

# DERBYSHIRE LEAD PRODUCTION,

1195-1505<sup>1</sup>

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AN Italian visitor to England at the end of the fifteenth century when remarking on the wealth of the realm, singled out for special mention that the English "have an enormous number of sheep, which yield them quantities of wool of the best quality . . . and *an infinity of lead and tin*".<sup>2</sup> Attempts have been made to assess the size of the production of wool and tin, but there is no estimate of the importance of lead production.<sup>3</sup>

It is the purpose of this paper to provide such an estimate for one of the major English lead camps situated in the High and Low Peak of Derbyshire.<sup>4</sup> Unfortunately, within this area there was a great multiplicity of ownership of mineral rights, quite unlike the unity of control which the crown or the duchy of Cornwall exercised over the Stannaries, thus necessitating the piecing together of a mosaic made up from information drawn from a wide variety of mining jurisdictions. Such a method, of course, makes it extremely difficult to estimate the overall production within the area at any one point in time, and means that any attempt to assess the prosperity of the industry must rest upon series drawn from a number of differing mining areas. Such series may be constructed from two main sources. First, there are tithe returns which provide an insight into production within the Peak jurisdiction of the dean and chapter of Coventry and Lichfield, comprising the parishes of Bakewell, Hope and Tideswell and also into production in Youghreave parish, where the tithe rights were owned by the Abbey of St. Mary de Pratis, Leicester. Secondly, there are the records of the collection of the seigneurial dues of lot and cope which were collected by the crown and later the duchy of Lancaster from the mines within Wirksworth Wapentake and in the forest jurisdiction of High Peak. Outside these two main fields accounts have survived from various smaller fields like Ashford, Eyam, Middleton and others, but ownership here was not continuous throughout the period and only scattered documents remain. From these documents tentative indications may be made of changes in the size of lead production.

The revenues of the Crown, the duchy of Lancaster and many smaller lay lords came from their seigneurial rights within the lead fields. During the

fourteenth, fifteenth and sixteenth centuries these exactions were fairly well defined and comprised two elements; lot which was a fixed proportion of production in kind and cope which was a money payment on all production not taken in lot. In a fifteenth century account for High Peak the revenues due the king (as duke of Lancaster) were described as "eighteen loads of lead pertaining to our lord the king of that total of 234 loads, having from each thirteen loads one load from ancient custom, and for each load beyond the aforesaid 18 loads wholly pertaining to the king from that custom called le cope, 4d."<sup>5</sup> In Wirksworth the proportion of ore taken in lot was the same as in High Peak but cope was 6d. per load.<sup>6</sup> Lot at Ashford was the tenth load and cope was 4d.<sup>7</sup> Of the other fields for which figures have survived there is only information regarding lot payments in the fifteenth century.<sup>8</sup> An account of 1297-8 reveals an identical pattern.

"And of 54 shillings received of 27 loads of lot due from 347 loads of ore, issues of the king's mine in the same period viz from all ore wherever it was, for license to dig in the king's mines, the king takes one load in thirteen according to the ancient custom of the king's mine in ancient use. And of 106 shillings and 8 pence received of the miners for 320 loads of ore which remains after the king has taken lot, rendering 4d. for each load, called 'cope' for having license to sell the ore wherever they wish."<sup>9</sup>

Yet a decade earlier in 1285 the justices of the forest, when describing the Crown's revenues in the Peak, mention only the right to lot,<sup>10</sup> and their predecessors in 1252 similarly omitted any mention of cope.<sup>11</sup> This lack of information concerning cope before 1290's is confirmed in the bailiff's accounts for High Peak which only mention ore sales in issues of the mine.<sup>12</sup> Similarly in Wirksworth Wapentake at the Inquisition of 1288 there was no mention of the right of cope, although the king was said to have a right to pre-emption of the lead ore, which he may buy at the market price.<sup>13</sup> It seems likely, therefore, that cope originated, at some time in the 1290's, in a payment to the lord for waiving his pre-emptive rights.<sup>14</sup>

Finally, in this discussion of the source material for the study of lead production in Derbyshire, some consideration must be given to the question of evasion of these seigneurial dues. Evasion must certainly have been endemic in a situation where a tax was levied on many small producers, affecting both buyer and seller, and which relied on the vigilance of one officer and his deputies for its enforcement, yet whilst such evasion limits the possibilities of aggregation it does not vitiate the use of the statistics in the discussion of trends if it remained constant through time.<sup>15</sup> Before the fifteenth century the paucity of records invalidates any attempt to check their accuracy but thereafter such a study may be attempted. During the period of direct administration by the Duchy of its Wirksworth field, the custodian of the mine accounted directly to the receiver, bringing a tally recording total production, and if he defaulted in accounting an exorbitant charge was placed on his account.<sup>16</sup> But how accurate a check was kept on

the tally of production? An external check on the validity of the tally seems to have been resorted to on occasion, for in 1432-3 John Tagge accounted for the revenues accruing from 98 loads of ore, yet in the next year he was charged with 4s. 2d. for 2 burdens and 1 dish of ore which he had omitted from the previous year's tally.<sup>17</sup> In High Peak the bailiff of the jurisdiction accounted for the revenues of the mines, which had been independently reported to the receiver by the barmaster who was an independent appointee of the Duchy Council at this time.<sup>18</sup> In this period, therefore, the Duchy seems to have kept a fairly rigorous check on the size of production.

From about mid-century the Duchy's rights were farmed to a third party. In High Peak the practice was not instituted until Edward IV's reign, but at Wirksworth it began in 1435-6.<sup>19</sup> By their very nature these rents represent only very rough indications of production, which could fluctuate markedly during the currency of the lease. At Wirksworth the first lease, to Walter Wooley, was for six years and rarely thereafter was the actual length of the lease more than this, and similarly in High Peak leases rarely lasted more than six years.<sup>20</sup> It should be possible, therefore, at about six yearly intervals to view the direction in which the revenues from lot and cope were changing if the negotiations for the lease took place in open competition between persons with accurate knowledge of the size of ore production. Certainly the lessees had intimate knowledge of the state of the industry. The list of farmers of the rights of lot and cope in High Peak and Wirksworth during this period reads almost like a "who's who" of the major Derbyshire smelters. Fitzherberts vied with Foljeambes and Babingtons with Vernons to obtain the leases.<sup>21</sup> Moreover, their competition took place in a free market. In 1506 the commissioners who negotiated the lease for Wirksworth remarked in their report:

"Please it your mastership to understande that among other thinges in our travell by the Kinges Comandment and yours in thes partes an offre has been made (among others to us) for the Ferme of the lote and cope over that £53. 6. 8. of that Master Foliambe Farmer thereof at this day paieth 20 marcs by yere more. Whereuppon we have geven monycon and notice to the seid Master Foliambe of the same offre . . . and rather than to departe fro the seid Ferme he hath offred us to pay the seid 20 marc."<sup>22</sup>

At least until this date, therefore, the leases seem to have represented a fair assessment of the revenues that could be collected.

