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HAMMERMAN'S HILL

The Land, People and Industry of the Titterstone Clee Hill Area of
Shropshire from the Sixteenth to the Eighteenth Centuries.

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Volume 2

Submitted for the Degree of Doctor of Philosophy, 1978.

PART THREE

THE PREDOMINANCE OF INDUSTRY, 1720 - 1780

1. THE IRON INDUSTRY FROM CIRCA 1720:

(a) General

The view that the iron industry continued to decline until about 1760, when there was a considerable increase in production, was held for many years. It was challenged with great effect by M.W. Flinn who, in his paper on the growth of the English iron industry from 1660 to 1760, pointed out that the limited contemporary evidence on which the view of the industry before 1760 was based must be treated with caution.

The evidence for the period between 1717 and 1760 consisted largely of occasional production lists, of pamphlets and of statements made before parliamentary committees. As most of it was produced during times of crisis in the iron trade, it was controversial and of doubtful value, for unusual conditions would be likely to be presented as normal, and special pleading would be encouraged ¹.

The major critical years were between 1717 and 1719, between 1735 and 1737, and in the early 1750s, and it is true that the earliest lists of total output in the iron trade are related very closely to these periods of crisis and, as the only figures available, they have had a great effect on the formation of views on the state of that industry ². Moreover, they refer to single years only, which were in most cases clearly abnormal years, and they can be shown to be incomplete in some areas because the compilers lacked local knowledge ³.

1. See above, pp. 195-199.

2. The lists of 1717, 1736 and 1750 are printed in E.W. Hulme, 'Statistical History of the Iron Trade', Trans. Newcomen Soc., ix (1928-29), 21 et seq. The list of 1720 is summarised in T.S. Ashton, Iron and Steel in the Industrial Revolution, 3rd ed. (Manchester, 1963), pp.236-237. For a brief summary of all the estimates of total production quoted by Hulme and Ashton, see M.W. Flinn, 'The Growth of the English Iron Industry, 1660-1760', Econ. Hist. Rev., 2nd ser., xi (1958), 145, note 4.

3. Ashton, op.cit., p.235; Flinn, art.cit., 145; Hulme, art.cit., 14, 20. See above, p. 196.

The first lists, made in 1717 and in 1720, gave what appeared to be a clear impression to some people that the industry was in a state of decline, for when compared they showed that within a few years the production of pig-iron had fallen from 18,190 tons to 17,350 tons and the output of bar-iron from 13,300 to 12,060 tons. However, as Hulme has pointed out ¹, the main value of the figures is that they illustrate a fluctuation in the iron trade rather than a long-term trend for they show the considerable decline in output which followed the boom of 1717. This boom was created by the government prohibition of trade with Sweden between 1717 and 1719 which reduced imports of foreign iron in 1717 to about one third of the usual amount. Consequently there was a sharp rise in the price of pig and bar-iron from which owners of furnaces benefited greatly ².

Between 1735 and 1737 other restrictions on imports caused problems for forge-masters. The list of 1736, which gives the output of bar-iron but not the output of pig-iron, shows that there were 135 forges at that date compared with 100 in 1720 and 116 in 1717. Although the forges were said to be capable of making 19,585 tons of iron, actual output at 12,190 tons was only 130 tons above the level of 1720. This corresponded closely with the evidence given before a House of Commons committee by Abraham Spooner and Edward Knight in 1737 ³. Spooner estimated bar-iron production at 12,000 to 15,000 tons and Knight gave the figure of 12,000 tons. Although they can hardly be treated as separate sources, for they were brothers-in-law and close business associates ⁴, their evidence tends to support the impression given by the 1736 list that bar-iron production was unusually low at that period because of the high price of pig-iron, and we are provided with little guidance to the level of normal production.

The high price of iron finally forced Parliament to admit American iron

1. Hulme, art.cit., 14.

2. Ashton, op.cit., pp.111-114.

3. Ashton, op.cit., p.236.

4. See below, pp. 289-90.

free of duty from 1750. Estimates of English bar-iron output for the same year vary widely from the figure of 10,000 tons given by Jonas Hanway to the figure of 18,800 tons given by a list that was based on the 1717 list ¹.

Clearly the contemporary estimates and lists give very little help towards reaching general conclusions on the development of the iron industry between circa 1717 and 1760. M.W. Flinn has pointed out that the extent of new investment provides the most convincing evidence of steady general expansion in the industry and has noted the number of new ironworks that were built in many parts of the country ².

The amount, and quality, of new investment can provide useful evidence of the development of the iron industry at regional and even at local levels, and there are other criteria that can supplement it. These include the great prosperity that was acquired through the iron industry by a succession of individuals and their families; the growth of small local groups of ironworks into large integrated regional concerns; and the great impact that the developing concerns had on the settlements, people and agricultural activities of the areas in which they operated their ironworks or from which they extracted their raw materials.

In addition there are other signs of successful development such as the resilience of the industry in bad times; its persistence in the face of difficulties or severe competition, which involves a willingness to adapt to changed situations through inventiveness or the adoption of new methods and technical advances; a determined search for new sources of raw materials or fuel; and successful efforts to satisfy the needs of new or expanding markets.

(b) The South-East Shropshire Area, circa 1720

The 1717 list of furnaces and forges in England and Wales, with the

1. See above, p. 270 note 2.

2. Flinn, art.cit., 146 et seq. See above, p. 196.

amounts of pig-iron and bar-iron produced by them, was sent to John Fuller and Son, gunfounders, of Heathfield in Sussex by William Rea ¹. The qualification that it contains errors or suffers from omissions or under-estimations of production ², applies less strongly to the ironworks of the West Midlands and Welsh borderlands than to other areas for Rea knew them well ³. His figures for the ironworks of the Foley partnerships are considered to be generally reliable by Mr. Johnson ⁴, which is not surprising for Rea had many links with the Foleys. In 1692 he became manager of Wildon forge and in 1704 he joined the partnership and was responsible for the forge at Monmouth and for other ironworks. He worked closely with John Wheeler whom he succeeded as general manager soon after 1708. In 1710/11 he held $2\frac{1}{2}$ shares in the partnerships and, as Wheeler's trustee, he probably exercised great influence for Wheeler left eight shares, the largest single holding, and Rea is known to have been trusted by his widow, Mary Wheeler, and to have obtained for her the leases of other ironworks ⁵. Rea was general manager of the Foley partnerships until 1725 or 1726, when he became insolvent. He owed £5,050 to the partnership and 'as much as £5000 more could be due ...', and other amounts were due to Lord Scudamore and the Duke of Kent ⁶. He was also a member of other partnerships. He was described in the Fuller manuscript as 'one of Mr Hussey's Partners'. This partnership, in which Rea and Mr. Goth each held three eighths and Thomas Hussey the remaining two eighths of the shares, was settled on 11 August 1725 ⁷. The account of its old stock reveals

1. E.W. Hulme, art.cit., 12.

2. See above, p. 196.

3. See Figure 13, p. 203.

4. B.L.C. Johnson, 'Foley Partnerships', Econ. Hist. Rev., 2nd ser., IV (1952), 322, note 2.

5. Ibid., 327 and note 3.

6. Hereford R.O., Foley Coll., F/VI/DGd, letters dated 29 Oct. 1726; 12 Dec. 1726; 12 Feb. 1727; 15 Feb. 1727; and 1 Aug. 1728.

7. Hereford R.O., Foley Coll., F/VI/DGd.

that it was based on Beckley and was heavily involved in casting guns and, to a lesser extent, pots. Meanwhile, in 1721, Rea had acquired John Bradley's interest in the Lower Mill, Wolverley, and had developed some connections with the Knight partnerships ¹.

The information given to Fuller by Rea gives an impression of reliability. None of the ironworks that were known to have been working at that period in the area were omitted. Even Prescott forge, Stottesdon, was included although it could not have been operating for long as it was still a corn mill in 1708 when it was leased by Peter Hussey, pan-maker, of Wolverley ².

After he had forwarded the list to Fuller, Rea sent corrections which Fuller added to the list. These referred to four furnaces or forges and revealed up-to-date knowledge of conditions affecting them. It is significant that they were all in the Welsh border area: Cranage forge in Cheshire; Pontyblew forge, Chirk, on the Denbighshire-Shropshire border; and Bringewood furnace and forge on the Herefordshire-Shropshire border. Bringewood furnace and forge were worked by Richard Knight and Rea noted that, for the year 1717, the furnace would not make 200 tons, 'and Bringewood Forge 320 Ton will stand still for want of wood ...' ³.

The severe shortage of wood at Bringewood was temporary for the furnace and forge continued to operate for nearly a hundred years afterwards. Rea's corrections indicate that the balance between supplies of wood and the production of iron had been upset recently and that iron production had been well above the usual amounts as Richard Knight had taken advantage of the sharp increase in prices caused by the embargo on Swedish imports to increase his profits even at the risk of having to reduce production at a later date. Rea's evidence of the shortage of wood for making charcoal at Bringewood is confirmed

1. Hereford R.O., Cat. Downton Coll., 488, 535.

2. S.R.O., 1424/426. 21.

3. E.W. Hulme, art.cit., 23.

by the relatively high price of charcoal. Between Christmas 1714 and Lady Day 1719 Knight purchased 4,517 dozen sacks of charcoal at a cost of £7504/14/4^d ¹. How much was bought before 1717 is not known, but the price, on average, of £1/13/2^{3d} a dozen sacks shows that charcoal was expensive at this time compared with the period between 1733/34 and 1743/44 when the cost at Bringewood was as low as £1/1/10^d, and never higher than £1/5/7^d a dozen sacks ².

The purchase from 1714 of large quantities of charcoal by Richard Knight coincided with the development of the furnace at Charlcott ³ and with the revival of the iron industry elsewhere. Prescott forge had an output of 120 tons of bar-iron a year and the Cleobury forges produced 180 tons a year according to the 1717 list. The mining areas of Titterstone Clee benefited from the revival in the fortunes of the iron industry and increasing activity there after about 1713 was closely connected with the growing demands of the furnaces at Bringewood and Charlcott for ironstone.

In 1717 the furnaces at Bringewood and Charlcott, which were controlled directly by Richard Knight, were capable of producing 450 and 400 tons of pig-iron, respectively, each year. Other furnaces over which he is known to have exercised influence, through agreements or through participation as a partner, early in the eighteenth century, included Hales (Halesowen), 500 tons, Grange, 450 tons, Willey, 450 tons, and Bouldon, 400 tons. The pig-iron produced by these furnaces amounted to 2,650 tons out of the total of 18,190 tons produced in the whole of England and Wales. Even if considerable errors had been made in the list the importance of his position in the iron industry is clear. In the same list Coalbrookdale furnace was shown to be producing 200 tons a year. By contrast none of Richard Knight's furnaces produced less

1. Dr. Bull, 'Some Account of Bringewood Forge', 55.

2. Calculated from figures in the Knight Mss, Books 244 and 245. These contain the General Accounts for the years 1733/34 to 1743/44 and are deposited in Kidderminster Library.

3. See below, pp. 281-283.

than twice this amount.

2. THE KNIGHT IRONWORKS PARTNERSHIPS

(a) Richard Knight: The Early Years

The life and achievements of Richard Knight, one of the greatest iron-masters of the late seventeenth and early eighteenth centuries, have been seriously underestimated, or ignored, yet he and the dynasty of iron-masters that he established had a profound influence on the industry for more than a century during a period of unprecedented expansion and change.

His origins and early life are still hidden in obscurity and the details that exist are based largely on a pedigree prepared in the nineteenth century, which is vague, or incomplete, in places and which does not inspire great confidence, and on family traditions which, by claiming descent from a Shrewsbury family of note, appear to be attempts to justify the acquisition of arms ¹. It has been possible, however, to correct or to extend many of the details concerned with his descendants, with the help of wills, parish registers, partnership agreements, marriage settlements and, in particular, of the family papers referred to in the catalogue of the Downton Collection at Hereford Record Office ².

Richard Knight is said to have been the son of Richard Knight of Castle Green, Madeley, Shropshire, who may have been in the iron trade also, and it is believed that he was born in 1659. Madeley is not far from Shrewsbury and this proximity appears to have contributed to the belief that the family had its roots there. However, iron-workers, and other people in the iron trade, frequently moved great distances and there is often little reason to assume that they were necessarily natives of the place in which they were working when

1. Kidderminster Library, Knight Mss, 6745. Hereford R.O., Downton Coll., 765. C.S. Orwin and R.J. Sellick, The Reclamation of Exmoor Forest, 2nd rev. edn. (Newton Abbot 1970), p.27.

2. See below, p. 287 for the revised pedigree.

they were first noticed or that they had come from nearby places. Sir Basil Brooke had rebuilt an iron furnace at Coalbrookdale, Madeley, in 1658 ¹, and Richard Knight, the elder, if he was an iron-worker which seems likely, could have been attracted there by the prospect of obtaining work. It is possible that he came from the Ludlow-Leintwardine area, rather than from Shrewsbury, for a family of Knights who were iron-workers or iron-masters had resided in that area since the time of Ralph Knight who was a partner of Sir Henry Sidney in his ironworks during part of the period that Sir Henry spent at Ludlow as Lord President of the Council in the Marches ².

Members of the Knight family who lived in Ludlow were referred to from time to time in the accounts of the churchwardens as in 1574-75 when Stephen Knighte was paid twopence for mending a 'pece of Iron belonginge to the chymes', and 1595-96 when John Knight was paid a shilling for nails and 'Clets of Iron', and for work done in the steeple. John Knight, 'smyth', was included, in 1600, in a list of the free-masters of the Company of Hammermen ³. In her will, dated November 12th 1747, Elizabeth Knight, Richard's widow, left a bequest of £10 to 'kinsman John Knight, Leintwardine, blacksmith' ⁴. But the main indication that Richard Knight had come from the area originally is given by his personal attachment to it. When he had established himself as an iron-master he made Bringewood and its ironworks the main base for his wider activities, made his home there, built up a large estate which included the manor of Leintwardine, and established through his older sons a powerful landed family in the area.

Although Richard Knight is said to have begun work at a forge in Coalbrookdale, Madeley parish ⁵, he first emerged as master of his own forge at

1. William Rees, Industry before the Industrial Revolution, i, 280.

2. Ibid., 249.

3. Llewellyn Jones, 'Antiente Company of Smiths', 305.

4. Hereford R.O., Cat. Downton Coll., 246.

5. Orwin and Sellick, op.cit., p.27.

Moreton in Shawbury parish about nine miles north-east of Shrewsbury. His move to this district could have been due to an advantageous marriage some time before 1693, when his oldest child, Richard, was born. His wife, Elizabeth, was the daughter of Andrew Payne of Shawbury, a wealthy landowner, and he appears to have benefited from the financial backing of his father-in-law. By 1695/1696 he was running Flaxley furnace in Gloucestershire ¹ and he had acquired a half interest in an iron furnace, a messuage and woodlands at Ruabon near Wrexham, for a period of twenty one years, for in that year he assigned his share to his partner Thomas Lowbridge of Hartlebury ². He was living at High Ercall at that time and was described as 'gent.'.

On 31st January 1698 he acquired from Lord Craven the lease of the mineral rights of the manor of Earls Ditton on Titterstone Clee Hill, and before that the lease of Bringewood furnace and forges for, in the deed concerning the mineral rights, he was stated to be residing at Deepwood, the farm associated with the ironworks ³.

Andrew Payne of Shawbury died in 1700 and his will was proved on December 30th in the same year. The second bequest in the will was to his son, Robert, who was left 'all sums of money in the hands of Richard Knight'. No amounts are given but the position of the bequest implies that they were significant. Other bequests made by Andrew Payne included £50 to his grandson Richard Knight the younger and a guinea to his daughter Elizabeth to buy a ring ⁴.

Richard Knight was a little over forty years of age at this time. He possessed great energy and skill and under his control the ironworks at Bringewood prospered and acquired a reputation for producing iron equal in quality to the best produced in Sweden ⁵. His interests were extended to

1. B.L.C. Johnson, 'Foley Partnerships', 327. W. Rees, op.cit., i, 327.

2. Hereford R.O., Cat. Downton Coll., 680.

3. S.R.O., 372/22. See above, p. 219.

4. Hereford R.O., Cat. Downton Coll., 246.

5. W. Rees, op.cit., i, 327.

Bouldon furnace probably through an agreement with his brother, Francis, who was also involved in the iron trade and was known to have shared an interest in Bouldon, later, with Richard Baldwin ¹, and he retained several of the ironworks that he had acquired before he moved to Bringewood. Among his papers are the accounts of the charge of making bar-iron at Moreton forge between July 18th 1721 and February 17th 1723, so he retained the management of this forge until the latter date at least ². He had the lease of Willey furnace also and his latest accounts for it were carried up to Lady Day 1733 ³. He is believed to have worked Ruabon furnace between 1702 and 1712 ⁴, but there is very little evidence that this was the case although he may have provided finance and marketing arrangements particularly to Thomas Lowbridge after he had assigned his half share of the furnace to him in 1696 ⁵.

Soon after the death of his father-in-law, Richard Knight began a rapid expansion of his interests which made him within a few years one of the most powerful men in the iron industry. The Foleys had made the supplies of tough pig-iron from their furnaces in the Forest of Dean the foundation stone of their partnerships but had not organised or managed the supplies of cold-short iron as carefully, for there had been many sources available to supplement the supplies from the Midland furnaces belonging to the partners or to their associates. With their approval Richard Knight took the opportunity offered by this omission and built up, through direct control and through agreements, a large group of ironworks in a loose partnership whose foundations rested firmly on Bringewood and on his Shropshire furnaces and their production of cold-short iron. He soon became the largest supplier of iron to the important nail-making industry ⁶

1. V.C.H., Shropshire, i, 473.

2. Hereford R.O., Cat. Downton Coll., 431.

3. Ibid., 431.

4. W. Rees, op.cit., i, 319, 327.

5. See above, p. 278.

6. R.A. Lewis, Two Partnerships of the Knights (Birmingham University M.A. thesis, 1949), Introd. p.i.

and was also able to supply from his Midland forges a wide range of iron of intermediate qualities to the craftsmen of other iron trades.

On August 31st 1705, he agreed to take over Hales and Grange furnaces and Wildon forge and mill, and their wood contracts, with the assent of all the Foley partners ¹. As part of the agreement he was to take, at Wildon forge, 500 tons of Forest of Dean pig-iron 'from Mr Foley's furnaces' each year, and was to supply Whittington forge with charcoal and with 150 tons of pigs and fifteen tons of castings from Hales furnace yearly. The agreement obviously indicates the beginning of Knight's close association with the Foley partnerships which, generally, has been dated nearer to 1707 ², and his occupation of the place vacated by them in the Stour valley. On January 10 1707, he obtained the lease of Cookley forge, near Kidderminster, from Sir Charles Lyttleton of Hagley, together with lands and meadows near Cookley bridge ³ and by the same year he had acquired, according to Rees ⁴, the forges at Wolverley, Mitton, Stourton and Whittington from members of the Foley partnerships. In most cases his participation in these forges was probably less direct than is implied and involved agreements, such as that made in 1705 with reference to the supply of Hales pig-iron to Whittington, which made them parts in a series of interlocking partnerships similar to those favoured by the Foleys whose management methods he appears to have copied at that stage. The Foley accounts for 1710-11 reveal that he held, by that date, three of the twenty five shares of the Foley partnerships ⁵.

In the Cleobury Mortimer area he was in a partnership with George Crump of Cleobury forge, so far undefined, which was connected with Peter Hussey

1. Hereford R.O., Foley Coll., F/VI/DFC.

2. B.L.C. Johnson, 'Foley Partnerships', 327. W. Rees, op.cit., i, 327.

3. Kidderminster Library, Catalogue of Mss, 7384. The original document was destroyed by the flood of 1955.

4. W. Rees, op.cit., i, 327.

5. B.L.C. Johnson, 'Foley Partnerships', 327.

who had established a forge at Prescott soon after 1708 ¹ and another forge at Hardwick later. After the death of Hussey, Prescott and Hardwick forges were leased in 1741 by Knight and Crump to two sons of Cornelius Hallen of Coalbrookdale, frying-pan maker, on condition that they were not used for the refining or drawing out of iron ². The condition makes it clear that Richard Knight was able to exercise close control over competition in that area.

Through his association with Crump he was connected with George Draper, iron-master, who ran Lower Mitton and Hartlebury forges. By 1734 the ironworks at both of these places were in the possession of Knight ³. Elsewhere he and Crump were in partnership with Richard Baldwin of Dudnell, Cleobury, who was the nephew of John Baldwin of Cleobury forge and the cousin of William Baldwin of Hints ⁴. Baldwin shared an interest in Bouldon furnace with Francis Knight ⁵ but when he died in 1727 he was operating a furnace at Atterley, near Willey. In his will, proved in London on October 3rd 1727, he left £200 each and half the residue of his estate to his executors, 'my partners Richard Knight of Bringewood, Esq., Thomas Green of Much Wenlock, gent., and George Crumpe of Cleobury Forge, gent.', and all his share in the 'iron and timber trade' and his lands in Cleobury Mortimer to his nephew Richard Baldwin. The other half of the residue of his estate was left to the children of his cousin, William Baldwin ⁶.

For some time before 1713 Knight was operating a furnace at Charlcott in Aston Botterell parish on the eastern edge of the Brown Clee. This furnace is said to have been worked by the Childes of Kinlet in the seventeenth century,

1. See above, p. 274.

2. Kidderminster Library, Knight Mss, 7157.

3. Hereford R.O., Cat. Downton Coll., 81, 431.

4. See above, pp. 205, 238-241.

5. See above, p. 278.

6. S.B.L., Deeds and Charters, 14696 (Extracts from Baldwin Wills).

and later ¹, but there appears to be no evidence that this was so. The manor had been owned by Sir Francis Lacon until he sold it to James Grove, citizen and draper of London, in 1620. Sir Francis is known to have had iron furnaces at Willey and at Cleobury Mortimer and there has been a tendency to assume that he, and his successors the Childes, had furnaces elsewhere also. Charlcott is near the small village of Cleobury North and it is possible that someone has confused this village with Cleobury Mortimer, as still happens from time to time, and thereby pre-dated its furnace. In his will dated October 15th 1624, James Grove left lands in Alveley, Glazeley and Charlcott. The details of the latter include a reference to two water mills but there is no indication that a furnace existed ².

In 1678 Charlcott manor was sold by Henry Grove to Dame Mary Yate and Thomas Audley, son of Sir Henry Audley, for £1,200 ³, so documents exist for this period also, but as before there is no reference to a furnace. The first documentary evidence of its existence is provided in 1713 when Richard Knight bought the manor from Apolonia Yate and Mary Audley. The lease to vest possession, dated February 24th 1712/13 describes him as 'of Bringewood, ironmaster', and includes as one of the properties of the manor a furnace and all lands appertaining ⁴.

Similar information has been discovered by Mr. Norman Mutton who used an abstract of title to Charlcott manor dated 1620 - circa 1750. Mr. Mutton concludes that, though it is unlikely, the possibility of a seventeenth century furnace existing at Charlcott cannot be altogether ruled out ⁵. There is, however, very little reason to believe that it existed until built, probably

1. V.C.H., Shropshire, i, 472-73; H.R. Schubert, British Iron and Steel, p.370.

2. Hereford R.O., Cat. Downton Coll., unnumbered 300s.

3. Ibid., 379.

4. Ibid., 352.

5. N. Mutton, 'Charlcombe Furnace', T.S.A.S., lvii, Part I (1965), 84-89.

by Richard Knight, under a beneficial lease shortly before he purchased the manor. The furnace fitted in well with his expansion elsewhere for the increased activity of the Bringewood forges, the recent acquisition of several additional forges and the establishment of interests in others had clearly overtaken the smelting capacities of his furnaces by 1712. The furnace at Charlcott was well sited in relation to supplies of wood, and of ironstone for although Bouldon was already taking ironstone from the Brown Clee carboniferous measures there was space on the opposite side of the hill for another furnace. Supplies of ironstone were sufficient for the needs of both furnaces for many years and when they began to fail Charlcott was near enough to the much larger deposits of Titterstone Clee to be supplied from there. It had the advantage also of being situated much nearer to the Stour valley than either Bringewood or Bouldon and this reduced the heavy costs of land transport. Some of the pig-iron was taken to Bewdley by land but most of that destined for the Stour valley forges was transported to Bridgnorth, which was only about eight miles away. From there it was shipped downstream for $1/3^d$ a ton, a rate of just over one penny per ton mile. Land carriage costs were $7\frac{1}{2}^d$ per ton mile so the total costs via Bridgnorth were $6/3^d$ per ton, plus a small wharfage fee, at times, of about 6^d per ton. By comparison the cost of over land carriage direct to Bewdley would have amounted to $8/1\frac{1}{2}^d$ per ton for the distance was about thirteen miles ¹.

Although Richard Knight must have spent considerable amounts of energy and of money in building up his interests in the iron trade during the early years of the eighteenth century he still had resources available for other activities. In 1704 he leased two messuages and the Down Farm in the manor of Earls Ditton from Lord Craven. The Down was well placed for supervising his interests on Titterstone Clee Hill and through his purchase of Charlcott manor in 1713 he obtained a similar foothold on Brown Clee Hill.

1. Calculated from figures in the Knight Mss, 244, the General Accounts for 1736-37, Charlcott, p.10.

Between these dates the Downton Collection ¹ reveals that he had acquired mortgages on many properties, some of which, including lands in Church Stoke, Montgomeryshire, in Leinthall Starkes and in Neen Sollars fell into his hands. On June 13th 1711, he paid Edward Jordan of Woolaston, Salop, £600 for property which included lands at Wistanstow ² and in 1714 the manor of Leirhall Starkes was assigned to him, on redemption of £984/10/0^d ³. On February 14th 1717 he agreed to settle lands worth £10,000 on his oldest son Richard and his bride, Elizabeth Powell, of Stannage, Radnorshire. The agreement was carried out in a marriage settlement made on March 15th 1720 ⁴.

Obviously, by 1720 Richard Knight had accumulated a great amount of wealth. The basis of his fortune had been laid early in the century when he had extended his interests during a period of hardship and retrenchment that had caused difficulties for others in the iron trade as well as for many landowners. When the iron industry began to recover during the second decade of the century he profited greatly from its increasing prosperity. He used his money wisely during this period and continued to benefit from the wealth of his wife's family. As late as 1721 the purchase of Leintwardine manor from Charles Craven was carried out on his behalf by his brother-in-law, Robert Payne. The manor which included Downton Farm and the furnace and forge sites at Bringewood was held in Payne's name until April 10th 1729 and was then passed to him. Two weeks later he settled it on his oldest son, Richard, and male heirs but reserved it for his own use during his lifetime ⁵. It appears significant, also, that the two grandsons who succeeded eventually to his landed estates and fortune were named Richard Payne Knight and Thomas Andrew Knight.

1. Hereford R.O., Cat. Downton Coll., Bundles 68, 69, 71.

2. S.B.L., Deeds and Charters, 18664.

3. Hereford R.O., Gatley Coll., F76/11/66.

4. Hereford R.O., Cat. Downton Coll., 227.

5. Ibid., Bundles 14, 20, 214. See below, p. 294.

Regardless of the way in which the money had been acquired, however, Richard Knight exercised considerable foresight and skill in using it to establish himself as a powerful iron-master and large landowner. There is a story, still current and possibly told about others as an illustration of their eccentricities, that describes how he was in the habit of riding regularly between his various works and properties. He travelled with saddle-bags full of gold coins which he used, it was said, to purchase on the spot anything that struck his fancy. Whether true or not, the story illustrates, in a popular fashion, his life of hard work which involved careful supervision and much travelling, his ready cash and general prosperity, and his eye for bargains. These features provided the basis for his own successful career and he did much to ensure that they were acquired by his sons so that they would be prepared to develop his achievements and to increase the wealth and influence of the family.

During the later years of his life he continued to build up his estates and ironworks, with the eventual disposition of his interests among his family obviously settled in his mind. His oldest son, Richard, received an extensive education which included legal training. By 1717 he was assisting his father with the administration of his landed estates and familiarising himself with the duties of a landed proprietor and the ambitions of a country gentleman ¹. In 1720 on the occasion of his marriage, the manor of Charlcott, with the exception of its paper mills and furnaces and their appurtenances, other lands in Aston Botterell and parcels of land in Cleobury North were settled on him by his father ² and he acquired a residence in Ludlow.

From this date he spent most of his time in Ludlow. His first child was baptised there in November 1721 and other children in 1723 and 1727. He was a burgess of the town and in 1724-25 he served as one of the churchwardens. The accounts of the churchwardens for 1729-30 note that he had made a generous

1. Hereford R.O., Cat. Downton Coll., 431.

2. Ibid., 227.

gift of ten guineas to them during the year and in 1731 32 when all of the eight bells had to be recast at great expense he made a contribution of one guinea. In 1745 he was elected Recorder, following the death of Abel Kettilby who had held the office since 1719, but he resigned in 1747 in favour of the Earl of Powys ¹.

Meanwhile, as his accounts for various dates between 1722 and 1743 reveal, he continued to receive and to expend money on behalf of his father. In a letter written to his father from Ludlow on March 19th 1743, concerning an account of the money that he had received from Richard the elder, he added news from Madrid and London about the hostilities and commented that the stocks 'are pretty high and on the rise' ².

The second son, Thomas, entered the Church and became rector of Ribbesford parish, which included the town of Bewdley. While he was rector he subscribed to the rebuilding of the steeple and chapel of the parish church, which was carried out between 1746 and 1748 ³. He, also, was provided with property which included two forges at Hartlebury, the manor and the advowson of Neen Sollars ⁴, Titfield Farm, Neen Sollars, and Wormsley Grange, Herefordshire, where he spent much of his time. Apparently he had little contact with the estates and business affairs of his father and his brothers. He died in 1762 and his son, Richard Payne Knight, inherited the large entailed estates when Richard Knight the younger died without male heirs in 1765.

The third and fourth sons of Richard Knight, Edward and Ralph, were encouraged to enter the iron trade. From about 1721 they were involved in the ironworks which Richard was reorganising and consolidating, gradually, into two clearly defined but related industrial groups.

1. T. Wright, The History of Ludlow and its Neighbourhood (London, 1852), p.500.

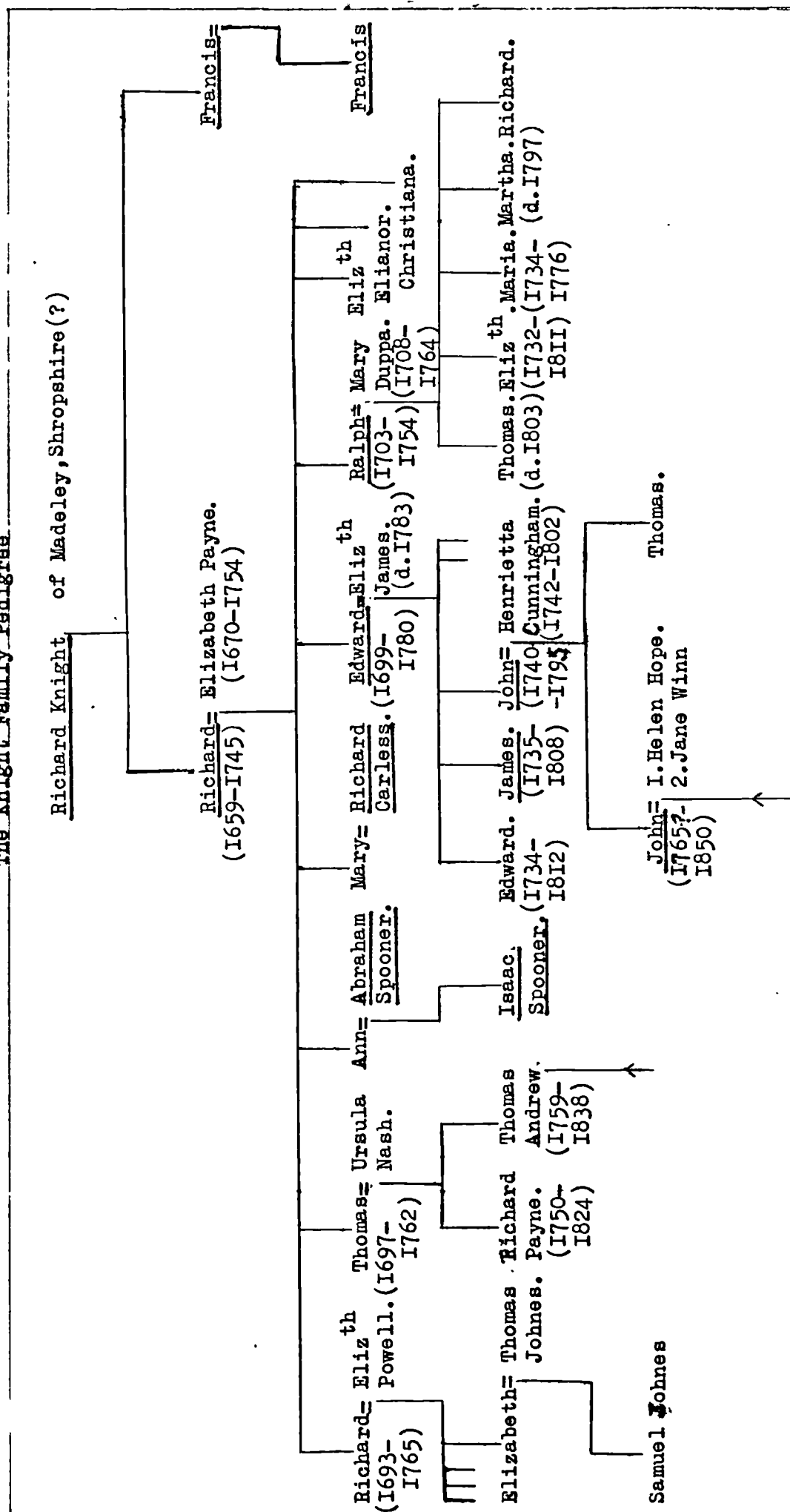
2. Hereford R.O., Cat. Downton Coll., 431, 487.

