would appear, therefore, that imprecise though these estimates of demand are for 1801 - an inevitable result of the shortage of accurate data on which to base calculations of population needs - the market in that area at the turn of the century could absorb comfortably an annual output of coal verging closely on 100,000 tons.

It was to exploit a market approaching this scale that local coalmasters invested so heavily during the previous thirty years, employed the latest devices that science and technology could provide, and formed combinations to fight off competition from neighbouring fields.

(31) Toll House

(32) Calculated from statistics in Appendix S, Tables 1 and 2
These totals, of course, disregard any sales by land carriage along the Southam turnpike as well as water-borne sales from Wyken, a colliery which lay to the south of Hawkesbury Junction.

Section III

Prices and Competition at Griff

To all intents and purposes Warwickshire collieries monopolised coal sales in the Coventry-Nuneaton area until 1790. In that year the junction of the Coventry and Fazeley Canals enabled cheaper Wednesbury coal to be brought to the South Midlands(33). Nevertheless, despite the advantage of being able to operate in what were virtually monopoly conditions for the greater part of the century, local pithead prices varied considerably from time to time. Leaving aside the problem of seasonal variations(34), this was due to the fact that the local market was never able to absorb the potential output of all local pits at one and the same time, even at the beginning of the century(35). Consequently, the greatest rewards went to the entrepreneur who established himself first at the beginning of a cyclical upswing. In this respect the Newdigates were counted among the leaders, being always alert to market trends and the state of nearby competitors' pits.

Existing evidence shows that pithead coal at Griff retailed for 4/5d. per ton (an average of 2½d. per hundredweight) in 1700, rising during the following year as competitors' pits became exhausted to 5/4d. (per ton). Sales continued at this price level until 1725 when they

(33) CR764/264/2: "The Case and Papers.....intended Canal.....Birmingham to Fazeley." 1782.

"The Wednesbury and Warwickshire coals are no strangers to each other, they have met together by land carriage, at Coventry, for some centuries before canals were made...."

(34) Infra, Section VI, Seasonal Production and Sales Cycles

(35) Thesis (Wh.), Part II, Chapt. 1, Sections D-E, passim.

rose once more to 6/8d., at which point they remained until the colliery closed in 1730[36]. It would appear, therefore, that during the first thirty years of the century Warwickshire coal prices, as reflected in those charged by the Newdigates, rose by virtually one half. In point of fact real prices rose much more slowly owing to the practice of varying the quantities vended in each stackload[37]. As the market became satiated so the quantity offered for sale by proprietors tended to rise[38]. Matters could be worsened in this respect for all coal-masters when some of their number, embarrassed by importunate creditors yet anxious to preserve at least a nominal degree of co-operation with their neighbours, secretly boosted their stacks to record levels[39].

The peak years for coal prices in the Bedworth area came in the 1760s, and it was in order to take advantage of the potentially high profits of that period that Sir Roger Newdigate took steps to build Griff Colliery anew in 1769. This opened in December 1774 and before the end of the month had despatched its first wagon loads of coal to Coventry. Not until 1779 however were teething troubles at the mine finally solved. Production then rose sharply and Sir Roger Newdigate recorded the price of his coal in that year as ranging from 8/4d. to

(36) Closure came about principally because of the rise of Bedworth and West Sydnall (the future Exhall) collieries which took away a large part of the market hitherto supplied by Griff.
Report: CR136/C619 The Colliery at Griff

(37) Sales were measured by the stackload, nominally of 30 cwts., rather than by weight. Statistics printed in Appendix U, Table 4, however, have been recalculated in terms of the ton of 20 cwts. in order to give a much more realistic picture of price movements over the course of the century.

(38) Thesis (Wh.), pp. 48-49.

(39) Chancery Depositions: H.M.46 (1740) W.S.L.

10/- per ton, according to quality[40]. Unfortunately for him, other local collieries, notably the Hawkesbury-Exhall group belonging to F. Parrott and partners, increased their output at the same time with the result that Griff prices had dropped to an average of 6/8d. per ton by 1782. Mutual interest, however, dictated some form of combination, especially in view of the projected Birmingham-Fazeley and Ashby Canals, and this included "An Agreement as to the Selling of Coals"[41]. Although no evidence is available to indicate the success of this price ring, the fact is that local prices remained at 6/8d. per ton for the following three years[42].

1789 was the last year wherein local coalmasters were able to operate in monopolistic conditions. It was also a record year for the baronet, over 32,000 tons of coal being sold, the bulk of it at the rate of 10/-d.[43]. So large an increase over previous years suggests that certain other unidentified collieries at this time had curtailed operations, possibly for fear of the result of the threatened competition

(40) Appendix U, Table 4. Pithead Coal Prices at Griff and Bedworth (Exhall) Collieries, 1687-1801.

(41) W. H. B. Court: A Warwickshire Colliery in the Eighteenth Century. Ec.H.R. VII (No. 1) 1936-37.

Unfortunately no further information was given on this point by the writer of the colliery memorandum book which was the subject of the article quoted.

(42) CR764/264/1. "Comparative View of the Price of Staffordshire and Warwickshire Coals to be delivered at Coventry."

Low though these prices might seem compared with those of 1778, it was claimed by the Grand Trunk Company that "Warwickshire Coals..... may and ought to be sold at most at 5/-d., the rest being a gross Imposition upon the Public".

(43) It was also the year when cumulative receipts from the mine since it opened exceeded £20,000.

from the West Midlands. In July of the following year sales at Griff dropped to zero[44] and in August, immediately preceding the first cargoes from Wednesbury a considerable number of colliers were dismissed. By December[45] over 3000 tons of "Birmingham" coal lay awaiting buyers at Coventry Wharf, three times as much as that from Warwickshire pits. The fears which Sir Roger Newdigate had entertained as long before as 1773[46] regarding the effects of competition from Staffordshire seemed at last to have been realised.

Great though the impact of West Midlands competition was in the short run the results were less serious than they would have been had the unequal tonnage rate, established in 1782 but repealed in 1785, not been abolished in good time[47]. Despite its superior quality the Staffordshire product made less of an impression in the Coventry area than further south along the Oxford Canal[48]. Nevertheless to the anxieties caused by this additional source of supply was now added coal from the newly-opened Wyken Colliery in 1791, with the result that Griff prices dropped steadily during the following ten years.

(44) Appendix L, Table 2: "Griff Colliery", monthly receipts, (1779-1805).

(45) CR 136 Diary.

(46) Correspondence (i) CR136/C642
(ii) CR136/B1739

(47) Appendix U, Table 3, "A Comparative State of the Price of Staffordshire and Warwickshire Coals....."

(48) Appendix S, Tables 1 and 2.

Section IV

The Market for Coal in Coventry

The Coventry market was already an important one by 1684(49). Twice during the eighteenth century the high prices which its citizens and visiting traders had been prepared to pay were the justification for elaborate and costly mining undertakings. Unfortunately for the mining community it was also an extremely volatile one, the more so as the city became increasingly dependent for its prosperity upon the success of luxury industries. It was almost certainly for this reason, as well as on account of the potential market in Oxfordshire, that the major coalmasters gave such enthusiastic support to canal and turnpike-building schemes(50) and tried to dovetail the progress of their own enterprises with plans for the improvement of public routes.

Coventry's industrial prosperity was fairly broadly-based during the first sixty years of the eighteenth century. The earlier staples of woollens and broadcloths yielded precedence after 1694(51) to an

(49) Exchequer Depositions by Commission: 36 Chas. II Mich. 43

(50) Richard Parrott invested profits from his mine in the Coventry-Nuneaton and Coventry-Southam Turnpikes, whilst Sir R. Newdigate concentrated upon the Mancetter Turnpike and the Coventry and Oxford Canals.

See: (i) A. W. A. White; Men and Mining in Warwickshire, V;

(ii) Appendix U, Table 1, Dividends on Midland canal stock, and interest on local turnpike mortgages, received by Sir R. Newdigate.

" " Table 2, Investment by Sir R. Newdigate in stock of the Coventry and Oxford Canal Navigation Companies.

(51) S. Timmins (Ed.): The Resources, Products and Industrial History of the Birmingham and Midland Hardware District (1866) p.179.

increasing number of newer textile products, many of which proved "a very extensive and profitable concern to the proprietors for some time"(52). Later this range(53) was widened temporarily, but by 1782 most of these trades had migrated to Leicestershire and Northamptonshire leaving the woollen industries very much a shadow of their former selves(54). At this time, however, the silk ribbon industry had become the principal source of employment in the city, depending for its success on demand in London and overseas markets, and in its turn providing, indirectly, much of the demand for local coal.

The silk ribbon industry appears to have been established in Coventry in or about 1703, and within the following thirty years its success reputedly rewarded "the industry of its proprietors with vast fortunes"(55). Between 1770 and 1815 it had become "not only the most important textile industry.....but the staple industry of the city"(56). As long as the silk ribbon trade was protected absolutely

(52) W. Reader: New Coventry Guide (1810) p.122 C.W.C.

(53) Consisting of (a) striped and mixed tammies - thin, highly glazed worsted.
(b) calimancoes - a glossy, satin-twilled woollen stuff, brocaded in the warp.
(c) shalloons - light woollen stuff.
(d) damlets - fabric of mixed wool and goat's hair.
(e) shags - coarse, woollen cloth.
(f) sarsenets - sarsnet silk (taffeta).

(54) T. Pennant: The Journey from Chester to London (1782), p.141. C.W.C.

(55) W. Reader; op. cit. p.123
According to the Hewitt Survey (CR136/V/12, p.52) silk weavers were established in Chilvers Coton as early as 1684.

(56) H. Miles: The Coventry Silk Ribbon Industry from the Introduction of the Use of the Dutch Engine Loom (c1770) to the Cobden Commercial Treaty (1860), p.13.

from foreign competition(57), and whilst fashion dictated the use of a wide variety of ribbons, the prosperity of the "old manufacturers of Middlemarch" was generally assured. By 1795, however, the dangers of over-dependence upon a single, highly fluctuating, industry were becoming apparent(59). There were, it seems, few supporting industries in Coventry(60) such as metal-working, and attempts in earlier years to widen the range of textiles by establishing gauze (1768) and calico weaving (1770) met with little success(61). Even the building of the Bedworth Mill (1789), supported by Sir Roger Newdigate(62), in order to substitute worsted-making for silk-ribbon weaving in that locality led to disappointment.

The natural consequence of the progressive narrowing of the city's industrial base during the eighteenth and nineteenth centuries was to place not only ribbon-weaving but mining, to a considerable extent, at the mercy of vagaries of fashion. In short, the balance of the local

(57) As it was from 1765 to 1824.

(58) Estimated at £500,000 in annual value in 1784.
Lord Sheffield: Observations on Commerce (1784), cited in Miles, op. cit., p.25.

(59) Sir F. Eden: State of the Poor, p.327 (1928 Edn.)
"Both the manufacturer(s') and the Poor's Rates are very fluctuating."
Part of the decline may be attributed to a deterioration in quality, caused by the absence of foreign competition in the home market.

(60) W. Bailey: Western Midland Directory (1783), p.219. B.R.L.
According to Bailey there were only eight assorted ironmongers, gunsmiths and bellfounders in the city, together with one soap boiler.

(61) According to H. Miles (op. cit., p.20), ribbon making suffered so much during the 1793-94 winter period that a public subscription was opened for weavers.

(62) Memorandum CR136/V/147: "The Case of Sir R. N."

economy was seriously distorted, the success of an important basic industry being made heavily dependent upon the progress of a luxury one[63]. And as an added complication, marginal domestic producers in outlying areas such as Bedworth sometimes sought employment in the mines whenever the ribbon trade took a turn for the worse.

A seasonal commodity such as ribbon could never be a necessity. "No effort on the part of manufacturers to produce cheaper goods, no skill in dyeing or colouring, could assist the sale of the article if the fiat of the fashionable world had gone forth that ribbons were not to be worn."[64] Despite the long Indian summer which the industry enjoyed in Coventry between 1840 and 1858 the end inevitably appeared with great speed when the last tariff defences were withdrawn under the provisions of the Anglo-French (Cobden) Treaty of 1860.

In view of the shortcomings of the Coventry market, which were already apparent before the close of the eighteenth century, local coalmasters had four courses of action to consider when formulating long term policy. They could either combine to fix prices in order to reduce the effects of cyclical developments in Coventry's premier industry, thereby stabilising the market to a limited extent; support the development of the Oxford Canal in order to improve access to Rugby, Southam, Banbury, Oxford and the intervening settlements; break into the Birmingham market, if and when the Coventry Canal was completed; or try to develop iron deposits in the vicinity of local mines. The first course of action had been adopted by 1782. The

(63) Watchmaking was the second most important industry in the city (1770-1815)

(64) Sir F. Warner: The Silk Industry of the United Kingdom: its Origin and Development, p.111

second was likewise taken up but bedevilled by the mutual enmity of the Coventry and Oxford Canal Companies which prevented a link being made between both waterways until 1785. The third was quite out of the question in view of the high-cost nature of the Warwickshire coal industry compared with its Staffordshire counterpart, and the fourth never really got started on account of the poor coking qualities of local coal(65).

To sum up, the long term interest of proprietors was heavily dependent on the extension of the market southeastwards into Oxfordshire. This could be effected by building the Oxford Canal and the lower levels of the Coventry Canal. Very conveniently for coalmasters between Atherstone and Coventry only the first seventeen miles of the Coventry Canal were constructed before its proprietors exhausted their funds, and this effectively delayed the early entry of substantial Staffordshire supplies into the region. However, that which proved to be the salvation of Warwickshire pits in one sense paradoxically caused a decline in the rate of expansion which had characterised the local industry between 1770 and 1785. Not until the supply of cheap Staffordshire coal had become nearly exhausted in the twentieth century did Warwickshire mines once more assume a dominant role in the local economy.

(65) Attempts to set up "blowe harthes" on the coalfield date at least from the mid-sixteenth century (B.M. Additional Charters, 48796), and experiments in iron-smelting were still being conducted three centuries later. An "abundance of excellent ironstone" was, in fact, being sent by canal from the Bedworth area to Staffordshire in 1841.

1842 Report on the Employment of Children.....in the Mines of Warwickshire (Introduction) (See Bibliography)

Section V

Factors affecting the growth of Combination

The development of combination was an important feature of the growth of the Warwickshire coal industry during the period under review, and it became particularly well marked during the last twenty five years of the century. This, however, had not always been the case. To judge from the practices of Sir Richard Newdigate II, sharp competition, taking advantage of the temporary shortcomings of nearby rivals, was the hallmark of business operations during the years 1700 to 1709. By the third decade competition had been modified to some extent by agreement to fix prices and by monopolistic features arising from the restricted use of the Newcomen engine patent(66). From 1769 to 1790 the nature of the industry became decidedly oligopolistic, with frequent ad hoc combinations of coalmasters lending support to their already restrictive outlook on the coal trade.