The reign of Henry VIII seems to have witnessed the breakdown of the system. The first rumblings came in 1520 when Godfrey Foljeambe petitioned to both the Lord Chancellor Wolsey, and the Chancellor of the Duchy of Lancaster regarding his rights in the finder's meer<sup>23</sup> and added at the end of his petition that he believed certain people were avoiding payment of lot and cope.<sup>24</sup> The Commissioners, headed by Sir Henry Sacheverall, appointed to enquire into the matter reported to Star Chamber that there was widespread evasion.<sup>25</sup> Shortly following certification Foljeambe again petitioned about evasion, claiming that since the Sacheverall report some 143 loads had been sold unmeasured against the

ordinance of the court. In 1527 the conflict was confined solely to proceedings before the Duchy Council, where Godfrey Foljeambe accused John Huchenson and others of avoiding payment on 278 loads. Twelve years later the claims were even more extravagant and Antony Babington alone was said to have "covered" 1500 loads without measuring them. Finally, after Sir Godfrey's death his executor James Foljeambe in 1542 took up the case claiming that various "brenners and buyers" of lead had evaded payment on 2,500 loads of ore.<sup>26</sup> The link between production and feudal revenue was broken, subsequently the *firma* became an ossified relic of a bygone age, rising slowly in value but bearing little relationship to the wealth originating from lead production.<sup>27</sup> Thus during the fifteenth century and probably earlier the figures may be taken as fairly accurate representations of production, thereafter the farm became increasingly divorced from the realities of lead output.

The earliest overall survey of the lead industry is provided in the pages of the Great Survey of 1086 in which are described, with one exception, the familiar concentrations of a later age.<sup>28</sup>

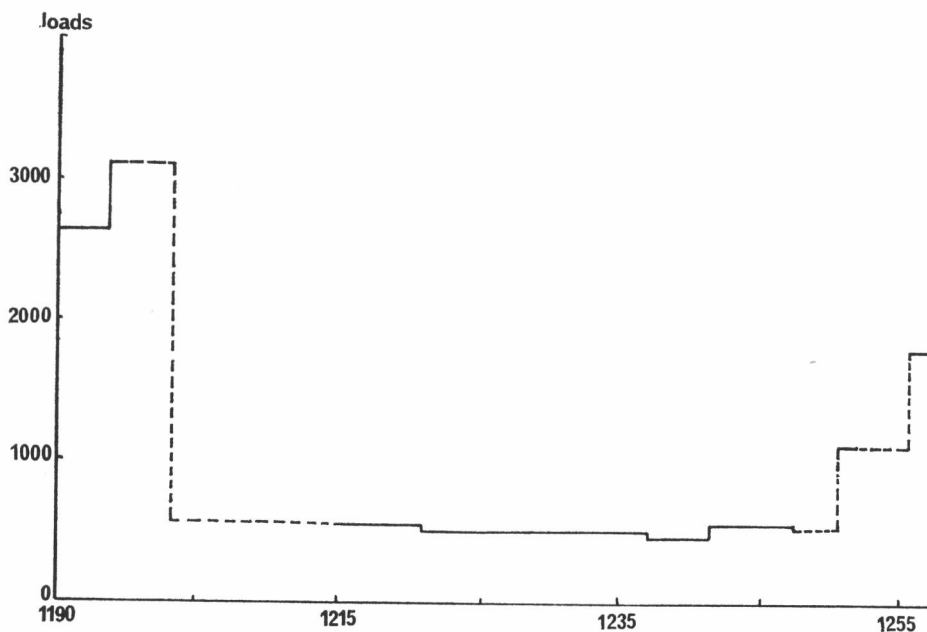
Table 1

A.	Wirksworth Wapentake (Hammenstan)	
	Matlock Bridge (Mestesforde)	1 plumbaria
	Wirksworth (Werchesuord) <sup>29</sup>	3 plumbariae
	Crich (Crice)	1 plumbaria
B.	High Peak, outer area south of the Lea	
	Bakewell (Badequella)	1 plumbaria
	Ashford (Aisseford)	1 plumbaria <sup>30</sup>
C.	High Peak, inner area north of the Lea	None

On the south-eastern edge of the limestone anticline was the large complex of the Wirksworth-Matlock field, which engrossed some half of the total number of workings (*plumbariae*), in close proximity to the fitz Hubert mine of the Crich inlier. Further north, crossing the boundary into High Peak or Bakewell Wapentake were the Ashford-Bakewell mines.<sup>31</sup> Yet beyond the Lea in the manor of Hope, in the northerly royal berewicks of Ashford and Bakewell or in the manors of William Peveral and Ralf fitz Hubert there is no trace, at this time, of lead production.

However, when after almost a century, information is again available about lead production it is from this area, north of the Lea, that it originates. In 1170 the Sheriff accounted for 40s. from mines within the Peak Forest. Work had continued in the Domesday fields but now a new field had been opened up, soon to make a substantial contribution to production.<sup>32</sup> How substantial becomes apparent in the pipe roll of 1195, an entry in which marks the genesis of material for the statistical investiga-

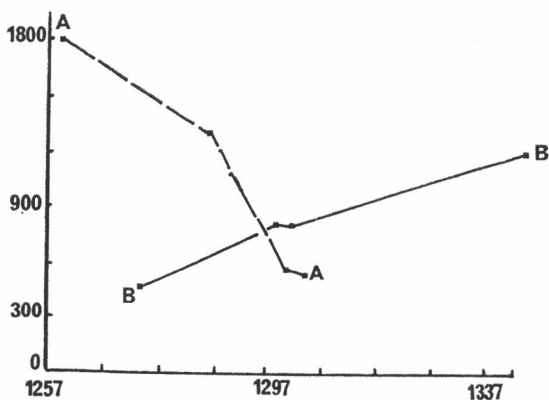




### LEAD PRODUCTION.

King's Demesne of High Peak, 1190 - 1257

Sources, see appendix A.



### LEAD PRODUCTION, 1257-1340.

Lordship of High Peak. A - A Peak Jurisdiction of the Dean and Chapter of Lichfield. B - B

Sources, see appendix A.

FIG. 1.

tion of production trends in the Derbyshire lead industry: "John Buche renders account of £16. 13s. 4d. for the mines within the demesnes of the lord king in Bakewell Wapentake for the preceding year."<sup>33</sup>

Thus out of the mists of statistical obscurity emerges one of the Derbyshire lead fields. The infant industry of 1170 had grown up. Within the crown's lordship of High Peak the mines of the Tideslow Rake were producing about 2,600 loads of ore, enough to produce some 175 fotheres of lead.<sup>34</sup> Nor was the process of growth completed, for by the end of the reign of Richard I Buche was paying £20 per annum. Yet 1199 marks a turning point, for it ushered in a half century of decline. Before the next reign closed in 1216, production had fallen from the high point of over 3,000 loads to no more than 550 loads, with the westerly Tideslow mines producing about 60 per cent of the total, the remainder being excavated at Wardlow. Thereafter decline continued to 1242, when at its nadir production amounted to about 480 loads, the brunt of the contraction being felt at Wardlow. Recovery followed through 1242-8 largely by extensive methods, new workings being opened up at Hucklow. This, however, was shortlived and by 1248 the mines were flooded; yet expansion continued, predominantly at Wardlow, until by 1256/7 the total output of the field amounted to over 1,800 loads.<sup>35</sup> The high point of recovery of the "inner core" of the High Peak field had, however, been attained and thereafter decline set in. By 1284/5 production was probably only 1,300 loads and in 1295/6 it had fallen even further to *circa* 520 loads. Yet this decline was only sectional and compensation came through expansion within the outer core of the Peak field.