3. T. Nash, Collections for the History of Worcestershire, ii (London, 1782), 283-284.

4. Hereford R.O., Cat. Downton Coll., 80.

FIGURE 18

The Knight Family Pedigree



Members of the family who were actively engaged in the iron trade are shown thus: Ralph

(b) The Reorganisation of the Knight Partnerships, 1720-1733

The first industrial group, which was based on the ironworks at Bringewood and Charlcott, the main centres of his earlier activities and the main sources of his wealth, required little change. The second group based on the furnace at Hales and the forges of the Stour valley in which he had acquired an interest between 1705 and 1707 had to be developed into a well defined partnership that was under his control.

In his earlier days as an iron-master Richard Knight had based the organisation of his concerns on the pattern provided by the Foley partnerships. His capital and, with it, his influence had been extended through loans, partnerships and similar arrangements, to include a large number of ironworks. Much of the balance of the capital required by each partnership was found by other people in the iron trade but in some cases it was provided by landowners who had money available for investment in industrial activities. The outlook and interests of such investors, which naturally inclined them to seek relatively safe, early and regular returns on their capital, conflicted with and often frustrated the aims of energetic and ambitious iron-masters of the type exemplified by Richard Knight, who wishing to develop and expand their industries and increase long-term profits, were willing to forfeit quick returns.

However, at Bringewood and Charlcott ironworks where he or his wife's relatives held all the stock he was relatively free, unlike many other iron-masters, to direct the work and development in his own way. He used his freedom well and these ironworks had been made to yield large profits. After 1720 he set out to extend and consolidate his control over them and over their supplies of raw materials and by 1733 he had acquired ownership of, or at least the majority interest in, most of the land and fixed assets involved in each stage of production at Bringewood and Charlcott.

At Bringewood he leased, and from 1721 owned, the furnace, forges, forge-house, workmen's houses and the nearby farm at Deepwood as well as large

areas of the surrounding land which included extensive woodlands ¹. At Charlcott he owned the furnace and its site, the adjoining paper mill - which he leased to William King ² - Charlcott manor and farm, and land on the nearby hillsides which supplied some of the ironstone used in the furnace ³. On Titterstone Clee, which supplied most of the ironstone used at Bringewood and some of that used at Charlcott, much of the area that contained coal measures was controlled by him for it was included in the lease of the mineral rights of Earls Ditton manor acquired from Lord Craven in 1698 ⁴.

In January 1726 he joined the partnership, known as 'Sir Thomas Lyttleton and Co.', which had operated Hales furnace for several years, and injected into it his forges at Cookley and Whittington and a capital sum of £2,000 which gave him two sevenths of the total stock of the company ⁵. His son Edward who was described as 'de Halesowen, gent.' in a bond dated February 7th 1726 ⁶, became his representative in the partnership and operated the forge at Wolverley that had been bought from the Jewkes family at about the same time. When Edward married Elizabeth James of Solihull on February 8th 1726, his father settled his stock on him and he became the managing partner. The accounts of the partnership, which he called 'the Stour Works', were prepared by him beginning with the year from Lady Day 1726 to Lady Day 1727. Details of the ownership of stock held in the first year include: 'To Edward Knight stock turned over to him p. his Father ... £2,000' ⁷.

Richard Knight soon rejoined the partnership by acquiring stock to the

1. See above, p. 284.

2. Kidderminster Library, Knight Mss., 7132.

3. See above, p. 282.

4. See above, p. 219.

5. R.L. Downes, 'The Stour Partnership, 1726-36', Econ. Hist. Rev., 2nd ser., iii (1950), 90.

6. Kidderminster Library, Knight Mss., 7133.

7. Ibid., 141.

value of £500, and at Christmas 1727, when Wolverley forge was brought into the concern he and Edward increased their stock by £1,000 each. Between them they held half of the total of the issued stock of £9,000 and were able to persuade the other partners, Sir Thomas Lyttleton and Joseph Cox, to follow their own practice of withdrawing each year the interest on capital only. Profits were retained and ploughed back into the business thus reducing the immediate returns but enhancing, through the expansion of the concern, the prospect of higher profits in the future. Sir Thomas Lyttleton does not appear to have had a great amount of confidence in this policy and he withdrew from the partnership in 1736. He was replaced by Abraham Spooner, ironmonger, of Birmingham, who had married Richard Knight's daughter, Anne, in 1733 ¹.

Joseph Cox left the partnership soon afterwards and an account of the stock of the Stour Works made in 1738 shows that the partners were, by then, Richard Knight, Abraham Spooner, Ralph Knight and Edward Knight. On September 7th 1738 these partners agreed that each of them should 'stand his share of loss and bad debts' ². Richard Knight does not appear to have been pessimistic about the future of the iron industry for he continued to support the Stour Works with loans, which by 1745 amounted to £5,400 ³.

The generation by the ironworks of sufficient capital to finance their own expansion was assisted by the reduction or ending of involvement in outlying ironworks such as Willey, Bouldon and Moreton after about 1733 when accounts and family papers ceased to refer to them.

Meanwhile the ironworks at Bringewood and Charlcott continued to operate. They supplied pig and bar-iron to the forges belonging to the Knights that had been incorporated into the Stour partnership as well as to other markets. The 1726-27 accounts of the Stour Works note that five tons of blooms were purchased

1. R.L. Downes, art.cit., 93; Knight Mss., 141; Cat. Downton Coll., 262.

2. Hereford R.O., Cat. Downton Coll., 431.

3. R.L. Downes, Art.cit, 92.

from Bringewood for Cookley forge. In 1727-28 Richard Knight bought nearly nine tons of pig-iron from Hales furnace, and sold one ton of Charlcott pig iron to Whittington forge and thirteen tons to Cookley forge. In 1728-29 Cookley forge bought more than thirty tons of Charlcott pig-iron and seventeen tons of Bringewood pig-iron; Wolverley forge bought nearly seventy eight tons of pig-iron from Charlcott; and Whittington bought between four and five tons of pig-iron from the same furnace. So in that year alone the Stour forges bought a total of nearly 130 tons of pig-iron from the other ironworks belonging to Richard Knight ¹.

The details of total production of pig-iron at Bringewood and Charlcott for this period are not available and the accounts of the Stour Works give little indication of the continuity or amount of bar-iron production at Bringewood and its associated forges for most of their purchases involved pig-iron. Richard Knight's account of payments and receipts for 1731-32, endorsed 'son Edward Knights accounts', gives details of the Charlcott pig-iron received at Bewdley during that year and reveals that Edward, who was now living nearby at Wolverley, was managing the marketing of Bringewood and Charlcott iron through the Bewdley warehouse ². The growth in his status as a result of the responsibilities placed on him by his father is emphasised by the influence that he wielded among his fellow iron-masters. On November 2nd 1731, he wrote a letter to Sampson Lloyd, iron master, which shows clearly that he was one of the group of iron masters who had recently fixed the price of iron at a higher level ³.

During this period there were few references to his younger brother Ralph whose later activities indicate that he was learning to manage both the day-to-day events at Bringewood ironworks and the organisation of supplies of

1. Knight Mss., 141.

2. Cat. Downton Coll., 431.

3. Marie B. Rowlands, Masters and Men in the West Midland Metalware Trades, (Manchester, 1975) p.72.

charcoal, ironstone and other raw materials. He was living at his father's home at Bringewood, or nearby, for when he married Mary Duppa at Bromfield, near Ludlow, on June 13th 1731, he was described in the parish register as a resident of Burrington parish which contained both Bringewood and Downton. After his marriage he acquired responsibilities connected with the furnace at Charlcott and lived in Stanton Lacy for several years. His first child, Elizabeth, and his second, Mary, were baptised there in 1732 and 1734. His accounts of January 2nd 1732 with his father, referred to his 'marriage fortune', to the purchase of Beckjay Farm, which was about three miles north-west of Leintwardine, and to payments due on Charlcott furnace ¹. The account was witnessed by his uncle Francis Knight who was the clerk at Charlcott for some years afterwards on a salary of £40 a year. The direct knowledge of Charlcott that Ralph acquired under the guidance of Francis Knight was similar to the experience gained by his brother Edward some years before at Wolverley. Clearly, their training was part of a carefully considered plan designed to prepare them for taking over control of the ironworks from their father. The concentration of efforts on the Bringewood and Stour partnerships made the succession easier and ensured that the views and interests of the professional iron-masters would be predominant in future.

(c) The Bringewood and Charlcott Partnership:

(i) The Partners, 1733-1783

At Midsummer 1733 Richard Knight handed over the management of the Bringewood and Charlcott group of ironworks to Edward and Ralph and by Lady Day 1735 the readjustments in the stock that were found necessary to give Ralph a share in the Stour Works had been completed. From 1733 detailed accounts, similar to those prepared since 1726-27 for the Stour Works, become available for the Bringewood and Charlcott works also. They continue in an unbroken

1. Cat. Downton Coll., 431.

series that ends at Lady Day 1779¹.

Ralph moved into Bringewood forge-house late in 1734³⁵ and the accounts for that year note that his father had allowed him £100 for the repairs that had been carried out there. Earlier in the year Richard had moved about half a mile away to his farmhouse at Downton which he made his home for the remainder of his life. Ralph became the managing partner for the Bringewood and Charlcott group of ironworks and Edward, who was still managing the Stour partnership, dealt with most of its sales and purchases outside the area. He concerned himself also with activities involving large capital investments, for which he alone appeared to be fitted, such as the sinking of new groups of mines and the development of new enterprises at the ironworks.

The stock of the new partnership was valued in round figures at £12,000 and was shared equally between Edward and Ralph. They held £2,600 outright and another £2,400 worth remained subject to the payment to Richard Knight of interest at the rate of five per cent for the remainder of his life. The record of this payment was included each year in the final summary of the accounts under the heading 'Due to the Partners'. The balance of the stock was transferred to the sons through a book transaction which credited their father with a loan of £7,000 to them. They paid interest of four per cent a year to him on this sum and, in addition, paid a total of £300 a year for the use of his lands, furnaces and forges at Bringewood and Charlcott. So, although he was apparently a sleeping partner, Richard Knight was still in a position to dominate the partnership should he consider it to be necessary.

The inventory made at Bringewood in 1733, in preparation for the transfer of the works to Edward and Ralph, is still in existence. It accounts for £8,253/5/10^d of the £12,000 and includes raw materials, pig-iron, bar-iron, old stock, old iron, payments in advance to miners, carriers, colliers, wood-cutters

1. General Accounts for Bringewood and Charlcott. Deposited at Kidderminster Library with the Knight Archives from Wolverley Hall. Hereafter they will be referred to in footnotes only when it is necessary, as the General Accounts for the years concerned.

and corders, and debts owed to Richard the elder which amounted to £3,816/13/0^d 1.

Unlike the Stour partnership the new partnership was a closed family business from the beginning and the partners, who were not anxious to have early returns, were able to give priority to the accumulation of capital for the purpose of expansion ². In the early years very little money was withdrawn from the concern apart from the interest payment of £120 each year to their father. The remainder of the interest, as well as all the profits, was retained as additional capital on which no interest was paid and they lived on other sources of income which included an annual salary for their work as general managers. In Ralph's case a salary of £60 a year was paid through the Bringewood accounts. Although both partners withdrew £500 at Lady Day 1737, the total value of the stock had increased by nearly fifty per cent to £17,727 a year later. A rolling and slitting mill, and a tin-plating works were built, equipped and supplied at great expense at Bringewood during the three years ending in March 1741, yet by that date the value of the stock had increased to £22,295 ³. During 1742-43 the partners withdrew £162 each and in the following year bad debts of £618/13/0^d were written off but by March 1744 the stock was valued at £30,626. This high level was not maintained, however, for Richard Knight died in February 1745 and the stock was reduced severely as the other partners were required to settle their obligations to his executors.

In 1729 Richard Knight had settled his extensive estates at Downton, Leintwardine and Leinthall to his own use for life and then to his son Richard in tail male ⁴. In his will he made bequests of £1,000 to each of his four sons and to two of his daughters, several relatively small bequests to other people

1. Cat. Downton Coll., 302A. A transcription of the document is available in Dr. Bull, 'Some Account of Bringewood Forge and Furnace', Trans. Woolhope Naturalists Field Club, 1869 (Hereford, 1870), 55.

2. Appendix 1, p. 416 (The Stock and Withdrawals of Profits).

3. See below, p. 312.

4. Cat. Downton Coll., 214. Reciting a settlement of April 25/26, 1729.

and a sufficient provision for his wife ¹. His estates were to be allotted according to the settlement of 1729 and, in addition, the residue of his personal estate which included stock in the partnerships and loans to them was to be laid out to purchase more property to be settled in the same way. The sites of the ironworks passed to Richard junior as part of the entailed estates but Edward and Ralph were protected with secure leases and they continued to pay the same rents that they had paid previously to their father. The leases of the mineral rights on Titterstone and other leases and agreements that were necessary for the operation of the ironworks had passed to them during the lifetime of Richard senior. Thomas and Edward were appointed executors of the will and had to deal with complex financial matters that were not resolved until about 1758 ².

The greatest impact on the Bringewood partnership was felt almost immediately for by Lady Day 1745 the value of the stock had fallen to £23,919. The amount due to the partners in interest on the stock was not subjected to deductions as in all earlier years so it appears that Richard Knight's stock valued at £5,000 had been repaid, together with accrued interest, before settlement day.

During the following year the nominal value of the stock was changed from £12,000 to £20,000, which was closer to its real value. As interest was always deducted after 1745 before the figure for profits was reached, the calculation of the profits made by the partnership was also more realistic. In the following year Edward and Ralph, who were the only partners after 1745, began to withdraw large sums of money which between 1747 and Lady Day 1751, alone, amounted to £18,600. In the early years some of this was required to settle the debts owed to the executors of Richard Knight but most of it was used by the partners for their own purposes. Both of them invested in mortgage loans but most of the

1. Cat. Downton Coll., 253.

2. Ibid., 214. Lease and release by the executors of Richard Knight, sen., of the entailed estates to Richard Knight, jun., dated Sept. 14/15. 1758.

money was devoted to building up landed estates, directly, with the ultimate disposition of their wealth and the future of their children in mind. In this, as in much else, they followed a policy similar to that adopted by their father when they had been children.

Ralph acquired considerable amounts of property in south Shropshire in the parishes of Clungunford, Cleobury North, Wistanstow, Stanton Lacy and in Bitterley where he bought the Henley Hall estate from the Powys family. Henley Hall was rebuilt later at great expense for he left a considerable fortune when he died in 1754, only nine years after his father. His children lived in style and in great security at Henley and at Ludlow and still had considerable fortunes when they died. The Bitterley parish register contains the record of a voluntary contribution, made in 1798, 'towards defraying the expences of Government in the Defence of the Country' which indicates their wealth and their high social position in the village, not to mention their patriotism. There were thirty three contributors ranging from the rector to John Smith, labourer, and a total of £180/10/0^d was collected. Of this sum Thomas Knight contributed £100 and his sister Elizabeth another £50. Twelve of the other contributors who were Knight servants provided £8/4/6^d and the rest of the contributors including the rector, John Walcot, who gave £5/5/0^d, provided the balance of £22/5/6^d.

When Elizabeth Knight made her will in 1811 she made one bequest of £2,000, six of £1,000 and three of £100, and gave £50 each to eight different parishes for the use of the poor. The residue of her large estate, like the remainder of the estate of her brother Thomas who died in 1803, also without issue, was bequeathed to various cousins of the senior Knight branches ¹.

When Ralph Knight died in 1754 his share of the stock of the Bringewood partnership amounting to £12,859/10/10¹/₄^d was soon repaid to his widow by Edward Knight. In the year ending on Lady Day 1755, alone, she received £6,471/4/0^d, and by the following year-end all that remained owing to her was an amount of

1. Cat. Downton Coll., 216, 469, 648.

about £92. Edward was now the sole owner of the Bringewood and Charlcott concern and of most of the Stour partnership. He had three sons, Edward, James and John, who were introduced to the iron trade in the same way as he and his brothers had been. In 1754 a visitor to Whittington, Cookley and Wolverley forges noted that none of them had a clerk and added: 'The stocktaker keeps an Account and delivers it once a Week to one of Mr Knight's Sons' ¹.

Edward junior replaced his uncle Ralph at Bringewood although he was only twenty years of age at the time. He was assisted by his father, particularly in the first year, and by his uncle, Richard Carless, who had been responsible for many years for the supplies of charcoal and ironstone to Bringewood and for many activities at Charlcott. In 1756-57 he was replaced by his brother James who was a year younger and from that time, as his pocket-books reveal, his life was not dominated by the family's industrial interests ². He had leisure to travel, study, draw, collect medals, coins and books and was able to prepare, as the eldest son, for taking over the large landed estates that his father had been building up at Wolverley and elsewhere. He corresponded with the poet William Shenstone ³, showed a deep interest in various houses, gardens, bridges and market-crosses ⁴ and in April and May 1767 he made a journey to France with a Mr. West and recorded the details in a diary ⁵.

James Knight remained the manager of the Bringewood partnership until his family's interest in it ceased in 1782-83. Like his father, his uncle Ralph, and his grandfather, Richard, he had a very serious attitude to his work.

1. C.K. Hyde, 'The Iron Industry of the West Midlands in 1754: Observations from the Travel Account of Charles Wood', West Midlands Studies, vol.6 (1973), 40, col.i.

2. Knight Mss., 283, 285-289.

3. Ibid., 100-108. William Shenstone 1714-63, lived at The Leasowes, his highly decorated estate at Halesowen.

4. Ibid., 294.

5. Ibid., 293.

In a letter written to his brother Edward in 1766 he remarked that it was his intention (to which he adhered) to live 'long a Bachelor and grow rich'. Moreover, he was moved by the spirit of invention and in December 1762 he acquired letters patent for the sole use of new types of bellows and of improved types of forge equipment. The details of the inventions were published ¹, as required by the terms of the patent, within four months and the Bringewood partnership expenditure for 1762-63 includes an amount of £53/11/0^d 'on account of patent'. The bellows were to be used to supply air 'into a furnace of the usual kind but considerably larger' but there is no reference to the use of coke instead of charcoal in the furnace. The forge equipment included a new type of slitting-press operated by a large screw and a heavy fly, a cast-iron hammer and helve which required no spring or beam to return it, for it was operated by cogs and the force of gravity, a cast-iron anvil block which could be used 'without any labour of the Workmen which in the old method is very great', and a new type of cogs which worked on brass shammel plates. In addition the patent covered a new type of air furnace for use when iron was being slit into rods or rolled into plates. This invention was part of an attempt to solve the most pressing problem of the time - the need to use pitcoals successfully in the refining process ² - and was the culmination of experiments that had begun soon after 1734 when Ralph Knight had been the managing partner. The general accounts reveal that it had been used successfully at Bringewood since 1759-60 to supplement the pitcoal chafery that had been introduced in 1755-56 ³.

The inventions did not bring great fame to James but cast-iron hammers and helves and other items covered by the patent were adopted by other iron-masters. His and, to a lesser extent, his predecessor's most significant achievement was the maintenance of the competitiveness and profitability of

1. Knight Mss., 7201. Dated March 23, 1763. The patent was No. 783 of 1762.

2. T.S. Ashton, op.cit., p.87 et seq.

3. See below, pp. 339, 348.

Bringewood bar-iron and mill products particularly after the 1750s when the rising costs of raw materials, transport, and wages coincided with severe competition from cheap imported iron and, later, from cheap British iron that had been smelted and refined successfully with coke.

On Lady Day 1766 Edward Knight withdrew £5,000 in cash and made James and his younger brother John partners in the ironworks by transferring a quarter of the stock to each of them. But he remained a formidable figure who inspired awe, even fear, in his sons. On October 5th 1766 James, who was thirty one years of age, sent a letter to his brother Edward which ended: 'Burn this when read'. He wrote that he had not left Bringewood during the past eighteen months for more than two or three days together and asked Edward to get their father's permission for him to make a visit to Edinburgh during that winter. He added: 'Chemistry seems to me to be almost a necessary Part of Education for an Ironmaster especialy to me who have been almost bred aprojected, and may probably continue such as long as I live, and transmit the Whole of Iron-making to Posterity in new Methods better adapted to the present situation and prices of Things ...' ¹.

The intercession of his brother appears to have been successful for James was allowed to make a brief visit to Edinburgh early in 1767 and he undertook experiments in chemistry when he was there ², but his intention of benefiting posterity appears to have been over sanguine, and he remains the least well-known of the iron master members of a family which, in general, excelled not in inventiveness but in the skilled and fruitful application of current technical knowledge and in the strict attention to business and money matters that has been described since as the essential spirit of the Victorian entrepreneurs.

Edward Knight withdrew from the partnership at the end of 1770-71 and

1. Knight Mss., 1434.

2. Ibid., 132.

James and John became the only partners, holding half of the stock each. Its nominal value was £20,000 and the real value of the stock in trade was about £25,000 which was roughly the same figure as at Lady Day 1765, although at least £10,000 had been withdrawn, mainly by Edward, since then. Until the end of the year 1775 76, when the value of the stock in trade was well over £35,000, the highest figure ever reached by the Bringewood partnership, the partners followed a policy similar to the policies of their father and grandfather and ploughed back into the business the profits and interest that had been earned. Between 1776 and Lady Day 1779, when detailed records of the concern cease, they withdrew £12,180 but the stock was still valued at £30,083 and its nominal value had been increased to £25,000.

Edward Knight died, in 1780, in possession of Wolverley Hall and estate, other extensive lands, a large collection of books and pictures, and an immense fortune. Shortly afterwards Nash noted that Wolverley Hall was occupied by the principal person in the parish, Mr. Knight, 'whose ancestors, having acquired a very large fortune by the iron trade, have built a good house, with pleasant walks ...'. Elsewhere, referring to people who had spent a fortune in elections and in hunting for Court favours, he compared them unfavourably to persons in his own county, such as the Foleys, Knights and others 'who have gained a more than ministerial fortune by the iron trade, and attention to their own domestic affairs ...' ¹.

On Lady Day 1779 Edward Knight, acting with his usual foresight, had made a list in his account book of his personal fortune ². It amounted to £123,269/17/8³/₄^d and was made up of loans, mortgages, stock, debts owed to him by his sons James and John, and by 'Brother Spooner', and cash which amounted to £1,316. His investments included government three per cent stock valued at £77,000 and four per cent stock valued at nearly £800, and eighty East India

1. T. Nash, Collections for the History of Worcestershire, ii (London, 1782), 471, 465.

2. Knight Mss., 7222.

bonds that had cost him over £8,187 when they had been purchased in January of the same year.

In his will Edward left a gift of £1,000, an annuity of £400, three quarters of his plate and all his household and personal effects to his wife, but he excepted the books and pictures which were thereby declared heirlooms that went with the house in future ¹. All his extensive lands and numerous messuages were settled in tail male on Edward Knight the younger. To James and John he bequeathed some lands at Upper Mitton, all his rights and interests in all the ironworks that were already in their possession, the rents of which they were to continue to pay, and he set up a trust to enable them to have Wolverley forge and its equipment and to purchase leasehold and copyhold lands there. All other sons, daughters, sons- and daughters-in-law and grandchildren were bequeathed £100 each, which was to be paid immediately after his death. He stated that, as he had given fortunes during his life to all his younger children, they were not to make claims on their brother Edward. The trust, which was to be established for the acquisitions at Wolverley forge, was to be financed with his East India bonds.

Clearly by 1780 several generations of Knights, including James and John who were already rich men, had found the iron trade to be a great source of wealth. A considerable proportion of this wealth had been generated by the Bringewood and Charlcott partnership.

The leases of both ironworks lapsed in 1780 when Edward Knight died and in 1783, after a protracted and, at times, bitter quarrel with their cousin Richard Payne Knight ², hopes of renewing them were abandoned. However, James and John continued to prosper at their Stour valley works. John, who had married Henrietta, the daughter of Daniel Cunningham of Stone House, Ludlow, in 1765, resided at Lea Castle near Wolverley. His father-in-law, a pioneer

1. Knight Mss., 6739.

2. Cat. Downton Coll., 326, 387, 391, 395, 473B. See below, p. 374-76.

of sugar plantations ¹, owned a mountain, woodlands, and a plantation at St. Mary Cayon on the island of St. Kitts in the West Indies and in 1766 John acquired the lease of this property ². When he died in 1795 he was succeeded by his son John, a man of considerable ability, energy and determination who gained a reputation as an agricultural improver ³ and who soon dominated the iron trade in the Midlands ⁴. To the fortune that he inherited, and built up, he was able to add the wealth of senior branches of his family when his uncle James died unmarried in 1808 and his uncle Edward died without male heirs in 1812. Also Wolverley Hall and the large estates that were left entailed by his grandfather in 1780 passed to him.

(ii) The Ironworks

To the Knights the most important part of the Bringewood . and Charlcott partnership was the ironworks at Bringewood which had been established in a well-wooded area near supplies of ironstone in the late years of the sixteenth century. The greatest advantage possessed by this ironworks was its source of power, the River Teme.

At many furnace sites, during summer droughts or severe winters, there was insufficient water to turn the wheel to provide the blast to the furnace. Also, in most places it was not possible to establish forges, which required even greater amounts of water, close to the furnaces that supplied them with pig-iron. Where they could be placed on the same streams they were sited,

1. Orwin and Sellick, The Reclamation of Exmoor Forest, p.31.

2. Knight Mss, 6525, 6526.

3. Orwin and Sellick, op.cit., p.31 et seq.

4. Marie B. Rowlands, Masters and Men, p.72, citing G. Brewer, Introduction to the Beauties of England and Wales (London, 1808), not paginated. John Rylands University Library, Manchester The Botfield Papers, which are unsorted and uncatalogued, contain Thomas Botfield's account book for 1812-14. It includes several entries which show deference to the decisions of John Knight and confirm that his influence was still dominant in the iron trade at least as late as 1814.

usually, much further downstream to obtain a sufficient head of water. Such disadvantages did not occur at Bringewood for the Teme rarely suffered from shortages of water. Its strength and reliability not only provided continuity and efficiency in the production of pig-iron but also allowed the establishment of the forges and other works nearby thus reducing transport and other charges. Moreover, there was a surplus of power available, to be harnessed if required, within a short distance of the ironworks. After Richard Knight had acquired the freehold of the site the restraints on new investments that had existed when it was held on lease from Lord Craven were no longer present and he and his sons were in a position to exploit its potential for further expansion as they thought fit ¹.

Although some of the iron produced at Bringewood was sold to the local market where it realised a good profit because of low transport costs and limited competition, much of it had to be sold in the main Midland markets ². This involved the transport of the iron by expensive land routes of more than twenty miles to Bewdley warehouse. Pig-iron transported in this way was rarely competitive with the products of furnaces sited near Bewdley nor with the pig-iron carried there from more distant furnaces by cheap water transport. So, except on rare occasions, all the pig-iron produced by Bringewood furnace was refined in its forges into blooms, most of which were then drawn out in the chafery into bar iron. These processes increased the value of the iron more than twofold, thereby reducing transport charges as a proportion of total costs and enabling the bar-iron to be more competitive in the market than the pig-iron from which it was made. The forges and chafery were able to refine and draw out more iron than the furnace was able to supply when demand was high or when shortages of raw materials and high costs made the production of pig-iron expensive at Bringewood furnace. At such times pig-iron was purchased from Charlcott furnace

1. See below, p. 312.

2. Appendix 2, pp.418 (Sales of Bar Iron). Appendix 3, pp.420-1 (Average Annual Receipts for Bar Iron).

and, occasionally, small amounts were purchased from other furnaces.

Charlcott furnace, which had no forges closely related to it, was situated on the eastern edge of the Brown Clee near to supplies of ironstone, limestone and charcoal ¹. In its earlier years it had been related closely to Bringewood ironworks as its inclusion in the same partnership implies. Its main function was to provide a reserve supply of pig-iron at Bringewood for its cheap raw materials and relatively low transport costs enabled it to produce pig-iron at prices that did not raise the costs of bar-iron to uncompetitive levels. In addition, it sold some pig iron to local forges and smithies in the area between Brown Clee and the River Severn, but during periods when its product was not required at Bringewood most of it was sold through the Bewdley warehouse to the Midland market, or was sent to the forges of the Stour partnership either directly through Bewdley by road or through Bridgnorth by road and river transport.

During the first half of the eighteenth century there was little progress in the application of technical improvements to the smelting of iron generally, for the successful use of coke by Abraham Darby was not widely adopted until many years of practice and improvement had made the process capable of producing pig-iron that was more competitive with at least some types of pig iron produced in the charcoal furnaces. As a result, during periods of increasing demand, such as 1717 and the late 1720s, there were complaints about the shortage and high price of pig-iron from forge-masters. These included the Knights, for, although they owned furnaces that could make considerable profits for them during such periods, their main interests were bound up with their forges.

In the absence of great technical changes, the most obvious method of making reductions in pig-iron costs was to purchase cheap imported pig iron which, although not of the highest quality, could be blended with local products to reduce the average cost of forged iron below that of iron produced entirely

1. See above, p. 283.

from local pig-iron. Where opportunities for using cheaper alternative supplies existed they were not ignored by the Knights. In 1727-28 some of the local pig iron purchased for the Stour forges cost over £9 per ton and Cookley forge bought forty three tons from Charlcott at an average cost of £8/16/6^d per ton. The price fell in the following year when thirty tons were bought from Charlcott at an average cost of £7/16/3^d but this was still very high and for the first time Edward Knight purchased some American pig-iron ¹. It amounted to four tons at a cost of £7/3/6^d a ton and he continued to buy more of this cheaper iron in the years that followed ². However, the duties imposed on imported iron restricted the use of this method of reducing the cost of bar iron until they were removed in the 1750s and other methods of increasing the amount of pig-iron and of reducing its price had to be adopted. These included the expansion of furnace output and the strict control of furnace costs.

According to Fuller's list of 1717 Bringewood and Charlcott furnaces were capable of producing 450 and 400 tons of pig-iron, respectively, each year ³. By 1733, although it was not always utilised, both furnaces had a much greater capacity which reveals that, in the interval, considerable amounts of money had been invested in them. In the nine months ending at Lady Day 1734 Bringewood produced nearly 585 tons of pig-iron and on one occasion, ten years later, it produced over 1,000 tons in one year. Charlcott was provided with a new hearth during 1733 and was, consequently, in blast for only part of the year, but from then on it produced pig-iron in every year until 1750-51. The furnace was probably much larger than it had been in 1717, for in each of the eight years ending at Lady Day 1744 it produced more than 400 tons. In two of those years, 1737-38 and 1738 39, production exceeded 400 tons by nearly 50%, and in 1745 46 and 1746 47 it produced 612 and 691½ tons respectively. The

1. Knight Mss., 141.

2. R.L. Downes, 'The Stour Partnership', 93.

3. E.W. Hume, 'Statistical History of the Iron Trade', 21, 22. See above, p. 275.

furnace was closed down during 1750-51 while large scale rebuilding, which cost £190, took place. During the following year 696 tons of pig-iron were produced there ¹.

Obviously, as these few figures and Rea's addendum to the 1717 list indicate ², considerable fluctuations occurred in iron production particularly in the production of pig iron. These fluctuations, while of interest and significance in themselves, distract attention from the general movements in production. These can be discerned in the following table of average annual production. The figures in it are based on the total amounts produced over periods of ten years beginning with 1733-34, the year for which detailed production figures are first available. The periods have no particular significance, although by chance all except the period from 1763-64 to 1772-73 contain years of war-time and years of peace-time.

TABLE 4

Bringewood and Charlcott Ironworks: Average Annual Production of Iron

Ten Year Periods Ending Lady Day	Pig Iron		Forged Iron		Bar Iron	
	Charlcott Tons Cwt	Bringewood Tons Cwt	Tons	Cwt	Tons	Cwt
1743	424 6	326 5	333	15	340	5
1753	365 7½	449 2	402	0	416	10
1763	375 2	392 3	402	16	417	19
1773	265 2	447 10	474	3	480	0
1773-74 to 1778-79	-	520 17	434	16	457	15
(1776-77)	574	10 (Total)				

1. Appendix 4, pp. 422 (The Production of Pig iron at Bringewood and Charlcott).

2. E.W. Hulme, art.cit., 23, and see above, pp. 273-74.

The combined output of pig-iron within the Bringewood and Charlcott partnership had reached already a high level by the 1730s with an average annual production of over 750 tons between 1733-34 and 1742-43. Output increased to its highest levels during the next decade when over 814 tons was smelted annually, on average, and it declined to 767 tons between 1753-54 and 1762-63, despite the Seven Years' War, and to $712\frac{1}{2}$ tons between 1763-64 and 1772-73. Over the period of forty years there was very little change in average annual production. The demand for ironstone was maintained, near to the high levels attained during the 1730s, until the 1770s when as the figures for the years 1773-74 to 1778-79 confirm, combined production declined to about $616\frac{3}{4}$ tons, largely due to the inactivity of Charlcott furnace.

At the beginning of the new partnership Charlcott had less difficulty in obtaining sufficient supplies of ironstone than Bringewood and the cost of its charcoal, which had been expensive, declined from £1/16/0^d a dozen in 1732-33 to £1/10/4^{1d} in 1733-34, to £1/9/2^d in 1735-36 and to about £1/8/0^d, on average, during the next twelve years. Its new hearth and low costs of production were of great benefit to the partnership, for during the first ten years of the partnership Bringewood furnace was in blast only every other year and the average annual production of $326\frac{1}{4}$ tons was not enough to satisfy the needs of its forges. Small amounts of pig-iron were bought on a few occasions from outside furnaces, as in 1734-35 when one ton of 'Bristol Co.' pigs was purchased at Bewdley at a cost of £5/5/0^d. Also, some old or broken iron was forged at times. In 1733-34 a ton was forged out of 'scraps' and six tons out of 'broken' iron, and in 1734-35 Richard Carless paid £3/2/0^{1d} for 'old iron' and 1^s for old cast metal from which the finers produced eleven tons of blooms at a cost of £1 per ton. However, most of the additional iron was bought from Charlcott. It amounted to 112 tons in 1733-34, 219 tons in 1734-35, 211 tons in 1736-37, 210 tons in 1741-42, and smaller quantities in the other years.