The conditions which normally favour the development and survival of industrial combinations fall into three categories: economic, political and social, each with its own sub-divisions. In the first category one may include the natural conditions of the industry; technical conditions which decide the size of each producing unit; and existing methods of transportation which fix the boundaries of the market to be served. The second category comprises conditions governing land tenure and the operation of the legal system, together with the attitude of government

(66) Thesis (Wh.): Part III, Appendix H, Newcomen Engine Licences and the London Committee, 1715-1733.

to combination as expressed through the working of the legal system. In the last category the size, distribution and employment of the population, together with its standard of living, must be taken into account. Three additional complications deserve note: the fact that with each positive set of conditions there is often a negative one which militates against the growth of combination(67); that the full influence of each category is dependent upon the interaction of all three; and that whilst many conditions tend to be fixed during the short run some of them, such as technical and transportation factors, become variables over time.

How may we apply this theoretical analysis to the situation as it actually existed in the region?

In considering the natural conditions of the industry production in the South Midlands at this time was effectively restricted to a narrow coal belt stretching from Coventry to a point close to Tamworth, the emphasis being placed upon the more southerly part of the field. Given that the principal area was no more than eight miles long, and a few hundred yards wide at the most, so small and so clearly delineated a zone lent itself admirably to the formation of industrial alliances.

Technical factors were of undoubted importance locally. It has been shown that to open a colliery in the Coventry-Nuneaton area required, among other things, heavy investment, and this in turn had an important bearing on the size of each producing unit. As a result there was, during the course of the century, a persistent tendency

(67) P. M. Sweezy: Monopoly and Competition in the English Coal Trade, 1550-1850, p.138

towards a reduction in the number of coalmasters willing and able to operate in such conditions.

The type, condition and extent of prevailing methods of transportation also exerted a powerful influence. Canals were by far the most convenient means of shifting bulky commodities. Nevertheless there were only two in the area(68), and under the provisions of the parent Act(69) governing each canal no vessel under fifteen tons was permitted to use locks without special leave(70). It is also significant that whilst the Coventry Company had exhausted its finances by the time its canal had been cut sufficiently far north westwards to accommodate the greater coalmasters, remaining in this position for fourteen years because of "inability" to raise further funds, its neighbour was able to add to its already substantially larger initial capital in order to build as far as Banbury.

With regard to political considerations the Warwickshire coalmasters(71) exercised considerable pressure both inside and outside Parliament to determine the form and passage of local canal, turnpikes and land inclosure Bills. Vigorous and effective protests were made against discriminatory clauses in legislation which threatened the

(68) Excluding consideration of the Arbury canal network.

(69) (i) Coventry Canal Navigation (First Act), 8 Geo. III C36.
(ii) Oxford Canal Navigation (First Act), 9 Geo. III C70.

(70) Whilst this requirement might be ascribed to a need to conserve water supplies it nevertheless played into the hands of both coalmasters and landowners.

(71) Led enthusiastically on several occasions by Sir. R. Newdigate himself. CR136/Diary, 1767-1785, passim.

profitability of their undertakings[72]. And yet, whilst denying their own exercise of monopoly power[73] in the region they readily employed it at different periods to oppose the (alleged) threat of regional monopoly by Staffordshire proprietors[74] and to break the domination of the Home Counties market by coalowners in the North-East[75]. Given that Parliament was largely representative of the landed interest at this time, with which the coalmasters were closely identified, the formation of combinations for offensive or defensive purposes presented no real difficulty for them.

Of the social conditions which have a bearing on combination the size of population, its distribution, employment and living standards are the most important considerations. The dependence of textile manufacturing on the "putting out" system over a wide area would have reduced the possibility of collective protests against the price of coal such as might have been the case in a more closely knit industry. With regard to standards of living insufficient evidence exists to permit comment on changes in demand. Although the capacity of the coal market in Coventry itself is estimated to have risen from approximately 30,000 tons per annum in 1730 to 43,000 tons by 1801 there are no

(72) CR764/264/1: "Petition to Parliament". 8th February, 1785

(73) " " "Case of the Warwickshire Coal Owners".

(74) Ibid.

(75) (i) B.M. 214.1.4(103), "Observations on the Effect of the Intended Oxford Canal....." 1767

(ii) " 214.1.4(119), "Letter from Yarmouth....." 1769

(iii) " 214.1.4(120), "Report from.....the Chamber of London on.....the Coventry Canal to Oxford".

means available at present for discovering how far this change was due to increased prosperity over the course of seventy years, if at all, or to a rise in population.

Section VI

Seasonal Production and Sales Cycles

Despite the fact that much greater tonnages were being raised in the second half of the century, especially by the larger collieries, seasonal production and sales continued to fluctuate but with a considerably smaller magnitude than hitherto. However, whereas it is possible to chart these cycles for limited periods for certain undertakings it was by no means the case that they all moved along a clearly defined, common path. In point of fact irregularities in monthly sales patterns at the smaller mines north-west of Nuneaton(76) were an important feature of business operations for many years. Allowing for the temporary exhaustion of supplies at particular pits, why did such disparities arise?

Seasonal demand was an important factor, not only because the state of the weather influenced the smaller collieries with their comparatively primitive machinery more than the larger ones but also because the condition of the roads and the canal link with Coventry had to be taken into account. The availability of credit was also

(76) Notably for those for which records are available in the Dugdale collection of manuscripts.

important, and present evidence suggests quite strongly that this was very limited and could be obtained only for short periods. This in itself could therefore exert an additional depressive effect on output at the downswing of a cycle.

How far the vend at Griff and Hawkesbury was conducted on a credit basis it is impossible to say. Sir Roger Newdigate was quite satisfied to record neatly rounded monthly figures of receipts, giving no indication of the proportion of cash to credit sales. Yet considering the importance of credit at Ansley, Baddesley, Haunchwood and Mancetter collieries it is extremely unlikely that he was never faced with requests for similar financial accommodation. Fragmentary records of Hawkesbury sales liekwise reveal no evidence of credit being taken into account. It is, of course, possible that being much nearer to the main market there was less need to give credit to dispose of coal.

A further factor where the more distant rural areas were concerned was the availability of carts and draught, or pack, animals. The requirements of agriculture during ploughing and harvesting almost certainly made some impression on the numbers available for the coal trade(77) and these would almost certainly have operated from collieries

(77) The supply of animals for shifting coal was certainly not the only problem with which to contend. Labour was generally paid at a higher rate in harvest, a policy which affected the number of men available for the summer coal trade.

A further complication was added when the canals were being built. "It is well known to all, and by many Sufferers feelingly remembered", wrote a Sutton Coldfield rector in 1793, "that much, very much of the Harvest, in the last Summer, was injured, for want of a sufficient Number of Labourers to gather it in, in due Time". The rector advocated legislation to prohibit canal building during corn harvest.

CR1022/2 W.C.R.O.

where prices were keenest and credit most readily available. Given all these considerations it was by no means uncommon to find the sales curves of neighbouring small collieries occasionally going in quite different directions.

The annual cycle of coal sales at Griff between 1779 and 1783 was well marked. December was invariably the best month, whilst April and August were commonly the worst. Production continued throughout the year although the proportion of sales between best and worst months could occasionally rise to 5 or even 6 to 1. In 1780, for example, total sales of 13,407[78] tons earned £1,248[79] for Sir Roger Newdigate but coal receipts veered from £300 in December to £50 for March and £20 for August.

After 1784 the regular summer trough of each cycle gradually rose until by 1795 the pattern of monthly receipts for the greater part of the year had become much more even. December, however, continued to be the peak period for sales until the end of the century. Between 1801 and 1806 the almost traditionally high Christmas sales of earlier years had dropped to less than half the average for the period 1796 to 1800, whilst July and August receipts displayed a tendency to move upwards. How far this trend towards a smoother cycle of operations throughout the whole year was attributable to greater competition from smaller undertakings during winter months, to greater price elasticity of demand following seasonal adjustments by coal merchants, to better credit facilities, to improvements in transportation, or to any combination of these factors, it is impossible to say on present

(78) Appendix L, Table 1: "Coals sold at Griff Collery", 1775-1805.

(79) Appendix L, Table 2: "Griff Collery", monthly receipts, 1779-1805.

evidence. That this development should have taken place, however, is an indication of the extent to which the coal trade as well as the industry in the southern part of the field had matured by the opening years of the nineteenth century.

Elsewhere the picture was darker. At Baddesley Colliery, for example, extreme variations both before and after mid-century[80] imply great difficulties in production, distribution, or in obtaining credit - possibly all three. January was fairly commonly a poor month for sales. September often a good one (decidedly so for credit)[81], whilst May, in consecutive years, was to be found at both ends of the scale.[82] A fairly similar illustration of irregularity and contradiction appears to have characterised the later fortunes of both Haunchwood[83] and Mancetter[84] collieries, factors which probably go far to explain the acute difficulties in which their proprietors found themselves from time to time.

Despite the many shortcomings of source material in the Newdigate Collection for the 150 year period ending in 1836, a number of observations may be made about the development of the local coal industry, as reflected in the progress of Griff Colliery, and the coal trade.

(80) Appendix P, Tables 1 and 2: Badgley Coal Records.

(81) For example, sales in September 1759 rose by 70% over August, itself a good month, but credit was increased by 363%.

(82) There is no evidence to suggest that the colliery was not working normally on both occasions.

(83) Appendix N, Tables 1 and 2: Haunchwood Coal Records.

(84) Appendix Q, Table 1: Mancetter, "Account of Colliery", 1813-14.

Sharp seasonal fluctuations in output and sales over a short period indicate a relatively primitive shape of development. This was fully the case at Griff during the seventeenth and early eighteenth centuries but became noticeably less pronounced as the latter century wore on. Between 1687 and 1689[85], for example, and again from 1700 to 1709, winter output often slumped to exceedingly low levels, February or early March frequently recording little or nothing. Between 1722 and 1729,[86] however, matters improved considerably, production continuing throughout the year although in several cases did so only with difficulty. During this decade annual fluctuations in production and sales commonly rose as high as 10 to 1. Between 1779 and 1801 these were halved. By the early nineteenth century the Colliery had developed a distinct and high-level, all-season capacity to meet demand but not until the 1830s did the proportion between best and worst months for any year fall as low as 3 to 2.

The greater regularity of coal supplies in Sir Roger Newdigate's day had important implications for industry. No longer were domestic and industrial users seriously hampered by occasional shortages. The construction of canal and turnpike networks facilitated the building up of large stocks of coal where they were most needed, and the pattern of an all-season coal trade was gradually but firmly established.

Such progress also increased the rewards to successful entrepreneurship and introduced a greater element of stability into the pattern of mine

(85) Thesis (Wh.) Appendix J, Tables 1(a) and 1(b) to Part III

(86) Ibid. Appendix J, Table 3

ownership. A larger, smoother and more dependable flow of income throughout the year reduced the need for short term borrowing to meet working capital requirements and almost certainly facilitated the raising of capital for long term projects.

To sum up, higher annual production and distribution coupled with the diminution of very short term cycles in the sale of coal by the end of the eighteenth century enabled Warwickshire mines to furnish the local economy with that basis of power which was indispensable for real and sustained growth.

Conclusion

The most important development of the century for the Warwickshire coal industry was the substitution of a regional for a purely local market. Before 1790 coalmasters operated on a modest scale in virtually monopolistic conditions, able to dispose of their product at high prices. This very fact was the justification for the heavy investment programmes undertaken in the 1770s. From 1790 onwards the situation changed. Warwickshire coal was now available to consumers outside the bounds of its traditional market. Nevertheless it was, at the same time, having to face new and formidable competition from collieries in Staffordshire. Mining investment henceforth had to be undertaken with other than purely local criteria in mind for the semi-enclosed economy of the Coventry area was gradually being drawn into the larger one of Birmingham and the West Midlands.

The development of heavy industry in North Warwickshire was well-worthwhile as long as it was screened from serious competition. The

completion of a large portion of the Midland canal network, however, destroyed the security in which local producers had basked for so long and exposed the coal industry to the blast of more efficient rivals. The extent of the market which coalmasters lost as a result of this change in transportation may be measured by the tonnages of Staffordshire coal shipped along the Coventry and Oxford Canals during the early years of the following century. The force of the impact of new competition upon Griff, in particular, may be seen in the fact that no real changes in colliery organisation, method or technology were effected there for forty years.

Little, if any, blame may be attached to the Warwickshire coalmasters for this state of affairs. The inferior nature of their product was something which they were powerless to change, and given the differences in natural conditions in which Staffordshire and Warwickshire proprietors operated, it is highly improbable that the latter could have done anything effective to reduce the gap in production costs which divided them.

Their period of monopoly, however, was well employed. Large, relatively modern collieries, able to supply the market for many years, were built on the southern half of the field. Some of them incorporated the latest devices that mining engineering at that time could provide. Without this period of development it is highly unlikely that the local coal industry would have been in a position to compete at all in the Coventry area by 1800. The widely-held fear of a Staffordshire coal monopoly extending over the South Midlands would then have become an accomplished fact and the rise of the Warwickshire industry might conceivably have been delayed for several decades.

By contrast, the near-monopolistic position exercised by the Coventry silk ribbon industry was a less happy one. Little attempt was made to employ the time afforded by absolute protection against foreign competition to mechanise production or to modernise methods of manufacture. In fact the reverse took place: the high quality goods of former years gradually gave way to articles poor in taste and low in standard. Not until 1836 were positive and distinct efforts made to set that industry on a modern footing, by which time the writing was already upon the wall. The local coal industry, however, despite the severe buffeting which it had experienced at the hands of first Staffordshire and then, later, Leicestershire producers, was at least in a position to meet the fuel requirements of households and new industry for many years to come.

CHAPTER 2

CAPITAL AND ECONOMIC GROWTH

Introduction

A feature of undoubted importance during the classical industrial revolution was the scale upon which capital was required for economic growth. Of special interest is the assertion frequently made that not only was capital employed on a larger scale than hitherto in industry generally but that the rate at which it was required for investment in fixed assets itself underwent substantial change. This assertion has not passed without challenge, nor without contrary demonstration based upon the early history of the cotton and worsted industries(1). And by way of reinforcement evidence has been adduced to show that important sectors of heavy industry, such as coalmining in South Staffordshire, thrived on minimal amounts of capital until well into the nineteenth century(2). It would appear therefore that whilst the increased use of capital was a vital factor in this period of accelerated growth the problem of changed and changing rates of capital employment should be considered in relation to specific sectors of an industry rather than to industry in general.

(1) J. P. P. Higgins and S. Pollard (Eds.): Aspects of Capital Investment in Great Britain, 1750-1850; A preliminary Survey, p. 1. (Report of the Conference.....held at the University of Sheffield, January 1969).