In this area, which comprised that part of High Peak Wapentake outside the bounds of the royal forest, production was centred in two main areas, namely along the Hucklow-Middleton Rake and in the south along the Hard-Mandle Rake.<sup>36</sup> In both parts of this field production expanded rapidly. At Eyam, in the north, the mine increased in value from 20s. in 1283 to 26s. 8d. in 1329, whilst at Great Hucklow over the short period from 1291 to 1304 the mine grew in value from 1s. to 4s.<sup>37</sup> Yet this growth provided but little compensation to offset the decline further west, for if all the known mines, at Hazelbadge, Great Hucklow, Eyam and Middleton, were taken together it is unlikely that even at their point of maximum production they produced much more than about 450 loads of ore per annum.<sup>38</sup> The main contribution to the outer region's increase in output came from the old Domesday area between the river Wye and the waters of Lathkill. Here within the manors of Bakewell, Ashford and Youghreave production grew rapidly until about 1340, after which date a downswing began. Within the Peak jurisdiction of the dean and chapter of Coventry and Lichfield production, drawn increasingly from the bishop of Lichfield's mine at Bakewell, was rapidly augmented, rising from about 470 loads in 1275, to 720 loads in 1298-1300 and 1,100 loads in 1339.<sup>39</sup> A similar growth is found upon the Earl of Kent's manor of Ashford where during the decade before 1340 output grew from about 500-600

loads.<sup>40</sup> What this meant in terms of total output may be gauged when the Youlgreave-Conkesbury field is added in,<sup>41</sup> bringing the total for the three manors in the early 1340's to 2,300 loads or enough ore to smelt 150 fothers of lead. Whether this new growth in the outparts of the High Peak compensated for the decline in the forest area, and what the course of production was from 1258-1340 will probably always remain uncertain. However, if one assumes that the trends remained more or less unchanged it is not implausible that overall production in High Peak followed the same course as further south.

By the late thirteenth century production within the Low Peak was largely concentrated within Wirksworth Wapentake, the old Domesday field of Crich hardly produced enough ore to smelt a fother of lead and was dwarfed by most Derbyshire fields.<sup>42</sup> The mines at Hartington and within the Soke were quite another matter, however, at their height they produced more than all the others put together. In 1275, the date of the earliest reference to the value of production therein, it was already a field of no mean proportions. When a new lease was made in 1275 the lessees, William de Addersley and Robert del Bou, after paying a fine of twenty marks for the lease agreed to pay a rent of £53. 6s. 8d. for the *minera* within the Soke, thus augmenting the previous rental by a third.<sup>43</sup> Thereafter the rent increased two and a half times to 1313/4 when the net return was £133. 6s. 8d. After this date decline set in, rapidly accelerating during the troubled times of the second earl's rebellion against Edward II. Finally, there was a brief recovery before the Black Death but production never reattained its previous glory. Thus the first half of the fourteenth century witnessed, in this area, and probably also further north, an ebb in the production of lead from the high point of the turn of the century.

If one now draws together the evidence from the various fields, it may be possible to make some tentative conclusions about the nature of lead production in thirteenth-century Derbyshire. Firstly, if the trend within High Peak is not atypical it may be suggested that the long-term trend of output between 1190-1200 and 1290-1300 was downwards and that at the latter date the Derbyshire field produced not less than about 391 fothers of lead annually.<sup>44</sup> Of this total, Wirksworth Soke contributed something over half, whilst the other old field of Ashford, Bakewell and Youlgreave produced another quarter, the new area of the High Peak beyond the Lea making up the residual fifth. Further, it may be suggested on the basis of the High Peak evidence that the downward trend was not a linear one and that upon the trend was superimposed a cycle (which I shall henceforth refer to as an 'A' cycle) at its apogee in the decade 1190-1200, falling to a trough about 1235-1245 and rising again throughout the area to a peak in 1290-1300, below the earlier peak. Finally, though they may be only partially discerned in the thirteenth century, there seems to have been a whole complex of shorter range fluctuations (henceforth 'B' fluctuations) superimposed upon the cycle.

During the fourteenth century the long-term downward trend continued<sup>45</sup>

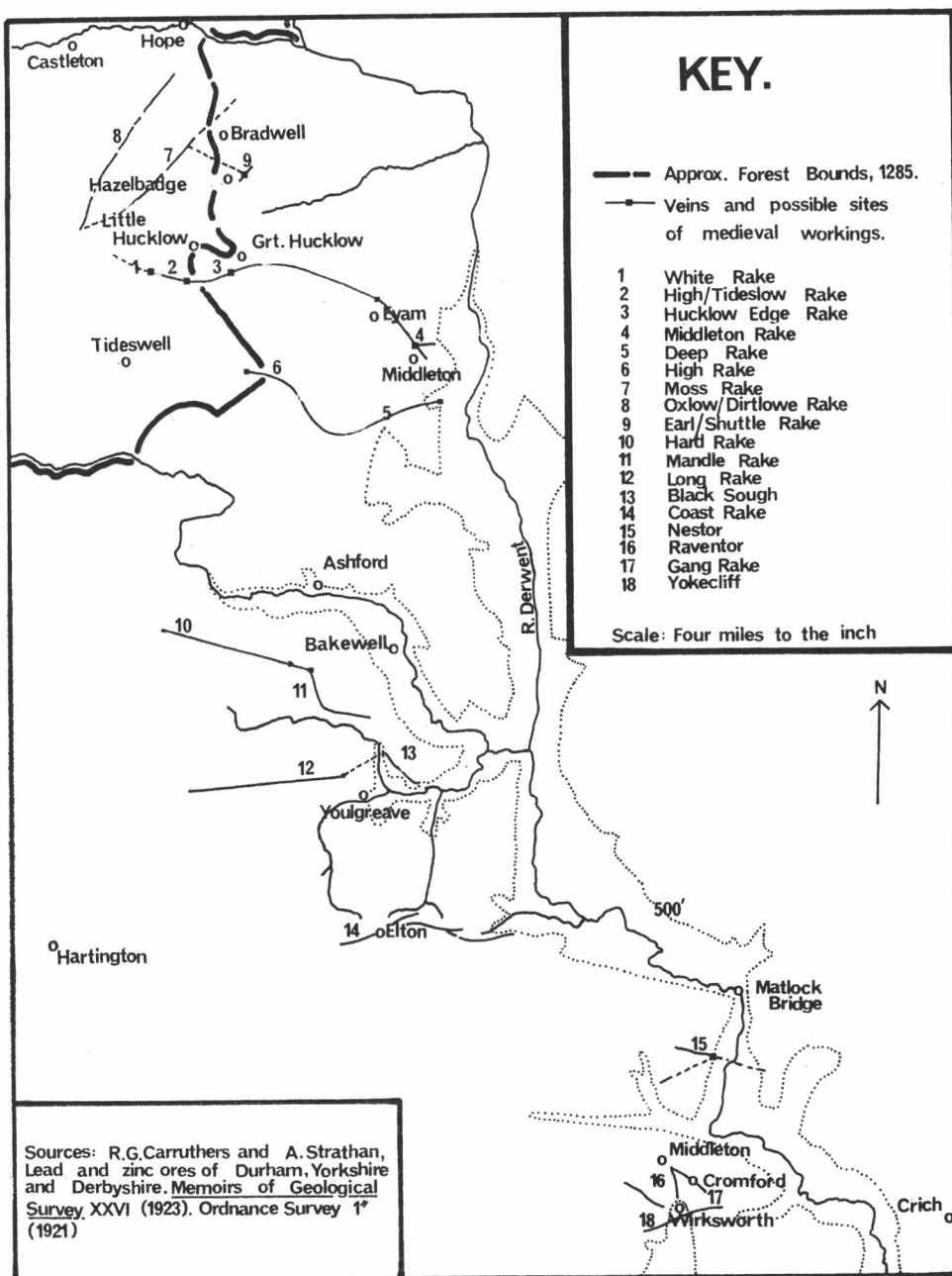


FIG. 2. The Derbyshire Lead Field.