By 1733-34 Charlcott pig-iron was already less costly than it had been in 1728-29 for stock at the furnace was valued at £6/8/0^d a ton. Delivered prices

at Bringewood varied between £7/5/0^d and £7/2/0^d a ton, which was less than the cost of the American pig-iron purchased in the earlier year for the forges of the Stour partnership by Edward Knight ¹. Its competitive advantages improved in the years that followed, as delivered prices at Bringewood fell in 1737-38 to £6/17/6^d a ton and in 1741-42 to £6/10/0^d a ton, where they remained for several years.

During the ten years ending with 1752-53 Bringewood furnace was much more active for it was in blast in seven of the years and the average annual production increased to 449 tons. Its difficulties in obtaining ironstone had been overcome and much less pig-iron was bought from Charlcott, apart from years such as 1751-52 when, because the furnace was not working, 361 tons were acquired from there. During the same period Charlcott was in blast for eight of the ten years. Neither of its periods of inactivity coincided with similar periods at Bringewood but little pig-iron was produced by either of them in 1744-45 and 1747-48. Over the ten year period the average annual production at Charlcott was lower, at 365 tons, than it had been in the previous ten years when the average amount produced each year was more than 424 tons. The fall in production occurred after 1749-50 and was a consequence, largely, of the closure of the furnace in 1750-51 while it was being rebuilt ², for in the seven years to 1750 422½ tons were smelted on average each year. Much of this pig-iron, amounting to 435 tons in 1743-44, to 598 tons in 1746-47 and, on average, to over 200 tons in most other years, was sold to the forges of the Stour partnership.

During the next ten years the pattern of production and of sales was apparently very similar. Charlcott and Bringewood furnaces produced an annual average of 375 tons and 392 tons of pig-iron, respectively. Some Charlcott pig-iron was sent to Bringewood but the Stour partnership forges, particularly Upper and Lower Mitton, were the largest market for it. However, production

1. See above, p. 305.

2. See above, p. 306.

was not maintained as regularly at Charlcott as in earlier years for although it was in blast in nine of the ten years it produced only 84 tons in 1754-55, 200 tons in 1757-58 and 284 tons in 1759-60. During most of the period it made losses which had to be borne by other, profitable, activities of the partnership. The losses amounted to £79/17/9³/₄^d in 1754-55 and £51/18/11¹/₄^d in 1757-58, but towards the end of the period they became much more onerous and frequent. Between 1759 60 and 1762-63 they amounted to £1,219/10/5³/₄^d altogether.

The accounts for the period from 1763-64 to 1772-73 show clearly that, as a result of more frequent operating losses at Charlcott, there had been a considerable transfer of the smelting activities of the partnership to Bringewood from Charlcott. Bringewood furnace was in blast every year during this period and produced on average 447¹/₂ tons of pig-iron each year. Purchases of pig iron were made from Charlcott, sometimes on a large scale as in 1772-73 when they amounted to 395³/₄ tons, but the amounts produced by this furnace declined. It sold much less iron to the Stour partnership forges and was in blast in only six of the ten years, which reduced its average annual production figure to 265 tons.

Its decline was related to rising costs of production following a long period of smelting with few intermissions. Charcoal, which had cost, on average, about £1/8/0^d a dozen after 1735-36, became more difficult to obtain as local supplies of wood were exhausted. Between 1750 and 1756 the wood-cutters were busy in the Titterstone Cleve area at Catherton, Hopton Wafers, Cleeton, Wheathill, Bitterley, Burford, Coreley, Milson and Cleobury Mortimer. The charcoal produced from this wood was very expensive because of the high transport costs. It cost £1/11/3^d/₄ a dozen in 1750-51 and continued to rise in price during the next five years, reaching £1/18/6^d a dozen in 1755-56. It did not fall far below this price during the next fifteen years and then began to increase again until 1774-75 when its price exceeded £2 a dozen. During this period the Charlcott wood-masters had to range far and wide in search of cord-wood. In 1765-66 they

were working in the parishes of Ditton Priors, Glazeley, Round Acton and Willey, to the north and east of Charlcott, and in Milson, which was eleven miles from Charlcott on the southern slopes of Titterstone over whose steep and rough tracks the charcoal was eventually transported. During 1768-69 the wood-masters were working in Milson again, and in Cornwood, Knighton-on-Teme, Worcestershire; in 1771-73 they were working in Hopton Wafers; and in 1774-75 they were in Coreley, Milson, Hope Bagot, Caynham and Cleobury Mortimer, as well as in Glazeley, Chelmarsh, Weston, Neenton and Newton which were nearer to Charlcott.

Smelting was affected also by increases in the cost of ironstone after 1756-57. The delivered price of ironstone which had remained at about $16/5^d$ a dozen from 1733-34 increased to about $17/3^d$ a dozen in 1757-58, to 18^s a dozen in 1759-60 and to $19/3^d$ a dozen in 1762-63. By 1767-68 it had exceeded £1 a dozen and continued to rise afterwards, reaching a peak of $£1/9/7^d$ a dozen in 1771-72 and averaging about $£1/2/6^d$ a dozen in each of the years between 1774-75 and 1778-79.

As a result of the increases in the costs of production Charlcott pig-iron, which had been sold to the Stour partnership at about $£6/10/0^d$ a ton, on average, between 1741-42 and 1751-52, cost the same partnership $£7/10/0^d$ a ton on average in 1754-55. At this price it could not always compete in the markets with cheaper local or imported pig iron, although its reputation for high quality ensured that some demand for it remained. Moreover, although it was afforded some protection from the full force of market competition by having its main markets within the partnerships of its owners, the Knights, their major concern was the competitiveness of the products of their forges and mills and they could not afford to ignore sources of cheaper pig-iron that were available to their rivals, nor could they afford to absorb its losses indefinitely. In 1754 a visitor to their Wolverley forge noted that 'they work all Foreign pigs, one finery with Tubal & Cardiff pigs for Mill Iron, the other with Bush River pigs for Mill best Tough, which they say makes the best Iron in England' ¹.

1. C.K. Hyde, 'The Iron Industry of the West Midlands in 1754: Observations from the Travel Account of Charles Wood', West Midlands Studies, Vol.6 (1973), 40, col.1.

Clearly Charlcott's position as a supplier of pig-iron to the Midland markets was already vulnerable from the early years of the 1750s. When the cost of its iron began to rise again from 1769-70 it was unable to compete with cheap iron produced by coke-fired furnaces. From Lady Day 1773 until records ended in 1779 it was in blast in 1776-77 only and produced a total of $574\frac{1}{2}$ tons of pig-iron. Most of this was supplied to Bringewood forges, which were the only ones in the Knight partnerships that were not using pitcoal pig-iron from 1765¹, during periods when Bringewood furnace was either unable to produce enough iron to satisfy its forges or was not in blast, as in 1776-77 when it required large-scale repairs after twenty one consecutive years of smelting. In the latter year small amounts of pig-iron were purchased by the Stour forges at £8 a ton and in the following year they bought fifty tons at £9/0/6^d a ton, which cost £9/8/3^d a ton by the time it was delivered. Obviously these costs were considered to be too high by the partners for no smelting took place at Charlcott in the last years of the partnership, although it was not closed down for ironstone was still being purchased in 1778-79. There is little evidence that the furnace operated again².

The list of furnace and forge production gathered by Fuller in 1717 shows that the output of Bringewood forges was 340 tons of iron. This was a maximum figure probably for the additional information provided by William Rea and given in the same list referred to actual output of 320 tons and stated that the shortage of wood threatened to stop all work at the forges³. The list of forges and their production compiled in 1736 reveals that by then the Bringewood forges had a maximum capacity of 350 tons per year, although the amount actually produced in that year was stated to be 300 tons⁴. These figures give the impression, which coincides with the general implications of the list,

1. R.A. Lewis, 'Two Partnerships of the Knights', p.120.

2. N. Mutton, 'Charlcotte Furnace', 87. See below, p. 376.

3. See above, p. 274.

4. E.W. Hulme, art.cit., 25.

that the production of iron was very much the same as it had been in 1717. However, the list was not altogether accurate with regard to current production at Bringewood for the accounts show that $361\frac{1}{2}$ tons and 342 tons of bar-iron were produced in the years 1735-36 and 1736-37, respectively. Also it appears that, although the maximum capacity of the forges in any one year had increased by only twenty to thirty tons, production was consistently higher than it had been in 1717 for in the ten years from 1733-34 to 1742-43 the average annual output was maintained at the impressively high figure of $340\frac{1}{4}$ tons.

Between 1739 and 1742 the partners built a rolling and slitting¹ mill, and a tin-plating works, the first in the country after Pontypool², on the Teme about half a mile from the furnace and forges at Bringewood³. The large amount of investment required for these enterprises, £2,196 including stock and equipment as well as the cost of construction⁴, provides additional evidence of the expansion of the iron industry at this period according to the criterion put forward by Mr. Flinn⁵ and the production figures for the ensuing years support his view. In 1744-45 the output of the forges exceeded 400 tons in one year for the first time and their increased capacity was recognised by the list of forges and bar-iron production that was prepared for 1750⁶. This stated that Bringewood forges were capable of producing 450 tons of iron each year. In fact, although only 410 tons were produced in 1749-50 and 431 tons in 1750⁵¹, more than 449 tons were produced during the next year so the list appears to be reliable. The average annual output of bar-iron in the ten year period ending with 1752⁵³ was $416\frac{1}{2}$ tons. The average annual output during the next ten years was

1. Slitting mill pillars and shears were purchased during 1739-40. Some slit iron in the form of rods was sold to local customers between 1743-44 and 1748 49. See Appendix 2, p. 418.

2. V.C.H., Staffordshire, ii (London, 1967), 173.

3. Dr. Bull, art.cit., 57.

4. Richard Knight provided a loan of £400 at three per cent per annum towards the cost of constructing the buildings.

5. See above, pp. 198, 272.

6. E.W. Hulme, art.cit., 27.

almost the same at 418 tons although in 1758-59 output reached its highest level so far when 458 tons were produced.

A great increase in production occurred in the ten years ending with 1772-73, for the average annual figure rose to 480 tons. A similar level was maintained each year until 1779 with the exception of 1775-76, which was affected by the closure of the rolling mill and tinworks at Bringewood¹. During this year output fell to 367 tons, as stocks built up, but recovery had taken place by the following year for over 461 tons were produced and in the next year the output of bar-iron was 530 tons. The average annual output for the five normal years after 1772-73 was 475 $\frac{1}{2}$ tons.

In the Bringewood partnership the most significant developments in iron production revolved around the forging and refining processes. The table of iron production² reveals that, although the output of pig-iron was maintained at roughly the same level during the first forty years of the new partnerships and declined afterwards, a large increase in the production of forged and bar-iron took place during the same period. This increase was achieved by controlling the cost of its raw materials, pig-iron and fuel, and by using the advantages given by the location of the main ironworks on the River Teme to develop iron-processing works which extended the partnerships' internal market for bar-iron³.

Although opportunities for making large reductions in the cost of the pig-iron used by the forges were limited by the import duty on cheap American pig-iron, local production costs were successfully restrained by making investments in new or improved furnaces, by using coal on a larger scale as a fuel in place of charcoal in the forges and mills, and by restraining or depressing the costs of carriage, generally, and the price of ironstone in the mining areas. In addition, the partners carefully concentrated production as much as possible at

1. See below, p. 337.

2. See above, p. 306.

3. See Appendix 2, pp. 418. (Sales of Bar-Iron). See above, p. 294.

the furnace which had the lowest production costs at that time. Large amounts of iron were purchased for the use of the Bringewood forges from Charlcott during the first fifteen years of the partnership when its production costs were relatively low. As its costs began to rise during the 1740s greater amounts were produced at Bringewood furnace. These were increased again as the prices of charcoal and ironstone, the main factors in the cost of producing pig-iron, continued to rise more steeply at Charlcott than at Bringewood.

The establishment of a rolling mill and a tin-plating works at Bringewood resulted in a great expansion of the local market for bar-iron and significantly augmented the profits of the partners ¹. The processing of bars into plate increased the value of the iron by more than fifty per cent. During the years 1741-42 to 1750-51 when Bringewood bar-iron was being sold in Bewdley at prices that ranged between £16/7/0^d and £17/2/11^d a ton, Bringewood iron plate was being sold in the same place at prices that ranged between £24/18/9^d and £28/13/8^d a ton. However, much of the plate, referred to as 'black plate' in the accounts for obvious reasons, was sent to the adjacent tinworks at Bringewood. About 300 tinned plates were packed in boxes which weighed between 118 and 128½ pounds, and as their price was on average about £2/10/0^d a box between 1743-44 and 1773-74, the tinning process increased the value of each ton of the iron content of the tin plate to roughly £45 a ton.

The restraints exercised over the costs of carriage and of fuel and other raw materials, the variations in the demand for pig-iron, the great increase in the production of bar-iron and the establishment of the new iron-processing works had a considerable impact on the areas that provided raw materials, carriage, skills and other services to the ironworks. The most extensive of these areas was Titterstone Clee Hill which was influenced also by the growing demand for coal as a fuel as shortages of wood affected other industries and householders as well as the iron industry.

1. See Appendix 5, pp. 424 (Sales of Black and Tinned Plate). Appendix 6, pp. 426 (Average Annual Receipts for Black and Tinned Plate).

3. IRONSTONE AND COAL: TITTERSTONE CLEE HILL

(a) Major Developments to 1733

By Midsummer 1733, when Richard night handed over control of the Bringewood and Charlcott ironworks to his sons Edward and Ralph, a third major centre of the partnership was already established on Titterstone Clee in the manor of Earls Ditton. The wastes of this manor contained a large proportion of the carboniferous measures of Titterstone which were far more extensive than those on Brown Clee Hill. Most of the remainder was included in the wastes of the manor of Caynham and Snitton which were divided into vaguely defined moieties during the sixteenth and seventeenth centuries as two separate manors slowly emerged. Snitton and its moiety of wastes passed down through the Foxe and Herbert families to the Earl of Powys and to Lord Clive but when Caynham manor was sold to Thomas Powis in 1668 the mineral rights of its moiety of the waste were excepted and were sold, later, to John Sheppard of Hillupencott ¹.

Sheppard set out to exploit these rights, as much as possible, by developing mines and local industries and by encouraging the establishment of enclosures and cottages on the top-soil to which he had no claim ². The degree of success achieved by him was revealed after his death by a rent-roll of his moiety of the wastes, prepared for his widow, Martha, for the period from 16th September 1717 to 14th September 1728 ³. During the year sales of coal amounted to £1,528/3/0^d which, at the current price for large coal of 6^s a ton ⁴, indicates that more than 5,000 tons had been sold. The royalties on the coals were charged at the rate of one eighth and amounted to £191/0/3½^d but the royalties received for pipe clay and for potters clay were only £1/10/0^d and £1 respectively. In addition a royalty of £6/14/4^d was received for ironstone which assuming the usual local rate of 2^s a dozen, indicates that a little over sixty seven dozen strikes

1. S.B.L., Deeds and Charters, Bdle. 6100 (Extracts as to Snitton, p.7).

2. See above, pp. 149-52, 243.

3. S.B.L., Bdle. 6110 (The Annual Profits of Mrs Shepheards Moyety of Clee Hill).

4. Knight Mss., 244 (Accounts for 1733-34).

had been sold to the furnaces. The cottage rents for the year, which included thirty couple of rabbits from a warren established on Hoar Edge above Treen Pits, amounted to £37/6/4^d. In a comment, written on the back of the rent roll, the agent of Mr. Herbert, who owned the other moiety of the wastes, noted that his employer had sold his coal rights for £80 a year. This was less than half the amount received by Mrs. Sheppard in royalties but it was free of capital charges and running costs. However, from this it can be assumed safely that more than 7,500 tons of coal were raised during that year in Caynham and Snitton wastes.

The main seam that was being exploited was the Gutter seam which, according to the evidence provided by the rent-roll, contained much less ironstone than elsewhere. It was known as the Five Foot seam and included several distinct strata. The bottom coal was two feet thick and was a good smiths' coal that sold at 6^s a ton. Above it was stone coal which was ten inches thick and 'of little value' although it was sold to the lime-kilns for 3^s a ton. Next was the 'Spire' coal which was twelve inches thick. This was the best coal and was 'an exceeding good burner' which was sold at 6^s a ton. Above it was twelve to eighteen inches of roof coal which burned well and was sold for 6^s a ton¹. A relatively large market for the coal existed in Ludlow, which was less than five miles away, and in its neighbourhood. The decline in the wood resources in that area had been noted as early as the sixteenth century² but the most rapid increases in the demand for coal from there occurred between 1646³ and 1727, as is revealed by the great contrast between the royalties received for coal in the Snitton rentals of those years.

Following a survey of Snitton manor carried out in 1729⁴, the owners

1. S.B.L., Bdle. 6110 (Sam^l Georges acc^t of the Coal works on the Clay Hill).

2. See above, p. 88.

3. S.R.O., 20/Box 13. See above, p. 215.

4. S.B.L., Bdle. 6111 (Snitton Manor. Description of the Line of Boundary). The waste is referred to on page three in the ultimate paragraph.

decided that the moieties of the wastes were undivided and between then and 1732 their mineral rights were leased to George Pardoe of Cleeton, Bitterley, who, under the agreement, paid to both of them £100 a year as rent together with royalties for the ironstone delivered to the furnaces each year ¹. As Pardoe was responsible for all the costs of sinking and other dead-work, and for maintenance, the new terms were more favourable to the owners and indicate that the enhanced value of the works was being recognised.

In 1742 Richard Knight purchased the moiety of mineral rights in the wastes of Caynham and Snitton that belonged to John Sheppard, junior, and in 1744 he leased it at an annual rent of £12 to his sons Edward and Ralph for their lives ². From this date only a very small part of the Titterstone Clee coal measures, situated between Titterstone peak and Hoar Edge in Bitterley parish, which was rarely worked at this period because of its inaccessibility, lay outside the areas controlled directly or indirectly by them ³.

The terms of the new lease of mineral rights in Earls Ditton manor, which had replaced the lease for twenty one years acquired from Lord Craven in 1698, had acknowledged the more intensive exploitation of the wastes of Titterstone Clee. This lease which was probably granted in 1719, and modified in 1721 when Bringewood furnace was purchased on behalf of Richard Knight ⁴, has not come to light but the accounts and incidental information reveal that the annual rent was doubled from £60 to £120 a year under the new agreement. The lease was in existence in 1727 when Lord Craven's rental of Earls Ditton manor for the six months to Lady Day 1728 included a payment by Richard Knight of £60 for 'Coalwork &c' ⁵. In addition the period of the new lease was extended to three lives, for

1. S.B.L., Bdle. 6111 (various memoranda, letters and rentals referring to Pardoe leases). Knight Mss., 244. The General Accounts for 1733-34 reveal that Pardoe had made deliveries of ironstone to the furnaces at least as early as 1732.

2. S.B.L., Bdle. 6110 (Proposals respecting the Coal and Iron Stone Works on the Clee Hill ... 1775). Dr. Bull, 'Some Account of Bringewood Forge', 56.

3. See above, Figure 4, p. 19, Figure 12, p. 116.

4. See above, p. 284.

5. S.R.O., 407/12.

it did not lapse until after the death of Edward Knight in 1780 ¹.

The earliest general accounts of the new Knight partnership, concerned with the nine months to Lady Day 1734, confirm that industrial activity in Earls Ditton had increased considerably since the early years of the eighteenth century when the rights to the ironstone had been subleased to Andrew Hill for the use of his furnace at Tilsop and a moiety of the coal had been assigned to William Baldwin for lime burning at an annual rent of £10 ². By 1733-34 the mines of Titterstone Clee Hill provided Bringewood furnace with all its ironstone and supplied an increasing proportion of the ironstone smelted at Charlcott furnace, as the deposits of the Brown Clee and its neighbourhood declined or failed. Coal production had increased, also, although not to the same extent as on the Ludlow side of the hill, and the value of the coal sold on the account of one colliery alone amounted to £414/11/2^d, and another colliery was subleased at £40 a year ³.

There is no indication that coal from the mines of Earls Ditton competed with the coal of Caynham and Snitton in the Ludlow area. Such competition would have been made difficult by high transport costs, for these mines were situated between six and a half and eight miles from Ludlow. However, they were near to Cleobury Mortimer and sold much of their coal in that town and its neighbourhood and to the lime-kilns of Oreton and Farlow, to other local industries and to local farmers and householders.

Clearly Richard Knight's desire to concentrate his efforts and resources on the partnerships that he controlled and particularly on the Bringewood and Charlcott partnership had extended to the mineral rights that were under his control as well as to the ironworks themselves. Yet, as the accounts reveal, the provision of satisfactory supplies of ironstone for his furnaces remained

1. S.B.L., Bdle. 6110 (Proposals respecting the Coal and Iron Stone Works).

2. See above, pp. 219, 239.

3. See below, p. 322.

his first objective and, while willing to take a profit from coal-mining if it offered itself, he looked upon the mineral resources with the eye of the iron-master and not the eye of the coal-master. To him coal was a by product of the mining rights that could be used to offset some of the cost of the ironstone. The backwardness of coal-mining techniques in the area was one of the consequences of the emphasis placed on ironstone supplies for the mining of much of the ironstone required very little equipment and very simple methods which made innovation unnecessary. Later, under his successors, when coal provided cheaper, alternative supplies of fuel to the ironworks at Bringewood, thus enabling it to increase production and to extend its range of profitable products, and when the local market for coal had expanded, greater interest was shown in coal-mining.

(b) The Early Years of the New Partnership

The close links with Bringewood, which had been developed after 1664 when Richard Walker acquired the mineral rights of Earls Ditton manor, were retained and the Titterstone Clee accounts were in general supervised from there and closely related to the ironworks accounts. The extant general accounts were drawn up from a series of small accounts which were not always referred to in detail, if at all, but most significant activities were either accounted for directly or referred to in indirect ways that can provide, through deductions or calculations, useful sources of information.

At least two copies of the general accounts for the partnership were made each year for the benefit of the two main partners, Edward and Ralph. Although Ralph managed the partnership from Midsummer 1733, Edward, who was the manager of the Stour partnership, dealt with the sales of iron at Bewdley, the most important iron market, purchased equipment and materials that could not be obtained locally, and made occasional visits to local sites and customers. There are signs that he was the dominant partner and that his skills, knowledge and opinions had great influence on the development of the partnership.

During its early years the partnership was handicapped, clearly, by a lack

of trained, able, reliable managers, supervisors and clerks and depended heavily on the close attention paid to detail by the partners themselves and by a few trusted assistants who included their uncle, Francis Knight, their brother-in-law, Richard Carless, and William Jones. The furnace accounts were kept by stocktakers whose lack of ability and lowly status were underlined by their limited salaries which were less than the wages paid to the furnace carpenters ¹. An example of the ineptitude that could occur is given in the accounts for 1737-38 where Ralph Knight found it necessary to write off £27, 'Allow'd as lost out of the Accompting house'.

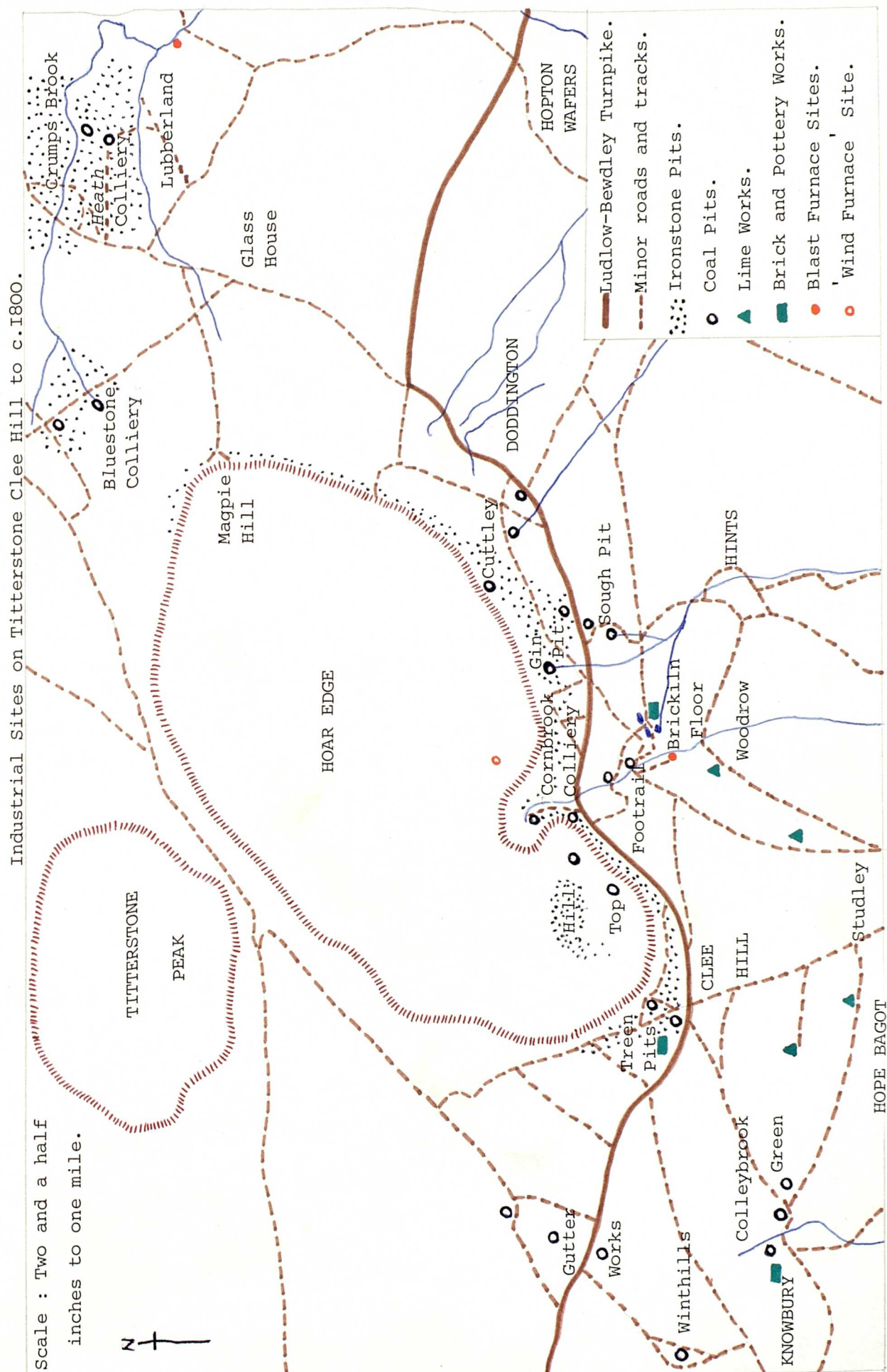
Wood-cutting, charcoal burning and carriage were supervised by the partners or their senior clerks through various local workmen or tenants, through the owners of estates or their agents, or through well-known carriers. The ironstone that was required by the furnaces was collected at various colliery sites on the hillside by the supervisors of those collieries but an ironstone account, separate from the accounts of collieries and other local activities, was kept by one of the senior clerks and was entered directly into the Bringewood ironworks account. However, the royalties for the ironstone were credited to the Clee Hill account, which was drawn up by the same person, usually, and which was concerned with all other activities of the partnership in Earls Ditton manor. It included rents, royalties, purchases or sales made on behalf of the account by the partners and clerks, profits, debts and payments for dead-work. For many years after 1733-34 some of the most important features in this account were provided by the balances of the Footrail account which was itself given in full in the general accounts.

At some time before 1733, as the accounts for that year reveal, Richard Knight had developed the Footrail colliery as the main centre of his interests in Earls Ditton manor ². The Footrail was situated in the depths of Cornbrook Dingle

1. The general accounts for 1733-34 reveal that, at Bringewood, the stocktaker was paid £10/12/0d but the carpenter received £15/12/0d during that year.

2. See Figure 19, p. 321.

FIGURE 19



where the Gutter coal, and other lower measures that were rich in ironstone, were as accessible as they had been in earlier days at Catherton. Transport from this site was very difficult but had been improved, as the name of the site indicates, by the placing of rails on tracks which had been extended along the sides of the dingle to reduce the gradient ¹. In its earlier days the Footrail level had supplied much of the ironstone transported to the furnaces but as the lower coal seams were exhausted alternative sources of supplies had to be developed. The role of the Footrail changed as new levels were driven into upper measures and the production of coal became its main objective but it continued to act, for many years, as the centre from which other pits and associated industries in the neighbourhood of Cornbrook Dingle were supplied, supervised or managed. Its accounts summarised the most significant part of the direct activities of the Knights on Titterstone Clee.

Several other collieries had been developed in Earls Ditton before 1733 very much as had been presaged in the terms of the lease of mineral rights granted to Richard Walker in 1664 ². They were usually composed of groups of pits that shared stables, smithies, access routes and drainage systems. Only one, the Heath colliery, was worked in Catherton. Until Lady Day 1733 it was managed on a royalty basis by Samuel Haycox and afterwards he rented it for £40 a year. Haycox was a trusted and experienced miner who had served the Knights for many years. In 1721 he had been in charge of the Gin pit ³, which, like the Sough pit, was situated higher up the hillside in Hints township ⁴. The Gin, which had a vertical shaft and winding gear, was nearly exhausted by 1733 and the Sough, which, as its name indicates, suffered from drainage problems, required soon afterwards a considerable amount of expenditure on dead-work. Another, smaller, colliery worked

1. See Plate 13.1 and 13.2, p. 343, Plate 14.2 and 14.3, p. 344.

2. See above, pp. 230-233.

3. See above, p. 233.

4. See Plate 15.1, p. 351 and Figure 19, p. 321.

the upper measures at Cuttley in Doddington township ¹, but it contributed very little to the revenues of the Knights until some years later when new coal faces had been opened up.

In addition to the collieries and large coal-pits and levels there were many shallow mines in the areas near the basalt cap where ironstones were dispersed widely throughout the upper measures. They were worked by small groups of miners, more or less intensively according to the demand for ironstone, and needed few tools other than pick-axes and shovels and little equipment apart from a skip and a 'turn barrel', or windlass, and ropes. The cost of sinking these mines, which was very little, was charged to the accounts of nearby collieries when the work was carried out by their supervisors or employees but usually it was charged to the ironstone account or to the Clee Hill account as 'deadwork' when the miners were paid to sink their own mines. Apparently no restraints were placed on the activities of these miners for they dug where they pleased and paid no rent or other dues apart from a royalty of two shillings a dozen strikes of ironstone, which went to the Clee Hill account of the partnership.

Shortly after they had taken over the partnership, Edward and Ralph were faced with serious difficulties on Titterstone Clee where the production of both coal and ironstone was affected by the almost simultaneous decline of several collieries. The Footrail produced about 1,000 tons of large coal and the Sough, Gin and Cuttley collieries produced about another 1,000 tons during the nine months to Lady Day 1734, based on receipts and royalties for coal and an average price of six shillings a ton. During the next year to Lady Day 1735 the coal output of the same collieries declined to about 1,750 tons and although £40 was received for the rent of the Heath, which had been leased to Samuel Haycox, the Clee Hill account showed a loss for the year of £142/12/11¹/₂^d. Coal production during the following year was about 1,700 tons and a loss of £71/12/11¹/₂^d was made on the account. During the same periods the amounts of ironstone produced

1. See Plate 15.2, p. 351.

on Titterstone Clee were $841\frac{1}{2}$, 697 and 740 dozen strikes respectively. Much of this was produced by small independent groups of miners for of the $841\frac{1}{2}$ dozens sent to the ironworks to Lady Day 1734, only 30 dozens were produced by the Footrail colliery and less than 250 dozens by all of the other collieries, including the Heath, combined.

The new partners soon became aware of the problems that they faced on Titterstone Clee and their difficulties, and possibly his own responsibilities, were recognised by Richard Knight, for during 1734 he allowed them £100 'towards the loss on Clee Hill'. The concern felt by Edward is indicated by the fact that he made five visits to the Titterstone Clee mines between 19th April and 16th September during the same year. His main aims were to increase the supplies of ironstone which had been reduced severely as the ironstone-bearing seams had been exhausted, most noticeably at the Footrail, to increase the amounts of coal mined, and to restore the mining areas to a state of profitability, but his task was made very difficult by the shortcomings of local organisation and management. The partners and their skilled clerks were too busy elsewhere to be able to pay close attention to mining affairs and, with the obvious exception of Edward, they lacked the necessary technical knowledge.

For several years after 1733 the work at the Footrail was supervised by John Hatton who also made up the accounts. He had done this work for Richard Knight since 1731 at least, as his accounts for 1733-34 reveal, and at the same time, together with his brother, Richard, and Thomas Glazebrook, he worked the Gin pit on which he paid a royalty. In the 1734 accounts he was described as a 'miner' and when he was buried at Coreley on 3rd May 1743 he was described as a 'ground collier'. His duties at the Footrail and elsewhere on Titterstone Clee on behalf of the Knights were extensive and required more attention than he appears to have given to them. Following the visits made to the mining areas by Edward Knight during 1734 he ceased to work the Gin pit and was able to spend more of his time at the Footrail. Also, he was relieved of some of the responsibility for the new work that was considered necessary by Edward, and of the duty of

acting as overseer of the general interests of the partnership through an arrangement that was made with Samuel Haycox. According to this Haycox was to be paid £10 a year in future 'for looking after the works' in his spare time. This arrangement confirms that there were few men in the area who possessed managerial skills and mining knowledge, for Haycox could have had very little spare time. He was working the Heath colliery which he rented from the partners ¹ and he had acquired an interest in lime-kilns at Farlow. Moreover, he was building up his property interests in several parishes in the area, and was expanding his land carriage business with the help of the pastures that they provided for his pack-horses ².

Although Ralph Knight noted in the 1735-36 accounts that he had given £5/5/0^d to John and Richard Hatton, this was probably a payment made in connection with the Gin pit. No other payments were made to them afterwards and John, who was not paid a salary through the Clee Hill accounts, could have been paid each year only through the wages accounts, like other miners, at the Footrail. Soon after 2nd August 1740 he was replaced at the Footrail by Thomas Longmore, a clerk, who was paid £18 a year, and the only reference to him that was made in the accounts after this date occurred at Lady Day 1744, after his death, when his debts of £8/16/2^d on the Clee Hill account, of 8/7^{3d}/₄ on the miners' account and of 3^{3d}/₄ on the colliers' and carriers' account, were written off.