(2) A. J. Taylor: The Sub-Contract System in the British Coal Industry, in Studies in the Industrial Revolution, p. 219.

With this in mind, the first task of this chapter is to test this hypothesis with special reference to the development of the Warwickshire coal industry during the eighteenth century, to place our findings in a wider context, and to relate them to the known capital requirements of certain other forms of industrial activity in the Birmingham-Coventry area.

The centrepiece of this thesis is, of course, the development of Sir Roger Newdigate's estate in North Warwickshire, and in particular his activities as a coalowner. Consequently the baronet's own capital requirements and the sources upon which he was able to draw will form the subject of special enquiry.

Banks and local attorneys feature largely in the financial records of the Newdigates during the eighteenth century. The importance of these lenders and the relevance of the interest rates which were charged to the timing of specific projects will be considered in separate Sections.

Finally an examination will be made of the changing nature of capital recruitment during this century together with its significance for local economic growth.

Section I

Industrial Capital during the Eighteenth Century

By way of preliminary note, it must be recorded that special difficulty has been encountered in assessing the total capital requirements of Warwickshire colliery undertakings. This concerns the distinction between original and subsequent investment, excluding the cost of repairs and maintenance but taking into account alterations

and improvements. In practice it is often impossible to draw a line between repairs and improvements to fixed assets such as mine buildings and pumping machinery. Matters are not improved in this case by the fact that account books and relevant estate data for the area examined do not as a general rule distinguish carefully between types of expenditure. In the case of Sir Roger Newdigate outlays were frequently grouped under general headings or split up into several categories with no clear line of demarcation between them. Consequently this portion of the chapter will, of necessity, be confined to considering the cost of original investment alone in local collieries.

This is a less serious handicap than would appear at first sight. All of the important colliery ventures concerned(3) were new ones, or very nearly so, established at greater depths and working on a larger scale than had hitherto been the practice. Consequently a large part of the fixed assets, such as mine buildings and heavy machinery, was entirely new. Unlike many sectors of the cotton, worsted(4) and silk-ribbon industries there was little opportunity to adapt existing buildings for manufacturing purposes or to employ power units, such as waterwheels(5) or small atmospheric engines, which had already performed useful services elsewhere. In addition, the nature of such fixed

(3) That is, Griff, the Hawkesbury-Exhall group (hereafter referred to simply as Hawkesbury), and Wyken.

(4) S. D. Chapman: Fixed Capital Formation in the British Cotton Manufacturing Industry in Aspects of Capital Investment..... pp. 59-60

(5) The baronet gave his waterwheel to the proprietors of the new Bedworth Mill in 1788.

assets made it certain that theirs would be lengthy working lives with little need for drastic alteration given proper care. Consequently whereas estimates of original investment would tend to give a false impression of the real cost of setting up textile manufactories the opposite is likely to be true in the case of a mine.

The Griff undertaking of 1774 cost Sir Roger Newdigate £20,000 "to open". Precisely how this sum was composed is not clear but suffice it to say that this estimate figured largely in his calculations of profit and loss over the next fifteen years. Of this total £3,758 was allocated to the building of a double fire engine, to sinking and framing a double pit shaft, to providing a gin, ropes and heading materials, and to erecting a blacksmith's shop(6). No adequate data are available regarding the cost of a second engine for pumping purposes, the Smeaton waterwheel and its related complex of water channels, or the charges borne in preparing the working areas, headings or gate roads. Likewise the cost of building the large underground watercourse and the surface network of canals and locks is not formally shown. The investments itemised above therefore represent considerably less than half, probably not more than a quarter, of the cost of the original fixed assets of this particular colliery.

How did Newdigate's capital outlay compare with that of other Warwickshire proprietors during this period?

Definitive statistics for the Hawkesbury undertaking are unavailable but expenditure incurred between 1772 and 1777, when that colliery was being extended, suggests strongly that even larger capital was required

for this particular venture. Richard Parrott claimed[7] to have spent nearly £5,000 in the preparation of a new "foundation" in nearby Foleshill whilst, to judge from correspondence with the Birmingham firm of Boulton and Watt, his brother had spent a sum in excess of £4,500 on a single, new engine by 1777[8]. Given, first, that the Hawkesbury Company was operating under less favourable physical conditions[9] than Griff, making it incumbent upon the firm to buy more sophisticated and expensive equipment, and secondly that in terms of annual production it was for many years considerably larger than its rival[10], the original fixed capital assets necessary to place it on a competitive basis in the 1770s must have cost considerably more than £20,000.

No details are available regarding the third major colliery (Wyken) to be built between Nuneaton and Coventry in the period 1769-1795 save that its proprietors had invested over £60,000 in it by 1811[11], that they had encountered serious difficulties but were willing to find a further £5,000 provided the Corporation of Coventry (as Trustees of Sir T. White's Charity) agreed to extend their lease. Subsequent annual production figures[12] show that in these terms it was smaller than the other two collieries.

(7) Will of Richard Parrott (d. 1774), Caddick and Yates MSS. 55(B) A copy.

(8) Correspondence: Boulton and Watt to Whieldon, Parrott and Taylor. Office Letter Bk. (June 1775-Jan. 1778), 6 July 1777.

(9) W. H. B. Court: A Warwickshire Colliery in the Eighteenth Century, p.224 Ec.H.R. VII, (No. 1) 1936-37.

(10) The size of capital employed by a firm is not, of course, an adequate indication of its size or capacity. But given the above circumstances in which Parrott found himself it is certain that Hawkesbury was the larger of the two collieries.

(11) (Coventry) Council Minute Book, A14(M), 3 Sept. 1811.

(12) Appendix R, Table 1.

If the capital requirements of these three mines are now compared with those for collieries sunk on the same part of the coalfield during the first thirty years of the century, strong evidence emerges in support of the hypothesis that in at least one sector of the Midland coal industry not only was there an increase in the growth of investment in mining but that the rate of increase itself underwent substantial change.

The initial outlay on Sir Richard Newdigate's mine in 1700 came to approximately £2,100(13). That for the projected Griff undertaking of 1730 would have cost the Newdigates £2,000, if parts of the old workings had been incorporated in it, or £4,000 for a completely "New foundation"(14). The Wyken mine was opened in 1719 by George Sparrow and Stonier Parrott for £1,099(15) whilst a second colliery in the Fackleys, not far away, cost the same partners £2,300 to prepare in 1723(16). Bedworth Colliery, which was "effectually destroy'd" by Stonier Parrott in 1729(17) during the final round of protracted bouts

(13) Thesis (Wh.) Part III, Chapt. 1:
The Construction and Capital Costs of an Eighteenth Century Warwickshire Colliery.

(14) Report: CR136/c618, The Present State of the Coalwork at Griff. 4th Feb. 1729/30.

(15) Partnership agreement: Aqualate MSS, D1788/61/IX (a copy), Assignment of a half interest by G. Sparrow to S. Parrott. 16th April 1719 S.C.R.O.

(16) Chancery Proceedings (Six Clerks Series), C11/300/42, G. Sparrow v R. and S. Parrott. 13th Jan. 1724 P.R.O.

(17) On the different relationships between local coalmasters at this time see my
Men and Mining in Warwickshire, IV; passim.

of mutual sabotage, cost its partners £3,000 to be brought into commission(18).

Allowing for undoubted exaggeration in the many legal suits in which certain local coalmasters were involved between 1720 and 1730 it is estimated that an average original investment of the order of £3,500 was essential for an important colliery by 1730. Thus, whilst initial capital outlays had probably risen by 60% during the first thirty years of the century, they increased by a further 400% during the following forty five years.

(ii) The capital requirements of other Midland industrial undertakings in the late eighteenth century: a comparison

(a) Collieries

Present evidence suggests that the capitalisation of mines in Staffordshire, for many years the heart of the West Midlands coal industry, was substantially smaller then in Warwickshire, and in this respect should probably be regarded as being atypical of the tendency to capital growth of a large part of the British coal industry during the industrial revolution. "Neither shaft sinking nor haulage machinery made heavy demands on the mineowner's pocket and this factor, together with the prevailing system of landownership, encouraged a proliferation of small enterprises"(19). Working areas less than ten acres in extent

(18) Chancery Proceedings (Six Clerks Series), C11/376/32, Sparrow and Pickard v Parrott, Parrott and Bateman. 3rd Mar. 1730.

(19) A. J. Taylor, op. cit., p.217

were common: those of more than twenty acres were comparatively rare. As late as the middle of the nineteenth century, "close on four hundred collieries were operating in the Black Country, each on average representing a capital commitment of no more than £3,000"[20], part of which was sometimes provided by "butties"[21]. In short, if the growth of fixed capital resources per single colliery venture be regarded as a yardstick of economic development the Warwickshire coal industry had already achieved a clear lead over its feared rival before the close of the century. Nevertheless the fact that this failed to prevent a successful invasion of the South Midlands market suggests serious weaknesses in the employment of statistics of investment in individual concerns as a measure of progress and productive efficiency. The viability of the larger Warwickshire collieries dictated heavy investment: the opposite was true for Staffordshire. The Warwickshire collieries were small in number but large in extent: the opposite again was true for Staffordshire. It is possible, however, that for every mining area of fifty acres in both counties investment was broadly similar. The basic fact underlying activity in both counties is that whereas Warwickshire proprietors worked comparatively thin, sloping seams at depth many Staffordshire coalmasters were fortunate to be able to operate in much more advantageous conditions. The difference was reflected in their production costs and explains, first, why the latter were able to compete successfully in the markets opened up by the Coventry and Oxford Canals and, secondly, why the

(20) Ibid. p.219

(21) R. N. Boyd: Coal Pits and Pitmen, p.114

great rate of expansion which the Warwickshire industry experienced during the quarter century ending in 1795 was gradually forced down to more modest proportions during the following forty years.

(b) Other industrial undertakings

The pre-eminence of the larger coal-producing and metal-making and manufacturing firms in terms of capital outlay is emphasised by the relatively small requirements of many other important industrial ventures in Warwickshire and Staffordshire during the late eighteenth and early nineteenth centuries.

Silk-ribbon weaving in Coventry, for example, was carried on in ordinary homes and in weavers' cottages in the related villages to the north and north-west of that city. Basic capital requirements for a weaver in 1818 were no more than £18 to £32[22] for a Dutch engine loom (according to condition) and £5 for a single handloom. Sometimes these machines could be purchased by instalments[23]. Not until the 1830s did the need for greater efficiency, necessitating fairly large quantities of fixed capital[24], lead to the building of steam-powered textile

(22) P.P. Minutes of Evidence taken before the Committee on the Petitions of Silk Ribbon Weavers (1818), p.8. C.W.C.

(23) There were 3508 Dutch engine looms (all manually operated despite their name) in Coventry, Nuneaton and surrounding villages in 1818 together with nearly 6500 single handlooms. Annual maintenance costs for the former type were less than £2 per annum

H. Miles: The Coventry Silk Ribbon Industry.....
Unpublished Thesis (Oxford) 1930. C.W.C.

(24) Engendered in part, no doubt, by new foreigh competition made possible by a reduction of the import duty on foreign ribbons in 1829 to 30%. Hitherto the import tariff had been as high as 45%

factories in Coventry. Of these the second had an initial capital of £15,000[25].

Birmingham, on the other hand, included a sprinkling of fairly large industrial undertakings. It was nevertheless a city in which small and medium sized businesses predominated. "Generally speaking there were few manufacturers employing large capitals"[26] there although this did not prevent considerable fortunes from being amassed. Many in fact required less than £100 to commence operations. According to evidence given by Matthew Boulton the "higher description of manufacturers"[27] in that city were committed to investment of the order of £6,000 to £7,000, in contrast to those in Leeds and Manchester, without however distinguishing between original and subsequent investment. His own undertaking at Soho, the "foremost" industrial enterprise[28] in the Birmingham area in 1770, required a capital outlay initially of £10,000[29]. Precision-working operations by the Boulton and Watt partnership in later years, however, committed them to heavy expenditure on specific projects. Nearly £9,000 was spent by the firm alone on the

(25) This particular factory was built in 1836 by a syndicate of ribbon manufacturers to combat growing competition from Derby, Congleton and Macclesfield. Internal rivalry, however, proved to be stronger than external pressures and the company was a failure as a business concern.

The first recorded steam-powered textile factory was built in 1731 but shortly afterwards burned down by local Luddites.

(26) H. Hamilton: The English Brass and Copper Industries to 1800, p.271.

(27) House of Commons Reports X, p.663. Cited in H. Hamilton, op. cit., p.271.

(28) D. E. C. Eversley: V.C.H. (Warwickshire), Vol. VII, p.94.

(29) J. P. P. Higgins and S. Pollard: op. cit. p.106.

"art of improving coinage and preventing counterfeiting"(30).

The requirements of the Midland metal-making companies at this time had more in common with the greater colliery undertakings than with the metal-working firms(31). The Birmingham Metal Company, for example, was founded with a capital of £20,000 in 1781 to produce brass and spelter. In the final analysis, however, only £17,000 were needed. The Birmingham Mining and Copper Company, a type of cooperative undertaking by local consumers, was established in 1790 with a capital of £50,000(32). These examples, however, pale by comparison with the capital requirements of some of the Midland canal companies. The Coventry Canal undertaking swallowed £90,000 before it was completed in 1790 whilst the even larger Oxford Canal Navigation Company had exhausted its initial capital by the time it had completed the first forty four miles of the course(33).

To sum up, the plain fact is that whereas public canals, major colliery undertakings (such as Griff, Hawkesbury and Wyken) and metal-making firms during the late eighteenth century generally required substantial amounts of capital during their early stages the opposite was broadly true for many mines in Staffordshire, for the manufacture

(30) Correspondence: B. and W. Colln. (A.O.), P2/42, M. Boulton to Sir. T. Plumer. 21st Jan. 1795

(31) Occasionally other Midland manufacturing enterprises outside Birmingham required large initial outlays. Using insurance valuations, for example, S. D. Chapman estimates the Parkes, Brookhouse and Crompton textile factory in Warwick at £10,000 (in 1797) and the Bedworth Mill of Henry Lane (in 1788) at £3,000. Such instances, however, were rare in Warwickshire.

(32) H. Hamilton: op cit., p.234.

(33) W. T. Jackman: The Development of Transportation in Modern England, p.369 (1966 Edn.).

See also Appendix Y (ii):
A Note on the Early History of the Coventry Canal Navigation Company

of Birmingham "toys" and for textile production in Coventry. Considering that collieries in Staffordshire and in the extreme north of Warwickshire were, on the whole, quite small undertakings, the scale upon which capital was invested in mines between Nuneaton and Coventry during the period 1770 to 1811 was therefore quite exceptional.