though the relative balance between the parts was greatly disturbed. The industry virtually collapsed within Wirksworth Soke and underwent a serious decline in the old regions of High Peak. The only compensation came from a renewed growth within the lordship of High Peak. Yet it seems probable that by the end of Richard II's reign production was well below the level of 1290, perhaps amounting to no more than a half its previous output. However, again the decline was not a continuous one. As has been noticed, production had begun to ebb, at Wirksworth and probably elsewhere, already in the first two decades of the fourteenth century, and after a brief recovery continued during the forties. However, with the outbreak of the Black Death a gradual decline was turned into a complete collapse; being highly labour intensive mining was badly affected by the depredations of the pandemic. The early fifties witnessed complaints of labour shortage, and at Ashford in 1353 production was

Table 2

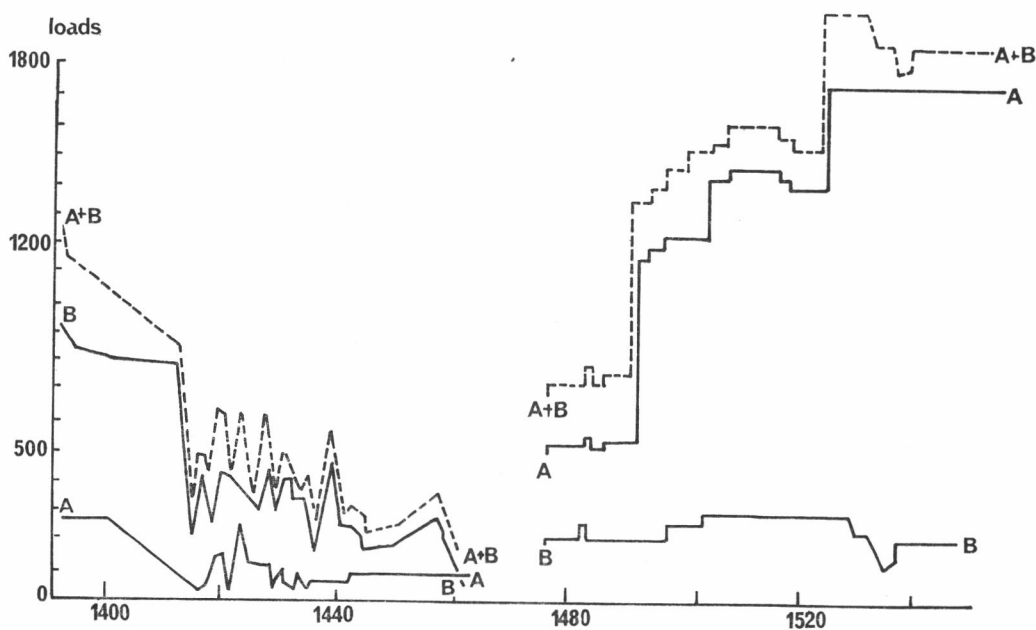
Lead production in Derbyshire *c.* 1290/1300 and 1390/1400  
(in fothers)<sup>46</sup>

<i>Field</i>	<i>1290/1300</i>	<i>1390/1400</i>
Wirksworth	210	44
High Peak viz		
Forest	35	60
Extra Forest	146	[102] <sup>47</sup>
	<hr/> 391	<hr/> [206]

said to have stopped because of the plague. Yet even as the jury was pronouncing upon the impact of the plague, recovery from its effects had begun, the previously valueless mine was said to be worth £1. The upswing of the 'A' cycle was underway though this time from a much lower trough than before. By 1365 the Ashford mines were well on the way to recovery, being valued at £5.<sup>48</sup> Similarly at Hope, Bakewell and Tideswell, the value of the tithe collapsed to a half of its previous value by 1356 but thereafter recovered to £12. 13s. 4d. in 1359, £17 in 1389-90 and £20 in 1403. This figure for 1403 exceeded the high point of the early fourteenth century in value, but represented in real terms because of the inflation, a volume only half the size of the earlier period.<sup>49</sup> Thus from about 1351 to 1395-1405 there seems to have been a recovery from the previous half century's decline, but a recovery insufficient to carry production back to its previous optimum. At Wirksworth output was but a fifth its previous level. At Youlgreave the decline was said to be even greater, a fall of eighty per cent, though this may well be canonical rhetoric

for such pre-plague figures as survive for this parish suggest no more than a 50 per cent fall.<sup>50</sup> However, overall, the long-term decline seems to have continued down to Richard II's reign.

During the next period from 1395 to 1505 the available information is largely restricted to the two main duchy fields of Wirksworth and High Peak, but again the familiar cyclical pattern reasserts itself, though this time about an upward trend. Starting at the peak of the 1390s production fell irregularly down to the early sixties, thereafter a recovery took place to *circa* 1505. Yet this time the peak at the beginning of the sixteenth century, thanks to the enormous recovery and growth within the Soke of Wirksworth, was much higher than the previous one in the late fourteenth century. Thus figure 3 shows both an upward trend in output during the fifteenth century and that upon this trend was imposed a 110-year 'A' cycle; however, it shows more than this. Uniquely, because of the completeness of the series, it is possible to discern the fluctuations of shorter duration — the 'B' fluctuations — particularly during the downswing from



### LEAD PRODUCTION, 1390-1540.

A. Wirksworth & Hartington.

B. High Peak.

FIG. 3.



the 1410's to the 1460's. Starting about 1417 at the bottom of a trough production grew in the early twenties, thereafter fluctuating about a plateau to 1431,<sup>51</sup> then declining. This decline reached its trough in 1437. Recovery then took place, followed by decline to 1442, recovery to 1458 and finally by collapse to 1462. Each peak and each trough was lower than the previous one, as the 'A' cycle continued its downward course. During the next half century the leasing of the mineral rights obscures the picture, but the upswing is clear, as are the alternating periods of stagnation<sup>52</sup> and rapid increase, viz.:

upswing	1442-57
decline	1457-64
?	1464-75
stagnation	1475-86
increase	1486-1505

Thus from the above survey one may perhaps tentatively suggest that upon the 'A' cycle were imposed certain fluctuations (B1) of random periodicity ranging from 5-30 years and others (B2) of an annual kind.<sup>53</sup>

Thus our survey is complete, encompassing the whole period 1195 to 1505. Certain conclusions may perhaps be drawn about production patterns within the Derbyshire lead industry during the later Middle Ages. Firstly, from 1195 to 1395 the overall trend of production seems to have been downward followed by recovery to 1505. Yet recovery was only to the level of the thirteenth century, probably below that of twelfth century. Secondly, that upon this trend were superimposed a series of 'A' cycles of 100-110 years periodicity. Thirdly, that upon this cycle were imposed 'B1' fluctuations of random periodicity ranging from 5-30 years and 'B2' annual fluctuations.