During the nine months ending at Lady Day 1734, before the decline in the mining activities had been noticed, John Hatton disbursed £207/0/7^d in wages and running costs on the Footrail account. The dead-work for the Titterstone

1. See above, p. 322.

2. Between 1721 and 1747 he purchased Cleeton's Gate, Andrews Wood, Cox's tenement, Smith's tenement and Stockall Lane cottage in Hopton Wafers, and several cottages, lands and a lime-kiln at Oreton in Stottesdon. In addition he leased a messuage and lands at Hill Houses, Farlow, from William Lacon Childe, the Burchill Knowle, Catherton, from Lord Craven and Charlcott Farm, Aston Botterell, and parts of the Down Farm, Cleobury Mortimer, from Richard Knight. S.B.L., Deeds and Charters, 822, 823, 824, 825, 827, 828, 831, 832, 10577. Knight Mss., 244, 245 (Rent accounts and carriers' accounts).

Clee mines for the same period cost £72/1/5^d. Of this Hatton paid Samuel Honeybourn, a carpenter, £7/14/11^d for work done on the Sough gutter, William Nichols of Hopton Wafers £21/10/0^d for sinking and driving 172 yards at the Gin, and Jeremiah Butcher and Richard Wardley £1/2/6^d and £3 respectively, for sinking pits to get ironstone. Also, he purchased wood for these works, paid the carriers who brought it, paid John Richards, blacksmith, 5/9^d for sharpening tools, and settled the taxes and poor rates assessed on the mining areas. In addition William Jones paid £8/2/1^d for other work done at the Sough, £5/5/0^d for driving at Cuttley and £2 for the digging up of clay to be used for brick-making. The following year was very much more active, as the visits of Edward Knight indicate, and the payments for the dead-work amounted to £223/3/4^d. William Jones paid out £128/9/7^d at the Sough and £24/4/0^d at the Gin for dead-work and Hatton paid more than £10 for work at the Sough and for sinking ironstone pits, £11/15/2½^d for brick-making and £10/0/3½^d for the construction of a new smithy and stable. In addition work on a new pit, known as the Air pit, had been started before the end of the year and £37/3/11^d had been spent on it.

With the help of the Air pit and extensions made to the Gin, the supply of ironstone from the Footrail was increased to seventy six dozens in 1734-35, 112 dozens in 1735-36 and 110 dozens in 1736-37. It then declined once more to fifty seven dozens in 1737-38, to forty three in 1738-39 and to insignificant amounts thereafter. In 1739-40 the Clee Hill account was credited with 13/4^d for ironstone 'got by the day at Footrail' and in 1741-42 it was credited with £2/14/2^d for 'ironstone got with the coals'. Although the investments in the collieries increased the amount of ironstone produced there temporarily, the main benefits were derived from an increase in the amounts of coal that were mined.

(c) The Supplies of Ironstone

The relatively small amount of ironstone provided by the collieries in 1733-34 was augmented by George Pardoe of Bitterley, who supplied nearly 24½ dozens from the wastes of Caynham and Snitton manors that he had leased from the

Herbert and Sheppard families, and by the small groups of men who worked the shallow ironstone pits on or near Hoar Edge, who provided a little over five hundred dozens. Neither they nor Pardoe had other markets for their ironstone so they could sell only the amounts that were required by the Knight partnership, and at the prices decided upon by the partners.

The key to the pricing policy for ironstone in different areas is to be found in its delivered costs. These were maintained for many years at almost exactly £1 a dozen at Bringewood and $16/5^d$ a dozen at Charlcott. In these circumstances the carriage costs of the ironstone had a significant effect on the prices paid to miners.

The carriage of Pardoe's ironstone, which was mined nearest to Bringewood on the western slopes of Titterstone Clee, cost $6/6^d$ a dozen and for the ironstone itself he was paid $13/6^d$, of which he retained $11/6^d$ after the payment of royalties, making the delivered cost exactly £1. But in Earls Ditton manor, where the cost of carriage from the Footrail and from the Heath, the nearest and the furthest collieries in relation to Bringewood, was $7/9^d$ and $9/6^d$ respectively, a delivered cost at the furnace of £1 a dozen could only be achieved by making a flat payment of 10^s a dozen at all collieries after the deduction of royalties.

This standard price had been paid by Richard Knight for the ironstone mined with the coal in Earls Ditton and it became a "customary" price that was maintained by his sons both in the early years of the partnership and in the years that followed when the amount of ironstone mined with the coal was very small. As all expenditure on equipment, supplies and tools and some of the expenditure on wages, sinking and overheads was borne by the coal accounts and then by the Clee Hill account, which often made losses that were offset against profits made elsewhere ¹, the true cost of mining was concealed and in this way the price paid to the small groups of ironstone miners was depressed. The delivered cost of their ironstone remained the same for more than twenty years, until 1755-56, and

1. See Appendix 7, pp. 428 (The Clee Hill Account: Profits and Losses).

was unaffected by variations in demand thus giving great stability to this element in the costs of the production of pig-iron ¹.

The expenses of carriage, another very important influence on production costs, were restrained also, and the true costs were concealed in a similar fashion. Some of the regular haulage was undertaken by George Pardoe, who transported his own ironstone to the furnaces as part of the agreement which gave him the freedom to exploit the mineral rights of the wastes of Caynham and Snitton, and much of the rest was undertaken by landholders, particularly those at Bringewood who were tenants of the Knights, for their leases included covenants which required them to undertake a certain amount of haulage ². In addition, other tenants were encouraged to pay their rents in kind through carriage and the general accounts indicate that there were some casual or part-time carriers among those who were usually employed as miners or colliers ³.

There are clear signs that some of the tenants found their carriage tasks to be too onerous and that the carriage rates were too low to attract additional carriers during periods of intense activity, despite increases in advances of payment, for there were increasing opportunities to transport coal. During 1738/39 the partners had to purchase the animals and equipment of Foxall, one of their tenants at Bringewood, and undertake his share of carriage temporarily and soon afterwards they were forced to take a more permanent participation in this activity ⁴. In 1742/43 they took over Deepwood Farm from their father and established their own carriage business which was retained until the partnership was dissolved nearly forty years later. During that time, although farming profits subsidised the costs of carriage, the farm account as a whole still made, in most years, considerable losses which were absorbed by the more profitable interests of the

1. See below, pp. 333-34.

2. R.A. Lewis, *Two Partnerships of the Knights*, pp. 150-52.

3. Knight Mss., 245. The General Accounts for 1743-44.

4. See below, p. 340.

partnership ¹.

From 1736-37, when it had become clear that the increased expenditure on the older collieries and on the new Air pit had not ensured a permanent increase in the amounts of ironstone supplied by the collieries, although it had increased the amounts of coal produced, the partners found it advantageous to rely almost entirely on Pardoe and the smaller groups of miners for its supplies. Although the partners financed, from time to time, the sinking of pits and also provided other assistance, this arrangement, by reducing capital expenditure and costs of maintenance and other overheads, eased the strain on their financial resources. It reduced, also, the burdens carried by the limited number of employees who were able to look after their interests in the area.

Although the price paid to the ironstone miners did not fluctuate with the demand, it was possible for many years to increase supplies relatively quickly at little cost to the mining or ironworks' accounts ². This indicates not only that ironstone remained easily accessible but also that there was a reservoir of unemployed, or underemployed, labour in the area that could be drawn into the ironworkings at very short notice. It implies also that the demand of the Knight furnaces for ironstone, which was itself responsive to the needs of the Midland and other markets for bar and plate-iron, influenced a wide range of marginal mining activities through methods which did not increase wages and other costs directly.

These methods appear to have been based to a large extent on the advance payments that were made to miners associated, when necessary, with an increase in the amount of money spent on the sinking of new ironstone mines. The advance payments made for the years ending at Lady Day in 1734, 1735 and 1736 were small and the amounts of ironstone sent to the furnaces from Titterstone Clee during the same years were also relatively small at 841, 697 and 740 dozens respectively.

1. See Appendix 8, pp. 430 (Deepwood Farm Account: Profits and Losses).

2. See Appendix 9, p. 432 (Deliveries of Ironstone from Titterstone Clee to the furnaces).

On the other hand, the accounts to Lady Day 1736 show that the substantial sum of £376/7/3^d₄ had already been advanced to miners and £108/11/0^d had been spent on dead-work. As a result, during the following year the ironstone supplied to the furnaces by the small groups of miners alone amounted to 988 dozens out of a total of 1,125 dozens produced by the whole of the mining area. Similar large advance payments and expenditure on dead-work were made in respect of the year 1737-38 and the miners responded by raising 1,136 dozens. Advances were increased to £494/1/5^d early in 1739 and the miners produced during the year to Lady Day 1740 approximately 1,200 of the 1,418 dozens sent to the furnaces from Titterstone Clee.

Between Midsummer 1733 and Lady Day 1737 George Pardoe provided the furnaces with, on average, about twenty six dozens of ironstone a year from Caynham and Snitton, but as the amounts of ironstone dug up in the collieries of Earls Ditton decreased he was encouraged to increase the output of his Caynham and Snitton pits. During 1737-38, 1738-39 and 1739-40 he provided 164, 226 and 203 dozens respectively and the average annual amount sent by him to the furnaces during the five years from Lady Day 1740 to Lady Day 1745 was 191 dozens.

During the same years deliveries of ironstone from the small miners of Earls Ditton averaged 1,385 dozens a year and the largest amount, 2,032 dozens, was produced in 1743-44. The amounts of advance payments, which reached a peak of £1,340/1/9^d₄ at Lady Day 1743, averaged £728/12/0^d a year but the amount spent on dead-work was only £62/13/0^d on average each year. The great expansion in production over these years appears to have been carried out effectively by using the advances as a tap but some setbacks occurred in the first two years when only 882 and 1,011 dozens arrived at the furnaces because of the strain on carriage facilities¹. During this period, also, the mortality rate among the miners, particularly among experienced miners and colliers, seems to have increased steeply. At Lady Day 1744 advances to miners totalling £110/10/10^d were written

1. See below, p. 340.

off the accounts and of this amount £78/14/5^{1d} was owed by men whose burials had been recorded in the registers of local parishes between 1740 and 1743. Richard Wardley, who was born in Hopton Wafers in 1696, had sunk ironstone pits 'on the Hill Top' for the Knights between 1733 and 1735¹. He was buried at Coreley on 7th August 1740 and the Footrail account was debited, by Edward Knight himself, during the same year, with a payment of £2/2/0^d to 'Wardleys Widow'. John Hatton who ceased to manage the Footrail account rather abruptly in the same week that Wardley died, although there is no evidence that the two events were related, was buried at Coreley on 3rd May 1743. At least three members of the Nichols family of Hopton Wafers, who had been employed by the partners in previous years to sink pits and, in particular, to undertake the very dangerous work of driving soughs and levels, also died during this period. William, aged 41, was buried on 5th April 1740, and his brothers Thomas, aged 38, and Edward, 37, were buried within three days of each other during August 1743. Another brother, Francis, who was born two years after Edward was never referred to again in the accounts or in the records of local parishes after 1743, nor was Jeremiah Butcher, senior, also of Hopton and fifty years of age in 1743, who as well as sinking ironstone pits for the Footrail account had sub-leased or managed part of the works under Hatton. His son, Jeremiah junior, continued to work as a miner in the same area, as did relatives of Thomas Norncott, aged 32, another sub-lessee, who was buried at Hopton on 30th January 1743. William Jones, another debtor, was buried at Coreley on 23rd March 1742 and his partner, Henry Evans, and Thomas Jones, like Jeremiah Butcher, senior, were never referred to again after 1743.

In addition to the miners whose debts were written off in 1743-44, there were others who were buried during the same period. Among them were John Glaize, Richard Wardley's partner, who was buried at Cleobury Mortimer on 14th September 1741, and Peter Heddington, aged 41, several of whose brothers and cousins were miners, who was buried at Coreley on 28th August 1743.

1. See Plate 16.2, p. 358.

At Lady Day 1745 the payments in advance to the miners had fallen steeply to £463 and the deliveries of ironstone during 1745-46 from the miners fell abruptly to 877 dozens. For the next twelve years the demand for ironstone was relatively steady and there were few great fluctuations. The largest and smallest amounts raised, by the miners and George Pardoe combined, during those years were $1,270\frac{1}{4}$ and 744 dozens in 1750-51 and 1755-56, respectively. The average annual amount at 978 dozens was less than the amounts mined during the early years of the War of Austrian Succession and was about the same as the amounts mined in the later years of the 1730s.

The relatively steady demand for the ironstone of Titterstone Clee during this period was a consequence, in part at least, of a decline in the amounts easily available for the use of Charlcott furnace on Brown Clee. From the early years of the 1740s cinders were being transported back to this furnace from the forges on the Stour and a greater proportion of the ironstone required was purchased from Titterstone Clee. During the period from Lady Day 1743 to Lady Day 1746 the proportion was well over half and in the twelve years that followed $4,615\frac{1}{4}$ dozens was received from Titterstone Clee. This was 35.6% of the total mined there and 46.85% of the ironstone used in the furnace. However, during this period there were signs that ironstone was becoming less easy to mine on Titterstone, also, particularly in the wastes of Earls Ditton manor, and that the method of controlling production by manipulating the advance payments to miners was not acting as effectively as it had in earlier years.

At Lady Day 1749 the miners were owed $£16/8/3\frac{1}{2}^d$ for the amounts of ironstone that exceeded in value the advance payments that they had received since Lady Day 1748. In earlier years such balances had frequently been much larger. At the end of the next year a balance of $£12/1/8\frac{1}{2}^d$ existed in favour of the partners. By Lady Day 1751 the miners' debt had increased to £177, although they had mined $1,270\frac{1}{4}$ dozens during 1750-51. Obviously they had not produced as much as was expected, but advance payments of £621 were made to them for the following year. However, they were able to produce only 818 dozens in that year and at the

end of it they owed the partners more than £409. By Lady Day 1755, when their debt had increased to £723/11/1³/₄^d, the ironstone accounts had been placed in the hands of Thomas Longmore who lived in Coreley where he had supervised the Footrail account since 1739.

The importance that the partners placed on obtaining cheap supplies of ironstone during this period, even if this policy resulted in the neglect of other interests, was revealed shortly before Ralph Knight's death when George Pardoe's lease of the mineral rights of Caynham and Snitton wastes was renewed from Lady Day 1753. Ralph, acting as the representative of Lord Powis as well as of the partnership, not only granted the lease for Pardoe's life at the same fixed rent of £200 a year, payable in equal parts to both owners of the moieties of the wastes, but also allowed Pardoe one year's rent 'on taking a new Lease' ¹. Clearly he was satisfied, as he had cause to be, with Pardoe's obligation to continue to supply large amounts of ironstone to the furnaces at 13/6^d a dozen and he paid little heed to the increasing importance of coal production, from which Pardoe was able to make large profits, and to the best interests of Lord Powis, whose mineral rights in effect were being used to serve the needs of the ironworks partnership. The extent of Ralph's indifference can be gauged by his failure, on inspecting the new lease, to notice the implications of a covenant which stated that:

'it shall be lawfull to and for the said George Pardoe his Executors Administrators and Assigns at the End ... of the said Term to Work out all such Pitts as have been sunk three months before ... paying the usual royalty of 5 shillings in the pound ... without ... trouble or interruption 2.

Thomas Longmore's accounts, for the Earls Ditton works, from 1754-55 provide fewer details than the earlier accounts and for several years give only the combined totals of payments made to miners on Titterstone and on Brown Clee. However, they reveal that he was expected to increase the amount of ironstone mined and, at the same time, reduce the debts of the miners. The additional

1. Knight Mss., 245. The General Accounts for 1753-54.

2. S.B.L., Bdle. 6111 (Lord Powis's Letter to Mr Edw^d Knight, 2nd Dec., 1767). See below, pp. 355-67.

work brought by the need for closer supervision and the extra responsibility incurred when making large payments for ironstone were compensated for by an increase in his salary of £10 a year. He appears to have restricted advance payments severely after Lady Day 1754, for by Lady Day 1756 the miners' debts had been reduced to £628. In these circumstances it was accepted that the supply of ironstone could not be controlled any longer by the methods used in earlier years. In 1755-56 the average amount paid for the ironstone delivered to Bringewood increased from almost exactly £1 a dozen a price that had been maintained for at least twenty two years, to $£1/1/8^d$ a dozen, thus providing for the miners of the wastes of Earls Ditton a return that was similar to that received by George Pardoe. However, the increase was not enough to stimulate a large expansion of ironstone mining, for only 744 dozens were produced during the year, so part of the way through the next year, in the early stages of the Seven Years' War, Longmore used other methods. On Brown Clee Hill he turned to local landowners for assistance and increased royalty payments from 2^s to $2/6^d$ a dozen, but on Titterstone he increased the price paid for ironstone and encouraged leading miners to organise their own groups of miners and act as charter-masters. As a result, output was increased to $906\frac{1}{2}$ dozens in that year and the average delivered price at Bringewood advanced to $£1/4/4^d$ a dozen. During the next year, when charter-masters were employed throughout the year to supplement the efforts of the small groups of miners the average delivered price remained at about the same level. As a result the largest amount of ironstone raised in any year on Titterstone Clee during the Knight partnerships, $2197\frac{3}{4}$ dozens, of which $310\frac{1}{2}$ dozens was supplied by George Pardoe, was sent to the furnaces. Payments to the smaller miners amounted to $£547/3/2^d$ and the charter-masters were paid $£499/5/3\frac{1}{4}$, some of which was for unspecified amounts of coal.

The high level of demand for ironstone was not maintained, as it had been in the early years of the War of Austrian Succession. In 1758-59 the services of the charter-masters were dispensed with and the delivered price fell to $£1/1/4^d$ a dozen, of which the miners received 11^s . This was a shilling more than

the earlier, customary, price but was much less than they had been receiving in recent years. The reduction effectively discouraged ironstone mining, for only $658\frac{1}{2}$ dozens were mined during that year, and many miners turned to the collieries for work. As a result there was a large increase in coal production during that year.

Although Thomas Longmore continued to reduce the indebtedness of the miners after 1757, some of the debts were irrecoverable and £230/8/4^d was written off in the accounts at Lady Day 1764. Of the twenty two miners concerned, three were men whose earlier debts had been written off in 1744, but in other respects the lists had little in common. The registers of local parishes reveal that only two or three of those listed in 1764 had died. The survival of most of the others is confirmed by later references to them in the accounts of the partnership. Moreover, apart from Thomas Wardley, Edward and Thomas Bishop, and Jeremiah Butcher, junior, all of whom were natives of Hopton Wafers, none of them had specialist mining skills or had been responsible for anything other than small undertakings. Clearly, ironstone mining had ceased to attract the attentions of the more experienced and skilled miners.

Between 1758-59 and 1767-68 the mining of ironstone followed a regular pattern that was relatively undisturbed by severe fluctuations. The delivered cost at Bringewood furnace averaged about £1/1/5^d a dozen and the average annual production for the whole of Titterstone Clee was 938 dozens. The largest amount, 1,182 dozens, was produced in 1764-65 and the smallest amount, $664\frac{1}{2}$ dozens, in 1761-62. During this period the accounts show that advance payments equivalent to about three months production were being made and were sufficient, obviously, to maintain the amounts of ironstone at the level required by the furnaces. However, towards the end of the period there were signs that this balance was being threatened by increasing difficulties, and so greater expense, experienced in obtaining ironstone both in Earls Ditton, as the easily mined deposits near Hoar Edge were worked out, and in Caynham and Snitton, where George Pardoe's lease of the mineral rights was coming to an end. For several years after 1765-66 Thomas

Longmore employed John Grateley, who was already active in coal-mining, to organise the mining and collection of ironstone. Grateley found his task difficult and his mining costs generally increased the delivered costs of the ironstone at the furnaces. At Charlcott where the cost had remained at about $16/5^d$ a dozen from 1733 until 1755-56, and had reached 18^s a dozen in 1759-60, it exceeded £1 a dozen in 1767-68 when nearly half of it was provided by Grateley, and at Bringewood by 1768-69 the delivered cost had reached $£1/2/10\frac{1}{2}^d$ a dozen.

After 1766-67, the partnership was no longer able to rely on cheap supplies of ironstone to help to offset the rising price of charcoal and other increases in production costs, and it was unable to safeguard the profits of the ironworks by increasing the price of bar-iron either at Bewdley or at the rolling-mill, for it faced severe competition from pitcoal iron produced at works that were situated on coalfields near to the main Midland markets. During 1733-34 Bringewood bar-iron was sold at Bewdley for $£18/4/0^d$ a ton on average but by 1768-69 the price had fallen to $£17/10/6^d$, and by 1774-75 to $£16/11/6^d$ a ton on average. Similarly, the price of rolled plate which had been $£27/8/9^d$ in 1740-41 had fallen to $£25/3/4^d$ in 1768-69 and to $£25/1/6^d$ a ton in 1774-75, and the price of tinned plate which had been $£2/14/9\frac{1}{2}^d$ a box in 1742-43 had fallen to $£2/10/7^d$ in 1768-69 and to $£2/1/8^d$ for the same amounts in 1774-75.

Few additional opportunities for making economies or for benefiting from technical changes existed at Bringewood and the uncertainty over its future was made worse by increasing concern over the leases of the works and mineral resources. None of the leases extended beyond the life of Edward Knight who, by 1768, was already an old man. It must have seemed very unlikely that Edward's successors would be able to obtain from their cousin, Richard Payne Knight, a renewal of the lease of the lands and ironworks at Bringewood and Charlcott at an annual rent of £300 and still less likely, as a result of the awakened interests of Lord Powis¹, that the lease of the moiety of the wastes of Caynham and Snitton

1. See below, p. 356 et seq.

would be renewed on the same generous terms, which included a nominal rent of £12 a year, that Richard Knight had granted to his sons, Edward and Ralph, more than twenty years before.

In these circumstances it is not surprising that the Knights appear to have recognised at about this time that the days of the dispersed charcoal iron industry were limited and that their survival as iron-masters depended on their ability to concentrate their resources on their ironworks in Staffordshire and Worcestershire. In 1774 they transferred their rolling and tin-plating works from Bringewood¹ and although the forges and furnace continued to work there they reduced severely the activities of Charlcott furnace because of its high production costs². At Bringewood the delivered cost of ironstone continued to rise each year until 1773-74 when it reached a peak of £1/12/10^{1d}₂ a dozen. It then settled down at an average of £1/10/0^d a dozen until 1779, when records cease.

In the mining areas it becomes apparent from about 1768 that their policy was to accept the higher cost of ironstone so that Bringewood ironworks could maintain a steady output of bar-iron that would supply the Ludlow area and that part of the Midland market that still preferred charcoal iron and, at the same time, to exploit the outstanding, but unknown, portion of the unexpired leases by extracting from them the maximum amount of profit from the sale of coal for as long as they could.

Between 1769-70 and 1778-79 the amounts of ironstone that were raised varied widely from 1,539 dozens in 1770-71 to 473¹₂ dozens in 1776-77. The average annual amount of 969¹₂ dozens was only about thirty dozens more than it had been during the previous twelve years and was less than the amounts that had been supplied to the furnaces each year on average between 1736-37 and 1754-55.

Clearly, although ironstone mining was of considerable importance to the area throughout the period covered by the Knight partnerships its greatest impact

1. V.C.H., Staffordshire, ii (London, 1967), 173.

2. See above, pp. 309-311.

on employment was felt from the late 1730s to the 1750s during the times when the shortages in the supplies of pig-iron helped to maintain the competitive position of the ironworks of the partnership. During the years that followed, apart from occasional periods when there were large temporary increases in demand, ironstone mining declined in importance, relatively, as the growth in the demand for coal and the greater profits that it offered led to an expansion of coal-mining which, as a result, exercised an increasingly powerful influence on employment and on other activities in the area.

(d) The Supplies of Coal

During the early years of the new partnership the production of coal declined but was restored by the opening up of new seams in 1734-35 and 1735-36¹ when expenditure of £223/3/4^d and £111/9/0^d was incurred. In 1736-37 receipts for coal sold by the banksmen of the Footrail and Air collieries amounted to £669/17/4^d, indicating the sale of the equivalent of 2,009 tons of large coal at the current price of 6/8^d a ton. The wages paid in the same year amounted to £631/1/5^d so the profit was very small. During the following year receipts at the same collieries amounted to £779/16/5^d, dead-work cost £70/14/6^d and wages £652/0/4½^d, leaving a profit of £57/1/6½^d. The profits of the whole Clee Hill account for the same years amounted to only £47/8/8^d and £105/5/11¼^d, respectively, and in 1738-39 there was a loss of £5/10/0^d. During the next three years an average annual profit of £71/3/11^d was made, but sales at the Footrail and Air pits declined to £572/6/10¼^d on average each year and stocks began to increase rapidly. By Lady Day 1741 they amounted to about 1,000 tons, valued at £300, which was equivalent to nearly six months' production, and a year later they had increased by another 500 tons. Clearly the languishing coal market helps to explain the ease with which the production of ironstone was increased during these years and also accounts for the participation in this work of many of the skilled colliers². Nevertheless,

1. See above, pp. 323-24, 325-26.

2. See above, pp. 330-331.

while coal-mining was still apparently in decline a new situation was developing that was extending the market for coal into the ironworks at Bringewood.

A small amount of coal had occasionally been delivered to Bringewood during the early years of the partnership. In 1734-35 its delivered value was £18/5/9^d and in 1736-37 it was £23/11/9^d. In 1737-38 an additional amount of coal valued at £25/17/4^d was debited to Ralph Knight's account 'for fining'. It was used, probably, in the experiments made by Ralph which had as their aim the discovery of methods of reducing the production costs of bar-iron. Coal was used successfully at other ironworks in the chafery hearth, but despite Ralph's experiments the use of coal in the forges at Bringewood was not adopted on a large scale until many years later ¹. By 1740-41 the delivery of coal to the homes of the workers at Bringewood ironworks had become a regular part of their conditions of employment. In that year the cost of 'Pitcoals to Houses' was £35/2/4^d, but the purchases of coal for the rolling-mill which began to produce iron plate at Bringewood in the same year were more significant. These purchases amounted to 199 tons of small coals from the Footrail, two tons of small coals and ten loads of large coal from John Withey, cricker ², of Coreley, and four tons of large coal from George Pardoe. Although the cost of the coal was nearly trebled by the time it was delivered, it was not found necessary to use any of the precious charcoal and in the following year 164½ tons of small coals were purchased from the Earls Ditton collieries, at 3/4^d a ton, and delivered to Bringewood at an average cost of 9/6¾^d a ton:

A trial operation of the tin-plating works was undertaken towards the end of 1740-41. The works was supplied with ten hundredweights of rolled plate from the rolling-mill and with ten tons of coal from 'Severn' and nine tons from Stourbridge, five loads of which was 'charked' coal. Continuous production began during the next year and 1,254 boxes of tin-plate were produced using a little over 120 tons of local 'pitcoals and coaks'. The expenses of tinning in that year

1. See below, p. 348.

2. See above, p. 159 and note 2.

included a payment of £36/15/0^d 'for information in Tinning'. Whether this advice extended to the choice of fuels was not stated, but the two works exchanged fuels shortly afterwards. The tinning works ceased to use coke and large coal and, after 1742-43 relied entirely on the cheapest small coal, and the rolling-mill, where some coke was used with the small coals in 1742-43, used, thereafter, mainly large coal.

Deliveries of coal to Bringewood increased from about sixty tons, the amount supplied to the houses of the workmen, in 1739-40 to about 250 tons in 1740-41, to about 340 tons in 1741-42 and to about 460 tons in 1742-43. The rapid rate of the increase in deliveries created serious transport problems and disrupted, temporarily, the carriage of ironstone to the furnaces during 1741-42. The partners, who had been faced with carriage problems in earlier years on a smaller scale found that it was necessary on this occasion to establish their own cricking and carriage business based on Deepwood Farm adjacent to the ironworks ¹.

The demand for small coals benefited the Clee Hill account by a total sum of £60/19/8³/₄^d in 1740-41 and 1741-42 and was particularly advantageous as it made good use of a grade of coal that was difficult to sell, except in limited quantities to the limekilns. The weight of small coal and slack amounted on average to about twenty two tons out of every fifty two tons of coal raised ² and much of it was an embarrassment. Even the brickworks owned by the partners preferred to use large coal in the kilns, as in 1734-35 when John Hatton supplied those near the Footrail with sixteen tons of coal at 7^s a ton. Much of the small coal remained unsold and was eventually deposited with slack and rubbish on the spoil heaps where some of it remains today ³. The development of a regular demand for

1. See above, p. 328.

2. S.B.L., Deeds and Charters, 6110 (Samuel Georges Account, p.2).

3. Plate 17.1, p. 359. Large quantities of coal and slack from heaps selected by Mr. Warrington of Watsill were transported to Stourport power station between 1945 and 1948. Other heaps are opened from time to time, by local people who salvage the coal, particularly during periods when there is a fuel crisis. The most recent occasion when this was noticed occurred during the early months of 1974.

small coal at Bringewood therefore provided two-fold benefits to the partnership, for as well as reducing the costs of producing tin-plate it brought profit to the colliery accounts by making use of 120 to 140 tons of coal each year that would have been wasted otherwise.

The stocks of large coal that had been building up at the collieries began to decrease after Lady Day 1742 following a temporary reduction in price from $6/8^d$ to 6^s a ton and the emergence of the rolling-mill as a major customer. During 1742-43, when receipts for sales at the Footrail amounted to $\pounds 712/18/3^d$, and 105 tons of large coal were delivered to the rolling-mill, stocks were reduced to 800 tons. At the end of the following year, during which receipts at the Footrail amounted to $\pounds 663/15/5^d$ and 150 tons of large coal had been delivered to the rolling-mill, they were reduced to 300 tons.

The Clee Hill account made profits of $\pounds 64/15/2\frac{1}{2}^d$ and $\pounds 173/3/8\frac{1}{2}^d$, respectively, in those years, but it did not make a profit again until fourteen years later¹ for, as the result of a serious crisis in the collieries, the profits made from the sale of coal were not large enough to pay for large amounts of dead-work and sundry payments that were incurred during those years for the benefit of ironstone mining. A decline in the production of coal began in 1743-44 and, as before, efforts were made to open up new seams or to rediscover lost seams by driving, or by making other extensions inside the collieries, and by sinking new shafts in or near established colliery sites. However, on this occasion the faulting or exhaustion of the seams was more serious than problems that had been encountered before and these efforts were less productive and, in most cases were only temporarily successful. It soon became apparent that several of the collieries were approaching exhaustion at the same time and that large-scale redevelopment and reorganisation of coal-mining was necessary. The most serious situation occurred at the Footrail, which had been the major colliery for many years. Sinking and driving brought very small results there, so in 1744 it was

1. See Appendix 7, p. 428.

decided that work should begin on the construction of a new level from a point far down in Cornbrook Dingle, near the Footrail site which, it was assumed, would give access to new seams by driving up through them. However, the scale of the work and the great depth at which it was undertaken had never been attempted before and many unexpected difficulties and technical problems were encountered. These delayed the work and increased the costs that were incurred and, as the old Footrail continued to decline, the partnership was driven to making desperate and expensive efforts to supply coal to Bringewood ironworks and to an increasing number of other customers.

During 1744-45 receipts for coal sold at the Footrail and Air collieries, and at the New Sough pit, an extension of the Sough colliery, amounted to £472/0/5^d only, and Thomas Longmore found it necessary to purchase coal to send to the rolling-mill from Thomas Lloyd who was working the small colliery at Cuttley on a royalty basis. Work began on the 'New' pit towards the end of the year and £212/8/5^d was paid into its account.

The production of coal was increased during the following year when the expenditure of over £100 on driving and other dead-work at the Footrail and Air pits helped to raise the receipts for coal sold on the banks to £529/14/4^d but, again, some of the coal needed at the rolling-mill had to be purchased from Thomas Lloyd. During this year the New pit swallowed up £228/13/11^d in wages and materials and made no recorded contribution to coal production.

Early in 1746-47 Edward Knight bought a mariners compass and sent it, together with some bellows, to the new workings and Richard Carless spent more than £300 on what he described as 'deadwork'. Some of his expenditure was applied to making extensions in old collieries and to sinking small basset pits for the purpose of increasing supplies of coal but most of it was spent on the New pit. It included £4/12/0^d for the building of a new brick kiln and £20 for the making of 80,000 bricks. Towards the end of the year the New pit produced coal that was sold for £14/8/0^d but the wages of the colliers who mined it amounted to £72/15/11^d. Clearly the new works was not profitable in spite of the great amounts

PLATE I3

CORNBROOK DINGLE.



- I. Viewed from the west. The old rail ways converge at the bottom of the dingle on the levelled site of the New Footrail. The line of the abandoned way leading to the Old Footrail upstream can be seen between the upper hawthorn bush and the top right of the photograph.



2. Viewed from the east. The Footrail basset pit and a track leading to the Woodrow can be seen in the foreground. Above them the way passes through the enclosures of the houses now known as the Poplars.

THE CORNBROOK AND FOOTRAIL COLLIERIES.



I.
Cornbrook Colliery, the turnpike road and Cornbrook Bridge cottages.



2.
The Old Footrail site,
with overgrown tracks.
The line of the level
is revealed by the
gully formed by the
collapsed workings.

3. The recently restricted
entrance to the New
Footrail level. The
arched brick entrance
is concealed by bracken.



of work that had been carried out on it. The receipts for coal in that year from all of the works that were in the hands of the partners amounted to £290/1/4^d only, and coals for the rolling-mill had to be purchased from Samuel Haycox at the Heath colliery, Catherton.

During 1747-48 the old Footrail ceased production and Thomas Longmore moved to Cuttley colliery where he attempted to increase production by driving and by sinking small pits, one of which cost only £5, but he was reduced to buying most of the coal that he needed from small groups of miners. His own sales of coal in this year, and in the following year, brought in a little over £100, for coal production was very small at the new works which was known by now as the New Footrail. Large direct payments which averaged £158 a year were made to its account during these years and in 1749-50 a large baset pit was sunk nearby to increase output. The level absorbed large quantities of bricks and other materials, some of which indicated not only that the lack of ventilation in the level was a serious problem but also that changes in mining techniques were taking place.