Section II

Capital Recruitment

Although capital was employed on a wider scale during the latter half of the eighteenth century than hitherto, investment in certain forms of industrial activity, such as ribbon-weaving, was not beyond the capacity of individuals. For deep mining, however, external sources of finance were essential to supplement those provided directly by owners and lessees. To judge from the experience of local proprietors this was by no means a novel feature of colliery enterprise in the area. Dependence upon resources other than their own was an established practice long before the upswing in industrial activity which began in the late 1760s(34).

Present evidence shows that there was no single, unchanging pattern of colliery finance for Sir Roger Newdigate and his contemporaries. Likewise no individual zone of thrift or sector of society provided exclusively the financial reserves on which coalmasters so heavily

(34) On capital recruitment for early eighteenth century Warwickshire mine undertakings see Thesis (Wh.), Part III, Chapt. 2. The Principal Source of Finance for Colliery Enterprise, passim.

depended. As the prospect of profit grew, an increasingly wide range of investors offered their contribution to the pool of available funds. It was precisely because of such developments that the baronet was able to rearrange the debt structure of his estate almost at will in contrast to his less fortunate father and grandfather. The transmutation of small savings and wealth acquired from trade or land into fixed assets and working capital was therefore an important factor in local economic growth insofar as it permitted entrepreneurs to assume a larger and more stable debt burden than would otherwise have been possible.

Whence came the necessary finance for mining?

The capital requirements of undertakings on the three most important mineral estates(36) between Foleshill (Coventry) and Atherstone were met from widely different sources. The Hawkesbury Company, for example, was financed initially by two partners. In 1744 these consisted of Richard Parrott(37) and the family lawyer(38), both of whom owned, severally and jointly, fairly substantial tracts of coal-bearing land between Foleshill and Bedworth. By 1765 the business was divided between four partners, of whom one was a successful manufacturer of ceramics, another a divine and the third a local

(36) (a) That of Parrott and Company between Foleshill and Bedworth.
(b) That of Sir R. Newdigate between Bedworth and Stockingford (Nuneaton).
(c) That of Richard Geast from Nuneaton intermittently towards Atherstone and beyond.

(37) Eldest son of Stonier Parrott who was declared bankrupt in 1732.

(38) John Bourne, of Newcastle under Lyme.
See also my Men and Mining..... (V) (Richard Parrott of Hawkesbury).

coal merchant[39]. On Richard Parrott's death in 1774 his place was taken by his younger brother, Francis, a Birmingham doctor and surgeon, who possessed wide business contacts in that city.

Although the Hawkesbury group of collieries appears to have been a success during the course of the following twenty years the level of profitability was insufficient to meet the needs of working capital all of the time. Reliance was placed upon a Coventry bank[40] for the necessary funds and by 1793 very large sums were owing to it. A consequence of crisis in banking circles that year was that pressure was applied for the speedy return of loans totalling £8,500. Over half of this was repaid within a span of nine months by the expedient of borrowing in Staffordshire[41].

The Griff undertaking, by contrast, was financed initially from family resources, income from the Newdigate estates in Warwickshire and Middlesex, by annuities, mortgages and by the issue of a large number of bills and notes. This complex system was gradually rationalised in favour of retained profits from the mine, a single very large mortgage by a London bank, and the resources of relatives and wealthy friends (infra.)

Colliery undertakings on the Geast estates were financed in a quite different manner. Throughout the eighteenth century the owner[42]

(39) Thomas Whieldon of Stoke on Trent, the Rev. John Fernyhough of Newcastle under Lyme, and Geo. Taylor of Bedworth, respectively.

(40) Little and Woodcock, of High Street, Coventry.

(41) W. H. B. Court: A Warwickshire Colliery in the Eighteenth Century, p. 227.

(42) Richard Geast, who adopted the name of Dugdale in 1799.

preferred to act as a rentier, leasing pits to a wide range of operators from Derbyshire, Leicesterhisre, Oxfordshire, Staffordshire and Warwickshire. These were permitted, as part of their agreements, to make such investments as were considered necessary for efficient working. In a number of cases, however, important items of equipment such as engines, engine houses, ancillary buildings, iron rail roads and weighing machines were left behind(43) when lessees departed(44) and some of them were included by the owner in the terms of subsequent contracts made with other undertakers. In this way the relatively safe position of rentier could, to a great extent, be combined with that of entrepreneur without however incurring the risks and charges normally borne by the latter. The real cost of much original investment was thereby thrown forward on to the lessee, an indication of the high inelasticity of demand for mining sites during the period 1770 to 1807.

By way of example, Richard Geast's lease(45) of a mine in Baddesley Ensor in 1790 to the "Banbury Company" included the right to use engines and engine houses erected at an earlier date. During their short period

(43) This practice was by no means unusual. For example, clauses in the 1713 lease concluded between Sir Richard Newdigate III and Messrs. Parrott and Sparrow stipulated, inter alia, the hiring of existing equipment and its return in good condition when the lease expired (or equivalent value) together with the surrender of all machinery built by the lessees on the field, saving only atmospheric engines. Lease: CR136/C3152, Sir R. Newdigate to R. Parrott and G. Sparrow. 26th Dec. 1713.

(44) Although it is possible that the owner paid lessees an agreed sum for equipment retained on their departure, those Dugdale leases which have been examined provide no supporting evidence on this point. Even if it were the case this would still have been a cheap method of providing important fixed assets since they would have been valued on a second-hand basis.

(45) Dugdale Muniments. Lease: DM 13X, Richard Geast to J. Bloxam et al. 5th Aug. 1790

of operations the partners in this group constructed a rail road across the local common for the easier conveyance of coal, together with at least one weighing machine. In a later instance, at a second mine owned by the same family, an unusual opportunity for avoiding investment liabilities yet adding to profits and rent was seized by the owner(s). Permission was granted to the lessee(46) to hire one rail road already in existence and to construct a second at his own cost, which, if completed, would have resulted in supplementary charges being imposed by the lessor for its use. Such a policy was both possible and fruitful where sharp competition existed for leases. It is significant that in the two instances quoted leases were signed for but ten and eleven years respectively.

Working capital, in the case of Newdigate and Parrott, was found locally to a great extent. Both men relied in varying degrees upon Coventry banks(47) for financial assistance when profits were slow to appear. In the baronet's case, however, reliance shifted after a few years to London bankers and local attorneys(48) and additional sources

(46) Lease: DM 1401(A), D. S. Dugdale to H. Okeover. 25th Mar. 1807. The lessee, in this instance, relied upon additional permission being granted by other landowners to build his rail road across their property to Atherstone. In the event of his being successful he was obliged to increase output per acre from the mine so as to raise at least £400 rent per annum and also pay 6d. per ton rail road charge into the bargain.

(47) (i) Originally Thomas Little and John Lowke, later Little and Woodcock.
(ii) Troughton, Bryan and Co.

(48) (i) William Dadley.
(ii) -- Troughton.

were found by the issue of bonds and notes which were essentially personal security loans. Little reliable evidence has come to light regarding the use of extended trade credit[49] as a method of financing the working of Griff Colliery, as was the case in early industrial Lancashire[50] although the ubiquity of book debt was very probably taken for granted and rarely recorded. Likewise, unlike many lesser proprietors on the South Staffordshire coalfield, no recourse was made then, or during the nineteenth century, to profits arising out of the trade of "Tommy shops", which institution appears never to have taken firm root in the mining areas of Warwickshire.

Section III

The Pattern of Sir Roger Newdigate's Borrowing, 1763-1796

Sir Roger Newdigate was a substantial borrower for the greater part of this period. That he was able to reduce total estate debt to relatively small proportions by 1796[51] was undoubtedly due to the profitability of Griff Colliery. Much of his early indebtedness was incurred in the purchase of land in the eventuality of his embarking on coalmining on a large scale, but since no clear indication is given

(49) Appendix X, Table 3;
Supplementary Credit (1763-1795)

(50) B. L. Anderson: Money and the Structure of Credit in the Eighteenth Century. Bus. Hist. XII (1970), p.96.

(51) Appendix X, Table 2: Debt Composition, 1763-1795.

in his accounts of the precise purpose for which each sum was borrowed this analysis of debt-structure will necessarily be concerned with the growth and decline of total estate indebtedness in the thirty four year period beginning in 1763.

In general terms the curve of Sir Roger Newdigate's debts rose and fell with the progress of his mine. The composition of debt during these years, however, falls into two clear divisions: that which obtained between 1763 and 1778 differed substantially from that between 1779 and 1796 in which the most important element was the ability to call upon substantial sources of finance outside the Midlands area.

Income from property in Warwickshire and Middlesex during the 1760s was adequate to bear the cost of normal estate improvements and meet the expense of purchasing small amounts of land. Consequently between 1763 and 1768, before positive steps were taken to reopen Griff Colliery, existing estate debt fell slowly from a total of over £19,000 to just under £17,000(52). However during the following ten years it rose sharply to a peak of £42,000, the greater part of which was met by mortgages on land. As and when these basic resources failed to keep pace with the baronet's requirements the difference was covered by the issue of bonds and notes the total value of which rose by 34.7% between 1775 and 1777, and by a further 42.6% during the next two years(53). Some of the notes issued during the 1760s were for sums less than £50

(52) Appendix X, Table 1:
The Relationship of Estate Debt to the Growth of Colliery Income, 1763-1796.

(53) Appendix X, Table 2:
Debt Composition, 1763-1795.

and, not surprisingly, energetic attempts were made to eliminate the smaller denominations in the interests of stability and administrative efficiency as larger sources of funds became available.

More than half of the sources of mortgage finance during this period of growing debt have been identified as relatives or friends, or nearby landowners with whom the baronet was on particularly cordial terms(54). In this respect he was almost certainly more fortunate than Francis Parrott(55). Considerable difficulty has been experienced in identifying all the owners of bonds and notes but it is an indisputable fact that friends and relatives played an important part in this form of borrowing too. Of considerable significance, however, was the number of small bonds and notes placed through the mediation of a Coventry attorney, William Dudley. By this means the small savings of minor businessmen, shopkeepers and others in the Coventry area were channelled into local industrial enterprise. Petty investments of this nature were, in a few cases, increased in value over a period of years, sometimes by sums of not more than £20 per occasion, suggesting that tradespeople, widows and others(56) were content to bypass local banks in order to deposit their growing surpluses at interest with trusted entrepreneurs.

With few exceptions bonds, like mortgages, were taken for lengthy periods of time, the average being seven to eight years. Nevertheless as new securities were issued the average size of them rose although

(54) Notably Lord Aylesford.

(55) Good credit rating and long established residence in the area were undoubtedly factors which acted in the baronet's favour. By contrast, Parrott's financial activities were still overshadowed by his father's earlier bankruptcy.

(56) Including Thomas Hutchins, the baronet's mine steward.

interest rates remained broadly the same. As with mortgages[57] interest rates were steady for the entire period at levels between 4% and 5% per annum, but considering that it was part of the baronet's policy to finance estate development at not more than 4%, if it could be avoided, bonds and notes bearing the higher rates were given preferential treatment in liquidation.

Drastic changes in the composition of estate debt took place between 1778 and 1779 and these reflect the growing ease with which Sir Roger Newdigate was able to employ London-based funds and call upon the support of relatives[58]. Mortgages, the backbone of the system of estate borrowing for the whole of this period, were reduced in number to two but at the same time rose in value to £24,000,[59] whilst the trend in bonds and notes followed a similar pattern. The twenty three securities in the latter class in 1777, totalling £8,420 were reduced first to fifteen, representing £12,015 in 1779, and then still further until by 1793 only three remained, valued at £5,600. At the same time a growing proportion of estate debt was secured by relatives, most of whom could be persuaded to be content with an annual rate of interest of not more than 4%. In short, the mine venture

(57) With one exception, (infra, Section IV).

(58) Marriage in 1776 to Hester Margaretta Mundy (his second wife) brought a marriage portion of £4,000 plus an entrée into the financial resources of a Derbyshire and Yorkshire coalowning family.

(59) Of which the largest (£20,000) was obtained from Robert Child & Co., of London, on the security of estates in Middlesex. Throughout the century, when in need of finance, the Newdigates were always ready to mortgage their Middlesex property to restore their fortunes in Warwickshire or to provide marriage portions for their daughters.

began more and more to assume the aspect of a useful family investment[60]. This tendency was reinforced by a further reorganisation of mortgage finance between 1788 and 1789 when, following protracted disputes with his principal London banker over what the baronet regarded as a fair rate of interest the balance of the mortgage[61] was repaid, the amount in question being met (temporarily) by relatives and by a new mortgage with a Midland landowner[62].

Sir Roger Newdigate was almost certainly a more fortunate coalmaster than any other in Warwickshire with regard to the provision of capital. Unlike Parrott he was never pursued by creditors[63] demanding early repayment, and in point of fact was in the rare position of being able to take issue with those thought to be too rapacious in their demands. The ease with which funds could generally be obtained, and sources switched, suggests very strongly that, locally, no major entrepreneur was necessarily thwarted by a shortage of capital even in the banking crisis year of 1793. Inconvenience, of course, might arise when a particular creditor demanded speedy satisfaction or where funds were made available only in small amounts.

(60) By 1793 over £13,000 out of total debts of £17,600 was owed to relatives.

(61) £12,000.

(62) (Rev.) Robert Marriott of Cotesbach, for £8,000. This was paid off within three years.

(63) W. H. B. Court: A Warwickshire Colliery..... loc. cit., p.227
From the tenor of Professor Court's article it would appear that Francis Parrott had a clear run of twenty years before running into difficulties with the Coventry bank. Considering that the Hawkesbury Company was still in the market for sophisticated mining machinery in 1796, and continued in existence until 1828, it would seem that its troubles in 1793 were only of a temporary nature.

A factor of great significance for the baronet was his ability to call upon the support of relatives even when his financial relationship with Robert Child, the London banker, took a turn for the worse. The main credit for this happy state of affairs however must go to the profitability of the mine, the success of which acted as a magnet to those with surpluses to invest. In these circumstances it was perhaps inevitable that preference should be given to relatives(64).

The cost of the original investment in Griff was repaid within eleven years(65) of the colliery getting into large-scale production and by 1796, the last year for which we have reliable data, total estate debt had been reduced to £14,300. Given the rate at which the remaining principal was being paid off between 1792 and 1796 it is highly probable that all his estates would have been cleared of debt entirely by 1803.

Section IV

The Role of Banks and Attorneys in Colliery Finance

The genesis of modern capitalism made the monetary specialist indispensable, and even borrowers like Sir Roger Newdigate, probably more fortunately situated than any other Warwickshire coalmaster to employ family savings, was glad to be able to call upon his services.

(64) An increasing number of female relatives invested in estate annuities after 1775.

(65) £4,350 of it in 1789, the year in which Sir R. Newdigate severed his connections (temporarily) with Robert Child, when the mine yielded an income of £9,200.