From the peak of 1505 production again began to follow the course of 'A' cyclical decline, but before the downswing was allowed to complete its course to its nadir, it was halted. About 1520-5 the medieval cyclical pattern was shattered and in its place rapid growth was substituted. Yet the boom collapsed in 1527, as rapidly as it had begun, the farm stabilising about 1534-8 and ultimately ossifying at that level.

#### REFERENCES

- <sup>1</sup> I am grateful to the Carnegie Trust for its financial support of my research on the British Lead and Silver-Lead Industries in the Later Middle Ages, a larger inquiry from which the evidence in this article has been drawn.
- <sup>2</sup> "A relation, or rather a true account of the Island of England about 1500", C. A. Sneyd (ed.), *Camden Society*, Old Series, XXXVII (London, 1847).
- <sup>3</sup> In the case of wool production only the size of the output destined for the export market has yet been evaluated. A. R. Bridbury, *Economic Growth: England in the later Middle Ages* (1962), pp. 25 and 27, utilising the cloth and wool export figures in E. M. Carus-Wilson and O. Coleman, *England's Export Trade, 1275-1547* (Oxford, 1962). Tin production, G. R. Lewis, *The Stannaries* (1908), App. J. K. & L.; A. R. Bridbury, *op. cit.*, pp. 25-6; and J. Hatcher, "A diversified economy: later medieval Cornwall", *Econ. Hist. Rev.*, 2nd Ser., XXII, 2 (1969).
- <sup>4</sup> I hope to publish, shortly, studies of each of the major lead fields investigating production trends therein.
- <sup>5</sup> P.R.O. DL.29/22/380. The italicised insertions are the author's.
- <sup>6</sup> E.g., P.R.O. DL.29/183/2910.

- <sup>7</sup> For cope see P.R.O. E.36/161, ff. 25-9, and for lot, manuscripts of his Grace the Duke of Rutland at Belvoir Castle [*Rutland MSS.*, hereafter] minister's account, number 1092.
- <sup>8</sup> e.g., Calvour, Bakewell, Stywardsfield.
- <sup>9</sup> P.R.O. E.372/143 mem. 28, quoted by J. H. Lander and C. H. Vellacott, "Industries", in the *V.C.H. Derbys.* II, 328.
- <sup>10</sup> P.R.O. DL.39/1/5 mem. 3.
- <sup>11</sup> P.R.O. DL.39/1/3.
- <sup>12</sup> E.g., P.R.O. E.372/81 mem. 15 or Bodleian, MS. *Dodsworth*, 76.
- <sup>13</sup> P.R.O. Misc. Inquis. 47(1) quoted by J. H. Lander and C. H. Vellacott, *op. cit.*, 326.
- <sup>14</sup> J. H. Lander and C. H. Vellacott, *op. cit.*, 325.
- <sup>15</sup> The validity of both the tithe and lot figures are intertwined for the barmaster on measuring the ore reserved to the crown its thirteenth dish and to the church its tenth (P.R.O. DL.1/10 F.2 evidence of James Else).  
As to the incidence of the levy this is impossible now to ascertain. However, contemporaries considered it had been partly shifted from the miner to the smelter during the fifteenth century (P.R.O. DL.1/10 F.2 replies of John Babbington and Richard Blackwell).
- <sup>16</sup> E.g., P.R.O. DL.29/183/2910 and 2908.
- <sup>17</sup> P.R.O. DL.29/183/2912-3, i.e. about 0.5% of total production due to the lord of the field, in 1432-3.
- <sup>18</sup> P.R.O. DL.29/22/380.
- <sup>19</sup> High Peak: P.R.O. DL.29/22/383-4. Wirksworth: P.R.O. DL.29/183/2915.
- <sup>20</sup> The nominal and actual length of the lease were often quite different, e.g., Henry Foljeambe took the Wirksworth lease in 1496 for twenty years, paying £45. 6s. 8d. (P.R.O. DL.41/29/8 f. 11), but in 1504 this lease was revoked and a new one made raising the revenue to £53. 6s. 8d. (P.R.O. DL.42/21 f. 119).
- <sup>21</sup> See appendix A2, C2.
- <sup>22</sup> P.R.O. D.L.41/29/12.
- <sup>23</sup> The meer or grove was the miner's working.
- <sup>24</sup> The case may be followed in the documents listed below:  
Cotermious proceedings in Star Chamber and before the Duchy Council c. 1520.  
DL.42/95 f. 68; STA/CHA. 2 15/141-50, 23/307.  
Proceedings against James and William Else and John Huchenson before the Duchy Council c. 1528/9.  
DL.1/10 F2 (1-3); DL.3/18 f. 35-8; DL.5/5 f. 353; DL.42/95 f. 96.  
Proceedings against Philip Criche and Edward Wyld c. 1536.  
DL.1/10 F2 (4).  
Proceedings again Philip Criche and Edward Wyld c. 1536.  
DL.1/10 F2 (22, 24).  
Proceedings before Sir Thomas Audley (Chancellor of England c. 1533).  
DL.1/10 F2 (9, 11, 13-4, 7-8, 10, 15-6?).  
Proceedings started by Sir Godfrey Foljeambe and continued after his death by James Foljeambe, before William Earl of Southampton c. 1539-42.  
DL.1/10 F2 (17-20, 6, 23).  
Unknown DL.1/10 f. 2 (21).
- <sup>25</sup> The extent of under-registration in Wirksworth Wapentake during Henry VIII's reign is, of course, difficult to estimate. Two approaches, one direct and one indirect, to this problem, however, seem fruitful. Firstly, from the sources listed in n. 24 it is possible to calculate the average *reported* annual evasion during this period by each of the 25 *identifiable* smelters operating within the king's field. This gives an annual estimated evasion of (676 lx 25) c. 1,700 loads. Secondly, it is possible to calculate approximate ore consumption. The total number of 'boles' in operation (28), multiplied by the frequency of annual usage (2) and the average amount of ore used at each 'boyle' (60 loads) gives an estimated ore consumption of c. 3,300 loads. Subtract from this 1,500.—1,700l. of recorded production and one is left with evasion of 16-1,800l. On production relationships see *Cal. Carew MSS.*, 270.
- <sup>26</sup> The figures for evasion in n. 25 represent an average reported rate of c. 50 per cent for the period 1509-45. Contemporaries, however, thought that the problem was becoming increasingly serious during this period and this figure might be a marked underestimate by 1545. Whether there was an increase in the problem or in the perception of it we cannot now tell.
- <sup>27</sup> Subsequently the two steadily diverged. At Wirksworth the rent remained unchanged until the Restoration when it was doubled at which level it remained through 1683 when a contemporary put the value of the mineral rights at £2,000 (*V.C.H. Derbys.* II, 335).
- <sup>28</sup> Based upon Sir Frank Stenton's translation of the Derbyshire section of Domesday Book (*V.C.H. Derbys.* I, 329-55).
- <sup>29</sup> These manors together with Darley, Ashbourne, Parwich and their berewicks gelded within Wirksworth Wapentake, as did Crich.
- <sup>30</sup> These manors, with Hope, rendered £10. os. 6d. in 1086 and £30, 5½ sesters of honey and 5 *plaustratae plumbi* of 50 *tabulae* TRE.
- <sup>31</sup> In Domesday Book the northerly wapentake of the county is not named, unlike Scarsdale (Scarvesdale, Scarvesdale); Wirksworth (Hamelestan, Hammenstan); Appletree (Apletreu) and Repton and Gresley (Walecross). Amongst the earliest names attached to this wapentake was that of the manor of Bakewell. See the pipe roll of 1199; in *Pecco in Wapentac de Bauchull* [Pipe Roll Society (henceforth PRS), new series X (1933), 209].