In 1747-48 deal pipes were supplied through Edward Knight's account to the Clee Hill account by Mr. E. Bowen at a cost of £3/19/2^d and in the following year 4½ boxes of tin-plates were used by William Barnett, an employee at the tinworks, 'for making pipes'. In 1749-50 Barnett and an assistant, Morgan, used 3 boxes and 45 sheets of tin-plates, and small amounts of block-tin, white lead and oil, while 'helping to make air pipes'. In the following year 122 sheets of tin-plates were used without calling upon them for assistance. The accounts and other records provide no information on the methods that were adopted to force air along the pipes, although the bellows provided during 1746-47 could have been used for this purpose ¹. There is no further reference to this or to similar efforts to provide ventilation but an inventory made at Lady Day 1771 noted that the stock at Clee Hill included 200 yards of air 'troughs' which were valued at £15 ².

1. See above, p. 342.

2. Knight Mss., 274, General Accounts for 1770-71.

By 1754-55 the problem of providing ventilation had been solved in another way, for when, during that year, the level was driven another forty yards a shaft, which cost £85/8/10^d, was sunk into it, thus providing for most of the level the equivalent of a dual-shaft circulatory system. Clearly this proved to be a satisfactory, although expensive, method of ventilating levels for afterwards vertical shafts were sunk into them regularly as they advanced ¹.

Relatively little wood had been purchased for the use of the small coal pits or the collieries until the New Footrail began to operate. In 1748-49 its account was debited with £16/17/6^d for timber and during the following year Thomas Longmore paid men for 'sawing and making curbs'. In 1750-51 fourteen tons and thirty four feet of timber was purchased for the Clee Hill account from Thomas Child, a timber-master, at a price of £1/5/0^d a ton. In the following year Child was paid £15/10/8^d for timber supplied to the Clee Hill account and £21/10/6^d for 'pitwood' supplied to Thomas Longmore at the Footrail. The amounts of wood that were purchased continued to increase at the New Footrail and it becomes apparent that the 'longwall' method of coal extraction was being used there for the first time on Titterstone Clee. During 1752-53 Longmore paid £49/11/4^d as his half share of the cost of wood and candles at the New Footrail and £19/18/10^{1d}₂ as his half share of the cost of the same items at the Footrail pit ², and in 1754-55 he bought 68¹/₂ cords of wood, locally, for the Footrail account at a total cost of £74/13/0^d, and spent £15/13/0^d on timber which included eleven tons bought from Mr. Hill at £1/1/0^d a ton.

The more extensive use of pit-wood spread rapidly to other pits and by 1769-70 it was being used on a very large scale. The Clee Hill account for that year noted that wood-masters and sundry persons had supplied pit-wood to the value of £612/18/2^d and that wood worth more than £644 had actually been used in pits of all types. In his account of the coal works, given on September 9th, 1769,

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1. S.B.L., Deeds and Charters, Bdle. 6110 (Samuel George's Account, p.3). George, in 1769, stated that a shaft must be sunk every sixty yards into a level.
 2. Richard Hatton was responsible for the other halves of the costs. See below, p.369.

Samuel George stated that wood was used to shutter the sides of the shafts of all vertical pits whether they passed through hard basalt or through soft measures and that in either case a cord of good wood was required to complete '5 yards down of a Pitt', the shaft of which was four feet four inches square. The workmanship was paid for at a rate of 8^s a yard ¹.

The demand for coal had increased while the New Footrail colliery was being developed and it showed no signs of diminishing after 1750. To help to meet the demand investments in pits and transport facilities remained at a high level for many years afterwards. The receipts for coal sold at the Footrail in 1751-52 amounted to £316/3/4^{1d}. In addition 293³/₄ tons of coal valued at £95/13/4^d was sent to the rolling-mill and royalties received from miners who were working other pits amounted to £39/14/8^{1d}. During this year the final major structural work on the new colliery, 'building the Arch at Footrail mouth', was completed at a cost of £32/10/10^d, a gin was constructed for a coal pit at a cost of £6/15/7^d, sundry payments amounting to £100/2/7^d were made on the coal works account, and brick-making at the Footrail cost £46/19/9^d. During 1752-53 the receipts for coal sold at the Footrail amounted to £437/2/3^d and Richard Carless paid £152/3/0^d into the account for coal that he had acquired for the rolling-mill and the houses at Bringewood. Approximately £71 was spent on dead-work and £61/2/1^d on brick-making during the year and the account made a profit of £56/10/10^d. Apparently most of the bricks were used in the level and in other pits at the Footrail for only £3/10/0^d was received into the account between Lady Day 1751 and Lady Day 1753 for bricks that were sold outside the works. Bricks continued to be used in the collieries and pits of the area in large numbers from then on.

During 1753-54 a total of £186/6/5^{1d} was spent on driving and arching at the Footrail level and at the Footrail pit and at least 3,000 tons of coal was raised at these pits alone. However, demand was even greater for stocks of coal were reduced during the year from 780 tons, including 300 tons of large coal, to 144

1. S.B.L., Deeds and Charters, Bdle. 6110 (Samuel George's Account, p.2).

tons, of which only twenty one tons was large coal. During the following year more than 4,000 tons of coal were raised at the Footrail but further investments were found to be necessary.

The first stage in the extension of Cuttley level required the expenditure of £18/7/6^d, and a new pit was sunk, at a cost of £85/8/10^d, on the eastern slopes of Titterstone Clee near the boundary of Farlow and Catherton. Within a few years a new colliery, known as the Bluestone colliery, was developed on this site. At the Footrail itself £172/4/2^d was spent on driving and on other dead-work and the quadrant, which was used to estimate the angle of dip of the coal seam, was repaired. In addition, to enable workmen and carriers to remove the coal more easily from the depths of Cornbrook Dingle new tracks were levelled along its sides and a new road was cut through the enclosures of a house nearby that had been leased to Andrew Baldwin, the rector of Coreley, by Lord Craven in 1737¹. A wooden rail way which was laid on the new track led to the expenditure of more money on timber and wages including the payment to Samuel Honeyborn, carpenter, of £1/6/2^d for sawing rails and for making 'throughs' to fix them.

During 1755-56, when coal with a pithead value of £130/10/2^d was delivered to the rolling-mill, a large new market for coal emerged at Bringewood. A successful pit-coal chafery was built there which in its first year consumed over 331 tons of coal valued at £107/2/1^d at the pithead². It continued to use large amounts of coal throughout the existence of the Knight partnerships, including 348 tons in 1757-58, 321 tons in 1758-59, 272 tons in 1759-60 and 310 tons in 1760-61, at an average delivered cost of 13/4^d a ton. Even in 1778-79, when the partners had already reduced their activities at Bringewood ironworks, the sales of coal to the forge and houses amounted to 314½ tons and 180½ tons, respectively, and together were worth £198/4/0^d to the Clee Hill account.

1. S.B.L., Deeds and Charters, 13079. See Plate 13.2, p. 343.

2. See above, pp. 298, 339.

The expanding market for coal which had encouraged the investment of large sums of money in the New Footrail and in other pits and collieries after 1744 was aided from the mid 1750s by improvements in local roads. In 1751 the First Ludlow Turnpike Trust was established to improve the road south of Ludlow towards Tenbury and Leominster. In 1756 the Mayor and Corporation of Ludlow spent £200 on an Act of Parliament which established another Ludlow Trust. This trust was concerned with the road leading from Ludlow towards Cleobury Mortimer and was of great interest to Edward Knight, for it could be expected to reduce the cost of transporting bar-iron and tin-plate to Bewdley and, at the same time, enable the mining areas to supply cheaper ironstone to the furnaces and large amounts of coal more cheaply to the newly constructed pit-coal chafery as well as to the wider local market that remained to be tapped. The part played by him in establishing the trust is not clear but it seems very significant that of the seven trustees, Benjamin and Edward Baugh were the sons of his sister Elizabeth, Thomas Johnes was the husband of his niece, Elizabeth, and Richard Baldwin's family was associated with him in the iron trade. Also, the treasurer of the trust was Somerset Davies, his friend and an agent of Lord Powis, who was himself Recorder of Ludlow through the courtesy of Richard Knight the younger who had resigned the office for his convenience in 1748.

On 15th June 1756, shortly after the passage of the act, the tolls of the road were assigned to him for twenty one years to secure £600 and interest ¹. Of this sum £200 was to be used to reimburse the Mayor and Corporation of Ludlow. His investment in the trust was increased in the years that followed and by 1779 the trustees owed him £1,700 ². His successors maintained an interest in the trust and were still involved in its affairs as late as 1852 ³.

The new trust extended the road system of the area by taking, on its way

1. Knight Mss., 7191.

2. Ibid., 7222.

3. Ibid., 7307.

to Cleobury a new line over the upper slopes of Titterstone Clee which passed through the mining areas of Caynham-Snitton and Earls Ditton manors ¹. Although this road was built on a course that was nearly straight, and consequently had steep inclines on the western and eastern sides of the hill at Angel Bank and Hopton Bank, respectively, it provided carriers and farmers with easier access to the mines and pits and encouraged greater use of wagons and carts. As a result the cost of transporting coal to the Ludlow and Cleobury Mortimer districts was reduced ², demand was stimulated and greater efforts and larger investments were put into the coal mines in order to increase production.

Edward Knight who was, after the death of Ralph in 1754, the sole owner of the Bringewood ironworks, was among the first to take advantage of the improvements in road conditions. The accounts of Deepwood Farm for 1755-56 reveal that it had acquired six draught horses worth £8 each during that year and that £36/10/0^d had been earned by 'team carriage'. The carriage of coal to Bringewood by this team was referred to for the first time in the accounts of 1758-59. Only thirty tons of coal was transported by it during that year but in the following year it earned more than £95 for carrying coal to the forge and rolling-mill, and in 1761-62 it earned over £102 for the same service.

In 1755-56 the receipts for coal sold at the Footrail amounted to £444/7/11^d, and £39/2/6^d was received from royalties on coal sold by other miners. Production of coal at the Footrail group of pits again exceeded 4,000 tons but a new pit which cost £66/1/9^d during the year was being sunk there and one hundred yards of rails were bought. Outside the Footrail account additional work on the Cuttley level cost £143/3/4^d indicating that this colliery was being developed on a substantial scale. During 1756-57 £107/17/11^d was expended on further sinking at the New Footrail pit and £65/15/2^d on driving. Elsewhere £115 was spent at Cuttley, a new level was started at Cornbrook and a basset pit was sunk, at a cost of £15/14/11^d,

1. See Figure 19, p. 321 ; Plate 14.1, p. 344.

2. The delivered cost of coal at Bringewood was reduced from nearly treble to about double the pithead price. See above, pp. 339, 349.

PLATE 15

SMALLER COLLIERIES IN EARLS DITTON MANOR.



I. The Gin Pit with the Gibbet stream in the foreground.



2. Cuttley Colliery, Doddington.

near Hoar Edge where the upper seam was close to the surface.

Clearly Edward Knight had committed himself to the large scale expansion of coal production in the area, for similar large investments were made in the years that followed as older collieries were extended one by one, new collieries were opened up and working practices were reorganised. By 1757-58 the Bluestone pit had been developed into a colliery and in that year it replaced the Heath colliery which was abandoned by Richard Francis, the son-in-law and successor of Samuel Haycox. At Lady Day 1758 Francis was allowed a rebate of £10 on his annual rent of £40 'for three pits' and his tools were purchased, on Thomas Longmore's valuation, for £3/14/6^d. Thereafter they were included each year in the valuation of the stock at Bluestone colliery.

At Lady Day 1759 the records of receipts, and debts, for coal sold, and of royalties, stock and deliveries to the ironworks indicate that at least 5,000 tons of coal were raised at the Footrail group of pits during 1758-59. However, as stocks declined from 202 tons to 126 tons and the rate of investment remained high during the year the demand for coal had obviously continued to increase.

During 1759-60 production of coal in the Footrail group of collieries was affected by serious drainage problems and was reduced to about 4,500 tons. A sough which was constructed to drain the works was very expensive and ultimately cost more than £134 but work, which cost £44/16/8^{1d}₂, was begun during the year at a new site on the side of Hoar Edge, near Cornbrook and several hundred yards above the Footrail colliery. The position of the new shaft is significant for it reveals that it had been accepted that the coal seams that were being exploited outside the basalt cap in that part of the hill were becoming too difficult and too expensive to work and that, to maintain coal production, it would be necessary to sink shafts through the basalt to considerable depths. This was an expensive extension of mining activities, as the large amounts of money spent on each of the shafts indicates, but it was rewarding also. The new colliery was developed rapidly for in 1760-61 the shaft was completed at a cost of £141/16/6^{1d}₄ and a basset pit was sunk nearby at a cost of £16/2/0^d. In 1761-62 another shaft and

a second basset pit were sunk in the same area at a cost of £122/14/4^{3d} and £14/9/10^d respectively. Much of the heavy expenditure was recouped through increased production, for over 5,000 tons of coal was produced by the Footrail group of pits, but in addition the price of large coal which had remained almost unchanged at 6/8^d a ton for nearly thirty years was increased to 7^s a ton. However, the coal account showed a loss for the year of £54/17/8^{1d}₂ and the price of large coal was raised to 8^s a ton during 1762-63. In spite of the steep rise in prices the demand was not diminished and the high level of investment was maintained, for more than £384 was spent on sinking at Cornbrook, Cuttley, the Footrail level and the Sough, and on driving at Cuttley during that year and larger amounts were spent during 1763-64. Most of the expenditure of these years was incurred at Cornbrook colliery which by Lady Day 1764 had replaced the Footrail as the main centre of Knight interests on Titterstone Clee Hill.

Although the larger and deeper pits absorbed most of the expenditure a valuable contribution to coal production continued to be made until well into the 1770s in Earls Ditton and in Snitton and Caynham by basset pits which were particularly valuable during periods when demand was increasing rapidly or when faulting, or other problems, in the larger pits reduced their output. Basset pits, which rarely cost more than £15 or £16 to sink, were sited about sixty yards apart, if possible, to limit the distance that the coal and spoil had to be transported underground and they could be worked with few tools, little equipment and a small labour force. Three men worked at the coal face, two got the coal away and another supported the roof and filled in behind them. The coal was dragged to the bottom of the shaft by one man if the distance was under thirty yards, but two men were needed for this job if the distance was from thirty to sixty yards and 'so on in that proportion'. The coal was drawn to the surface using a gin operated by a horse under the control of a boy, and two banksmen were needed to grade, stack, weigh and sell the coal. In all, ten or eleven people and a horse were employed by such a pit and about ten stacks of coal were raised on average each day. In 1769 the daily wages of the men ranged between twenty and sixteen pence, the boy

was paid eight pence and the hire of the horse cost eighteen pence ¹.

In 1764-65 coal to the value of £1,277/14/6^d was sold from the Cornbrook account. Nearly £600 was spent on sinking and other dead-work and more than £359 on pit-wood and sundry items of equipment. By 1767-68 when the Sough colliery had been abandoned and sales at the Footrail contributed only £7/5/0^d to the coal account, two other new pits, the Jewstone and Top of the Hill, both of which had been sunk through the basalt near Cornbrook, began to produce coal. With their help Cornbrook colliery produced nearly 6,000 tons of coal during that year and more than 6,800 tons during 1768-69.

No coal was supplied by the Footrail colliery after Lady Day 1768 and a map of the wastes of Earls Ditton manor, which was included in a survey of the estates of Lord Craven made in 1769 ², which described the Sough colliery as 'Old Level', made no reference to it. The inventory of the Bringewood works made at Lady Day 1771 ³ noted that there were no assets or stock there apart from 1,000 yards of rails and sleepers valued at two pence a yard.

The 1769 map of the wastes showed that three of the four large shafts in the Cornbrook colliery were situated on the basalt cap and that the fourth, the main shaft on Cornbrook level, was on the edge of it, and it provided information concerning the major collieries that were still operating. The Jewstone which, according to the inventory made in 1771, possessed a water pump valued at £5/5/0^d was ninety five yards deep and one of the new pits nearby, which was described in the accounts from 1771-72 as the Deep pit, was 105 yards deep. Top of the Hill and Cornbrook level pits were both eighty eight yards deep, as was the shaft on the main level on the edge of the basalt at Cuttley colliery. The old Bluestone pit was said to be nearly worked out but a new shaft was being sunk a few hundred yards away, although it was believed that it would not be able to work without a new

1. S.B.L., Deeds and Charters, Bdle. 6110 (Samuel George's Account, p.3).

2. S.B.L., Mss. 2481, Map vii.

3. Knight Mss. 274, General Accounts for 1770-71.

level.

The increase in demand for coal also affected the other major coal-mining area, for during 1758-59 a new level, designed to open up more seams, was driven under the Treen pits in Caynham and Snitton wastes. George Pardoe, who bore the expense of this work estimated, in 1766, that it had cost him about £1,100. He added that he had spent about £400 in 1763 on other pits at Colleybrook Green ¹.

The renewal of his lease in 1753 was a considerable success for Pardoe, for the fixed annual rent and the security of tenure that could be extracted from the covenant ² ensured that he was free to exploit the coal resources of Caynham and Snitton wastes as much as he wished and could benefit not only from the greater amount of coal sold but also from being able to raise his prices as the demand for coal exceeded the capacity of other collieries on the hillside to satisfy it. Moreover, subject to his own foresight and judgement, he was able to ensure that his heirs would be entitled to operate the Caynham and Snitton coal-works long after the end of the term that the lease was expected to run by the proprietors of the mineral rights.

Pardoe's profits were considerable and although some of them were ploughed back into the coal-works almost continuously he and his family prospered. He acquired a town house in Ludlow, added to his lands in Bitterley and provided for his younger children ³. In 1752 his son George Pardoe the younger married Elizabeth Rocke at Nash and was, within a few years, established there near his brother-in-law, Thomas Hill of Court of Hill, in a new mansion known as Nash Court ⁴.

Lord Powis became deeply concerned with the 'immense' coal profits that

1. S.B.L., Deeds and Charters, 6110 (Mr. Pardoe's Comments, 9th Sept. 1767).

2. See above, pp. 323-34.

3. See below, p. 361, note 2.

4. See Plate 17.2, p. 359.

were going into Pardoe's pockets instead of his own, and with the possibility that Pardoe would exercise his freedom to raise the price of coals to an extent that would cause distress in the 'country', so in 1766, when Pardoe was seventy two years of age and ailing and the time seemed opportune, he began to treat with him in respect of his own moiety for the surrender of the leases of 1753, first employing John Cartwright, 'an able collier' to survey the coal-works ¹.

Cartwright's report, dated August 19th 1766 ², noted the existence of four large coal-works in the wastes of Caynham and Snitton ³. The Colleybrook Green works was inactive at that time, as was the Gutter works where Mr. Pardoe proposed to drive up a new level, six hundred yards long, to reopen the coal faces. At Treen pits ⁴ two seams were being worked, one at a depth of eighty yards, known as the 'Nine Feet Thick', and another ten yards below it which was three feet thick. Another seam lay at a greater depth and a level which was being driven up at that time would be able to work all three seams when it was completed. Cartwright considered that the colliery was in very good condition and had ascertained that thirty tons of coal were being raised each day at a rate of fifteen tons from each pit and that output could be increased if necessary. At the Knowbury works, which had resumed production recently following the sinking of a new shaft to a depth of about one hundred yards, thirty yards below the level that had been used formerly, ten tons of coal could be raised every day. Although at that time Treen pits were being operated by day work he stated that coal at all these works could be raised by bargain at a price of $2/3^d$ to $2/6^d$ a ton on the banks and that, allowing $1/6^d$ a ton 'for wear and tear', including all expenses on timber and other materials, the cost of raising coal did not exceed 4^s a ton. He concluded his report by making two recommendations. The first was that if a lease were granted,

1. S.B.L., Deeds and Charters, 6111 (Lord Powis's Letter to Mr Edward Knight).

2. S.B.L., Deeds and Charters, 6110.

3. See Figure 19, p. 321.

4. See Plate 16.1, p. 358.

an eighth share should be reserved to the proprietors who should appoint a banksman to represent their interests, although his salary should be paid by the lessee, and the second was that a small fire engine be erected to pump out the water from the works thus enabling the miners to raise 'very great quantities of good Coals'. Such an engine could be erected for about £600 and it would cost little or no expense to run for it could use 'the rubbish coal which is not saleable'.

According to Cartwright forty tons of coal were being raised each day at the two works that were operating, which indicated that weekly production was about 240 tons and annual production was near to 12,000 tons. When he made another survey in 1770 he repeated much of the information that he had given in 1766 and added: 'To raise 40 ton p day amounts to 12480 ton p ann'¹. This implies that he was referring to average daily production rather than actual daily production for it seems unlikely that the pits would be working six days a week in every week of the year. Pardoe's royalty payments during this period indicate that the equivalent of about 8,000 tons of large coal was being raised each year².

George Pardoe's observations on the first report, dated 9th September 1767³, were brief to the point of abruptness, and disputed most of the conclusions. He stated that about 4,000 tons of coal were raised on Lord Powis's liberty which, if referring to his moiety of the wastes, implied that the total annual production of coal was about 8,000 tons in the wastes of Caynham and Snitton. However, if he were referring to collieries within Lord Powis's manor of Snitton, he was implying that the amount of coal raised on average each day at the Treen pits was only about 13 tons. In either case he was contending that Cartwright had exaggerated the amount of coal that was being raised. In addition he noted that the cost of raising

1. S.B.L., Deeds and Charters, 6110.

2. See Appendix 10, p. 434 (Coal Production on Titterstone Clee, 1733-34 to 1778-79).

3. See above, p. 355 note 1.

PLATE I6

COAL AND IRONSTONE WORKS : THE SETTLEMENT OF CLEE HILL.



1. Treen Pits, Caynham, now in Clee Hill, Knowbury parish.



2.

Ironstone pits, twelve
to fifteen yards apart,
at Hill Top, Hoar Edge.

3. View from Hill Top
over the settlement
of Clee Hill.



PLATE I7

SNITTON AND CAYNHAM COALWORKS : GEORGE PARDOE.



I. Colleybrook Green Colliery. A section of an eighteenth century spoil heap showing layers of small coals.



2. Nash Court, Burford, the home of George Pardoe the younger.

coal was about 5^s a ton and he struck out an estimate of 4^s a ton and emphasised that even his own figure did not take into account the large capital costs, such as the driving of levels and soughs, that were incurred by the undertaker of the works. According to him he had laid out £1,500 on only two of the works a few years before and added that the cost of driving up the proposed new level to the Gutter works would be at least £1,000. He did not bother to include the cost of either the recently completed shaft at Knowbury or the cost of the new level at the Treen pits, both of which were referred to by Cartwright, and he made no comment on the suggested purchase of a fire engine to pump out the mines.

Clearly Pardoe was aware of the strength of his bargaining position and was prepared to make good use of it. Some notes enclosed in Cartwright's report of 1766 recorded two proposals containing terms under which Pardoe would receive a consideration for surrendering the lease. The earliest, obviously Lord Powis's, offered Pardoe £500, only, to surrender the lease and hand over the coal-works in the condition that they were in at that time. The second, even more obviously Pardoe's for its tone was similar to his observations on Cartwright's report, suggested that if Lord Powis advanced to him half of the money already laid out in the works - which must have been well over £2,000 - as well as the £600 proposed to be laid out, then Pardoe would undertake the works, being allowed £50 a year for his 'Care', and would account with Lord Powis on oath for half of the clear yearly profit.

Pardoe's point was taken and Lord Powis had to abandon the intention of regaining for himself direct control of the coal-works at an early date. On 23rd October 1767 his agent, Richard Baldwin, and George Pardoe signed an agreement which accepted that Lord Powis would grant to Pardoe a new lease for twenty one years as the consideration for the surrender of the old lease ¹. The terms of the new lease were to be agreed by two referees, Thomas Hill of Court of Hill and Somerset Davies of Ludlow, with whom Pardoe promised to deposit all account books and papers relating to the affairs of the works during the previous ten years.

1. S.B.L., Deeds and Charters, 6111.

On 10th November 1767 Lord Powis, who was in Bath, wrote to Baldwin and gave him 'some Hints, concerning Mr Pardoe's Affairs of the Coalworks ...' which he wanted Somerset Davies to receive privately ¹. The first was that the lessors would find it more advantageous to replace the fixed rent with 'a Duty p. Ton' and the second was that a covenant should be included in the lease which would render the lessee liable to penalties if he raised the price of coal above a fixed price without the agreement of the proprietors. Powis explained that if this were not done he feared that the lessee would 'exact what Price he pleases ... and perhaps do it at my Expense, by bringing a Clamour upon me, - under Pretence, that I drove him to that necessity, by the hard Terms of the new Lease'.

However, the efforts of Lord Powis were unsuccessful for George Pardoe died soon afterwards and was buried at Bitterley on 7th April 1768, leaving the matter of the lease unsettled. His will, dated 9th December 1765 and proved on 14th March 1769 had not been changed ². It described his entitlement to 'certain coalworks and other minerals on the Clee Hill' in the manors of Caynham and Snitton by a lease from the Earl of Powis and Edward Knight, which was determinable 'on my death' subject to covenants for his representatives to continue on the same terms. His son George was 'to have and enjoy the said works'.

Thereafter the course of events confirms that the terms mentioned in the will referred to the lease of 1753 and that the Pardoes had carefully maintained their rights under the covenant in selected areas. After the death of his father, George Pardoe the younger continued to work the two major active collieries at Treen pits and at Knowbury with no apparent opposition, and he ceased to be responsible for the supplies of ironstone to the furnaces, as this obligation was not referred to in the covenant. This was probably a great relief to him for his father, who had supplied the furnaces with roughly 130 dozens of ironstone on average each year during the three years ending at Lady Day 1768, had continued to

1. S.B.L. Deeds and Charters, 6111.

2. National Library of Wales, Aberystwyth, Diocese of Hereford Copy Wills, Book 37, fos. 337 r, 337 v, 338 r.

receive only $13/6^d$ a dozen, the same price as he had been paid when the lease was made, in spite of the great increase in mining costs that had occurred since ¹.

Edward Knight, who had taken no part in the efforts made by Lord Powis to hasten the surrender of Pardoe's lease, was well prepared for his death, and within three weeks Thomas Longmore, junior, was established at Pardoe's pits and was supervising his coal sales and receipts so that the Knights' share of the royalty of five shillings in the pound could be safeguarded. Longmore's accounts were attached to George Pardoe's accounts at Lady Day 1769. They reveal that Pardoe sold coal to the value of $\pounds 2,456/4/4^d$ during the year and paid more than $\pounds 307$ in royalties to the Knights as well as $\pounds 100$ in rent. After the deduction of Longmore's salary of $\pounds 18/1/6^d$ for the forty seven weeks that he had worked and the transfer of $\pounds 100$ to the rent account the new account showed a profit of $\pounds 188/19/0\frac{1}{2}^d$. Although this profit was reduced, partly, by an increase in the cost of the ironstone, the supply of which was organised by John Grateley, Edward Knight had little cause to be dissatisfied for he, and his successors, continued to receive large payments for the royalties of coals from George Pardoe the younger until 1779.

TABLE 5

Royalty Payments made by George Pardoe to the Knight Partnership

1769-70	$\pounds 381/2/0\frac{1}{4}^d$	1774-75	$\pounds 471/1/3\frac{1}{4}^d$
1770-71	$\pounds 392/0/7\frac{1}{4}^d$	1775-76	$\pounds 552/7/0\frac{1}{2}^d$
1771-72	$\pounds 385/14/4\frac{1}{2}^d$	1776-77	$\pounds 578/16/2^d$
1772-73	$\pounds 387/15/8\frac{1}{2}^d$	1777-78	$\pounds 423/12/0^d$
1773-74	$\pounds 430/5/10^d$	1778-79	$\pounds 496/0/8^d$

The receipts from coal royalties and the absence of the need to expend large

1. See above, pp. 332-336.

sums of money on dead-work ensured that the Caynham and Snitton account contributed large profits each year to the Knights.

These profits, together with the payment of £100 made to the rent account, exceeded in every year the total amount of rent, £312, due to Richard Payne Knight for the ironworks, Deepwood Farm and other lands at Bringewood, the ironworks, farm and other lands at Charlcott, and the houses and mineral rights on Snitton and Caynham wastes.

TABLE 6

Snitton and Caynham Account: Profits from Lady Day 1771 to Lady Day 1779

1771-72	£308/14/0 $\frac{3}{4}$ ^d	1775-76	£462/18/0 $\frac{1}{4}$ ^d
1772-73	£370/4/11 $\frac{1}{4}$ ^d	1776-77	£456/13/9 $\frac{3}{4}$ ^d
1773-74	£348/8/11 $\frac{1}{2}$ ^d	1777-78	£319/19/10 $\frac{1}{2}$ ^d
1774-75	£402/1/11 $\frac{1}{2}$ ^d	1778-79	£418/12/10 $\frac{3}{4}$ ^d

However, the Earl of Powis was still dissatisfied and considered various courses of action, which were aimed at avoiding or overcoming the consequences of the offending covenant, with very little success. He employed Samuel George, who had worked for George Pardoe the elder for many years, first to provide information and give advice which was based on his lengthy experience of the coal-works of the area, and then to act as supervisor in much the same way as Samuel Haycox and others had acted for the Knight partnership in the past in Earls Ditton. Samuel George's account of the coal-works indicates that, by 1769, Lord Powis had accepted that Pardoe would not release his hold on the two major collieries at an early date for it was concerned with alternative ways of exploiting the mineral rights of the wastes. Interest was directed mainly towards the possibility of reopening the Gutter works and towards the development of a series of small basset pits which would exploit the upper coal seams. A year later Cartwright, in his second report ¹, considered that the driving of the projected level up to the Gutter works

1. See above, p. 357.

'would pay for itself' in twelve months but other people must have been less enthusiastic for the Gutter works remained closed and an attempt was made to reopen Colleybrook Green colliery instead. This was not a success, for although a small amount of coal was produced during the first year the colliery was abandoned shortly afterwards. Some basset pits which were opened near Pardoe's works at Treen pits were primarily concerned with the mining of ironstone and little coal was raised from them. Although the Knights' Clee Hill account for 1770-71 noted that pit-wood, timber and other material with a total value of £60/5/0^d had been transferred to Snitton and Caynham from Cornbrook, an inventory at the end of the accounts for the same year did not acknowledge the existence of any stock, working pits or other assets in that area which implies that the materials had been consumed in small, easily exhausted ironstone pits.

From Lady Day 1771, when Edward Knight handed over the partnership to James and John, the account of Thomas Longmore, junior, was separated from George Pardoe's account and appeared in the general accounts as the account of 'Snitton and Cainham Ld'ps'. During its first year the new account received half of the royalty on stone sold at a newly opened quarry at Horseditch and coal royalties amounting to less than £1 from pits that were not controlled by Pardoe, as well as the royalty of one eighth of the value of the coals sold by Pardoe himself. In addition the account was credited with £8 and £2/10/0^d for stocks of coal that existed at Colleybrook Green and at Treen pits respectively, but the inactivity of these works was revealed by the inclusion of the same stocks in the accounts for the following year.

From 1771 Oakly Park Estate, including the manor of Snitton and its mineral rights, was in the possession of the second Viscount Clive, the husband of Henrietta the only daughter of Lord Powis who had retired to Bath where he died on 10th September 1772. Lord Clive, who received the stone and coal royalties that were owed to the manor of Snitton during 1771-72, opened up a new limeworks in January 1772 which was based on two quarries at the Heath and one at Gorstley. John Robinson was paid a salary of £20 a year for supervising the works which had

received, by 31st December 1772, cash payments from Lord Clive's agents totalling £275/5/0^d and had sold lime to the value of £225/8/5^d. Expenditure on tools and equipment amounted to £22/2/2^d and £369/14/5^d was spent on workmen's wages and team hire. After the deduction of £32/6/6^d for repairs and £20 for Robinson's salary only £56/10/4^d remained of the original investment ¹.

No coal was raised at Colleybrook Green during 1772-73 and, although a new pit was opened at Winthills, Knowbury, it is clear that by the early months of 1773 Lord Clive's works were very unprofitable and that he had decided to cut his losses. At Treen pits, the largest of his works, receipts for coal amounted to £12/2/5^d during the period from 31st December 1772 to 13th February 1773, but disbursements amounted to £57/2/11½^d ². On the latter date all of these works were leased to Pardoe who acquired also the stocks of coal on the banks and, later, the limeworks ³. Lord Clive's efforts, and those of his predecessor, had increased industrial activity and employment in the area but George Pardoe's position had not been weakened at any stage. He appears to have absorbed the unprofitable pits successfully for the amounts of coal sold by him increased considerably after 1773, as is shown by the records of the royalty payments that were made by him to the Knights and to Lord Clive ⁴, and he made large profits, for he involved himself in very little capital expenditure.

In 1775 a memorandum was drawn up for Lord Clive which contained proposals 'respecting Glee Hill Coal and Ironstone works, in order to lease it afresh to Mr Pardoe' ⁵. It was suggested that Pardoe be offered a new lease for the remaining part of Mr. Edward Knight's lifetime in return for the abandonment by him

1. S.B.L., Deeds and Charters, 6110 (John Robinson's account with Lord Clive).

2. Ibid. (Accounts for Treen Pits, 1 Jan - 13 Feb., 1773).

3. Ibid. (The late John Ashby's accounts with Mr Pardoe).

4. Appendix 10, p. 434, and see above, p. 362. S.B.L., Deeds and Charters, 6111 (Oakly Park Estate accounts of sums received from the royalty of coal mines).

5. S.B.L., Deeds and Charters, Bdle. 6110.

of the covenants included in the lease granted to his father. It was stated that he was working, at that time, three pits that were 'on the decline' so it must have been realised even then that he would not be able in any case to continue to work for much longer from the pits and levels inherited from his father. This knowledge appears to have encouraged Lord Clive and his agents to wait with more patience than they had exercised previously and there is no evidence that Pardoe was in fact offered a new lease based on the proposals put forward in the memorandum.