Estate records show that the principal intermediaries in the provision of capital for local colliery enterprises were banks and local attorneys. Of these, attorneys appear to have been the most important Warwickshire source of finance for the baronet, not least because they frequently possessed intimate knowledge of local society born of long experience, and were well placed to obtain access to local reservoirs of savings. Country banks, on the other hand, arrived late in the field, the first in Coventry not being established until 1762.

(i) Banks

Although little evidence exists to show the use made of local banks by Francis Parrott a considerable amount of it shows that the baronet's business relationships with them were substantial and prolonged. Bank finance was employed by him for two purposes: to provide a long term mortgage, to arrange for payments to be made on draft, and occasionally to discount bills. For these purposes he employed two metropolitan banks, one of which had been for long a favourite with landowners and was a specialist in the provision of mortgages to the aristocracy(66), and a local one which had strong connections with the City(67). Occasional use was made of the other Coventry banking partnership(68),

(66) Robert Child. Child's bank, immortalised as "Tellson's" in Charles Dickens' Tale of Two Cities, merged with Glyn, Mills and Company (now Williams and Glyns) in 1923.

(67) Troughton and Bryan, of Coventry, who drew on Messrs. Vere, Lucadou, Troughton, Lucadou and Smart of London.

(68) Thomas Little and John Lowke (later Little and Woodcock), Coventry's first private bank. This bank, which built up an enviable reputation for sound business practice, amalgamated with the Birmingham Banking Company (later the Metropolitan Bank of England and Wales), which in turn was absorbed by the Midland Bank in 1914. Little and Woodcock drew upon the metropolitan bankers Smith, Payne and Smith.

but in general the baronet preferred to deal with metropolitan rather than country banks. The reason for this state of affairs is fairly simple: country bankers were typically engaged in note issuing, discounting and remittance activities. Rarely[69] were they to be found consistently channelling savings to points of investment demand, even in the short run[70]. Their principal functions were notably dissimilar from those of the modern commercial banker; to attract cash deposits and to make loans to credit-worthy customers. In this field they were probably thwarted by the existence of long-established local attorneys[71], keen to offer small banking services as part of their business. Some of the larger London banks, on the other hand, were better placed to handle long-term finance, and in so doing to assume the role of intermediaries in an embryo capital market.

Sir Roger Newdigate's most important set of dealings with the London banker, Robert Child, lasted from 1778 to 1789, during which period a single mortgage was taken out on his estates at Harefield, Brackenbury and Moorhall (Middlesex) for £20,000. The immediate consequence of borrowing so large a sum was that the baronet was able to provide a substantial part of the original capital from metropolitan sources whilst at the same time reducing the complexity of existing estate debt - with its mass of small notes and bonds - to more manageable proportions[72].

(69) B. L. Anderson: The Attorney and the Early Capital Market in Lancashire (Essay No. 3) in Liverpool and Merseyside: Essays in the Economic and Social History of the Port and its Hinterland (Ed. J. R. Harris).

(70) Notwithstanding the case of Francis Parrott, (supra).

(71) Both Woodcock and Troughton began their local banking associations as attorneys.

(72) Appendix X, Table 2

Similarly such other sources as he could command at that time could be freed for the provision of working capital or to provide the necessary finance for building his network of estate canals.

For the bank, long accustomed to making substantial advances on mortgage(73), the lending of so large a sum on "one security" was to create an awkward precedent(74). That Child should have done this, it was averred, "at a less Interest from you than He received for any other Sum lent during the last War" is a reflection of the baronet's standing in London banking circles at the time(75). That the period of the mortgage should have been occasionally punctuated by demands on the baronet's part for an abatement of the rate of interest (not without success) and then finally terminated after a further dispute over interest rates without causing him serious embarrassment indicates the still fluid state of the metropolitan capital market at this time.

How far did local banks actively promote new investment in and around Coventry, or act purely passively to accommodate eligible clients?

As far as Sir Roger Newdigate was concerned the bank with which he had regular dealings was a capital-servicing rather than capital-forming institution. Its activity was not a causal factor in local economic

(73) P. G. M. Dickson: The Financial Revolution in England: A Study in the Development of Public Credit, 1688-1756, pp. 441-444 (1967).

(74) "A step through the Rule of the Shop", - (in 1778).
Correspondence: Child's Archives CB 56. Robt. Child to Sir R. Newdigate, 30th Oct. 1788.
See also Appendix W for this correspondence in extenso

(75) Not to mention the influence he wielded at that time as Member of Parliament for the University of Oxford, keenly committed to the support of canal and turnpike building schemes which might have given him greater weight in those circles anxious to profit by such economic activity.

growth but more in the nature of a response to the financial problems posed locally by growing industrialisation. In this respect the work of Messrs. Troughton and Bryan (and very possibly too, that of Little and Woodcock) was very similar to that reported[76] for the typical country banks of Lancashire.

(ii) Attorneys

In the absence of institutionalised money and capital markets[77] local attorneys performed a particularly useful function as intermediaries between investors (industrialists) and savers (those possessing monetary surpluses) during the eighteenth century. Of them it is said that "even as early as the fifteenth century they were showing a peculiar capacity for acting as a bridge between the merchants and the nobility and the most outstanding among them were on a par with the greatest London merchants"[78]. Attorneys'progress was fastest in those rural areas

(76) B. L. Anderson: The Attorney..... Loc. cit., p.74

(77) This is not to say that no market for long term capital existed but that ordinary industry was excluded from it. At that time the market dealt only in government loans and companies' stocks and shares. Owing to the limitations on types of enterprise to which Parliament would concede joint-stock organisation only a narrow range of securities was handled in recognised exchanges and coffee houses. This served to restrict the flow of long term capital and emphasise the importance of short to medium term finance.

The "Bubble Act" of 1720 also made life difficult for entrepreneurs by restricting ordinary partnerships to no more than six members, each of whom was fully liable. It was not easy in such circumstances for men of substance to assume risks. In such fertile conditions did the bolder attorneys thrive.

(78) B. L. Anderson, loc. cit. pp. 50-51.

of which economic growth was a distinct feature[79], the Coventry-Nuneaton area being such an example, and considering that the mortgage market stood at the centre of much industrial financing[80] it might justifiably be said that many of the more active of them dominated the local capital markets to a greater extent than the country banks. As long as business was transacted at the highest levels of probity an indispensable service was provided for entrepreneurs. Unfortunately this was not always the case in Coventry.

A Midland Directory for 1783[81] listed, inter alia, three attorneys and one barrister as being in practice in Coventry. Of these the former group was closely identified with the local worlds of banking, mining and tax collection by 1791. Not one of the group, however, was concerned with the management of the Newdigate estate, or with the provision of capital for industrial purposes, probably on accouht of the serious risks which the baronet had run, quite unwittingly, in earlier years. Prior to 1777 he had had close and regular dealings on a variety of matters with a fourth lawyer, William Dudley, who had built up a thriving business as a scrivening attorney during the course of which he had provided the baronet with useful sums. An examination of the lawyer's business affairs after his death, however, revealed

(79) Ibid.

(80) Particularly in Birmingham and Coventry when the first private banks were established in 1765 and 1762 respectively.

(81) W. Bailey: Bailey's Western and Midland Directory, pp. 231 and 367

a mass of forged and altered documents[82]. Conceivably it was the belated realisation of the vulnerability of local markets in which dealings in small individual sums predominated that spurred the baronet to revise his system of borrowing drastically. Henceforth local contact was limited to the despatch of remittances or the payment of taxes[83] through the medium of one of the local banks.

Section V

Industrial Development and the Rate of Interest

Whereas the view that marginal changes in the rate of interest over a long period would have had no serious effect upon entrepreneurs[84] is probably correct, it would be an error to suppose that they were viewed lightly. The rate of interest was an active and continuing attraction for Sir Richard Newdigate (II) and his grandson and was

(82) (i) CR 136 Diary for 1777, passim:

(a) 14 July: "Mrs. Garlick brt. her bond which ha(d) the 4 pr. cent in it erased and five written on the erasure by Dadley".

(b) "Th. Watson and J. W. Smith and Mrs. Smith of Coventry brt. a forged Bond for £300 dated 1771 but neither my handwriting nor my seal. Shewed them Mr. Dadleys Accts.....they went away saying it was enough, they had no doubt of my (honesty)".

(ii) W. H. B. Court: loc. cit. p.221

(83) On the influence of local Receivers of H.M. Taxes on the money market see Appendix Y:(i)
Tax Collectors and Capital

(84) B. L. Anderson: Provincial Aspects of the Financial Revolution of the Eighteenth Century.
Bus. Hist. XI, No. 1 (1969) p.14.

regarded by both of them not simply as an "enabling condition"(85) for coalmining enterprise but rather as one of a number of cost factors to be taken into account. From the side of the supply of loanable funds, too, the rate of interest was, for certain categories of lender, a secondary albeit important factor in decisions to place savings(86). Decisions to produce coal, or not, on the other hand were determined principally by the estimated level of effective demand which both baronets viewed closely before taking the plunge.

In these circumstances, to embark upon colliery enterprise could, and did, involve the entrepreneur in borrowing on a rising market, it being hoped that the extra cost would easily be recouped out of profits. Borrowing "long" in these circumstances had obvious attractions provided it started early enough. We have seen that Sir Roger Newdigate was largely successful in financing the early stages of the Griff venture in this fashion. Borrowing thus on a falling market, however, could be unnecessarily expensive, a point to which he devoted considerable attention.

Long term downward shifts in the rate of interest equally might exercise little influence in decisions to save a failing business. Between 1712 and 1720, for example interest rates generally fell(87),

(85) L. S. Pressnell: The Rate of Interest in the Eighteenth Century, in Studies in the Industrial Revolution (Ed. L. S. Pressnell). p.210

(86) Especially where the recipient was the local Lord of the Manor, a magistrate and a wielder of influence in social and political circles, or where the lender placed security at the top of his scale of preferences.

(87) L. S. Pressnell, loc. cit., p.179

yet the Griff undertaking of that period gradually became less and less profitable and the lessees terminated their contract prematurely(88) in order to move elsewhere rather than take advantage of relatively cheap money to deepen investment in the mine. Even the decision by Sir Richard Newdigate III to reopen the mine in 1722 was based more upon the willingness of the then exclusive holders of the local monopoly of the Newcomen engine patent to share its advantages with him rather than to the availability of finance at relatively low rates of interest.

Low interest rates in themselves provided no spur to industrial enterprise as far as the Newdigates were concerned(89), and indeed it is doubtful, considering the scale upon which local mining and textile industries functioned during the latter and busier part of the century, whether they seriously entered into preliminary assessments of the viability of an undertaking at all. During the period of "cheapest money of the century"(90) the family interest in mining was simply that of a rentier.

Both Sir Richard Newdigate II and Sir Roger Newdigate kept their borrowing rates within the 4%-5% band. In the case of the latter the top rate (5%) was paid more commonly on bonds and notes rather than mortgages(91) and featured especially during the years 1763 to 1767

(88) Agreement: CR136/c616; Richard Parrott, Stonier Parrott and George Sparrow to Sir R. Newdigate III 10 Nov. 1720.

(89) By contrast keen attention was paid to the level of retail prices of coal. Sir Roger Newdigate's interest in mining in the 1760s significantly waxed and waned in concert with price movements.

(90) I.E. 1736-1760
A. H. John: Insurance Investment and the London Money Market of the Eighteenth Century, p.145 et seq. Economica (N.S.) XX 1953.

(91) Which being secured on land carried less risk.

and again from 1783 to 1787[92]. For the rest of the time he was able to finance his mine venture at 4 to 4½%, thanks to the willingness of relatives to take the lower rate. By virtue of this fact he was able to make a practice of liquidating securities bearing a 5% coupon within a short space of time and to use it as leverage in order to force down the level charged initially by his principal London banker.

Whilst it has been, and is, the practice of commercial banks to adjust interest rates according to the standing of the customer, the practice of Robert Child during the late eighteenth century appears to have been unusually elastic, given the experience of two Warwickshire coalowners. Sir Roger Newdigate, for example, originally agreed to mortgage his Middlesex property at 4% per annum[93]. According to later correspondence between the parties a caveat was entered at that time to enable the banker to raise the rate to 5% if "the then Disputes with America should not subside, and a War ensued" [94]. Some doubt arises as to the truth of the caveat. Newdigate refused to pay the increase, offered instead 4½% which was accepted, and made speedy efforts to reduce the principal to £12.000. At this level they remained until 1786 when a further application was made for a reduction[95]

(92) Appendix X, Table 4:
Rates of Interest paid by Sir R. Newdigate, 1763-1795.

(93) Mortgage in fees CR764/57/8:

(94) Correspondence: Child's Archives, CB 56
R. Child to Sir R. Newdigate 30 Oct. 1788
See also Appendix W.

(95) At the beginning of a general downward movement in rates

"We again complyed", wrote the banker, "though the fair rate of Interest was then and is now 4½ per cent". Not until two years later did Child finally bring himself to give notice for repayment of the outstanding £12,000, protesting that "the Interest has not been a motive.....this House.....felt a delicacy in doing it till money was obtainable or the Interest you mentioned.....in the country". Newdigate had, in fact, been making unfavourable comparisons between metropolitan and provincial interest rates. Whereas indeed this had often been the case in earlier years(96) the difference in levels had narrowed considerably at this time. It was certainly possible for him to borrow £4,000 from friends and relatives: the rest, however, had to be borrowed afresh at that same rate which he had declined to pay to Child.

The second example briefly concerned Lord Craven, also a coalowner. A loan for £1,000 was requested on his behalf in 1792. This was granted "at what interest he likes".(97)

The generation of larger provincial incomes from mid-century onwards was also a major factor in stimulating the growth of semi-autonomous provincial capital markets. Added to existing family resources and reinforced by the activities of scrivening attorneys (plus the occasional country bank) this could go far towards explaining the contemporary denial of a close similarity between yields on government stock in London and private interest rates. Nevertheless, whilst differences in the levels

(96) Thesis (Wh.), pp. 77 and 81.

(97) (i) Correspondence: Child's Archives CB 85(B)
R. Child to Joseph Hull (for Lord Craven).

(ii) Also private correspondence Aug. 1792.

payable by entrepreneurs might excite comment, encourage switching from one lender to another and have an undoubted influence on the burden of servicing debt, they seem never to have been taken into account by the Newdigates when formulating mining policy. Insofar as such men were able to flourish the prospect of successful family enterprise they were able to insulate themselves to a useful degree not only from short term fluctuations in market rates but also from the full rigours of the cost of servicing industrial debts.