- <sup>32</sup> PRS, XVII (1894), 7. For references to other fields see *V.C.H. Derbys*, II, 324.
- <sup>33</sup> PRS, new series, VII (1930), 270.
- <sup>34</sup> The crown's own demesne lands in High Peak by 1195 lay within the forest of the Peak (on which see fig. 1), many of its Domesday manors like Bakewell or Hucklow had been granted away. Mining within the forest was confined during John's reign to workings on the Tideslow and High Rakes (P.R.O. DL. 39/1/3). The crown's rights therein were confined to the levying of the thirteenth dish or lot. See appendix A. Throughout this article all references to the fother relate to the measure of 2,184 lbs. For local lead measures see appendix D.
- <sup>35</sup> Appendix A and figure 1 which is based predominantly on the rolls of the forest justices. Note: broken lines merely connect data points. For weights and measures see appendix D.
- <sup>36</sup> See fig. 2.
- <sup>37</sup> P.R.O. C.133/37 (7); C.135/33 (2); C.133/111 (1); E.149/6 (5).
- <sup>38</sup> P.R.O. C.133/61 (1).
- <sup>39</sup> See appendix A, table 3.
- <sup>40</sup> P.R.O. C.135/24; C.135/118 (18).
- <sup>41</sup> Bodleian MS., Laud Misc. 625 f. 161 for Youlgreave. The water of Lathkill divided the Abbot's field from that of the king, in Overhaddon, which accounted for its production within the total render of the Soke (see Derbyshire Record Series, 3 [1967], doc. A4). Nether Haddon, the only other manor crossed by the rake, had no mines established within its boundaries during this period. (P.R.O. C.133/12 [3]; C.134/75 [17]; C.135/16 [16]; C.135/225 [7].)
- <sup>42</sup> P.R.O. C.132/36 (20); C.134/98 (6); C.135/35 (36).
- <sup>43</sup> See appendix C1. What is meant by *minera* in this context is uncertain, as in the account of 1324-5. It may well be, however, as in 1322, not simply the right to collection of seigneurial dues but rather the lease of the earl's smelting establishment, approximating therefore to the net returns therefrom. It is not meaningful, therefore, to compare these early leases with those of the late fourteenth and fifteenth centuries which the right to collect lot and cope.
- <sup>44</sup> See appendix B.
- <sup>45</sup> See Table 2, p. 127.
- <sup>46</sup> Sources to Table 2: Appendices B, A2, A3, C2.  
Ashford, P.R.O. C.135/155 (17); Youlgreave, Bodleian MS., Laud Misc. 625 f. 113d.  
Lesser fields, C.136/69 (6); C.135/127 (12).
- <sup>47</sup> It is impossible at this date to provide a complete survey of all the minor fields though at places like Crich mining had ceased entirely. To provide some compensation, therefore, the returns for Peak Jurisdiction (appendix A3) which include perhaps more than Bakewell have been returned under that one heading. Thus the figure quoted probably overestimates production.
- <sup>48</sup> P.R.O. C.135/118 (18); C.135/148 (19); C.135/155 (17).
- <sup>49</sup> Appendix A3.
- <sup>50</sup> Bodleian MS., Laud Misc. 625 f. 161.
- <sup>51</sup> The same pattern of B1 fluctuation in this period is also found in the records of a number of smaller fields (*Rutland MSS.*, 1014-7, 1092-1098).
- <sup>52</sup> Fig. 3.
- <sup>53</sup> A further distinguishing factor between B1 and B2 fluctuations other than their varying inter-temporal periodicity is that the latter vary inter-spacially at a point in time whilst the former are constant, as will be seen in my forthcoming studies of the Mendip, Flint and North Pennine fields.

# APPENDIX A

## HIGH PEAK

TABLE 1

*Value of 'Lot' in High Peak during the twelfth and thirteenth centuries*

Date	Annual 'farm'		Hucklow	Tideslowe	Wardlowe	Amount of 'lot' ore	Price per load
	Bailiff's <sup>1</sup> accounts	Rolls of forest <sup>2</sup> justices					
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	Load, burd, dish. <sup>7</sup>	s. d.
1194-5	16 3 4						
1198-9	20 0 0						
1216-22		4 10 0	Nil	2 10 0	2 0 0		
1222-34		4 10 0	Nil	2 10 0	2 0 0		
1234-7		4 0 0	Nil	2 10 0	1 10 0		
1236-7	6 18 2 <sup>3</sup>					76 2 0 0½	1 9¾
1237-42		3 16 0	Nil	2 10 0	1 6 0		
1237-8	5 10 0					69 — 4½	1 6¾
1242-8		4 10 0	13 4	2 10 0	1 6 8		
1243	2 0 0 <sup>4</sup>					26 2 0½	1 6½
1243-4	5 17 0					78 — —	1 6
1245-6	5 0 7						
1247-8	4 2 0						
1248-9	4 0 0	4 6 8	Nil <sup>5</sup>	2 10 0	1 16 8		
1252-3	6 6 8 <sup>6</sup>						
1256-7	10 10 0					140 — 4	1 6
1284-5		10 0 0					

TABLE 2

*Value of 'Lot and cope' in High Peak, 1296-1547*

	Firma £ s. d.	Amount of lot loads dishes	Price per load(s)	Total Product loads dishes	Amount coped at 4d. load
1296 <sup>8</sup> temp.	c. 12 0 0	40 0	2 0	520 0	480
Richard II	36 0 0	55 0	9 0	720 0	665
1391-2	30 13 4				
1399-1400	30 0 0				
1412-4	30 0 0				
1414-5	12 0 0				
1416-7	21 13 4				
1417-8	13 9 4				
1419-20	21 17 4				
1426-7	14 2 0	23 5	8 0	306 0	282 4
1427-8	20 12 0	34 4½	8 0	448 4	413 8½
1428-9	14 9 0	24 0	8 0	313 0	289 0

TABLE 2 (continued)