During 1777-78 Pardoe ceased to work the Knowbury and Colleybrook collieries and concentrated his work force on the Treen pits but he found shortly afterwards that it was necessary for him to begin negotiations with Lord Clive and his agents for a new lease, for the reserves of coal that could be got from the present level were nearly exhausted. While the negotiations proceeded several small groups of miners were encouraged by Lord Clive to sink small pits at Knowbury and two groups of miners led by George Ashcroft and George Glazebrook intensified the search for ironstone and coal near Treen pits using basset pits which were partly financed through the Snitton and Caynham account of the Knight Partnership. By Lady Day 1778 the tools and implements supplied by the partners to Treen pits were worth £150¹.

Pardoe found that the terms of the new lease were severe, which is not surprising in view of the annoyance and frustration caused to the owners during the previous fourteen years by the terms of the old lease. Moreover, he discovered that his bargaining power had been reduced by the willingness of a large group of miners to compete with him for the possession of the lease. He was given a final opportunity to take up the lease on Sunday the 10th of January 1779, but at eight o'clock in the evening of January 9th he wrote from Nash Court to Lord Clive's agents at Oakly Park, Bromfield, near Ludlow stating that he would be unable to meet them the following day as he had not yet 'ventured out of the House'². He added that he would not be able to accept the terms of the new lease for it restrained him from increasing the price of coal although large sums of money would have to be

1. Knight Mss., General Accounts for 1777-78.

2. S.B.L., Deeds and Charters, Bdle. 6111.

spent immediately and there was an 'approaching Scarcity of Wood to carry on the Works'. He asked for this restraint to be modified but if this were not acceptable he offered to 'undertake the Clee Hill agt every dreadfull Consequence that may attend it' as long as he was allowed one year's rent and was indemnified against the effects of the arrival in the area of a canal which was 'New talk't of'. He ended his letter with a request for an answer which, as a result of the lateness of the hour, the tone of his letter and the introduction of new elements into the bargaining, he does not appear to have received directly. However, a few hours later, on Monday the 11th of January, the agents of Lord Clive, John Ashby and John Probert, accepted the proposals for leasing the works that had been put forward by James George, John Carter and Benjamin Giles 'as an intended Company of Mine Adventurers', thus giving Pardoe his reply indirectly ¹. Carter, who was a maltster and farmer in the Burford area, and Giles, who lived at Hope Court, Hope Bagot, were wealthy men who provided the finance required by the undertaking and both of them signed the agreement. James George, the son of Samuel George, made his mark, as the representative and leader of a group of sixty four colliers and miners who were all referred to by name in a copy bond of 18th January 1781, where they described themselves as 'the Company of Coal Merchants' ².

On the 25th of March 1779 the company took over Lord Clive's moiety of the coal and ironstone works from Pardoe ³ and his final account was drawn up two days later ⁴. The new lease had a term of twenty one years, a clear rent of £400 was payable and the company had to accept several conditions and restraints. Firstly, they agreed to undertake the driving, to Knowbury colliery and to the Gutter works, of levels which would have to be at least 1,500 and 600 yards long, respectively, and which would have to be completed 'properly' before 25th March

1. S.B.L., Deeds and Charters, Bdle. 6110.

2. Ibid., Bdle. 6111.

3. Ibid., Bdle. 6110 (Minutes respecting Clee Hill Coal Works, Ladyday 1779).

4. Ibid., Bdle. 6110.

1785; secondly, they were required to continue to supply large and small coals to Lord Clive's local residences, limeworks and brick-works, and to the general public, 'at the present prices' unless they were given permission by him in writing to raise them; thirdly, they engaged themselves 'to enter into the like agreement' with Richard Payne Knight for the moiety of the works with the same rent and conditions, subject to the life interest of Edward Knight. In addition they were to be bound 'in the penalty of £5,000' for their performance of the covenants and requirements of the lease but were given permission to get coals and ironstone under the enclosures and cottages on the waste and to drive levels under them, 'Doing thereby as little Damage as may be'.

The moieties of the coal and ironstone works of Snitton and Caynham wastes were undefined and could not be separated so, as the third condition of the lease suggests, Lord Clive must have been acting on behalf of Richard Payne Knight and with his full support. He must have acted in agreement with James and John Knight, also, for the company took over the moiety which they held from their father, on the same date, and paid them rent at the rate of £400 a year until Edward died ¹. Their acceptance of the agreement and the fact that they had made no efforts to acquire the lease of the works themselves, confirms that they had decided, as was apparent elsewhere, to withdraw from the area.

(e) The Final Years of the Bringewood and Charlcott Partnership

The Knight partnerships had always retained the lease of the mineral rights of Earls Ditton manor and in their earlier years had utilised it with different objectives and under very different conditions from those that had influenced George Pardoe. Although sub-lessees at the older and smaller colliery sites and at basset pits had been responsible for raising coal for many years, the emphasis that had been placed on ironstone production had ensured that the partners had retained a closer involvement in mining activities than they had at Snitton and

1. S.B.L., Deeds and Charters, Bdle. 6111 (Lord Clive's rentals as to Clee Hill Coalworks ... to 25 March, 1783).

Caynham. This involvement was increased in the later years as the demand for coal increased, particularly from about 1750, for the larger collieries that were developed and the more complex mining problems that were encountered absorbed large amounts of capital and required the use of tools and equipment that were too expensive for most individual miners to provide for themselves. As a result of their closer connections with these works there was no place for large sub-lessees who would have been capable of taking the responsibility for the whole, or for large parts, of the works as George Pardoe had taken it in Snitton and Caynham and, until the later years of the 1760s, smaller sub-lessees had fewer opportunities to acquire the skills and capital that would enable some of them, in time, to manage larger undertakings.

From Lady Day 1752 Richard Hatton leased the New Footrail and the Footrail pit, with their tools and equipment, from the partners and agreed to accept responsibility for half of the mining costs including dead work in return for half of the proceeds from the coal sales. However, he lacked sufficient capital to pay for his share of the dead-work when his money became tied up in coal stocks and in debts owed to him. By Lady Day 1754 he owed more than £60 to the partners so the agreement was ended. For several years afterwards he was paid a fixed price for each ton of coal that he produced and the partners financed the coal stocks and paid him for carrying out any dead-work that was necessary.

After the closure of the Heath colliery in 1757-58¹ no other collieries or pits were leased out at fixed rents for long periods to be developed at the expense and discretion of the sub-lessees. The most common method of working the pits which had already been developed several years before was to lease them by simple agreement to one or two experienced miners who provided their own balanced working force. The terms of bargains made with miners varied but they were usually required to raise a minimum quantity of coal each year. In most cases the owners provided working pits complete with equipment and tools and they paid for the

1. See above, p. 352.

sinking of shafts, the driving of levels and soughs and the other dead-work that was made necessary when faults were encountered. The miners either shared the receipts with the owners when the coal was sold or they were paid a fixed sum for every ton of coal raised.

According to Samuel George, who had been employed at the Gutter Works in the wastes of Caynham and Snitton for many years under a bargain with George Pardoe, the company of which he was one paid Pardoe '10^s out of the 20 for what the Coals sold for', when Mr. Pardoe sank the shafts and provided the pit-wood that was needed, but when the miners sank pits and provided their own wood they paid him '7^s to 8^s in the pound' ¹. Agreements such as these quickened initiative and eventually encouraged the emergence of larger numbers of men who, because they were skilled both in mining and in the organisation of mining operations, were able to undertake difficult and responsible tasks on behalf of sub-lessees and, later, on behalf of the owners or main lessees.

In Earls Ditton manor, however, after the failure of Richard Hatton at the Footrail colliery the agreements made by the Knights were usually based on the raising of coal at fixed prices, although from 1756-57 Edward Bishop paid royalties of 6/8^d in the pound at Cuttley, and from 1758-59 John Price, who had agreed to get coal at Bluestone for Bringewood rolling-mill and forge at 5/6^d a ton, paid a royalty of 5^s in the pound on the coals that he sold elsewhere.

During 1756-57 Edward Knight appointed Richard Hatton to supervise the works and to look after his interests, as Samuel Haycox had done earlier, at a salary of £10 a year. He kept the post until he died in July 1762. In addition William Taylor and William Giles were paid, for the first time, 'for taking account' at the Footrail and Cuttley collieries, respectively, and in 1758-59 Luke Price began to receive payment for carrying out the same task at the Bluestone colliery. The closer involvement of the Knights in coal-mining activities, brought about by the pressing need for large investments in soughs, levels and deep shafts, was

1. S.B.L., Deeds and Charters, Bdle. 6110.

emphasised more emphatically at Lady Day 1758 by the valuation of £165/6/0^d placed, in the accounts, on the tools and equipment that belonged to the partners on Titterstone Clee Hill. They had not bothered to value them in earlier accounts which had referred only to the latching tools, worth £3/10/0^d, that were used by the supervisors to ensure that sub-lessees were getting the coal in a careful and thorough manner.

After Richard Hatton had been appointed to supervise the works, his mining activities at the Footrail were taken over by John Jefferies and Josiah Hatton, who worked the Footrail level, and by Thomas Lloyd and Edward Butcher, who worked the Footrail pit. By 1760-61 six groups of men were responsible for the daily operation of most of the pits in the area, but although they had acquired some experience they were unable, at first, to take over the responsibility for working the new colliery at Cornbrook where large capital expenditure, mainly on deep vertical shafts, extensive levels and expensive equipment, had opened up large reserves of coal ¹. So for several years this colliery was worked by direct labour under the supervision of John Grateley, who had worked under Richard Hatton since 1756 at the Footrail and Sough collieries.

Grateley was responsible for the dead-work and the running costs also and Edward Knight found that his coal, like his ironstone ², was expensive. As a result when Knight set out, in the later years of the 1760s, to exploit the new coal seams that had been tapped at Cornbrook as fully and as economically as possible, he began to encourage the formation of organised groups of skilled colliers who were able, by providing a joint stock of skills, effort and capital, to work his pits with very little assistance, thereby reducing his capital expenditure and increasing his profits.

The Clee Hill account made a profit of £466 during 1768-69, although as in previous years large amounts of money were spent on dead-work and on general

1. See above, pp. 352-53, 354.

2. See above, pp. 335-36.

expenses, overheads, salaries and facilities that benefited the ironstone account. The profit for the year ending at Lady Day 1770 was nearly £1,128. By 1770-71, although Grateley still accounted for more than half of the coal raised during the year, at least four companies of independent miners had been formed and had acquired the right to work by bargain the Cornbrook and Jewstone pits. In 1770-71 banksmen and others sold coal to the value of £3,255 and coal delivered to Bringewood was valued at the pit-head at £332. This implies that at least 9,000 tons of coal had been sold, at a price of 8^s a ton.

The demand for coal continued to increase, as is reflected elsewhere in the royalty payments made in Snitton and Caynham by George Pardoe ¹, and James and John Knight who had become the sole partners after Lady Day 1771, continued their father's policy of extracting large amounts of coal as cheaply as possible but with a greater sense of urgency that was natural at that stage in the currency of the lease. Soon after Lady Day 1771 Grateley's contribution to coal-getting was reduced to an insignificant amount and the bulk of the coal was won by six or seven companies whose agreements obviously required them to carry out any dead-work that was needed at their own expense for no expenditure on dead-work was incurred by the partners between Lady Day 1771 and Lady Day 1778. During this period the partners made great efforts to acquire the maximum benefits from the large investments that had been made, earlier, in the new collieries. The average annual profit made on the Clee Hill account for the seven years to Lady Day 1778 was £651/7/6¹/₄^d and far more coal was raised in most years than was needed to satisfy the demand. As a result the value of the coal in stock increased from £1,648 at Lady Day 1771 to £2,518, £3,715 and £5,121 at the succeeding annual account days. Production reached a peak of more than 15,000 tons during 1773-74 when the receipts for coal together with the increment in coal stocks were valued at £6,305 in the accounts. Thereafter it settled down at about 11,000 tons a year until 1778-79.

The increases in activity and in coal production were reflected in the

1. See above, p. 362.

growth in the balances of the Clee Hill account from £2,857 in 1767-68 to £3,778 in 1768-69, to £4,998 in 1769-70 and to £6,779 in 1770-71. After that date the increases were even more significant and the account was valued at £8,082 at Lady Day 1772, at £9,372 in 1773 and at £11,356 in 1774. Thereafter there was a period of relative stability that lasted for about four years during which activity was maintained at the new higher levels. The production of coal settled down at about 11,000 tons a year and the value of the account varied little, being £10,959 at its lowest point at Lady Day 1776 and £11,699/11/6^d at its highest at Lady Day 1778.

However, when the demand for coal increased during 1777-78 and the receipts for sales amounted to £4,821/15/8^{1d}₂, the largest amount received in a single year for coal in the history of the partnerships, production was not increased for the partners took the opportunity to reduce coal stocks by more than 2,000 tons. During the following year expenditure on pit-wood, which at £680 in 1777-78 was very near to the average amount spent each year from 1773-74 onwards, was reduced to £388, coal production declined to less than 5,000 tons and coal stocks were reduced by more than 5,000 tons valued at £2,206/16/1^{3d}₄. The value of the Clee Hill account declined to £9,549/3/0^{3d}₄ and a loss, the first for eleven years, of £580/15/0^{3d}₄ was made.

Clearly from 1777-78 the partners were preparing for the surrender of the lease, for as well as running down coal stocks and reducing their purchases of pit-wood they began, during 1778-79, to prepare for the rendering up of the coal works 'in good and sufficient repair' as was required according to the conditions in Lord Craven's leases at this period. During that year 'sundry' charges which had averaged £379/4/0^d a year during the previous four years amounted to £526 and another £500, a significantly round sum, was put aside for 'Sinking, driving etc for succeeding year'.

There is no evidence, as at Snitton and Caynham, that James and John Knight made any attempt to renew the lease of the mining areas of Earls Ditton after the death of their father, Edward, in May 1780 and on 20th October in the same year it was granted to Thomas Botfield, coal-master, of Dawley for a term of sixty years.

No inventory or other detailed record exists for this period but gins, pumps, tools, implements, utensils and large numbers of other fixed and moveable assets needed for coal and ironstone mining must have been purchased, as was usual in such cases, by Botfield following a valuation. The transfer of ownership appears to have been carried out smoothly for there is no sign that any major disputes or difficulties occurred.

For many years afterwards other property was sold, other assets were realised and debts were collected by various bailiffs and agents. These included Thomas Longmore and his son Thomas, who were buried at Coreley in 1786 and 1787, respectively, but an older son, John Longmore, who survived until 1835 and who was described as an iron-master, was the most important. He was active at Charlcott and at Titterstone Clee Hill according to James Knight's cash accounts for the years from Lady Day 1779 to Lady Day 1788¹ and he collected and spent large sums of money on behalf of the partners. He was responsible for the collection of arrears of cottagers' rents in Snitton and Caynham² and became closely involved later in the affairs of the ironworks at Bringewood³.

An inventory of the equipment was made at Bringewood and Charlcott ironworks at the time of Edward Knight's death in May 1780⁴, and shortly afterwards James Knight entered into negotiations with Richard Payne Knight, his cousin, for the renewal of the lease. He used covenants that he asserted were in the lease of 1733 as a basis for retaining the ironworks pending a settlement. The parties immediately fell into dispute over the interpretation that James had put on these covenants, for Richard was unable to find a copy of the lease⁵, but on 7th July a temporary agreement was reached. This permitted James to continue in possession of the ironworks and of their associated lands at an annual rent of £300 a year until a

1. Knight Mss., 7534, 7536, 7537.

2. S.B.L., Deeds and Charters, Bdle. 6111 (Cottagers in arrears for Rent to Messrs Knight at Lady Day 1780).

3. See below, p. 376, 377.

4. Hereford R.O., Cat. Downton Coll., 407.

5. Ibid., 473B.

settlement of the terms of the new lease were agreed. Shortly afterwards, when negotiations concerning these terms were opened, James, in a draft agreement, used the supposed 1733 covenants to strengthen his bargaining powers and a long and, at times, bitter quarrel ensued for Richard and his agents suspected that James was guilty of sharp practices. In a letter to Samuel Nash, his uncle and adviser, dated 5th June, the year apparently being 1781, Richard stated that it was his opinion that James was attempting to close the ironworks down and drive trade away by using delaying tactics ¹.

This does not appear to have been an unjust assessment of James's influence, and shortly afterwards in a letter to Richard he stated that he intended to continue working Bringewood ironworks 'as no other tenant was prepared to do so' ². It seems clear, however, that he wanted to retain his hold on the ironworks so that he could extract as much profit from it as possible and so that he could liquidate or remove the bulk of his own stock. The damage done to the ironworks seems to have been a consequence of these intentions rather than of a deliberate act of policy. He and his brother had little to fear from the iron-masters who might be able to run Bringewood at a profit for such men could not compete with the partners in their Midland markets or even be sure of gaining access to the Bewdley warehouses without their approval.

On 7th April 1782 James paid Richard £200 as rent for the period to Lady Day 1782 and there is no record that he made any further rent payments, although he claimed that he had done so. His cash accounts for 1782-83 show that there was a considerable decline in the value of the stock at Bringewood between 1781 and 1783 as iron, coal, utensils, equipment, hay, horse-keep and other assets were sold off and there is no sign that he spent anything on maintenance or repairs at the works ³. During 1782 fresh disputes broke out in connection with Deepwood Farm and other

1. Hereford R.O., Cat. Downton Coll., 326, Bdles. 387 and 395.

2. Ibid., Bdle. 395.

3. Knight Mss., 7537.

lands ¹ and on 8th April, the day after he had paid the rent that he owed, James asserted his rights to possession of the charcoal at Bringewood in a letter to Samuel Nash. He added that it was his intention to enter into and occupy the works for part of the year 'as rent has been paid for this' ².

The dispute dragged on for more than a year after this and on 20th June 1783 James was served with a writ to answer to Richard Payne Knight in a plea of trespass³. This must have been effective for Richard was able to begin negotiations aimed at leasing the works to other people, although one of them, John Longmore, was James Knight's agent at Charlcott and at Titterstone Clee Hill so it is clear that James still hoped to protect his interests indirectly for as long as possible. However, it was discovered that the works at both Bringewood and Charlcott were in need of extensive renovation and estimates of the cost of repairs and replacements were prepared for both ironworks ⁴. There is no indication that, as a result, any repair work was carried out at Charlcott and no evidence exists in the records left by both branches of the Knight family that these ironworks ever operated again after that date.

During June 1783 a draft lease of the Bringewood ironworks and its associated lands was prepared ⁵. The lessees were William Downing of Strangeworth Forge, Pembridge, Benjamin Giles of Hope Court, Hope Bagot, gent., and John Longmore, iron-master. The term involved was twenty one years, the rent was £110 a year and a long list of repairs that the partners were required to carry out was included. These, clearly, were too onerous for a lease was not completed. Instead, in an agreement that was made with them on 14th July, Richard Knight accepted that he would be responsible for carrying out repairs and would put the furnace and forges

1. Hereford R.O., Cat. Downton Coll., Bdle.387.

2. Ibid., Bdle.395.

3. Ibid., 391.

4. Ibid., 547.

5. Ibid., 348, Bdle.610.

into working order ¹. He employed Cornelius Bagnell and Richard Walford, forge carpenters and millwrights for this purpose and by 18th October they had completed the repair of the furnace wheel, the finery wheel and machinery and had renewed other equipment ². On 29th October another draft lease, which included Richard Price of Knighton, Radnorshire, gent., as an additional lessee, was prepared for a term of thirty one years at a rent of £114 a year ³. It was followed shortly afterwards by a lease from which Price was omitted but once again it was not completed ⁴. On this occasion the failure to reach agreement was concerned with the need for repairs at the chafery. Again Richard Knight found that it was necessary for him to take responsibility for the repairs and he employed Thomas Downing for this purpose ⁵. Finally, on 29th September 1784, the Bringewood ironworks were leased to William Downing and Benjamin Giles for a term of thirty one years at a rent of £114 a year ⁶.

Very little is known of the activities of Bringewood ironworks after 1784, but it probably faced greater competition in its local markets from 1794 or 1795 when Thomas Botfield began to operate a large coke-fired furnace on Titterstone Clee close to the supplies of raw materials ⁷. The furnace, which was placed on the Cornbrook a short distance below the site of the New Footrail was associated with a Cleobury Mortimer forge, leased by Botfield before 1790, which was referred to in the records of the family businesses as the 'Cleobury Dale Ironworks' ⁸.

In 1796 Bringewood furnace produced 250 tons of charcoal pig-iron only, although

1. Hereford R.O., Cat. Downton Coll., 601.

2. Ibid., Bdle. 324, Bdle. 395.

3. Ibid., 323.

4. Ibid., 405.

5. Ibid., Bdle. 302, Bdle. 327.

6. Ibid., Bdle. 163.

7. See Figure 19, p. 321.

8. John Rylands University Library of Manchester, The Botfield Papers, passim.

it was capable of producing 500 tons, and Cornbrook, which had a capacity of 1,000 tons, actually produced 482 tons of coke pig-iron ¹. Bringewood, which finally closed down in 1814 or 1815, continued to use charcoal as its fuel to the end ².

4. POPULATION AND SETTLEMENTS:

(a) Population

Signs of a gradual recovery from the conditions of severe hardship that had occurred in the early years of the eighteenth century began to appear in the parish registers of the area after 1712. Increases in the numbers of marriages were followed by increases in the numbers of baptisms and, as the numbers of burials remained roughly the same or decreased, notably in Cleobury Mortimer, the excess of baptisms over burials became more significant. By 1720 the improvement was clear but still slight for demographic activities had merely returned to about the levels that had existed in the late seventeenth century and in the first few years of the eighteenth century, during the period of depression immediately preceding the crisis, and were much lower than those that had existed during the 1670s and 1680s.

The main features of the population movements that occurred in the area between 1720 and 1790 can be traced with the help of nine-year moving averages derived from the crude figures of baptisms, burials and marriages provided by a reasonably wide selection of local parish registers ³. The parish registers of Bitterley, Burford, Cleobury Mortimer, Coreley, Hopton Wafers and Neen Savage have reliable figures for all of these events and those of Caynham can be relied upon for figures of baptisms and burials although not for details of marriages. These parishes contained 31,398 acres between them and covered about seven eighths of the area ⁴. The registers of Hope Bagot, which suffer from obvious omissions and other

1. Harry Scrivenor, History of the Iron Trade, 2nd edn. (London, 1854), p.95. Cornbrook furnace is placed, incorrectly, in Herefordshire.

2. Dr. Bull, 'Some Account of Bringewood Forge and Furnace', 56.

3. See below, pp. 382-386.

4. Greete, Hope Bagot, Milson and Neen Sollars contained another 7,250 acres.

signs of unreliability, and those of Greete, Milson and Neen Sollars, which are limited in value by the small size of each parish and by the relative paucity of the entries of vital events, have not been used.

The registers that have been selected have been little affected by neglect or carelessness although some under-registration of Catholics and dissenters can be detected. However, this failing was small in scale and does not cause serious distortions of the general pattern of population movements. The Compton Census of 1676 noted that there were only nine papists over the age of sixteen or seventeen in the whole of the area, all of whom were living in Cleobury Mortimer and Neen Savage. The registers of these parishes and other sources reveal that most of them were either members of the Blount and Lacon families or were servants employed by them. Occasionally they used the local parish churches for events other than marriages, as was illustrated when John, the son of Mr. Francis Lacon and of Catherine, 'whom he affirms to be his wife', was baptised at Neen Savage on 6th November 1693.

There is no indication that the number of Catholics increased greatly during the eighteenth century, although the chapel of St. Mary existed at Mawley where it was referred to discreetly as 'the servants' hall' ¹. The first entry in the register of this chapel was made in March 1763, and during the next ten years it recorded the baptisms of fourteen children from neighbouring parishes or from Cleobury Mortimer itself. Most of these children were Blounts, or were the offspring of clerks or workers at their Mawley forges. From 1763 the records of baptisms at the chapel have been taken into consideration when dealing with the records of the parishes in which the parents dwelt at that time. The burials of Catholics took place in their own parishes, usually Cleobury Mortimer, and were recorded in the parish registers. Although they were described at times as 'Romanists', in most entries no comment was made on their religious affiliations.

The Compton Census indicates that there were only six adult Nonconformists in the area in 1676. Three were in Coreley, two in Cleobury Mortimer and one in

1. Shropshire Roman Catholic Registers, Shrops. Par. Reg. Soc. (Shrewsbury, 1913), introduction, p.xv.

Hopton Wafers. Those in Coreley included Robert Lloyd, the son of John Lloyd 'minister' at Burford from 1646¹, and his wife Margaret. Their marriage, which had taken place in 1663 after the death of Robert's first wife, was not recognised by the rectors of Coreley until 1677 when they ceased, at last, to refer to her as Margaret Rowley. In the meantime they baptised the six children of the marriage and later they recorded the burial of Margaret on the 15th of June 1695, and the burial of Robert on the 20th of April 1697.

Entries concerning Nonconformists were made in the registers of other parishes also. In January 1692 Salop Quarter Sessions licensed the house of Benjamin Millichope, of Nash in Burford parish, for public worship². Millichope's baptism had occurred in the same parish on the 14th of April 1651, the baptismal details of his son Joseph were interpolated among the entries for 1684 and a regular entry on the 26th August 1686 recorded the baptism of his second son, Benjamin. The burial of his wife and his own burial were recorded in 1726 and in 1734, respectively.

The only other person in the district licensed by the Salop Quarter Sessions to use his house for public worship was Thomas Wheeler of Neen Savage, who acquired this privilege in July 1699³. When he was selected as one of the churchwardens for Neen in 1693-94 he appointed, and paid, a substitute which was an uncommon but not unknown practice in that parish at the time. The baptism of his son Thomas in 1704 and the baptisms of other children in 1706, 1710, and in later years, and his own burial on the 15th of November 1736, were all recorded in the parish register of Neen Savage.

Clearly for many years after 1676 the number of Nonconformists in the area was very small and their presence, in view of their obvious desire to have their baptisms and burials recorded in the parish registers, could have had very little effect on the reliability of the registers of the parishes in which they lived.

From about the middle of the eighteenth century Nonconformists gradually became more numerous and it is possible that the desire to have the vital events

1. See above, p. 131.

2. Abstracts of the Orders made by the Court of Quarter Sessions for Shropshire, Jan. 1660 - April 1694, ed. R. Lloyd Kenyon (Shrewsbury, 1908), p.139.

3. Ibid., July, 1694 - Jan., 1708-9, ed. R. Lloyd Kenyon (Shrewsbury, n.d.), p.182.

of their families recorded in the parish registers diminished. However, there is little evidence that this was the case and more evidence that practices changed very little. When a new Wesleyan chapel was founded and built in the recently established village of Clee Hill ¹ in 1796 it attracted many of the people from all parts of the area who were known dissenters but its register recorded only a very small number of events that were not recorded also in the registers of the neighbouring parishes ².

The graphs based on the nine-year moving averages of baptisms, burials and marriages for the parishes referred to above, which cover most of the area, reveal that the higher levels of demographic activities that developed after 1712 were not maintained for long and the population, although not stagnant, remained relatively unaffected by great changes until, roughly, the middle of the century.

The recovery began to falter from about 1723 as another period of hardship was encountered. The increase in the number of baptisms was not maintained except in Cleobury Mortimer, and to a lesser extent in Coreley and Neen Savage, and the numbers began either to decline or to remain about the same. This situation coincided with a general increase in the number of burials and indicates that the area was affected not only by the series of poor harvests that occurred between 1725 and 1729 but also by the prevalence of smallpox in 1725 and 1726, and of epidemics of typhus and other fevers in 1727 and 1728 ³.

The harvests during the next ten years were generally good and sufficient cheap food was available. Trade flourished, times were more prosperous and the increased activity of the iron trade provided more work for the labourers, colliers, miners, carriers and other residents in the parishes on, or near, the mining areas of Titterstone Clee Hill. However, in much of the area many of the benefits derived from the increase in demand for coal and, in particular, for ironstone had

1. See Plate 16.3, p. 358.

2. Nonconformist Registers, Part II, Shrops. Par. Reg. Soc. (Shrewsbury, 1922), pp.208-40.

3. C. Creighton, History of Epidemics in Britain, ii (London, 1965), 66-71, 519, 754, 771-72. T.S. Ashton, Economic Fluctuations in England, 1700-1800 (Oxford, 1959), pp.138-78.