Section VI

Capital for Coalmining: A Century of Change for the Newdigates

The inadequacy of personal financial resources and the need to borrow widely was an important feature of industrial enterprise on the North Warwickshire estate of the Newdigates during the whole of the eighteenth century. Even during the latter part of the previous century the family had been hard pressed to provide exclusively all the capital required to establish sizeable colliery undertakings. Great efforts were therefore made by successive baronets to increase estate income from other sources in order to solve their financial problems and to build up surpluses for investment. But since the scale of mining grew faster than changes in estate income every venture into this highly speculative industry became more heavily dependent upon external support than its predecessor.

The Newdigates were probably more fortunately situated than other local coalmasters insofar as additional finance was always available to them. The conditions upon which access was granted, however, were frequently onerous, and contributed in no small measure to that

absence of strategic planning which characterised much of their work during the first part of the century. Nevertheless, important changes took place in the nature of the financial markets open to them during this hundred year period, the net effect of which was to reduce to more acceptable levels the risk which attached to large industrial ventures not supported exclusively by private wealth. These changes also contributed positively to entrepreneurs' ability and willingness to recognise the relationship which linked success in the coal industry with the creation of a regional infrastructure of turnpikes and canals.

Financial developments for the Newdigates were divided into three well-demarcated phases, with limited evidence to support the view that in this, as well as in other aspects of mining enterprise, the rate of change gradually accelerated as the century drew to a close. The first phase lasted from 1700 to 1725, the period in which the second and third baronets made desperate efforts to turn their mining ventures into business successes. The second covered a period of little more than half a century and bore unmistakeable signs of a period of transition. The third began in 1779 and ended at or near the turn of the century, the profitability of the mine rendering superfluous the need for further external financial support.

Phase I (1700-1725)

During the first phase there was no discernible capital market[98] open to local entrepreneurs. Occasional attempts to obtain long term

(98) i.e. No organised market for medium and long term finance for industry. See also footnote 76, *supra*.

support from relatives bore fruit but generally speaking borrowing was highly localised and short term in nature. In consequence there was an urgent need to renegotiate a large part of estate debt at frequent intervals, or otherwise meet obligations by the sale of property. Indeed much of the strain borne by Sir Richard Newdigate (II) at the beginning of the century stemmed from the necessity of having to find new lenders every year(99). That this state of affairs should have lasted with little change for so long is attributable to three factors: the political uncertainty which was particularly well marked during the first decade(100) and continued for some time; the financial demands of the many wars in which England was involved between 1688 and 1756(101); and the very size of the cash requirements of Sir R. Newdigate and, to a lesser extent, his son(102). The first factor expressed itself in a high degree of liquidity-preference on the part of lenders; the second caused heavy demands to be made upon private purses through the depredations of the Land Tax and numerous local taxes(103). The third factor was rather more complicated: because of the recklessness which characterised so much of the borrowing of

(99) Thesis (Wh.) pp. 76-77.

(100) A. H. John: Insurance Investment and the London Money Market of the Eighteenth Century, p. 140. Economica XX (N.S.) 1953.

(101) England was at war for nearly thirty out of the sixty six years which ended at the outbreak of the Seven Years War in 1756.

(102) Sir Richard Newdigate III.

(103) P. G. M. Dickson: The Financial Revolution in England: A Study in the Development of Public Credit, 1688-1756, p.10.

the second baronet during the first ten years of the century, a heavy burden of short term debt was added to the estate's already serious liabilities(104). On his succession Sir Richard Newdigate (III) inherited a mass of debt totalling £56,000, the liquidation of which occupied his attention for the greater part of his life.

In the absence of earlier profits the principal vehicles of industrial finance were mortgages on land(105), bonds and notes. Mortgages during the first decade ranged from £2,600 to £100 and together with other forms of security possessed one important characteristic: they were of short duration, often lasting for no more than a few months and rarely more than two years in the first instance. Most of them were provided by relatives, friends or nearby landowners. An additional administrative burden was caused by the fact that many of the notes were for sums as small as £12. As a result, the number of creditors of all types was, on occasion, very high.

The strain caused by so vulnerable a system of borrowing was no doubt felt by others in the vicinity who relied upon the loan of temporary surpluses for their own businesses. This is demonstrable by the dependence of both Sir Richard Newdigate II and his son upon petty sums ("Driblets") provided by tradespeople, employees and others.

(104) Thesis (Wh.), pp. 74-79

(105) Because of their greater security mortgages could generally be obtained at slightly more favourable rates of interest than bonds or notes.

On occasion receipt was acknowledge for sums as small as £5[106]. To scrape the financial barrel as closely as this is an indication of the narrow margins by which both baronets existed at times and equally an explanation of their preoccupation with short term mining activity.

Phase II 1726-1778

For the Newdigates, Phase II of developments in financial markets was marked by the closing years of one mine venture and the opening period of another. By 1726 there were distinct but limited signs of a widening of the money market[107] to include lenders in London. Although metropolitan sources of finance had been employed by other local coalmasters during the first part of the century, notably by George Sparrow and Stonier Parrott[108], these were provided almost entirely by scrivening attorneys. By 1726 itwas clear that Sir Richard Newdigate III had begun to borrow from London bankers[109]. The mine venture, like that of his father, however, was failing to yield the anticipated profits and in consequence there was still a heavy dependence upon local sources of finance to meet the requirements of the

(106) Paying the rent, normally a harmless exercise, could be particularly hazardous at times for tenants. Between 1714 and 1718, for example, Messrs. Parrott and Sparrow were frequently persuaded to forego the change out of their £100 bills or drafts whenever they paid a portion of the rents for their pits at Griff. Such amounts were, of course, set against future liabilities.

(107) i.e. finance for a period of up to two years.

(108) Of Bedworth and West Sydnall Collieries respectively.

(109) According to bank archives, Henry Hoare lent £2,000 on his private account by way of mortgage to the baronet in August 1726.

C. Hoare & Co., Bankers, (Private records).

colliery for the remainder of its short life.

By 1763 the need of entrepreneurs for more stable sources was matched by the unmistakable rise of capital markets based upon the family and the locality. This was the most important single advance in the development of financial markets which the Newdigates experienced during the century. Mortgages and the larger bonds were taken for periods of seven to eight years, occasionally longer, the greater duration of such assistance being an important factor in establishing the greater coalmasters as a distinct social group. Mortgages and bonds could also be acquired in larger individual amounts which, despite the greater requirements of industrial enterprise at this time, contributed substantially to a more stable form of debt structure and to greater flexibility in strategic planning. Coalmasters such as the Newdigates were, for the first time, able to give effective expression to the need to coordinate personal investment schemes with improvements in public transportation. It was with business considerations in mind that they actively supported plans to build turnpike and canal networks before embarking upon their own private ventures.

Despite these reforms, however, there were still serious drawbacks to be faced. Undue dependence upon the local capital market facilitated an unhealthy familiarity on the part of lenders with the fortunes of Griff Colliery. Local industrial development was vulnerable to rumour and occasional disenchantment, and where reliance was placed upon scrivening attorneys for even a modest part of the necessary finance, personal lapses by them could, and did, exercise a disproportionate influence upon the administration of debt. Even the belated rise of an additional capital market based upon wealthy relatives did little to remove these very real dangers on account of its mobility as yet to provide the bulk of the necessary assistance.

Phase III 1779-1800

From 1779 onwards Sir Roger Newdigate (fifth baronet) obtained access to external sources of finance on terms which were almost ideal for industrial development. Henceforth, money markets played an insignificant role in industrial enterprise on the estate. Three sizeable (and overlapping) capital markets were now open to him, and for the first time this century the family was able to accept or reject specific sources of finance on their own merits. That this state of affairs was as yet far from being universal over the southern half of the Warwickshire coalfield is less important than the fact that London-based capital was now available for local mining on such terms and in such quantities as facilitated long term industrial planning and the administration of debt. That the fifth baronet should, on the other hand, have chosen to reject his principal London banker after twelve years is an indication, first, of the strength of financial support now available to him through the medium of the capital market based upon relatives and, secondly, the profitability of his mine.

The reduction of financial anxieties to more manageable proportions during the period under review had important implications for industrial development. The establishment of larger and sounder debt structures permitted the implementation of investment schemes on a scale far greater than hitherto had been the case. Greater attention, too, could be paid to exploiting the newly-widened regional market in coal. The way was open for a smoother and steadier rate of economic growth in the county.

Conclusion

It will be evident to the reader that it would be difficult, if not imprudent, to generalise about capital and economic growth in Warwickshire during the eighteenth century on the basis of incomplete evidence concerning a single, large industrial undertaking however important. The task is not lightened either by the fact that the position enjoyed by the Newdigates throughout this period was unique. Here was a family long established on valuable estate, wielding immense influence in society and able to call upon financial resources to the extent that it could rise from crushing indebtedness to great affluence within the space of three-quarters of a century. And whilst this transformation was taking place the external industrial world in the county was undergoing changes in organisation no less significant in spite of the fact that in general its individual parts were less favourably blessed. Nevertheless this very quality of uniqueness may be called to aid in the formulation of tentative conclusions about the origins of capital and economic growth insofar as we may regard the Newdigates as having been local pioneers in industrial development.

By far the most important financial development of the century was the gradual substitution of capital markets for money markets where a limited number of investors was concerned. Not only was finance being made available in larger quantities and on more favourable terms than hitherto but specialised agencies in the guise of attorneys and banks were increasingly able to assist in the servicing of debt and the granting of financial help. Two important consequences followed this chain of events: the division between Capital and Labour, already apparent earlier in the century, was widened and confirmed. Secondly,

in terms of industrial finance, the economy of the Midlands was being drawn closer to London, for despite the rise of semi-autonomous provincial markets it was against the facilities offered by metropolitan agencies that their efficiency was measured.

On the basis of existing evidence of eighteenth century industrial developments in the Midlands the larger Warwickshire collieries ranked among the leading undertakings in terms of investment. Yet this should not necessarily be construed to mean that they were the largest producers of their type. It is evident from the foregoing chapters that the value of the market for final products was the ultimate determinant of the size of investment. Given the right conditions an industry of modest proportions could point to great enterprises in its midst, born of careful calculation and nurtured by skilful planning. The rise of more efficient financial markets was, for them, if not an enabling condition at least a factor of great importance. Where these enterprises were closely concerned with the production of essentials, such as fuel, the stage was set for economic growth on a large scale.

Our present state of knowledge shows that only a small number of entrepreneurs in the local coal industry was ready and able to obtain access to these new sources of capital. That this should have been so must be set against the fact that until the regional canal network had been completed and a fresh appraisal had been made of the market in coal there was little justification for coalowners and major lessees in the northern part of the field to make important moves in this direction. By this time a useful precedent and indication of possibilities in the expanding world of industrial finance had been provided by the Newdigates.

CHAPTER 3

THE CHANGING NATURE OF MINING ENTERPRISE IN WARWICKSHIRE DURING THE SEVENTEENTH AND EIGHTEENTH CENTURIES AND THE ROLE OF THE GREAT ESTATE IN LOCAL ECONOMIC GROWTH

Introduction

Throughout this thesis discussion has centred on the twin problems of ends and means in relation to the early development of the Warwickshire coal industry. The proximity of a substantial market for coal was the justification for much time, ingenuity and effort being disposed by successive groups of entrepreneurs. The study of the means whereby success might be attained has in turn led us to an examination of the development and organisation of estate resources, the acquisition of mineral wealth, the solution of serious technical problems and the employment of new forms of capital.

Attention has also been focussed upon the role of the Newdigates of Arbury, as owners of the great estate, since for a large part of the eighteenth century they provided the vital element of leadership in the growth of the local coalmining industry. In most instances it has been possible, albeit imperfectly, to measure the progress made in several departments of the industry. It is appropriate therefore that this account should conclude with an analysis of the residual factor, entrepreneurship, and the quality of industrial leaders, and to assess the importance of the great estate in local industrial growth on the eve of the Industrial Revolution.

Section I

Entrepreneurship in the Coal Industry

That the local coal market was already a valuable one at the beginning of the seventeenth century, and that it grew even more so during the following decades, is proved by the number of venturers of all types who came to Warwickshire to try their hands at coalmining between 1600 and 1800. A few succeeded, most failed: some disastrously and abjectly. Why was this so? To answer this question fully would be to demonstrate how far some of them failed to exhibit personal capacity worthy of a paragon of all the business virtues. Nevertheless, the latter part of this period was a time of almost unique opportunity for a minority of men of modest talent, good fortune and yet disciplined ambition to establish themselves as pioneers of economic growth in the county.

A common quality said to have been shared by successful entrepreneurs was "a sense of market opportunity combined with the capacity needed to exploit it"(1). Those who came to the coalfield undoubtedly shared the first virtue, impelled in each case by the prospect of personal gain: few possessed the second, and of those who did personal deficiencies such as poor timing, failure to appreciate the limitations of existing technology, impatience and stubbornness contributed heavily

(1) C. Wilson: The Entrepreneur in the Industrial Revolution in Britain, p. 103

History XLII (No. 145), 1957.

towards their defeat[2].

The most important feature of personal "capacity" was organising ability, and during the earlier stages of development of the industry it was possible for the aspirant coalmaster to undertake all the tasks involved single handed. Having recognised the market, which in nearly all cases was Coventry and the surrounding districts, this meant acquiring title to coal deposits, since few already possessed coal-bearing land, ensuring access to external sources of finance, selecting suitable sites for operations, building or hiring adequate machinery and organising labour to raise and sell coal. Only one coalmaster singlehandedly passed this test[3] on the southern part of the field.

The terms which lessees could obtain from landowners depended largely on the level of demand at any given time, the presence of suitable sites and the ability of the entrepreneur to enlist the interest of the lessor. In some instances it was even possible to obtain special assistance. For example, the Mayor and Corporation of Coventry, acutely aware of periodical fuel shortages in the city and anxious to build up rent receipts from Charity lands[4], were occasionally willing during the seventeenth century to make rent rebates, grants or loans available to operators who took leases of

(2) Successively (a) Huntingdon Beaumont,
(b) Sir Richard Newdigate II,
(c) Stonier Parrott,
(d) Sir Richard Newdigate III.

(3) Sir Roger Newdigate.

(4) Sir T. White's Trust lands in Wyken and Sowe.

their pits. In others, a landowner's appetite might be titillated by the prospect ofsharing the profits of successful enterprise. Where the entrepreneur appeared as a skilled and experienced operator, as in the case of Richard Parrott I[5] and George Sparrow, the lessor[6] was quick to recognise the significance of the improvements which he proposed to make to existing mining techniques.

Having laid his claim to coal in situ the operator invariably had to raise capital. Here the landowner-entrepreneur possessed undoubted advantages over the lessee. By offering security in land his greater ability to inspire confidence in lenders enabled him to acquire finance in large quantities and on relatively convenient terms. Sir Richard Newdigate III, for example, was spared the desperate expedients of borrowing from the Revenue and metropolitan scrivening attorneys in contrast to Stonier Parrott[7].