	Firma £ s. d.			Amount of lot loads dishes		Price per load(s)		Total Product loads dishes		Amount coped at 4d. load								
1429-30	18	14	0	31	0	8	0	406	0	375	0							
1430-1	18	12	0	31	0	8	0	404	0	373	0							
1431-2	14	8	0	23	0	8	0	302	0	279	0							
1432-3	14	12	0	24	0	8	0	316	0	292	0							
1435-6	9	5	4															
1438-9	20	3	3½															
1439-40	11	7	6															
1440-1	9	17	10	18	4½	6	8	241	3 <sup>9</sup>	222	7½							
1441-2	9	12	0	18	0	6	8	234	0	216	0							
1442-3	9	5	6	17½	0	6	8	228	0	210	4½							
1448-9	8	9	6	16	0	6	8 <sup>10</sup>	208	0	192	0							
1449-50	9	0	0	17	0	6	8	221	0	204	0							
1450-1	11	17	8															
1456-7	12	2	8	22	8	6	8	297	6	275	7							
1460-1	2	10	0	4	6	6	8	61	0	56	3							
1475-6	6	13	4	Farmed to Robert Eyr at 6s. od.														
1476-7																		
1478-9																		
1480-1																		
1484-5	7	0	0	Farmed to Robert Eyr														
1485-6	6	13	4	6	13	4	Farmed to John Savage											
1486-7																		
1491-2																		
1497-8																		
1499-1502	7	3	4	Farmed to Robert Eyr														
1503-4	7	13	4	Farmed to Arthur Eyr														
1506-7																		
1508-12																		
1512-27 <sup>11</sup>																		
1527-8	4	6	0	In the king's hands														
1528-9	4	6	0	"burdoned in this year, as in the last"														
1530-1	3	9	4	8	0	4	8	104	0	96	0							
1531-2	2	18	4	7	0	4	4	91	0	84	0							
1533-4	3	1	2	7	7½	4	0	101	7½	94	0							
1534-40	4	13	4	Farmed to Antony and Thomas Fitzherbert														

Sources: Public Record Office: Duchy of Lancaster

DL.29/22/373-82, 384-95; 23/396-412; 24/413-7

DL.29/728/11987; 729/11995-6, 11988, 12001, 12004; 730/12008, 12011-2.

730/12015, 12017, 12019A; 731/12021A; 732/12027, 12029, 12032-4, 12036.

733/12042, 12044.

DL.28/22/1-15; 23/2-11. 30.

DL.37/53m.5; 56.no.76

DL.41/29/8f.9; 10f.29

DL.42/28f.127v; 30f.99; 20f.90; 21ff.111, 119v.

DL.43/1/25 Book 2.

Sources: Public Record Office: Exchequer

E.372/143m.28

: MSS of his grace the Duke of Rutland

Ministers' accounts Nos. 1014-7, 1025, 1028, 1092, 1098.

*Note:* the missing accounts for High Peak and Wirksworth between 1464-73 coincide with the grant of these manors to the Duke of Clarence. R. Somerville, *History of the Duchy of Lancaster* Vol. 1, 1265-1603 (London, 1953) pp. 241-2.

TABLE 3

*Value of lead tithe of Bakewell, Hope, Tideswell*

1275	..	..	..	..	£ 4	13	4	c. 470 loads titheable product
1298	..	..	..	..	£ 8	0	0	c. 770 loads
1300	..	..	..	..	£ 8	0	0	c. 770 loads
1339	..	..	..	..	£18	10	0	c. 1100 loads
1342	..	..	..	..	£18	0	0	c. 1080 loads
1356	..	..	..	..	£10	13	4	c. 300 loads
1359	..	..	..	..	£12	13	4	c. 380 loads
1389	..	..	..	..	£17	0	0	c. 420 loads
1390	..	..	..	..	£17	0	0	c. 420 loads
1401	..	..	..	..	£16	0	0	c. 400 loads
1403	..	..	..	..	£20	0	0	c. 500 loads <sup>12</sup>
1428	..	..	..	..	c £20	0	0	500 loads
1429	..	..	..	..	c £38	4	0	955 loads
1430	..	..	..	..	c £12	0	0	300 loads
1431	..	..	..	..	c £48	2	0	1216 loads
1432	..	..	..	..	c £13	6	0	340 loads
1433	..	..	..	..	c £12	2	0	306 loads
1434	..	..	..	..	c £10	8	0	260 loads <sup>13</sup>
1481	..	..	..	..	£10	0	0	c. 400 loads <sup>12</sup>

<sup>1</sup> Bodleian MS., *Dodsworth*, 76 ff., 35, 76; P.R.O. SC.6/1094/11 m. 7d; P.R.O. E.372/81 m. 15, 91 m. 14, 94 m. 18, 95 m. 6, 98 m. 6; P.R.S., new series, VII, 270; VIII, 148; X, 209.

<sup>2</sup> P.R.O. DL.39/1/3, 5.

<sup>3</sup> Account of "R. de Assebourne" for Peak, 1235-6 (P.R.O. E.101/131/21) makes no mention of mining.

<sup>4</sup> Ascension-Michaelmas.

<sup>5</sup> "flooded".

<sup>6</sup> One year and twenty-two days.

<sup>7</sup> See appendix D.

<sup>8</sup> Account (P.R.O. E.372/143 mem. 28) is for period Easter-Michaelmas 1296 and records:

"54s. rec. of 27 loads lot at 2s. od. a load due from 347 loads."

"106s. 8d. rec. of 320 loads residual, coped at 4d. a load."

To complete the year by estimating for Mich. 1295-Easter 1296 two considerations have been taken into account. Firstly, the normal production relationship between the two sub periods and trends in other fields in the medium term during this period.

<sup>9</sup> Long hundred of 120 used in account.

<sup>10</sup> In 1445 Richard Vernon obtained a lease to buy lot ore at 6s. 8d. a load for six years at the price current in the previous years (P.R.O. DL.37/53 m. 5).

<sup>11</sup> In miscellaneous accounts 1517-27, £7. 16s. 8d. (P.R.O. DL.28/22/4-15; 23/2-11).

<sup>12</sup> Lichfield Joint Record Office, MSS. of *Dean and Chapter*, E.4-5, 9, 13, 16, 26-7; F.4, 7-10.

<sup>13</sup> MSS. of his Grace the Duke of Rutland, nos. 1012, 1014-7, 1025, 1098.



## APPENDIX B

*Distribution of lead production in Derbyshire c. 1300*(a) *High Peak*

Peak Jurisdiction of dean and chapter of Lichfield <sup>1</sup>		Crown's lordship. <sup>2</sup>
Tideswell		
Hope <sup>3</sup>	[34f]	Tideslowe <sup>6</sup> [34f]
Bakewell (i) de Gernoun manor <sup>4</sup>	nil	Wardlowe 1f
(ii) bishop of Lichfield's manor <sup>5</sup>	c. 17f	
	51f	35f
Eyam (PRO. C133/37[7], C135/127[12])	c. 11f	
Middleton (PRO. C135/127[12])	c. 17f	
Hazelbadge (PRO. C133/61[10])	c. 4f	
Great Hucklowe (PRO. C133/111[1])	c. 1½f	
Youlgreave and Conkesbury (Bodleian, MS.Laud.Misc.625 f.161)		40f
Ashford (PRO. C135/24, C135/118[18])	40f	
(b) <i>Low Peak</i>		
Hartington and Wirksworth Soke	191f <sup>7</sup> (PRO.DL.29/1/3)	
Crich	¾f (PRO.C134/98[16])	

<sup>1</sup> Manuscripts of the dean and chapter, Lichfield, JRO, E.5, 9.<sup>2</sup> P.R.O. E.372/143 m. 28.<sup>3</sup> There is no evidence of mining activity along the Moss Rake, in Hope parish, during the Middle Ages, the depth of the lode acting against its utilisation (*Memoirs of the Geological Survey*, XXVI (1923), 52-3).<sup>4</sup> P.R.O. C.134/103 (7).<sup>5</sup> British Museum, Harley 4799.<sup>6</sup> In Tideswell parish.<sup>7</sup> As the *firma* does not represent the right to collect lot and cope and probably more closely approximates to the net return from the smelting plant, the conversion from farm to output has been made upon the net profit per fother of lead sold, being c. 14s. (P.R.O. SC.6/1146/11 m. 13).