FIGURE 20

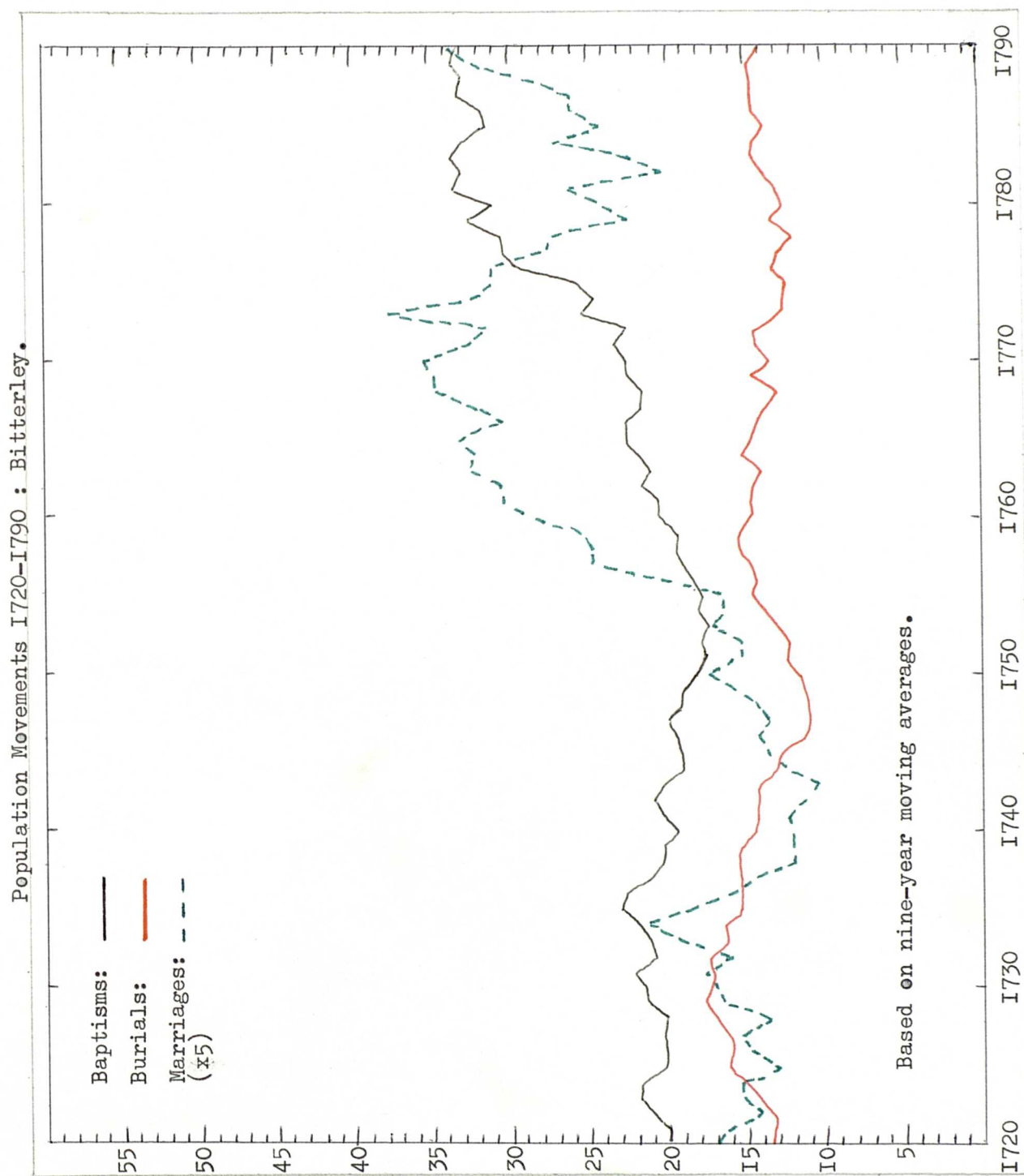


FIGURE 21

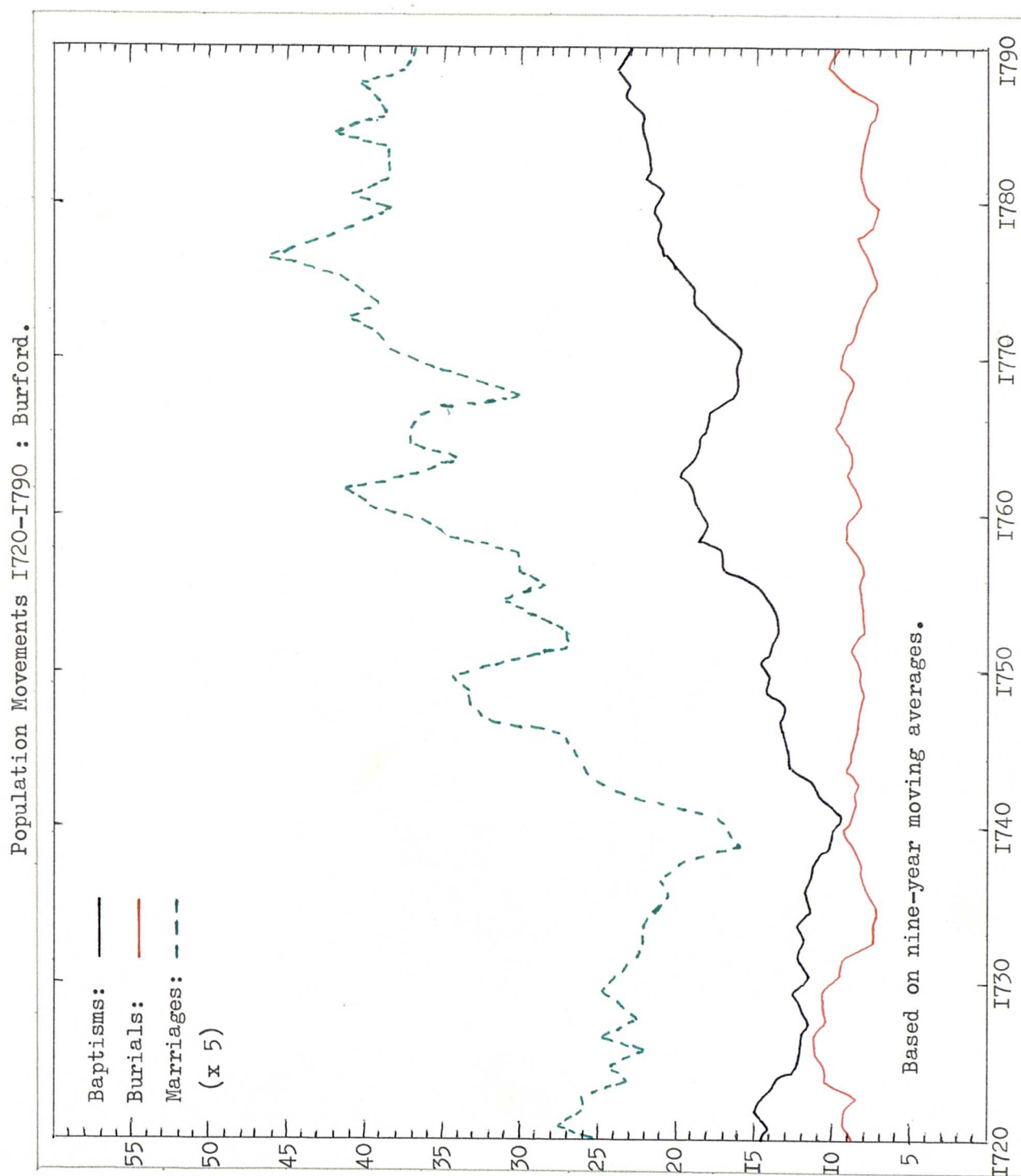


FIGURE 22

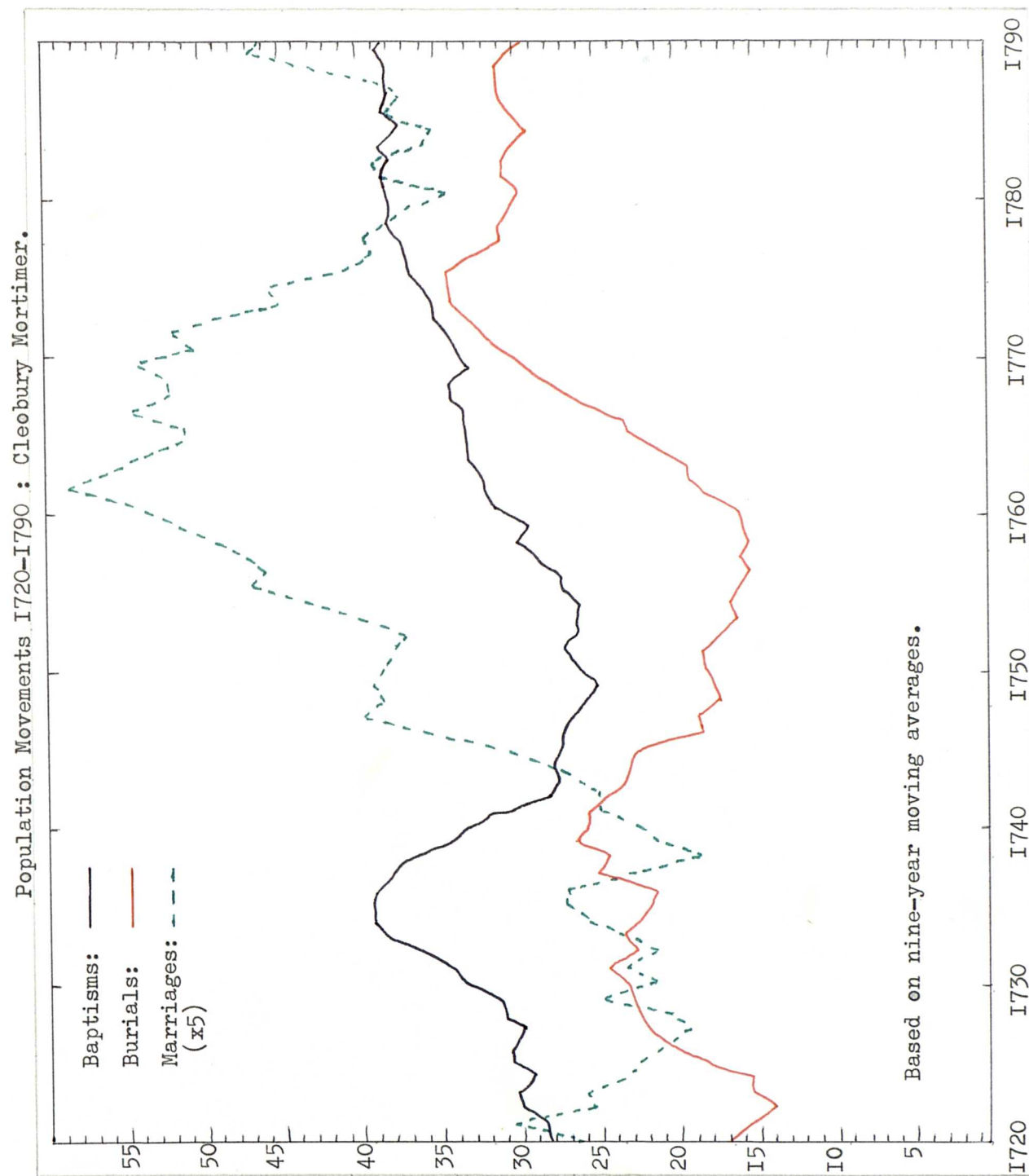


FIGURE 23

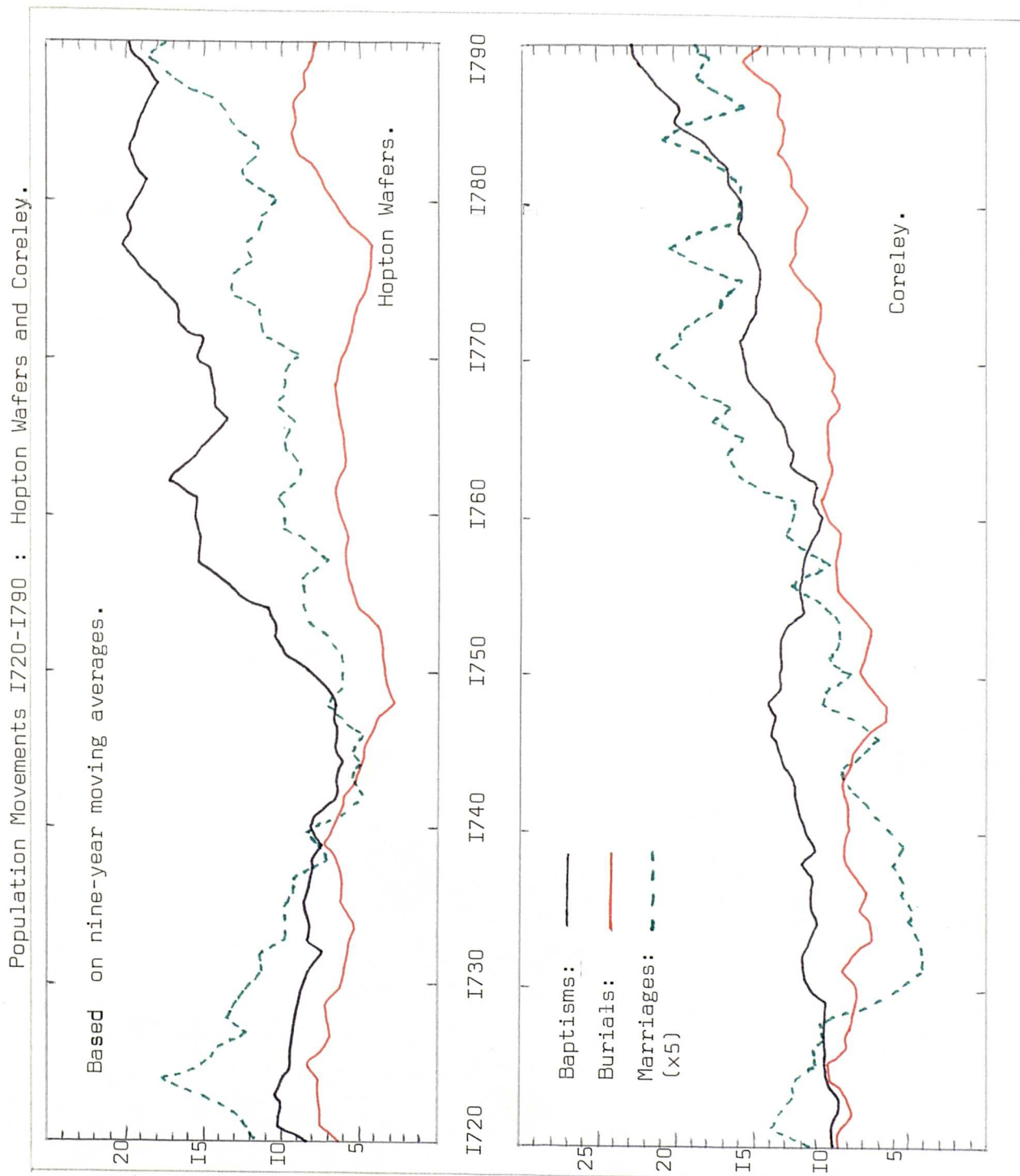
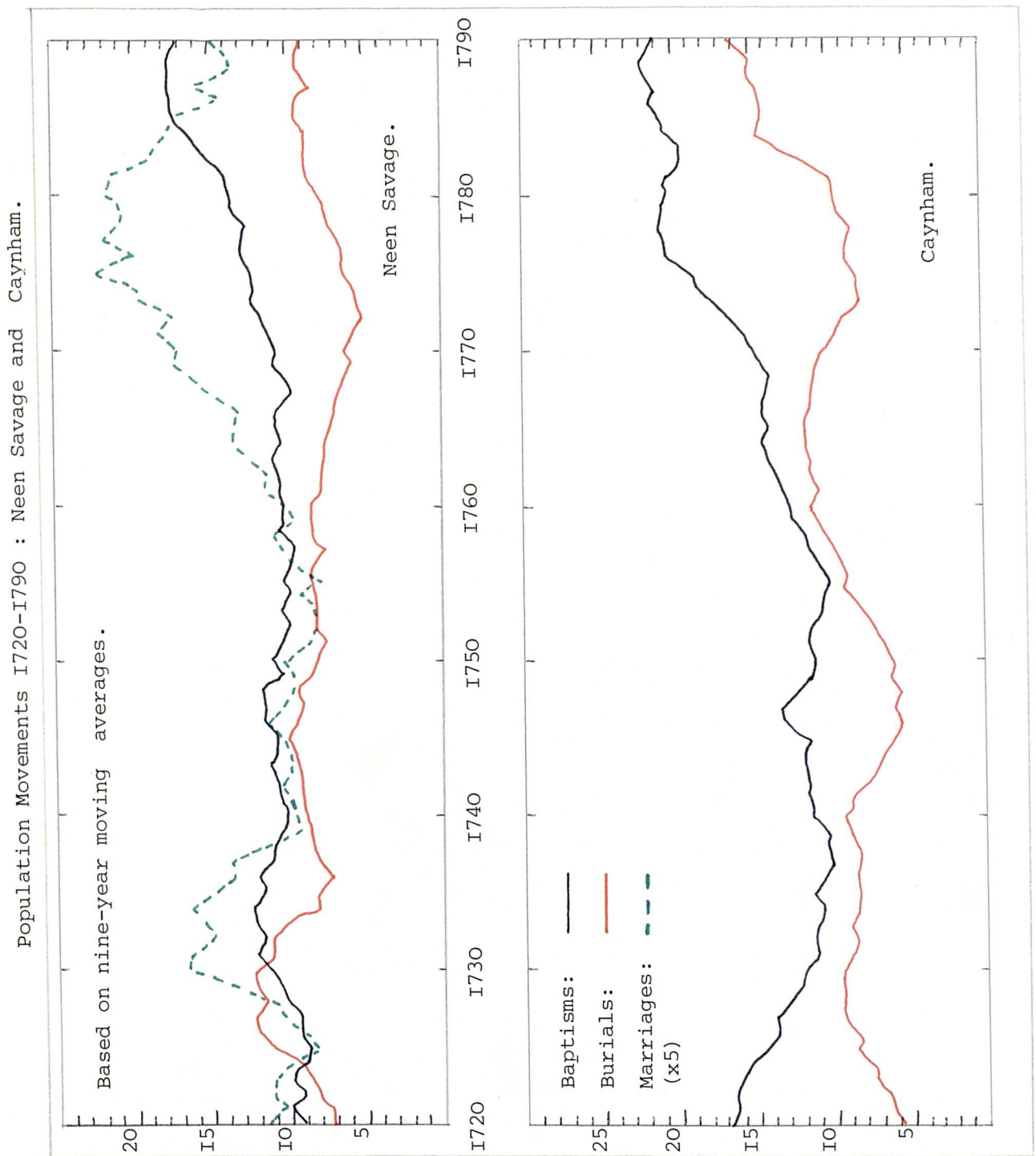


FIGURE 24



little effect for several years largely because of the rundown condition of the mining industry, which was aggravated by geological and technical problems, but also, in part, because of the restraints imposed by the difficulties and costs of transport. The numbers of marriages increased after the period of hardship but soon declined and the numbers of baptisms remained about the same or, in some cases, declined. However, as a result of a small, consistent reduction in the numbers of burials an excess of baptisms over burials was maintained. In the late 1730s and early 1740s, following the decline in the numbers of marriages, there was another period of hardship which was associated with the general decline in trade after 1737, the severe winters of 1739-40 and 1740-41, and the failure of the harvest of 1740. The numbers of burials increased in all parishes, except Bitterley, and the numbers of baptisms decreased, most notably in Cleobury Mortimer.

By the early years of the 1740s estimates show that the population in each parish was larger than it had been twenty years before ¹. The increases were the result, to a great extent, of the natural increments that are revealed, by the graphs based on moving averages, as the excess of baptisms over burials. The natural increases were supplemented by some movements of population into the area for there were more families in nearly all parishes by the 1740s than there had been in the first decade of the century, as is revealed by comparisons of the numbers of surnames noted in the parish registers ². The comparisons show that there were very few movements of families into Burford and Neen Savage, which had few industries, or into Bitterley and Hopton Wafers, which had expanded rapidly at the end of the seventeenth century and beginning of the eighteenth century, and much larger movements into Coreley, where the number of different surnames increased by more than fifty per cent, and into Cleobury Mortimer, where they increased by nearly twenty five per cent. Some of the new population of Cleobury Mortimer was absorbed into the town of Cleobury which, following a period of consolidation, began to

1. See below, p.390.

2. See below, p. 389.

expand and to prosper as a local market for the nearer parts of the mining areas and as a transit point on the road from Ludlow and Bringewood to Bewdley, but most of it was attracted to Catherton and Doddington liberties which were, like most of Coreley, parts of the manor of Earls Ditton. Settlement in this manor, which contained the most extensive mining areas on Titterstone Clee Hill, had been restricted after 1670 ¹ but was resumed at a faster rate as the importance of the mining areas increased from the early years of the 1730s ².

The amount of migration and the extent of its influence on population changes during the first half of the eighteenth century are difficult to assess. However, it is clear that the number of baptisms did not increase in proportion to the increase in the number of families. This suggests that the birth rate had fallen and that the population increases were the result of a decline in the death rate. Although this decline became much more significant later, the changes that had already taken place by 1741 appear to mark a turning point in the development of the population of the area for it showed much greater resilience during the crisis of 1740-41 than it had shown in the crisis of 1708-10 and soon resumed, at a more rapid rate, its upward movement. The recovery, which coincided with a great increase in ironstone mining and a growing demand for coal and for carriage facilities, began with a large, sustained increase in the numbers of marriages, starting in Burford and Cleobury Mortimer in 1742 and 1743 and in most of the other parishes between 1746 and 1748. These increases were followed by a significantly larger number of baptisms from about 1742 in Burford and Coreley, from 1746 in Caynham, from 1748 in Hopton Wafers, from 1752 in Cleobury Mortimer and from 1754 in Bitterley. Increases in the numbers of baptisms were much less noticeable in Neen Savage where the number of marriages remained nearly stable until about 1770.

Although the numbers of baptisms continued to increase in most parishes between 1751 and 1790 at a relatively rapid rate, the numbers of burials did not

1. See above, pp. 159-60.

2. See below, p. 396 et seq.

increase, in general, at the same rate and, in some parishes at least continued to decline. In Cleobury Mortimer which contained, from 1739, a workhouse that served the southern parts of Stottesdon Hundred and where there were as a result more people at risk because of old age, sickness and other infirmities, the number of burials increased steeply from about 1770. They reached a peak in 1777-78 when the town was swept by an epidemic of diphtheria ¹ and remained higher than in any of the other parishes for the rest of the period. However, even in this parish there was an underlying improvement in the death rate, as is shown by the infant mortality rate which fell from 85.32 per thousand between 1701 and 1710 to 78.57 per thousand between 1751 and 1760 and to 67.79 per thousand between 1801 and 1810. The numbers of baptisms exceeded the numbers of burials in all parishes every year including the periods during which earlier levels of burials were reached, as they were in Bitterley, Caynham, Coreley and Hopton Wafers from about 1755 and in Cleobury Mortimer from about 1765. The excess of baptisms over burials indicates that there was a rapid growth in the population during this period and comparisons of the numbers of surnames noted in the parish registers show that the natural increase was augmented to a greater extent than before by large movements of people into the area.

TABLE 7

Numbers of Surnames Noted in the Parish Registers

	<u>1701-10</u>	<u>1741-50</u>	<u>1781-90</u>
Bitterley	112	118	152
Burford	121	126	169
Cleobury Mortimer	166	207	245
Coreley	45	69	109
Hopton Wafers	64	64	111
Neen Savage	72	79	98

1. C. Creighton, History of Epidemics in Britain, ii, 710.

There are no population listings available for any of the parishes of the area for the period between the Compton Census of 1676 and the National Census of 1801 and the census of 1811 which is clearly more reliable in this area. Comparisons of the figures for 1676 and 1811 reveal that, between these dates the populations of Coreley and Hopton Wafers nearly trebled, those of Bitterley and Cleobury Mortimer more than doubled and the population of Caynham increased by 58%. The increases in the parishes that were least affected by the local mining industries were much less and amounted to 42% in Burford, 40% in Neen Savage and under 30% in Milson and in Neen Sollars.

A very rough indication of the population totals at dates between 1676 and 1801, or 1811, can be obtained by adding or subtracting each year the excess or deficiency, respectively, that arose from the difference between the numbers of baptisms and burials.

TABLE 8

The Population of the Parishes, 1676 - 1811

	<u>1676</u>	<u>1721</u>	<u>1741</u>	<u>1761</u>	<u>1801</u>	<u>1811</u>
Bitterley	500	715	820	940	1,083	1,103
Burford	718	926	983	1,109	819	1,023
Caynham	520	-	-	-	711	820
Cleobury	717	988	1,118	1,340	1,368	1,582
Coreley	205	176	220	307	458	560
Hopton Wafers	162	223	267	380	392	434
Milson	103	-	-	-	134	129
Neen Sollars	163	-	-	-	197	209
Neen Savage	333	476	481	514	469	464

The great amount of migration, indicated by the increase in the numbers of

surnames between 1741-50 and 1781-90¹, suggests that the estimated population totals based on the excess of baptisms over burials have little value after the middle of the eighteenth century. A detailed study of the surnames that had disappeared from the registers during the same period shows that they amounted to 42% in Coreley, 43% in Bitterley, 47% in Hopton Wafers, 48% in Cleobury Mortimer, 52% in Burford and 57% in Neen Savage. This confirms that large numbers of outward movements took place also and there was a large turnover of population in all parishes, particularly in the less industrialised parishes. Some of the people who disappeared cannot be traced but many of them, including a high proportion of miners and labourers, reappeared in local parishes. Some of them moved several times and it seems that they were able to migrate easily whenever it was necessary for them to take advantage of the changing opportunities for employment in different parts of the area. Population mobility, in particular the movements of people into the mining parishes, was encouraged by the availability of houses and of sites for settlement in the wastes of those parishes.

(b) Settlements

The establishment of new settlements and the growth of older settlements on the hillsides of Titterstone Clee, particularly within or adjacent to the wastes, continued at a much greater rate between 1720 and 1780 and affected not only the areas where settlement had been encouraged earlier by families such as the Hills, Hydes and Sheppards but also areas such as Earls Ditton manor where restrictions on settlement had been imposed during the seventeenth century².

In the manors of Snitton and Caynham the older settlements at Bennetsend, Whitewayhead and Knowbury which were situated near the Colleybrook, Knowbury and Gutter collieries expanded either through further encroachment on the wastes or through the building of more houses in and around the enclosures that had been

1. See above, p. 389.

2. Most of the places referred to in this section can be related to Figure 4, p. 19, Figure 11, p. 94 and, in particular, to Figure 19, p. 321.

made earlier. Other settlements developed on Angel Bank above Hillupencott, alongside the new turnpike road between the Gutter Works and Treen pits, and at Clee Hill where the junction of the turnpike road with the road to Tenbury provided a natural centre situated roughly halfway between Treen pits, the ironstone pits at Hill Top, and the collieries at the Footrail and at Cornbrook.

New settlements were not discouraged in Snitton and Caynham manors either by the manor lords or by their courts which were closely controlled by them through their representatives. They valued the profits and rents that were derived from the industrial activities of the area and were well aware of the fact that more complex mining operations and increases in the production of coal and ironstone depended to a great extent on an expanding labour force which contained at least some skilled miners and able workers. Although George Pardoe and the Earl of Powis, and his son-in-law Lord Clive, were not always on good terms after 1765 as a result of conflicting views concerning the lease of the mineral rights of Snitton-Caynham, they did not allow their differences to overcome their mutual interests still less to cause a breach between them. George Pardoe the younger, who continued to act as the steward of Munslow hundred and of Snitton and Bromfield manors on behalf of Lord Powis and his successor until 1780 ¹, did nothing to restrain further settlement on the wastes of Snitton, and other officers of the manor were sympathetically inclined towards the interests of the tenants. In or about 1770 the bailiff of Snitton, Samuel Hughes, sent a list of the tenants' requests to the agent, Mr. Probert ². Many of the requests were for wood needed for making repairs to houses and other buildings but some were concerned with rents that were considered to be too high. Among them was one from Francis Thomas who said that he could not pay a rent of £4 a year and repair the buildings, which were falling down. He wanted both a reduction of his rent and help towards making the necessary repairs. Hughes added, significantly, that his case was recommended by Samuel George who was Lord Powis's adviser on mining

1. S.B.L., Deeds and Charters, Bdle.6107 (The courts leet and baron of Snitton manor, 22 Oct., 1779); Ibid., Bdle.6110 (Copies of Mr. Pardoe's Bills).

2. Ibid., Bdle.6111 (Mr Sam¹ Hughes's Memo. at a Rent day).

affairs. The point was made more explicit in the case of Thomas Roberts who 'complains greatly' about his rent, 'and says he must leave the place'. Hughes, implying that they could not afford to lose him, added: 'he is a very useful workman in the works'.

The rental of Mrs. Sheppard's estate at Hillupencott made in 1728¹ shows that the estate included forty five cottages and two additional enclosures on the wastes of Snitton and Caynham. The rents which varied between 2/6^d and £4 a year were said to total £37/6/4^d. However, the agent of the Powis family who made comments on the back of the rental considered that the value of the rents was exaggerated, that the cottages depended on the 'works' and that the Powis family was entitled to 'cull open' the enclosures and tines. He estimated that the cottages which 'are usually accountable but as paper and packthrid' were worth at best £27 a year. There is no record of the number of cottages that existed in the other parts of the wastes at the same date but the comments of the agent indicate that there were relatively few that were not included in the claims of the Sheppards and that this formed part of the grievance that Lord Powis felt about the exploitation by the Sheppards of their joint moieties of the waste.

A perambulation of Lord Powis's manor of Snitton which was carried out in 1729² re-established his claim to the top soil and restricted the interests of the Sheppards to the cottage settlements established in Caynham manor and to the moiety of the mineral resources that they had purchased from Thomas Powys's successors³. As a result, as later records show, possession of cottages established in the wastes of Snitton passed to Lord Powis and the Sheppards retained only those that had been established in Caynham manor. Thus a larger share of the houses on the hillside was owned by Powis from about 1731 when the dispute was settled.

The Hillupencott estate was acquired by Richard Knight in or about 1742⁴

1. See above, p. 315.

2. S.B.L., Deeds and Charters, Bdle.6111 (Snitton Manor ... Boundary, 1729).

3. See above, p. 315.

4. See above, p. 317.

and from 1746, after his death, the cottage rentals were included in the accounts of the Bringewood and Charlcott ironworks partnership. The accounts for 1746-47 show that the estate contained forty five cottages at that time. Cottage rents amounted to £17/17/0^d and arrears to £16/14/0^d. Although some new cottages had been built since 1731 in the areas of Caynham controlled by the Knights the increase in rents, a mere £3 or so, indicated that settlement during that period had taken place on a very moderate scale. After 1746-47 the cottage rents remained at £17/17/0^d until 1752 when they began to increase again as the demand for coal increased. By 1754-55 they amounted to £21/4/3^d a year and the arrears, which had grown even more rapidly, exceeded £38. Thereafter the details of the rents given in the accounts were incomplete, for some cottages around the pits were included in the leases of mineral rights granted to George Pardoe. He was responsible for collecting the rents and passing them on to the representatives of the partnership but, as his detailed accounts have not survived, only the amounts that he handed over have been recorded. However, after the period of additional settlement early in the 1750s the total amounts received for rent each year remained nearly unchanged during the following seventeen years, thus indicating that few new cottages were established and that the settlements remained relatively unchanged. Meanwhile the rent arrears of the cottagers increased steadily year by year until they reached a peak of £78/16/11^d in 1770-71.

The establishment of new settlements and the expansion of the old ones was given a fresh impetus by the rapid increase in coal production after 1769-70 and by 1773-74 the cottage rental amounted to £29/10/6^d. In 1780 Joseph Oldham, lord of the manor of Caynham and others concerned, including Richard Payne Knight, acquired an act for the enclosure of Caynham wastes. The survey of the Knights' cottage lands carried out by the commissioners did not value the buildings but revealed that at least seventy seven existed at that date ¹. This was an increase since 1746-47 of almost exactly seventy per cent. The enclosure award ² itself reveals that most of

1. S.B.L., Deeds and Charters, Bdle.6110 (Mr Knight's Cottage Land ... 1780).

2. S.R.O., 1187/21 (Dated 26 Sept., 1780).

the cottages belonging to the Knights were situated around the collieries at Colleybrook and Treen Pits, and on the northern side of Clee Hill village. They occupied seventy seven acres and three rods of land. A few possessed four acres and one occupied by John Robinson had only five perches but the average holding was about one acre.

A list of the Snitton cottages not included in the manor rental was drawn up in 1745¹. It reveals that there were forty nine cottages and several encroachments, one of which had been made as early as 1738, in the wastes of the manor. The total of the rents that were due to Lord Powis amounted to £53/2/6^d a year and ranged from £2/10/0^d paid by Thomas Maund for his own and for his late father's houses and enclosures to 5^s a year paid by several holders of recently erected houses. Seven of the tenancies were held jointly by people with different surnames indicating that more than one family lived in some of the cottages but fifteen of the other householders were widows who, in most cases, lived alone.

The Snitton rent roll for Michaelmas 1778² contained a list of sixty eight cottages which included one 'exchanged with Mr Oldham' and two 'never before in the Rental'. Many of the additional cottages had been built in the enclosures that already existed in 1745 so in spite of the increase in their number by more than thirty nine per cent the rent had increased by less than £2 to £55/1/0^d. Although the rents were much lower on average than they had been in 1745, the poverty of many of the cottagers, like the poverty of those in the neighbouring settlements owned by the Knights, is revealed by the large amounts that they owed in arrears of rent. These, which amounted to £72/11/9^d in 1778, had increased to £90/2/6^d six months later according to the manor rent roll of Lady Day 1779³. No joint tenancies were recorded in either of these rent rolls and the number of female householders had fallen to eleven.

1. S.B.L., Deeds and Charters, Bdle.6110 (List of Cottagers in the Manor of Snitton ... Nov., 1745).

2. Ibid., Bdle.6111 (A Rental of Cottages ... 1778).

3. Ibid., Bdle.6110 (A Rental of Cottages ... 1779).

No new cottages were added to the rental between Michaelmas 1778 and Lady Day 1779 but it is clear that the pace of settlement had increased during the 1770s as it had done in the areas owned by the Knights. The proceedings of the courts leet and baron for Snitton manor held on 18th October 1777 contained presentments of thirty one people for the enclosure of lands on the waste. A year later at the same courts thirty four were presented and by 22nd October 1779 the number had increased to thirty eight and included Thomas Child and Edward Roden who had erected cottages on their encroachments. On 8th November 1780 and 20th October 1781 forty and thirty nine people, respectively, were presented and amerced, although by this time some of the earliest offenders had been given a lease and were included in the rental instead of in the records of the manor court ¹.

In Earls Ditton manor, which included the largest areas of waste that contained ironstone and coal, settlement had been restricted after 1670 through the influence of the freeholders and other landholders on the manor courts. However, the attitude of suspicion and hostility directed towards cottagers and towards mining activities had begun to change by the early 1720s and disappeared altogether a few years later. This change coincided with the recovery and, later, with the expansion in mining activities which provided more work and income for the people of the district and it was encouraged subsequently by the influence exerted in the manor courts first by the Knights and by their employees, notably Samuel Haycox and Thomas Longmore, who had acquired land in the manor, and then by the influence of the increasing number of landholders who benefited from providing transport, timber or other services or supplies to the mines or to their labour force. The change in attitude, which was slight at first, was associated also with a decline in the concern for sheep and for their grazing rights on the waste felt in particular by the larger landholders of the lower parts of the manor who began to place a greater emphasis on their lands outside the waste which, at times, had to be protected from the depredations of the sheep.

The last complaints about cottagers' dogs and about the practice of 'resetting

1. S.B.L., Deeds and Charters, Bdle.6107.

of inmates' in cottages on the waste were recorded in the proceedings of the manor courts held in 1719 and 1721 respectively ¹ and the final action taken against a miner who did not 'fill up or otherwise Secure his Colepitts ... from the danger of Cattle and Sheep falling in' occurred in 1731 when Samuel Haycox was amerced the sum of £1/19/0^d for failing to take notice of the warning served on him in 1730. After about 1720 the matters that occupied the attention of the courts for some years concerned agricultural problems of the areas outside the wastes rather than the presence or behaviour of the cottagers, and involved, mainly, the closing, hanging or maintaining of road gates, the scouring of ditches and dressing of roadside hedges, the diverting of streams from their customary courses and the breaching of pounds. From about 1730 the courts began to ignore these matters also and gradually became a formal and relatively inactive annual meeting which was concerned almost entirely with presenting a list of people who had encroached on the wastes. The constables stated almost invariably, in laboriously prepared memoranda obviously copied from those made in previous years, that all was well and that they had nothing to present, and the courts having amerced cottagers and encroachers on the wastes formally concluded their proceedings by continuing 'all pains formerly Layd'.

The manor rental of 1728 referred to twenty five cottages ². In addition two other cottages were the subject of presentments to the manor courts during the same year. The total of twenty seven was much smaller than the number that were included in Mrs. Sheppard's rental of the same year and, because of the much greater area covered by Earls Ditton manor, their impact on settlement patterns was much less than was experienced by Snitton and Caynham. Most of the Earls Ditton cottages were scattered around Shetfields and Hillside in Hints, near to the brickworks and to Footrail and Sough collieries, in the area that lay between Cuttley colliery and the Marsh Down Farm, and at Catherton along the banks of the Mill streams that ran on

1. S.B.L., Deeds and Charters, 8104, 8106. Earls Ditton manor court rolls, which have been studied in detail for this section, exist in an almost unbroken series from 1722 to 1769 (numbered 8304 to 8350), and from 1770 to 1783 (numbered 8107 to 8119).

2. S.R.O., 407/12.

both sides of the Heath colliery.

The number of cottages increased relatively slowly after 1728, as at Snitton and Caynham, and a study of the manor records indicates that nearly all of them were established by following the same procedure. In 1728 four enclosures or encroachments were presented at the manor courts in addition to the two cottages already referred to above. By 1733 all of them contained, according to the presentments, a newly erected cottage. Their owners had either lodged elsewhere for several years or, as seems more likely, they had been living on the enclosures in temporary shelters that were so crude that they had been overlooked by the courts. In a survey made in 1769 such a shelter was referred to as a hut ¹.

By 1743 there were thirty two cottages on the wastes. Twenty six of them were included in the manor rental ² and the other six were included in the presentments to the manor court. Only one other cottage was added to the presentments up to 1747 but during the next four years, as the Knights struggled to supply coal to their works and to domestic customers and became involved in large-scale and expensive work on the construction of the New Footrail colliery, five more cottages were built, bringing the number that were included in the presentments to twelve. The study of the names of the occupants of these cottages reveals that very few, if any, were transferred to the manor rental until about 1757. Thereafter as the manor stewards steadily transferred them to the rental by granting leases they were replaced in the presentments by new cottages at a rate which maintained the number of cottages amerced each year at, or close to, twelve.

The increase in the rate at which cottages were being established during the period from 1757 is revealed by a survey of Lord Craven's estates which was carried out in 1769 by Matthias Baker ³. Baker, who included all cottages in existence at that date whether they were included in the rental or not, gave the details of fifty

1. See below, p. 399.

2. S.B.L., Deeds and Charters, 9872.

3. S.B.L., Ms. 2481.

six cottages, and of a 'hutt' occupied by the Widow Garbet which was situated on a very small island enclosure measuring thirty five perches in the wastes of Catherton. A comparison of Baker's survey and maps with the presentments made to the manor courts in the same year show that three cottages which already existed were referred to merely as enclosures in the presentments. The occupiers were amerced accordingly for several years afterwards.