Having acquired capital he had to sink pits and set up machinery adequate for the task of keeping the mine open. It has already been shown that due to the efforts of local coalmasters the industry was in the van of national progress in mining technology for much of the eighteenth century. Whilst it is impossible to demonstrate the cost-reducing benefits of specific types of machinery it is significant that on two occasions[8] the introduction of advanced forms gave

(5) Father of Stonier Parrott and grandfather of Richard and Francis Parrott of Hawkesbury.

(6) Sir Richard Newdigate III, in 1713.

(7) H.M.B. 1/47.

(8) (i) The introduction of the Newcomen engine to Griff in 1714.
(ii) The advent of the first Boulton-Watt engine in 1776 at Hawkesbury.

individual collieries a new lease of life. Where the entrepreneur was obliged to mass obsolescent forms of equipment, as happened in the case of Sir Richard Newdigate II, no amount of ingenuity or skill in other departments of an undertaking could conceal this disadvantage(9).

The ability to find, recruit and retain labour skills of the right type occasionally led entrepreneurs to despatch recruiting expeditions to other coalfields. In this manner did the second and third Newdigate baronets obtain the experienced faceworkers required to work the sloping seams at Griff(10). The absence of a body of senior operatives competent to take charge of particular areas of a colliery, however, thrust additional responsibilities upon the venturer. In addition to being an organiser, an innovator and a capitalist, he discharged the duties of modern production and labour managers. The predilection of Sir R. Newdigate II for interfering at all levels of activity during the first decade was almost certainly aggravated by the absence of suitable staff.

Given that by the early nineteenth century few strategically-placed entrepreneurs could, by withholding large investments, significantly arrest the rate of national industrial expansion(11), the case

(9) Had the Newcomen engine been available during the early years of the century the whole course of development of the Newdigate estates might well have been advanced by several decades.

(10) Thesis (Wh.), Part IV, Chapt. 1. The Origins of the Labour Force, passim.

(11) E. L. Jones: Industrial Capital and Landed Investment; the Arkwrights in Herefordshire, 1809-43 in Land, Labour and Population in the Industrial Revolution, p. 71

appears to have been radically different in the eighteenth century, to judge by local experience. "Decisions made in the counting house"[12] by the later Newdigates, Parrotts and Geasts had a seminal influence upon local economic growth. Although primarily concerned with private gain their entrepreneurial efforts were inextricably linked with progress towards ultimately higher standards of living and greater social mobility.

Section II

Entrepreneurs in Local Mining

"I think the following from Terence is more nearly my character" wrote Richard Parrott in 1772[13]

"Such was his life - to bear with and suffer all men easily; with whomsoever he was in company to resign himself; to devote himself to their pursuits, at variance with none and never putting himself before others[14]

'Men's lives are but shadows and dreams,'"

The roseate picture of benevolence conjured up by this epitaph was a reflection of social aspiration rather than entrepreneurial

(12) T. S. Ashton: Business History, p.2. Business Hist. I, 1958-9.

(13) Will (of Richard Parrott II). Caddick and Yates MSS. 55B. A copy 18 July 1772 B.R.L.

(14) Terence: Andria I, 1, 37.

I am indebted to Mrs. E. A. Gooder, of the Department of Extramural Studies, University of Birmingham, for translations of the above Latin and Greek texts.

success[15]. Parrott was one of the very few coalmasters to make good on the N. Warwickshire coalfield during the course of nearly two centuries. In point of fact his personal business history was unique insofar as he progressed from the aftermath of his father's bankruptcy to a position of comparative affluence within the space of thirty years. The level of ability and single-mindedness implicit in such a record firmly refutes the lack of driving ambition suggested by his memorial inscription.

Primary source material presently available suggests very strongly indeed that entrepreneurial progress was particularly uneven over the coalfield as a whole. The smallest advances were made in the northern sector, and in point of fact the quality of entrepreneurs who operated between Nuneaton and Atherstone in the latter part of the eighteenth century had more in common with that exhibited in the Coventry area a century earlier. Three factors go far towards explaining the relative retardation of the northern part of the industry: the preference of lessees for coal deposits located between Nuneaton and Coventry; the absence of good communications with centres of demand until late in the century, and the presence of stiff competition from Staffordshire suppliers once the Birmingham-Coventry-Oxford network was open.

The work of coalmasters in the southern sector is more extensively documented and enables us to divide the whole period into three parts: the first lasted for a hundred years; the second began in 1700 and

(15) Born of a desperate and sometimes embarrassing effort to ingratiate himself with the upper ranks of local society, to judge from his brother's bitter comments in later years.

covered approximately forty years, and the third continued into the nineteenth century. With few exceptions those who ventured into mining during the seventeenth century knew very little about mining. By contrast many of those who came during the years of transition, which lasted from 1700 to 1740, made a significant contribution to the growth of the industry. Those who established themselves during the final sixty years were commonly men of substance and vision who, if not already resident landowners, rapidly insinuated themselves into the ranks of the landed proprietors. These were the men who largely established a pattern of ownership in the local coal industry which continued with little change into the twentieth century.

That part of the field which lay within the county of the city of Coventry attracted a large number of venturers at a very early date. Much of it was controlled by the Mayor and Corporation of Coventry as Trustees of Sir Thomas White's Charity, and it was with this body that prospective entrepreneurs negotiated leases. Between 1595 and 1685 at least forty eight tried to establish themselves there as coalmasters, the majority of them in partnership, a few of them on several occasions[16]. Of these, eighteen claimed residence in Warwickshire and sixteen came from London, the latter especially so after 1660.

(16) Principal sources: (i) Coventry Corporation Coal Leases D Coll 5 passim.

(ii) Coventry Corporation (Council Minutes Books) Series A(14) et seq.

All forty eight persons have been named in the records. None has been counted more than once, even where operations were carried on in several separate places.

Most of these operators were drawn from a wide range of society, such was the demand for coal locally. In addition to an assortment of London merchants, toolmakers, joiners, clothiers and haberdashers they included an earl(17), two knights, eight drapers, two dyers, four "gents", two mercers and a divine, together with a number of aldermen and other worthies of the city of Coventry. Given also that small groups of miners undertook operations independently(18) during the early years of the following century it is entirely possible that upwards of a hundred persons of all ranks and stations in life had an entrepreneurial interest in mines between Hawkesbury and Wyken between 1600 and 1700. With one possible exception(19) none of these venturers appears to have made a real success of his enterprise, and only two had anything to offer which might conceivably have accelerated the development of the industry(20). In the circumstances this was hardly surprising. Local mining practice and requirements by this stage had already advanced beyond the proper comprehension of the enthusiastic amateur. Additionally, matters were not improved by the unpredictability of certain lessors. Coventry Corporation, for example, fixed rents

(17) The Earl of Dover (1636-1639). See Men and Mining.....II.

(18) Thesis (Wh.), pp. 159-162

The practice of very small scale working was common throughout this period until the mid 18th century when the small man was gradually squeezed out by the landowners.

(19) Sir Thomas Beaumont, who came to Warwickshire with his brother in 1595 and who was still operating locally in 1614.

(20) Successively (a) Huntingdon Beaumont
(b) John Brome.

arbitrarily and occasionally imposed severe operating conditions[21]. In a few instances they were prepared to waive initial rents; in others they were ready to give financial assistance[22]. This mixture of undisciplined ambition and incompetence, on the one hand, and caprice, on the other, would lead to but one result. Long before the end of the century local mines had acquired a reputation as a graveyard of personal hopes and fortunes.[23]

The second period of entrepreneurial progress was one of transition. Technological problems had become acute by this time and this was reflected in the changes which took place in the number and type of venturers locally. The mass of speculators who had played so colourful a role in the Coventry area during the previous century now yielded place to a smaller number of men, highly conscious of the need to employ new techniques of pit construction and mine drainage[24] and prepared to use experience gained on other fields. Of these, the principal participants were Sir Richard Newdigate II and, later, the Parrott and Sparrow families[25]. Between themselves, all three groups were able

(21) See footnote 17, supra.

(22) By way of example, John Brome requested £100 in 1698 towards the cost (£300) of building a canal from the pits to the local highway at Longford (Coventry). The Council agreed, "intending to set a good example to others", to make a grant of £20 - on security. A few days later, however, the grant was changed into a loan for the same amount.

(23) Exchequer Depositions by Commission: 36 Chas. II, Mich. 43, passim.

(24) See Part III, Chap. 3 supra.

(25) Relatives of both Richard Parrott I and George Sparrow played an active part in local mining.

to assume a dominant position on the southern part of the field, thanks to the revolutionary nature of their contributions to the industry. By 1725 the greater part of this area had passed under their control, and although metropolitan speculators had not yet ceded the possibility of a successful return to the field[26] the day of the amateur had clearly passed away. At the same time, however, opportunities still existed for a minority of independent colliers to establish themselves as lessees of broken mines, or as tenants of some of the few small strips of coalbearing land which had not yet passed into the hands of the greater coalmasters[27].

During the course of the final sixty years of the period the leading entrepreneurs on the southern half of the field approximated more nearly to their modern counterparts. They were organisers rather than speculators, innovators rather than investors. Being men of substance, with access to ample financial resources, they were able to take a more objective view of the market, its problems and possibilities. They were also in a position to judge the failures and partial successes of their predecessors, to take advantage of the improvements which they had effected, and to employ their own vastly greater resources to obtain that improved network of communications upon which their and other traders' prosperity ultimately depended. The groundwork of much of

(26) Engine Licence and Agreement: Aqualate MSS., D1788/61/IX. 7 March 1715 S.C.R.O.

The two leading creditors of Stonier Parrott seized the latter's mine in 1732 and attempted unsuccessfully to work it during the following four years.

(27) Footnote 18, supra.

their success, however, had already been laid during the previous transitional period, since it was in those years that the changes in mining technology crucial to the future development of the industry took place.

Entrepreneurial progress on the northern half of the field during the final period however was much slower. On that part of the field lying between Nuneaton and Atherstone for which data are available(28) at least eighteen venturers(29) took leases of pits between 1752 and 1807. Of these men eight came from Oxfordshire, seven from Warwickshire and the remainder from Derbyshire, Leicestershire and Staffordshire. Coal merchants and bailiffs formed the largest single group but others included an "engineer", a cabinet maker and a coal higgler together with the occasional miller and farmer. A few of them were involved in successive leases, but the majority departed after a short period. That so large a proportion of entrepreneurs came from Oxfordshire may be regarded as an indication of the importance attached by buyers in the south Midlands to regular supplies of coal, and the extent to which suitable sites nearer to Coventry had long since been snapped up.

To conclude, despite the fact that primary source material is lacking for that part of the field lying between Atherstone and Tamworth we are able to name ninety nine persons(30) who considered

(28) For the Geast-Dugdale estates.

(29) This list is necessarily provisional on account of limited access at present to family MSS.

(30) Excluding collier groups.

the potential rewards of mining activity great enough to try to establish themselves locally as coalmasters during the period 1595 to 1807. Of these, only six are known to have been successful, and only one spectacularly so(31). And although these entrepreneurs were among the few able to take advantage of the revolutionary developments in mining technology which were essential for the growth of the coal industry, it is significant that this same minority almost exclusively exhibited awareness of the vital connection between success at their own individual collieries and the simultaneous development of other forms of industry.

Section III

The Great Estate

The principal forms of economic activity undertaken in northern and eastern Warwickshire during the eighteenth century were textile manufacturing, agriculture and coalmining. The great estate, as represented by the Newdigates of Arbury, paid little attention to manufacturing, preferring to concentrate its efforts upon developing its own resources(32). Silk ribbon weaving, the premier industry in Coventry between 1770 and 1815, was conducted on the undertaking system and was dominated not by great landowners themselves but by a small number of merchant capitalists, most of whom appear to have been

(31) Sir Roger Newdigate.

(32) In this respect the activities of the Newdigates confirmed closely to the practices of the greater landowners similarly placed in other parts of England.

G. E. Mingay: English Landed Society in the 18th Century, p.191

preoccupied with metropolitan interests[33]. Periods of cyclical expansion and contraction, however, closely involved settlements lying between Coventry and Nuneaton, after the fashion of marginal land in classical economic theory. Only insofar as the resultant distress affected people living on or close to Sir Roger Newdigate's estate was he prepared to become involved in the progress of manufacturing[34] locally. Like other nearby great landowners he preferred to concentrate upon farming, planting, heavy industry where this involved the exploitation of mineral deposits, and the development of local communications. Policies based upon these activities were of greater significance for long term economic growth in the county than those which placed emphasis upon textiles.

In considering the role of the great estate in this process we may begin by identifying the more important landed proprietors on the coalfield in the 1780s, since this was the first complete decade to register widespread business expansion. From south to north there were eight important landowners and two charity trusts possessing mineral rights. Within the county of the city of Coventry these consisted of Lords Clifford and Craven, together with Sir Thomas White's Charity Trust. Adjoining them in Foleshill and Exhall lay the holdings of the Hawkesbury Colliery complex belonging to Francis Parrott and partners. Northwards again there were, successively, colliery lands

(33) H. Miles: The Coventry Silk Ribbon Industry.....(unpublished Thesis) pp. 5-8 and p. 13.
According to Miles there were only twelve such undertakers in 1782.

(34) (i) CR 136/V/147: "The Case of Sir R.N." } Concerning the substitution of worsted manufacturing for silk ribbon weaving in Bedworth
(ii) CR 136

owned by the Bedworth charity of Nicholas Chamberlaine and the Newdigate estate which stretched from Collycroft[35] to Stockingford[36]. Immediately to the north-west, and in the direction of Tamworth were situated the intermingled holdings of the Aston and Geast families, followed by lands belonging to the Ludfords of Ansley, to Lady Bertie and to Lord Weymouth.

The advantages possessed by great estate owners enabled them to assume a dominant position at an early stage. They were, like coal-owners in many other fields, few in number but large in acreage. Consequently they were certain to be involved[37] from the very beginning in mining and transportation enterprises of any real size, either as owner-entrepreneurs, partners or associates where coal was concerned, or as passive supporters when a new turnpike or canal was proposed[38]. By their possession of mineral resources willingness to grant or to withhold leases on the one hand, or undertake activity directly on the other, they were in a position to decide whether or not coal should be raised and sold. In this respect their control

(35) Northern suburb of Bedworth.

(36) Lying to the west of Nuneaton.

(37) D. Spring: English Landowners and Nineteenth Century Industrialism in p.16

Land and Industry: The Landed Estate and the Industrial Revolution

Professor Spring's observations on the role of the 19th century landed estate in the Industrial Revolution are particularly apposite where late 18th century Warwickshire was concerned.

(38) It is a moot point whether they could have resisted pressures of this type for any length of time but the fact of their involvement led to the weakening of their social and political hegemony in the long run.

was strengthened by law[39] since all minerals *in situ* went, part and parcel, with ownership of the surface land, saving only gold and silver deposits[40]. Landowners likewise exercised great influence over the administration of local justice by which the rights and privileges of property could be enforced whenever danger threatened. Last, but not least, of their advantages lay in their favoured position in parliamentary circles which enabled them to accelerate, delay or cripple legislation designed to facilitate local development[41].

In terms of regional development important landowners had more to offer than the *arriviste* leaders of industrial society in the county. Thanks to their firmer economic base, as reflected in rising incomes from land, rents and minerals, and superior access to financial markets, they could sustain industrial operations on a larger scale over a longer period, even when faced by market difficulties or competition. Given their greater stability they were more favourably situated than any other local form of enterprise to note the interrelationship between diverse economic activities, to plan strategically and to translate policy into effective action. In

(39) *I William and Mary c30.*

(40) At common law mines of gold and silver had belonged to the Crown since 1567.
(*R.V. Northumberland*, I Plowd. pp. 310-339)

(41) By way of example, Sir Roger Newdigate took the Chair at the Select Committee which examined the Oxford Canal Navigation Bill and lobbied actively in London to ensure its passage through Parliament.

The importance of social connections, too, should not be underestimated. The baronet intervened directly in early disputes between the canal company and neighbouring Lords Denbigh and Craven to enable the course of the canal to be surveyed. Likewise he worked closely with another Warwickshire landowner and active parliamentarian, Sir Charles Mordaunt, to ensure the success of local inclosure Bills.

this sense the role of landowner-entrepreneurs in local development[42] was "pivotal" in that they not only controlled the necessary economic, social and political forces but they led, or acquiesced in[43], the movement for harnessing them for the purpose of industrial expansion. And by so doing they unwittingly paved the way for other leaders of the new industrial age to expedite the process[44].

What were the factors which motivated the greater landed proprietors? Clearly these varied considerably between owners and were reflected in the degree of personal involvement. The two charities were principally concerned with building up their incomes from rents and royalties and were content for this period to act purely as rentiers. The Newdigates regarded the period of economic expansion which began in the 1760s as an unprecedented opportunity for estate development[45] and for discharging once and for all the burden of debt which had hung like a millstone around their necks since the seventeenth century. It was also an opportunity for placing the family finances on a sound footing, for indulging in patronage of the arts[46] in common with other aristocrats of the age, and for engaging in such forms of conspicuous consumption

(42) I. Feller: Approaches to the Diffusion of Innovation, p. 234 E.E.H. (Sec. Ser.) IV, No. 3 1966-67.

(43) Even the more cautious ones, such as Richard Geast.

(44) One which inevitably led to the weakening of their social and political leadership in the long run.

(45) As also Lord Craven at Combe Abbey and the related Ludfords of Ansley, but not, apparently, Richard Geast (Dugdale). Merevale was not rebuilt until the 1840s.

(46) Sir Roger Newdigate also established the Newdigate Prize for verse at the University of Oxford.

as rebuilding and embellishing Arbury Hall, near Nuneaton, as a model of the revived Gothic style.

"Minerals", it has been stated, "not only buttressed the fortunes of established landed families but also aided the rise of new gentry"(47). The best local example of social mobility engendered by industrial growth was the Parrott family. Determined to erase the memory of their father's earlier disgrace the two sons(48) established themselves as pillars of local society in the Foleshill area of north Coventry, built and extended a new family "seat"(49) and appear to have aspired to the highest social positions in the county(50).

What was the significance of the Newdigates during this period? The solution to this problem may be approached from two angles: that of the market, and the condition of labour.

The Newdigates were centrally placed on the coalfield, able to meet a large part of the fuel requirements of Nuneaton, Bedworth and Coventry. During Sir Roger Newdigate's time they possessed both the will and the means to lead the movement for industrial expansion. In a phrase, the baronet was instrumental in creating the environment

(47) J. T. Ward: Landowners and Mining (2)
in
Land and Industry: The Landed Estate and the Industrial Revolution, p. 100.

(48) Richard (d.1774) and Francis (d.1796) Parrott.

(49) Hawkesbury Hall.
See also lower panel, Map 5.

(50) Francis Parrott II had become High Sheriff for Warwickshire by 1805.

necessary for local economic change at that time.

Despite the breadth of their charitable interests it has been questioned whether the landed proprietors could not have paid more attention to the poor(51). Undoubtedly parliamentary inclosure and the rise of mining activity tended to accelerate the polarisation of society which had been underway locally since the seventeenth century. Hardship was certainly caused, as we have seen(52), to small owners whose property lay in the path of estate development. It must be recorded, however, that the ambitions of the Newdigate baronets were more diffuse than those of entrepreneurs of economic theory. In addition to being patrons of the arts, business and social leaders, a strict paternalism was exercised in what was believed to be the interest of the community(53). The management of their collieries and control of tenancies excluded the more ruthless, singleminded elements of society from exploiting temporary advantage. It is significant that the occasional riot which marked social behaviour during the latter half of the century was directed not at Sir Roger Newdigate himself but against middlemen suspected of being connected with occasional food shortages. Considering the consequences

(51) G. E. Mingay, op. cit. p. 275.

(52) Supra, Part II, Chap. 2.

(53) In addition to helping to establish the Bedworth worsted mill as an alternative source of employment for textile workers Sir Rogeer Newdigate's benefactions included the building of the local "house of industry", securing medical attention at the Birmingham Hospital for needy cases, and maintaining the school in Chilvers Coton.

of economic growth for labour in certain other mining areas[54] the direct participation of the great estate had an ameliorative effect upon social conditions even if, by modern standards, these still left much to be desired.

Conclusion

The period 1600 to 1800 was one of almost constant endeavour on the Warwickshire coalfield. The presence of the valuable coal market in Coventry acted as a beacon to a wide variety of venturers who dreamt of establishing themselves as successful coalmasters in this county. The qualities of entrepreneurship needed on this field were essentially no different from those required elsewhere but we have seen that only a small minority of men achieved their ambition. Most of them failed to recognise early enough that local mining on any real scale was no sinecure. It posed problems at a very early date which were quite beyond the competence of the vast majority of entrepreneurs. The latter were, in the main, merely speculators with little positive to offer except hard-won savings, profits from commerce or borrowed finance all of which disappeared rapidly along with their initial enthusiasm into undertakings of seemingly endless appetite.

The main problems facing them concerned mining technology, finance and transportation. Not until 1714 was a solution found to the first.

(54) Notably parts of the South Staffordshire coalfield. According to the First Report of the Midland Mining Commission (S.Staffs.) the rank and wealth of employers exercised a direct influence upon the welfare of miners (P: CIII).

It seems extremely unlikely that what was said of a Stafford butty (in evidence) would have applied equally to a local landowner-entrepreneur:-

".....did not care a pin to have a man work for him above a few years for he said he 'could have all the marrow out of his bones in that time'".

Not until the great estate had built up income from its many resources could a resolute effort be made to tackle the second. Finally the problem of transportation called for the exercise of political, social and financial power to a degree possessed only by the greater landed proprietors and their friends. Given all these factors it was inevitable that landed society held the key to rapid economic development locally, and that the period of substantial growth which began in the latter half of the eighteenth century should be led by it.

Significantly only one of the major colliery undertakings on the southern part of the field was established by outsiders(55) and this occurred before the reorganisation of landholdings caused by inclosure. Much of the remaining coalbearing LAND disappeared under the control of the great estate by virtue of inclosure, purchase or lease with the result that the more blatant forms of entrepreneurship displayed on parts of the South Staffordshire coalfield never became established in Warwickshire.

The Newdigates played a leading role in local coalmining enterprise for the greater part of this period. Although Sir Roger Newdigate alone achieved real and lasting success the operations of the second and third baronets constitute an important chapter in the history of county mining since the experience bought so dearly in earlier decades formed the basis upon which the fifth baronet was able to mount his own operations.

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(55) The Parrotts.

GENERAL CONCLUSION TO THE WORK

The principal theme of this work has been the rise of the Warwickshire coal industry during the eighteenth century, making special reference to the role of the Newdigates of Arbury. In many instances surviving data have contributed more to a recognition of the complexity of its development than to an exposition of all the factors involved. Given these limitations, however, two important conclusions may be drawn: that the local coal industry underwent very substantial change during this period, and that the greater landowners were instrumental in effecting it.

As business organisations the enterprises of the Newdigates were atypical of colliery undertakings in general on the coalfield. Nevertheless the economic problems with which they had to contend were essentially the same for all entrepreneurs whose object it was to supply a wide market. The changes planned and the stratagems devised by them were in many cases adopted by lesser coalmasters until with the passage of time they collectively formed a loosely knit bank of industrialists with common objectives and broadly similar policies.

The upward curve of economic activity which took place shortly after mid-century and which resulted in a sharp increase in the rate of growth of the coal industry should be regarded as the last rather than the first of a series of developments which led to the coming of the industrial revolution locally. Unsuccessful attempts had indeed been made by a large number of venturers to establish themselves on the field in earlier years, some of whom made significant contributions to the growth of mining. Their efforts, however, should not be regarded as complete failures but as indispensable preliminaries to the main period of change since it was upon their experience that later entrepreneurs

were able to build relatively modern colliery undertakings with the capacity to sustain large scale operations over the course of many years.

We have seen that the progress of the industry during the seventeenth and eighteenth centuries fell into three main periods. That which took place between 1600 and 1712 was painfully slow and fundamentally different from that of later times. Available evidence suggests very strongly that those developments which had taken place by 1603 sufficed for the rest of that period. It seems doubtful, therefore, whether the seventeenth century contained any significant precursive growth for subsequent years.

The second period lasted from 1713 until approximately 1774 and was substantially different from its predecessor. Colliery units became larger and more productive, and competition for worthwhile sites, as measured by rental increases and the severity of conditions incorporated in mining leases, became sharper. Revolutionary changes took place in mining technology and the industry became markedly capitalistic. Nevertheless, for all these results, the first part of this phase ended in the 1730s with a further spell of depression. Notwithstanding the poor state of local roads at that time the supply of coal had become more than adequate to meet the requirements of the market. Fierce competition was the hallmark of entrepreneurial activity and by 1735 the three greater producers had been forced to withdraw from the field. Few coalmasters had either the resources or the vision to note that the long term prosperity of the industry was inextricably linked with joint efforts to enlarge the market and improve long distance transportation.

Disappointing though much of this period was for the leading proprietors they had in fact established the foundations for the

third phase. The technical problems which had bedevilled coal production for so long had by now been solved. Winding and pumping machinery used in later decades was in many respects a development of the forms employed during these years. The design of pits, the method used to extract coal, the need for heavy initial investment, the recruitment of specialists and the need to study developments on other coalfields were all factors of which mining entrepreneurs had learned to take note.

The third period opened in the 1770s and continued with little significant change until the 1830s. Progress was particularly well marked on the southern part of the field and was characterised by a very substantial increase in capital investment, size of output and a capacity to sustain large scale operations. More important, however, was recognition by proprietors of the necessity of collaboration in the pursuit of their collective aims whilst leaving room for limited competition on matters of detail.

The trend of coal output in Warwickshire during the seventeenth and eighteenth centuries differs considerably from both regional aggregates and county totals postulated by J. U. Nef. Neither firm nor suggestive evidence has been found locally to support his claims for the former period, whilst all the data unearthed so far show that coal output increased proportionately and absolutely in much greater terms during the eighteenth century. Much of the change was due to the technological and transport revolutions which occurred during the latter period. Mines could be worked continuously and at greater depths than hitherto. Roads were improved, straightened, made fit to bear heavy coal carts and linked, thereby reducing the cost of

carriage. Canals enabled supplies to be delivered more regularly to centres of demand. Price differentials between the products of different collieries were brought closer together and greater competition was introduced. A consequence of all these eighteenth century developments was that colliery units became larger and more efficient. In these circumstances it was inevitable that a landlocked industry, such as that in Warwickshire, should register bigger growth rates than the national norm based largely upon production totals for fields with coastal or riverine outlets for trade.

What part did the greater landowner play in the growth of the industry? The active cooperation of the majority, and at the very least acquiescence on the part of the remainder, was essential if the coal industry were to make real progress. Nearly all of the principal sites were controlled by a close circle of landed proprietors and trusts, whose rights were strengthened by the provisions of private inclosure Acts. The power of decision to undertake, permit or prohibit mining activity therefore lay in their hands. But given that leases were sometimes granted to others, the capacity to build and maintain large undertakings and ancillary works still favoured the landowner. He often possessed superior knowledge of local market conditions which enabled him to time projects with greater accuracy than lesser entrepreneurs. Likewise he possessed advantages in securing capital in large quantities and on favourable terms.

An additional factor worthy of note was the domination of Parliament by the aristocracy. Legislation to sanction inclosure, turnpike or canal projects could be obtained only with their support. Outright opposition would have resulted in serious delay to the growth

of the industry. In this respect the active cooperation of the great estate, as exemplified by Sir Roger Newdigate, was indispensable for early progress.

The role of the Newdigates in the rise of the local coal industry was of great significance. At different times during the eighteenth century their colliery at Griff was the scene of experiments many of which enabled the industry to make faster progress than hitherto. Sir Roger Newdigate, in particular, recognised that industrial expansion ultimately depended upon the integration of schemes for private gain with those for public benefit. His own considerable social and political influence was employed to provide the necessary drive both in the county and in Parliament. Whilst it is not improbable that other landowners and their allies could have initiated some of the important changes which the coal and transport industries underwent during this period, it is nevertheless extremely likely that without his active leadership local developments would not have been effected in time to meet the challenge from Staffordshire producers in 1790.

What has this study taught us? In terms of Midland history it has shown that the industrial revolution in Warwickshire, particularly in the Coventry-Nuneaton area began not in the nineteenth[1] but in the late eighteenth century, that it stemmed from radical changes in landholding, coalmining and transport, and that it was associated with the substitution of a regional for a local market. Whilst the "take-off" point for the local industry may be located within the period

(1) Pace J. Prest: The Industrial Revolution in Coventry.

1760-1780 the roots of its development are discernible in the activities of a minority of entrepreneurs which began over half a century earlier still. It has also demonstrated the importance of the great estate during the early stages of large scale economic growth.

In a wider context our comprehension of the historical process and of the workings of economic forces at first hand needs the reinforcement of detailed empirical research(2). Whilst many of the features of the rise of the local coal industry are by no means unique(3) insufficient evidence is as yet available to test the claims of earlier historians whose generalisations on the growth of the national coal industry are based upon the more spectacular advances of coastal fields.

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(2) R. A. Church: Kenricks in Hardware: A Family Business 1791-1966. p. 326.

(3) J. Langton: Coal Output in South-West Lancashire, 1590-1799. Ec.H.R. XXV (S.S.) No. 1 1972.