Between 1728 and 1769 the number of cottages on the wastes of Earls Ditton manor had more than doubled from twenty seven to fifty seven. Most of the increase, amounting to more than 78%, occurred between 1743 and 1769, with the largest increases taking place after 1757. A rapid rate of settlement was maintained after 1769, during the final years of the Knight partnership, as the demand for coal increased and as the partners ensured that the deeper pits that had been sunk were exploited as much as possible, and it was maintained in the years that followed their departure as is foreshadowed by the great increase in the number of new enclosures that took place from 1777.

The establishment of large numbers of cottages in the wastes of Earls Ditton manor between 1728 and 1783 had considerable effects on the size of settlements that already existed and influenced the settlement patterns of the various parishes and townships of the manor in different ways.

In Coreley, with the exceptions of some ribbon development at Cornbrook Bridge¹ and a few island settlements in the waste, the new settlement was based on encroachments and enclosures made along the edge of the waste at Studley, Upper Woodrow, Shetfields and Hillside. It fitted into the patterns of settlement already established on a small scale in the sixteenth and seventeenth centuries when cottages had been built in enclosures and encroachments recovered from the edges of the waste. Similar expansion into areas that were partially occupied occurred in that part of Hopton Wafers around Hopton Bank that had been settled in the seventeenth century, and at Hill Houses in Farlow which had been established near the Gutter

1. See Plate 14.1, p. 344.

TABLE 9

Earls Ditton Manor Courts: Presentments of Cottages and Encroachments ¹

	<u>Cottages</u>	<u>Number of persons amerced for enclosures or encroachments</u> ²
1771	3	10
1772	3	10
1773	3	11
1774	5	12
1775	(5) ³	12
1776	5	13
1777	6	22
1778	6	22
1779	6	22
1780	10	25
1781	13	27
1782	19	26
1783	20	27

-
1. The details have been extracted from the court rolls of the manor.
 2. Some of these persons were amerced for more than one enclosure or encroachment. In addition to those given in this list there were three long-term enclosures that were never occupied by persons who were seeking to establish a cottage on them. As far as can be ascertained, they were used for agricultural purposes only and were in the possession of Thomas Longmore, Henry Tedstall and George Mantle.
 3. Four cottagers were amerced in 1775, but it is clear that one cottager was omitted as the result of a clerical error.

outcrop in the late sixteenth and early seventeenth centuries.

In Earls Ditton and Catherton townships, however, the pattern of settlement was very different for in both places new communities which extended much further into the waste were established. The Earls Ditton enclosures gradually spread upwards along a well-drained ridge from the neighbourhood of the Marsh Down Farm to Cuttley colliery. From there, as gaps were filled in, encroachments and enclosures were made eastwards between Hoar Edge and the line of the turnpike road, which was closely followed, and a new community centred on the junction of the turnpike road and the road to Earls Ditton was established which had a separate identity from the lower townships of Earls Ditton and Dudnell. It became known as Doddington, which was formerly the name of the whole liberty of which it formed a part, and in time it acquired its own village centre and school. In 1849 it was detached from Cleobury Mortimer and, with the addition of parts of Coreley, was formed into a new ecclesiastical parish.

Although more island enclosures and cottages were established in Catherton waste between 1728 and 1783, they were closely related to the two adjacent areas of continuous settlement along the banks of Mill Brook and the little Mill Brook. Although these settlements in their earlier and lower stages were only separated by a narrow strip of land little more than a hundred yards wide which contained the Heath colliery, they developed into distinct settlements. The earliest reference to the settlement on Mill Brook occurred in 1660 when the vicar of Cleobury, Robert Goodwin, noted among his receipts from Catherton township the sums of two shillings each from 'Bishop' and 'Goodman Crump' for tithes and Easter Dues respectively ¹. He referred to their place of residence which was some distance from Heathhills and even further from the centre of Catherton township as 'the Clee syde'. Later in the seventeenth century he, and others, described people who lived in that area as 'of the Clee', indicating that the settlement had not acquired at that stage a separate identity and name.

The rentals of the manor of Earls Ditton for 1662, 1664 and 1666 ² reveal

1. Goodwin, Memoranda Books, fos. 9 v, 19 r.

2. S.B.L., Deeds and Charters, 7450, 7548, 9816.

that both Henry Crump and Widow Bishop, or Richard Bishop, paid $3/4^d$ a year in rent to Lord Craven for their cottages and enclosures on Mill Brook. The Bishop family moved later in the century to Earls Ditton and then to Hopton Wafers but the Crumps remained behind at 'Clee Side'. In 1728 Widow Crump, who was obviously living in the same cottage, paid the same rent as her predecessors had paid more than sixty years before and she was still paying the same amount in 1742/43. In Baker's survey of 1769 the settlement based on the Mill Brook, including the adjacent island enclosures, contained fourteen dwellings and covered thirty acres and thirty one perches of land. Nearly a quarter of this was held by John Crump, whose enclosures covered about seven acres, but the amount of rent that he paid was not noted in the survey. His successor, George Crump, paid an annual rent of fifteen shillings for the same holding in 1787¹. At some time between 1728 and 1787, probably between about 1747 and 1769 when the settlement was expanding around the holding already occupied by the Crumps, first the stream and later the settlement itself became known as Crumps Brook. Both of them have retained this name to the present day.

In 1769 the settlement based on the other Mill Brook contained eight cottages and covered nearly fifteen acres of land. It expanded rapidly after that date and became known as Lubberland at about that time. As far as can be ascertained the first written record of this name was made in the parish register of Cleobury on 25th March 1781, when the burial of Joseph Davis of Lubberland was noted. It seems reasonable to assume that the settlement acquired this unusual name because of its awkward and haphazard appearance, which still shows on maps and aerial photographs today and which was the result of the difficulties faced by settlers who were attempting to reclaim an area that had been intensively mined in pursuit of the Gutter coal seam in the seventeenth century.

1. S.B.L., Deeds and Charters, 9864.

CONCLUSION

The great industrial changes that occurred in the second half of the eighteenth century were preceded and prepared for by a large number of smaller changes. The most obvious of these, which clearly gathered momentum from the second decade of the century, were the consequences, primarily, of business needs and of managerial and industrial innovations and improvements. They included increases in the scale of industrial ventures, the emergence of more professional and more energetic leadership, the extension of management, technical and working skills, substantial increases in investment in response to the demands made by larger markets, and the application of technical advances and other discoveries to industrial processes and to their associated activities.

The developments of the earlier years of the eighteenth century were themselves preceded by adaptations, innovations and other changes which were significant. However, these occurred, usually, at a slower rate, their impact was less widespread and in general they were less important than wider economic and social changes, resulting from developments and alterations in landholding patterns, in land management and in agricultural practices, that were transforming the background of the society in which the industries operated.

Changes in landholding patterns, which took place at different rates in different parts of the area and even in different parts of most of the individual parishes, were influenced by the great increase in arable farming in the adjacent Hereford plain, by the introduction and adoption of new crops, and by greater emphasis on pastoral farming, for which the land of the area was best suited. The rate at which changes were adopted was influenced by the nature and the situation of the land, by its previous development and, to a large extent, by the pressures and proximity of seigneurial control. In general they proceeded more rapidly in the lower parishes and townships than in those that were situated above them on the slopes of Titterstone Clee. The changes released labour, entrepreneurial skills and capital that could be applied to local industries and,

by increasing the disposable income of landholders, provided a larger market for manufactured goods and services.

In the lower areas the polarization of holdings was already well advanced by the early years of the seventeenth century, although for some time its effects were concealed or reduced by the expansion of settlements into the existing woodlands and wastes and by the increasing opportunities that were provided by industrial employments and by-employments. The most important of these were connected with the newly dispersed blast furnaces which had been attracted to the area by the presence of abundant supplies of ironstone, wood, and water power.

Although the sparseness and poverty of the population, the lack of large local markets and transport difficulties acted as a restraint on the development of the iron industry and of other local industries and trades, by the end of the seventeenth century a large and increasing number of men, many of whom had been rendered landless by agrarian changes, were occupied in the employments and by-employments of industry and had become conditioned to the needs and disciplines of such work. The revival of industry in the second decade of the eighteenth century was encouraged and assisted by the availability of a work pool provided by these men. As the opportunities for settlement ceased in the lower parts of the area, their numbers were constantly replenished and augmented. As a result settlements in the upper townships and parishes were extended, or new settlements were established, for these districts possessed, by a fortunate coincidence, large areas of hillside wastes which allowed a considerable population increase.

However, despite the fact that rapid industrial expansion was sustained, particularly after 1712 as the area became an established, integrated part of a wider economic system based on the iron industry of the Midlands, its position as a lowly supplier of raw materials to local ironworks that were not well placed themselves in relation to the major markets, ensured that its position in the iron trade remained peripheral and vulnerable and that little inventiveness was exercised in its mining industries.

Consequently the Titterstone Clee area cannot be said to have made a

significant direct contribution in the later stages to the wider and more revolutionary changes that occurred in industry towards the end of the eighteenth century. Nevertheless, the study of its history is valuable for, by revealing the development of a society that was influenced increasingly by change and industrial growth over a period of three hundred years, it can help to illustrate or explain the development of similar areas elsewhere, and, in addition, it can indicate at least some of the earlier and indirect contributions these areas made to the series of wider social and economic advances that culminated, ultimately, in the industrial revolution.

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APPENDIX 1

Bringewood and Charlcott Partnership: The Stock and Withdrawals of Profits

<u>To Lady Day</u>	<u>The Value of the Stock</u>	<u>Withdrawals of Profits</u> ¹
(June, 1733)	(£12,000)	-
1733-34	£12,240 (Calculated)	-
1734-35	£13,691	-
1735-36	£14,808	-
1736-37	£14,341	£1,000
1737-38	£17,727	-
1738-39	£16,457	£1,141 ²
1739-40	£19,880	-
1740-41	£22,295	£2,000 ³
1741-42	£26,233 (Inventory)	-
1742-43	£26,344	£324
1743-44	£30,626	-
1744-45	£23,919	£4,862
1745-46	£24,509	£1,000
1746-47	£25,471	£3,000
1747-48	£20,910	£6,000
1748-49	£21,398	£3,000
1749-50	£19,812	£3,600
1750-51	£19,493	£3,000
1751-52	£22,352	-
1752-53	£23,914	£2,000
1753-54	£24,942	£1,000
1754-55	£18,893	£6,471
1755-56	£15,363	£4,443
1756-57	£18,100	£49
1757-58	£22,330	- ⁴

<u>To Lady Day</u>	<u>The Value of the Stock</u>	<u>Withdrawals of Profits</u>
1758-59	£24,845	£14
1759-60	£22,149	£5,500
1760-61	£21,473	£3,500
1761-62	£21,365	£2,000
1762-63	£22,442	-
1763-64	£21,175	-
1764-65	£24,727	-
1765-66	£21,862	£5,000
1766-67	£23,959	£1,000
1767-68	£19,707	-
1768-69	£22,175	-
1769-70	£22,150	£4,000
1770-71	£24,903	-
1771-72	£27,225	-
1772-73	£29,522	-
1773-74	£31,433	-
1774-75	£33,347	-
1775-76	£35,871	-
1776-77	£32,354	£6,180
1777-78	£34,753	-
1778-79	£30,083	£6,000

-
1. Sums of money are given to the nearest pound.
 2. The partners paid £570/12/1 $\frac{1}{2}$ ^d each into the stock of the Stour Works.
 3. The partners loaned £1,000 each to the Stour Works.
 4. Following the payments made to Ralph Knight's widow the stock was replenished by an advance of £1,500 made by Edward Knight.

APPENDIX 2

Bringewood and Charlcott Partnership: Sales of Bar-Iron ¹

<u>To Lady Day</u>	<u>Retail Sales and Country Customers</u>		<u>The Rolling-Mill and Mill Uses 2</u>		<u>Sales to Customers at Bewdley</u>	
	<u>T.</u>	<u>Cwt.</u>			<u>T.</u>	<u>Cwt.</u>
1733-34	62	9			196	0
1734-35	74	7			231	0
1735-36	74	13			164	8
1736-37	79	4			190	5
1737-38	77	11			179	10
1738-39	83	7			251	0
1739-40	104	1			424	16
1740-41	56	6	(Sales of Rod Iron)	54 3	296	13
1741-42	40	9	5 0	112 1	212	5
1742-43	44	6	8 7	146 11	168	15
1743-44	56	1	11 5	157 5	167	0
1744-45	65	0	11 1	180 1	183	5
1745-46	80	12	12 18	199 15	155	3
1746-47	89	19	12 17	183 3	183	16
1747-48	69	1	11 9	199 13	151	15
1748-49	60	13	1 0	192 10	138	4
1749-50	66	17		207 2	126	13
1750-51	79	12		218 11	143	18
1751-52	92	6		237 1	125	6
1752-53	70	16		230 11	121	18
1753-54	88	0		181 6	102	12
1754-55	69	1		184 10	150	11
1755-56	65	18		210 12	159	13
1756-57	52	16		230 17	172	1
1757-58	39	11		162 3	202	0

<u>To Lady Day</u>	<u>Retail Sales and Country Customers</u>		<u>The Rolling-Mill and Mill Uses</u>		<u>Sales to Customers at Bewdley</u>	
	<u>T.</u>	<u>Cwt.</u>	<u>T.</u>	<u>Cwt.</u>	<u>T.</u>	<u>Cwt.</u>
1758-59	43	18	176	3	239	1
1759-60	37	3	189	17	212	5
1760-61	24	0	220	6	151	2
1761-62	31	6	257	0	124	16
1762-63	38	11	240	4	101	5
1763-64	37	0	223	16	93	16
1764-65	43	14	210	16	166	5
1765-66	42	1	247	2	121	15
1766-67	69	7	239	0	192	16
1767-68	63	4	290	9	150	12
1768-69	99	12	228	12	277	17
1769-70	102	15	301	9	117	10
1770-71	96	2	306	4	120	15
1771-72	93	11	273	18	74	15
1772-73	107	16	192	6	74	1
1773-74	122	14	107	6	88	15
1774-75	138	17	91	14	154	0 ³
1775-76	131	2	Nil		356	16 ⁴
1776-77	61	6	Nil		525	10
1777-78	108	5	Nil		474	10
1778-79	106	11	Nil		331	10

1. Weights are given to the nearest hundredweight.

2. In addition small amounts, usually less than a hundredweight, were delivered to the Clee Hill Works from time to time.

3. Including three tons of blooms sold directly to Cookley forge.

4. Including two tons of blooms and two tons and nine hundredweights of bar-iron sold directly to Cookley and Whittington forges respectively.

APPENDIX 3

Bringewood and Charlcott Partnership: Average Annual Receipts for Bar-Iron

<u>To Lady Day</u>	<u>Retail Sales and Country Customers</u>	<u>The Rolling-Mill and Mill Uses</u>	<u>Sales to Customers at Bewdley</u>
	<u>Cost per ton</u>	<u>Cost per ton</u>	<u>Cost per ton</u>
1733-34	£18/9/0	-	£18/4/0
1734-35	£18/8/0	-	£18/3/0
1735-36	£18/2/0	-	£17/15/0
1736-37	£16/13/0	-	£16/2/0
1737-38	£16/9/6	-	£15/17/0
1738-39	£15/18/0	-	£15/12/6
1739-40	£15/10/0	£15/10/0	£15/12/0
1740-41	£16/14/0	£16/0/0	£16/15/0
1741-42	£17/9/6	£16/0/0	£17/1/5
1742-43	£17/6/0	£16/0/0	£17/2/0
1743-44	£16/11/0	£15/6/2½	£16/7/0
1744-45	£16/12/0	£15/14/0	£16/11/6
1745-46	£16/13/0	£16/0/0	£16/18/6
1746-47	£16/8/0	£16/0/0	£17/0/9
1747-48	£16/14/0	£16/0/0	£16/19/6
1748-49	£17/0/0	£16/0/0	£17/2/11
1749-50	£16/15/0	£16/0/0	£17/2/9
1750-51	£16/10/0	£17/6/0	£17/2/10
1751-52	£17/2/0	£17/5/0	£18/5/0
1752-53	£17/16/0	£17/3/0	£18/3/0
1753-54	£17/2/0	£16/17/0	£17/9/8
1754-55	£18/9/0	£18/13/0	£18/10/0
1755-56	£18/13/0	£18/13/0	£19/4/4
1756-57	£18/15/0	£18/12/0	£19/3/0
1757-58	£18/10/6	£18/10/0	£19/8/4½

<u>To Lady Day</u>	<u>Retail Sales and Country Customers</u>	<u>The Rolling-Mill and Mill Uses</u>	<u>Sales to Customers at Bewdley</u>
	<u>Cost per ton</u>	<u>Cost per ton</u>	<u>Cost per ton</u>
1758-59	£18/6/0	£18/10/0	£18/6/8½
1759-60	£18/14/0	£18/10/0	£19/17/9
1760-61	£21/10/0	£20/10/0	£21/8/0
1761-62	£19/2/0	£18/16/0	£19/10/3
1762-63	£17/0/0	£17/3/6	£18/3/6
1763-64	£18/10/0	£17/19/0	£19/0/2
1764-65	£18/13/0	£18/10/0	£19/11/6
1765-66	£17/0/0	£18/0/0	£19/12/0
1766-67	£16/8/0	£17/0/0	£18/11/6
1767-68	£16/3/0	£16/17/5	£18/3/2
1768-69	£16/3/0	£16/10/0	£17/10/6
1769-70	£17/18/0	£16/16/0	£18/0/1½
1770-71	£17/19/0	£17/0/0	£18/4/0
1771-72	£17/13/0	£16/0/0	£18/1/3
1772-73	£17/3/0	£15/9/6	£18/1/0
1773-74	£16/18/0	£16/10/0	£17/11/7
1774-75	£16/16/0	£15/10/0	£16/11/6
1775-76	£16/11/8	-	£16/14/0
1776-77	£17/0/0	-	£18/1/6
1777-78	£17/16/0	-	£19/5/9
1778-79	£17/18/0	-	£19/19/0

APPENDIX 4

The Production of Pig-Iron at Bringewood and Charlcott^I

<u>To Lady Day</u>	<u>Bringewood</u>		<u>Charlcott</u>		<u>Total</u>	
	<u>Tons</u>	<u>Cwt.</u>	<u>Tons</u>	<u>Cwt.</u>	<u>Tons</u>	<u>Cwt.</u>
1733-34	584	15			584	15
1734-35	-	-	495	0	495	0
1735-36	433	15	261	0	694	15
1736-37	-	-	428	0	428	0
1737-38	724	0	593	0	1317	0
1738-39	-	-	584	0	584	0
1739-40	619	10	470	0	1089	10
1740-41	-	-	503	0	503	0
1741-42	705	18	430	0	1135	18
1742-43	-	-	479	0	479	0
1743-44	1069	10	410	0	1479	10
1744-45	189	10	46	0	235	10
1745-46	941	10	612	0	1553	10
1746-47	-	-	691	10	691	10
1747-48	123	0	60	0	183	0
1748-49	752	0	374	11	1126	11
1749-50	-	-	763	16	763	16
1750-51	701	0	-	-	701	0
1751-52	-	-	696	0	696	0
1752-53	714	10	-	-	714	10
1753-54	-	-	649	0	649	0
1754-55	597	15	84	0	681	15
1755-56	-	-	636	0	636	0
1756-57	694	15	500	0	1194	15
1757-58	598	3	200	0	798	3

<u>To Lady Day</u>	<u>Bringewood</u>		<u>Charlcott</u>		<u>Total</u>	
	<u>Tons</u>	<u>Cwt</u>	<u>Tons</u>	<u>Cwt</u>	<u>Tons</u>	<u>Cwt</u>
1758-59	524	9	558	0	1082	9
1759-60	436	0	284	0	720	0
1760-61	258	0	-	-	258	0
1761-62	382	0	410	0	792	0
1762-63	430	0	430	0	860	0
1763-64	435	0	-	-	435	0
1764-65	468	15	553	0	1021	15
1765-66	324	0	471	0	795	0
1766-67	562	0	440	0	1002	0
1767-68	386	10	-	-	386	10
1768-69	484	6	368	0	852	6
1769-70	660	0	-	-	660	0
1770-71	485	3	393	0	878	3
1771-72	524	17	-	-	524	17
1772-73	143	7	427	11	570	18
1773-74	851	18	-	-	851	18
1774-75	293	0	-	-	293	0
1775-76	935	13	-	-	935	13
1776-77	-	-	574	10	574	10
1777-78	391	0	-	-	391	0
1778-79	653	10	-	-	653	10

I. In the accounts many of the production figures have been given to the nearest ton. Where more detailed figures exist they have been shown in the table to the nearest hundredweight.

APPENDIX 5

Bringewood and Charlcott Partnership: Sales of Black and Tinned Plate

<u>To Lady Day</u>	<u>Black Plate</u> ¹		<u>Tinned Plate</u>
	<u>Tons</u>	<u>Cwt</u>	<u>Boxes</u> ²
1733-34	-	-	-
1734-35	-	-	-
1735-36	-	-	-
1736-37	-	-	-
1737-38	-	-	-
1738-39	-	-	-
1739-40	-	-	-
1740-41	17	8	-
1741-42	27	10	458
1742-43	41	4	883
1743-44	61	13	1369
1744-45	57	15	1320 $\frac{3}{4}$
1745-46	73	0	1546 $\frac{1}{2}$
1746-47	56	5	1582 $\frac{3}{4}$
1747-48	77	1	1860
1748-49	49	6	1731 $\frac{1}{2}$
1749-50	42	14	1827 $\frac{1}{2}$
1750-51	51	17	2182 $\frac{3}{4}$
1751-52	32	0	1973 $\frac{1}{4}$
1752-53	34	11	1669 $\frac{3}{4}$
1753-54	60	7	1997 $\frac{3}{4}$
1754-55	56	6	2141
1755-56	39	17	1949 $\frac{1}{4}$
1756-57	37	17	2144 $\frac{1}{4}$
1757-58	7	8	2570
1758-59	12	8	2177

<u>To Lady Day</u>	<u>Black Plate</u>		<u>Tinned Plate</u>
	<u>Tons</u>	<u>Cwt</u>	<u>Boxes</u>
1759-60	18	12	2351
1760-61	10	4	2094
1761-62	88	14	1893 $\frac{3}{4}$
1762-63	108	12	1587 $\frac{1}{2}$
1763-64	87	9	1473
1764-65	83	15	1725 $\frac{1}{4}$
1765-66	90	13	1703
1766-67	88	9	1800 $\frac{1}{2}$
1767-68	76	0	1800 $\frac{1}{2}$
1768-69	83	8	2163 $\frac{1}{4}$
1769-70	76	15	2111 $\frac{1}{4}$
1770-71	76	9 (and 18 boxes)	1833
1771-72	86	14	1725
1772-73	75	7	1432 $\frac{1}{4}$
1773-74	53	13	1424
1774-75	39	11	1090 $\frac{1}{2}$
1775-76	-	-	433
1776-77	-	-	12
1777-78	-	-	-
1778-79	-	-	-

1. Weights are given to the nearest hundredweight.

2. It has been estimated that the contents of the boxes weighed between 118 and 128 $\frac{1}{2}$ pounds.

APPENDIX 6

Bringewood and Charlcott Partnership: Average Annual Receipts for Black and Tinned Plate

<u>To Lady Day</u>	<u>Black Plate per ton</u>	<u>Tinned Plate per box</u>
1733-34	-	-
1734-35	-	-
1735-36	-	-
1736-37	-	-
1737-38	-	-
1738-39	-	-
1739-40	-	-
1740-41	£27/8/9	-
1741-42	£28/13/8	£3/5/11
1742-43	£26/13/6	£2/14/9½
1743-44	£26/15/8	£2/12/8
1744-45	£26/14/3	£2/12/0
1745-46	£26/15/6	£2/10/3
1746-47	£26/14/3	£2/7/0
1747-48	£25/1/6	£2/6/6
1748-49	£26/0/0	£2/7/8
1749-50	£25/11/0	£2/8/6
1750-51	£24/18/9	£2/8/8
1751-52	£24/10/2	£2/11/0
1752-53	£24/18/3	£2/10/7
1753-54	£26/9/0	£2/10/0
1754-55	£26/0/0	£2/11/0
1755-56	£25/5/0	£2/11/9
1756-57	£24/18/7	£2/12/8
1757-58	£18/16/1½ ¹	£2/12/8
1758-59	£21/4/5	£2/12/10½

<u>To Lady Day</u>	<u>Black Plate per ton</u>	<u>Tinned Plate per box</u>
1759-60	£23/2/6	£2/13/6
1760-61	£21/16/0	£2/16/0
1761-62	£25/5/3	£2/14/0
1762-63	£23/6/0	£2/10/0
1763-64	£23/1/6	£2/10/3
1764-65	£24/2/8	£2/9/8
1765-66	£24/6/0	£2/9/6
1766-67	£24/14/0	£2/9/6
1767-68	£24/15/0	£2/9/10
1768/69	£25/3/4	£2/10/7
1769-70	£25/13/6	£2/10/9
1770-71	£25/11/6	£2/8/9
1771-72	£25/0/0	£2/9/0
1772-73	£24/19/0	£2/8/7
1773-74	£24/18/6	£2/9/1
1774-75	£25/1/6	£2/1/8
1775-76	-	£2/1/8
1776-77	-	£2/6/4
1777-78	-	-
1778-79	-	-

1. Very small amounts were sold during this year and during the following three years. See Appendix 5.

APPENDIX 7

Bringewood and Charlcott Partnership - The Clee Hill Account: Profits and Losses ¹

<u>To Lady Day</u>	<u>Profits</u>	<u>Losses</u>
1733-34	£25	
1734-35		£143
1735-36		£72
1736-37	£47	
1737-38	£105	
1738-39		£5
1739-40	£31	
1740-41	£30	
1741-42	£153	
1742-43	£65	
1743-44	£174	
1744-45		£115
1745-46		£157
1746-47		£518
1747-48		£319
1748-49		£371
1749-50		£470
1750-51		£421
1751-52		£335
1752-53		£22
1753-54		£177
1754-55		£101
1755-56		£116
1756-57		£279
1757-58	£102	
1758-59		£82

<u>To Lady Day</u>	<u>Profits</u>	<u>Losses</u>
1759-60		£89
1760-61		£22
1761-62	£61	
1762-63		£208
1763-64		£241
1764-65	£338	
1765-66		£56
1766-67		£297
1767-68		£20
1768-69	£466	
1769-70	£1128	
1770-71	£839	
1771-72	£1226	
1772-73	£1051	
1773-74	£850	
1774-75	£690	
1775-76	£230	
1776-77	£261	
1777-78	£251	
1778-79		£581

1. Sums of money are given to the nearest pound. The balances of the Snitton and Caynham account have not been included. See above, pp. 362-63 for details of this account.

APPENDIX 8

Bringewood and Charlcott Partnership - Deepwood Farm Account: Profits and Losses ¹

<u>To Lady Day</u>	<u>Profits</u>	<u>Losses</u>
1733-34	-	-
1734-35	-	-
1735-36	-	-
1736-37	-	-
1737-38	-	-
1738-39	-	-
1739-40	-	-
1740-41	-	-
1741-42	-	-
1742-43		£220
1743-44		£33
1744-45		£43
1745-46		£41
1746-47		£59
1747-48		£40
1748-49		£43
1749-50		£43
1750-51		£33
1751-52		£21
1752-53		£60
1753-54		£16
1754-55		£105
1755-56		£187
1756-57	£15	
1757-58		£81

<u>To Lady Day</u>	<u>Profits</u>	<u>Losses</u>
1758-59		£112
1759-60	£60	
1760-61	£56	
1761-62	£44	
1762-63		£76
1763-64	£16	
1764-65	£48	
1765-66		£138
1766-67	£6	
1767-68	£27	
1768-69		£23
1769-70		£39
1770-71		£17
1771-72		£105
1772-73		£102
1773-74		£65
1774-75		£22
1775-76		£128
1776-77		£127
1777-78		£75
1778-79		£129

1. Sums of money are given to the nearest pound.

APPENDIX 9

Deliveries of Ironstone from Titterstone Clee to the Furnaces

<u>To Lady Day</u>	<u>Delivered to Bringewood</u>		<u>Delivered to Charlcott</u>		<u>Total Delivered</u>	
	<u>Dozens</u>	<u>Strikes</u>	<u>Dozens</u>	<u>Strikes</u>	<u>Dozens</u>	<u>Strikes</u>
1733-34	803	0	38	5	841	5
1734-35	349	$1\frac{1}{4}$	347	$10\frac{1}{2}$	696	$11\frac{3}{4}$
1735-36	459	$8\frac{1}{2}$	280	5	740	$1\frac{1}{2}$
1736-37	465	0	660	$4\frac{1}{4}$	1125	$4\frac{1}{4}$
1737-38	991	2	366	$5\frac{3}{4}$	1357	$7\frac{3}{4}$
1738-39	427	$10\frac{1}{2}$	869	$3\frac{1}{4}$	1297	$1\frac{3}{4}$
1739-40	689	$1\frac{1}{2}$	729	3	1418	$4\frac{1}{2}$
1740-41	439	$9\frac{1}{2}$	655	$9\frac{3}{4}$	1095	$7\frac{1}{4}$
1741-42	795	9	441	$5\frac{1}{4}$	1236	$2\frac{1}{4}$
1742-43	1097	$1\frac{1}{2}$	505	$11\frac{1}{2}$	1603	1
1743-44	1361	2	813	11	2175	1
1744-45	1186	$5\frac{1}{2}$	582	8	1768	$1\frac{1}{2}$
1745-46	670	0	312	7	982	7
1746-47	340	2	441	3	781	5
1747-48	535	3	441	2	976	5
1748-49	650	8	353	7	1004	3
1749-50	604	6	501	5	1105	11
1750-51	730	10	539	5	1270	3
1751-52	614	2	262	1	876	3
1752-53	717	10	358	5	1076	3
1753-54	700	3	222	5	922	8
1754-55	575	2	516	1	1091	3
1755-56	515	1	228	9	743	10
1756-57	668	10	237	9	906	7
1757-58	1684	10	512	11	2197	9
1758-59	528	$1\frac{1}{2}$	130	4	658	$5\frac{1}{2}$

<u>To Lady Day</u>	<u>Delivered to Bringewood</u>		<u>Delivered to Charlcott</u>		<u>Total Delivered</u>	
	<u>Dozens</u>	<u>Strikes</u>	<u>Dozens</u>	<u>Strikes</u>	<u>Dozens</u>	<u>Strikes</u>
1759-60	961	9	158	6	1120	3
1760-61	606	$4\frac{1}{2}$	62	11	669	$3\frac{1}{2}$
1761-62	542	$5\frac{1}{2}$	121	11	664	$4\frac{1}{2}$
1762-63	621	$5\frac{1}{2}$	275	9	897	$2\frac{1}{2}$
1763-64	1009	1	64	2	1073	3
1764-65	1020	3	161	9	1182	0
1765-66	772	$9\frac{1}{2}$	203	5	976	$2\frac{1}{2}$
1766-67	818	2	243	0	1061	2
1767-68	331	6	465	$1\frac{3}{4}$	796	$7\frac{3}{4}$
1768-69	606	6	18	5	624	11
1769-70	959	10	-	-	959	10
1770-71	1153	3	385	10	1539	1
1771-72	1141	1	39	9	1180	10
1772-73	639	$6\frac{1}{2}$	-	-	639	$6\frac{1}{2}$
1773-74	864	4	-	-	864	4
1774-75	1172	0	-	-	1172	0
1775-76	1138	$8\frac{1}{2}$	-	-	1138	$8\frac{1}{2}$
1776-77	352	1	121	4	473	5
1777-78	945	3	-	-	945	3
1778-79	739	10	8	9	748	7

The figures given above have been calculated from references in the accounts of both furnaces to deliveries of ironstone; from the details of royalties on ironstone paid in Earls Ditton and in Snitton/Caynham manors; and from the payments made to independent suppliers of ironstone, the most important of whom was George Pardoe of Bitterley.

APPENDIX 10

Coal Production on Titterstone Clee, 1733-34 to 1778-79 ¹

<u>To Lady Day</u>	Col.1	Col.2
	<u>Earls Ditton Manor</u> <u>Tons</u>	<u>Snitton-Caynham Manor</u> <u>Tons</u>
1733-34	1645	(1728-29: 7500) ²
1734-35	1727	
1735-36	1697	
1736-37	2009	
1737-38	2339	
1738-39	1731	
1739-40	1841	
1740-41	2603	
1741-42	2038	
1742-43	1786	
1743-44	1672	
1744-45	2203	
1745-46	1892	
1746-47	1238	
1747-48	903	
1748-49	594	
1749-50	597	
1750-51	3793	
1751-52	2610	
1752-53	2996	
1753-54	3041	
1754-55	4289	
1755-56	4027	
1756-57	3366	
1757-58	4136	
1758-59	5187	

<u>To Lady Day</u>	Col.1	Col.2
	<u>Earls Ditton Manor</u> <u>Tons</u>	<u>Snitton-Caynham Manor</u> <u>Tons</u>
1759-60	4499	
1760-61	4347	
1761-62	5371	
1762-63	4526	
1763-64	5401	
1764-65	4553	
1765-66	4143	
1766-67	4422	
1767-68	5720	
1768-69	6862	6140
1769-70	10027	7622
1770-71	10399	7841
1771-72	12106	7715
1772-73	12771	7745
1773-74	13699	8606
1774-75	12191	9421
1775-76	10936	11042
1776-77	10756	11576
1777-78	10061	8472
1778-79	4727	9922

1. As the accounts do not provide details of coal production these figures are estimates. The totals in Column 1 have been calculated from deliveries made to Bringewood ironworks and houses and from the royalty and sales receipts recorded in the Footrail and Clee Hill coal accounts. The totals in Column 2 have been calculated from the royalty payments made by George Pardoe to the Snitton and Caynham coal account. As it has been assumed, if not stated otherwise, that the receipts referred to large coal, and as no attempt has been made to assess coal production at the Heath colliery, for which an annual rent of £40 was paid by the Haycox family between 1734 and 1758, and at other small pits operated by Lord Clive's agents, the true production figures were undoubtedly larger.

2. See above, pp. 315-16.