## APPENDIX C

## WIRKSWORTH SOCAGE

TABLE 1

*Revenues from the Wirksworth and Hartington Mines, 1275-1329*

Date	Firma	Lessee-Accountant
	£ s. d.	
1273-4	40 0 0	William de Addersley and Robert del Bou Receiver of Thomas, earl of Lancaster
1275-8	53 6 8	
1313-4	133 6 8	
1322	79 16 8	William de Birchover
1323-4	80 0 0	
1324-5	125 0 0	Robert and Nicholas de la Forde
1325-6	100 0 0	
1326-9	110 0 0	John and Laurence de Denum

The mines, as part of Wirksworth Socage, were in the hands of Edmund, first earl of Lancaster until 13 October 1274 when they were surrendered to the crown, only to be resumed in 1279 as part of an exchange for the marcher lordships of Cardigan and Carmarthen.<sup>1</sup> In the interim they were let by the crown to de Addersley and del Bou who paid a fine of twenty marks for the lease.<sup>2</sup> Thereafter, the mines remained in the hands of the earls of Lancaster until they were resumed by the crown on the attainder of Thomas, the second earl, in June 1322.<sup>3</sup> On occasion, during the period 1279-1322, they were leased, as to Campanus Lombard,<sup>4</sup> on others kept in hand as in 1313-4.<sup>5</sup> From the resumption they remained in the crown's possession, at first administered directly<sup>6</sup> and then let out<sup>7</sup> until the last lease granted to the de Denums was voided when Henry, the third earl and subsequently the first duke of Lancaster regained the honour of Tutbury, at the king's pleasure in December 1326.<sup>8</sup>

TABLE 2

*Value of lot and cope at Hartington and in Wirksworth Socage 1377-1540*

Date	Value of lot and cope	Quantity of lot loads, burdons, dishes	Price of ore per load
	£ s. d.		s. d.
tempore Richard II	13 6 8	Farmed to Thomas de Brampton, previously £25	9 0 <sup>9</sup>
1412-3	1 10 0	As approved for no one to account	
1413-4	- 16 8		
1414-5	2 8 4½		
1415-6	6 3 3½		
1417-8	6 10 8	{ £5 18 0 Wirksworth - 12 8 Hartington	
1419-20	- 12 8	{ Nil Wirksworth £- 12 8 Hartington	
1421-2	7 7 9½		
1424-5	4 13 4	{ £4 13 4 Wirksworth Nil Hartington	
1425-6	6 7 3		
1426-7	7 1 9		
1427-8	7 9 0		
1428-9	3 0 0 <sup>10</sup>		
1429-30	5 10 0		
1430-1	5 0 7	6 1 0	9 0
1431-2	2 14 2	3 1 0	9 0
1432-3	6 1 6	8 1 0	9 0
1433-4	2 14 1½	3 1½ 1	9 0
1434-5	4 13 8	6 2 0	8 0
1435-41	4 13 8	Farmed to Walter Wooley	
1443-56	5 6 8	Farmed to Thomas Bradfield	
1460-1	5 6 8	Farmed to Philip Leche	

TABLE 2 (*contd.*)

Date	Value of lot and cope	Quantity of lot loads, burdons, dishes	Price of ore per load
	£ s. d.		s. d.
1461-3	5 6 8	Lease made to John and Robert Fitzherbert for 10 years on 21 Dec. 1 Edward IV. DL. 37/54m. 2	
1474-84	26 13 4 <sup>11</sup>	Farmed to John and Ralph Fitzherbert	
1484-5	27 6 8	Farmed to Marmaduke Constable	
1485-6	26 13 4		
1486-91	27 0 0	Farmed to John Savage and John Fitzherbert	
1492-3	40 0 0		
1493-6	40 6 8		
1496-1503	45 6 8	Farmed to Henry Foljeambe	
1504-7	53 6 8		
1507-9	66 13 4	Farmed to Godfrey Foljeambe	
1509-15	68 13 4	{ £66 13 4 Wirksworth: <sup>12</sup> Farmed to Godfrey Foljeambe	
1516-7	67 14 0	{ 2 0 0 Hartington: Farmed to John Clerk	
1518-9	67 13 4	{ £67 0 0 Wirksworth: do.	
1520-3	67 13 4	{ 14 0 Hartington: in lord's hands	
1523-38	72 13 4	{ £67 0 0 Wirksworth: do.	
1538-40	72 13 4	{ 13 4 Hartington: in lord's hands	
		{ £67 0 0 Wirksworth: do.	
		{ 13 4 Hartington: Farmed to Henry Bryddon	
		{ £72 0 0 Wirksworth: Farmed to John Bradbourne	
		{ 13 4 Hartington: Farmed to Henry Bryddon	
		{ £72 0 0 Wirksworth: Farmed to Antony Babbington	
		{ 13 4 Hartington: do.	

Sources: Public Record Office:

DL.28/22/1-15, 23/1-11, 30, 31/4.

DL.29/183/2906, 2908-16; 184/2917-32, 2932A; 185/2933-9, 2940-5;  
186/2946-56; 187/2958-69; 188/2970-82; 189/2983-2993; 197/3087-90,  
3093, 3103, 368/6167; 369/6170; 373/6219, 6221, 6223, 6225;  
375/6229-30, 6232, 6235; 376/6237, 6239, 6243; 377/6245-6, 6248, 6250;  
378/6252, 6255, 6258; 379/6259, 6262, 6264; 380/6266, 6269, 6271-2;  
381/6275, 6278; 402/6447-8; 403/6468-74; 404/6475-6; 407/3501;  
408/3516-8; 730/12017, 12019A; 731/12021A, 12022; 732/12027, 12029,  
12032-4.

DL.37/54 m. 2; 56 (no. 37).

DL.41/29/8 f. 11; 29/11 f. 21.

DL.42/29 ff. 27, 57; 30 ff. 30v, 39v; 20 f. 92; 21 f. 110v, 114v, 115v, 119, 119v.

- <sup>1</sup> R. Somerville, *History of the Duchy of Lancaster, I, 1265-1603* (1953), 14, n. 3.  
<sup>2</sup> For the history of the lease, cf. *Cal. Pat. Rolls*, 1272-81, 84; British Museum Add. MS., 6681 f. 86; P.R.O. E.372/120-32.  
<sup>3</sup> R. Somerville, *op. cit.*, 27-30.  
<sup>4</sup> K. Kunze, *Hanseakten aus England, 1275 bis 1412* (Halle, 1891), 33.  
<sup>5</sup> P.R.O., DL.29/1/3 m. 12.  
<sup>6</sup> William de Birchover assumed control of the honour on the day of the Earl's trial (P.R.O. SC.6/1146/11 m. 12) and accounted for the mines from 24 March—29 September 1322 and then for two whole accounting years. The account for 17 December 1323—29 September 1324 survives engrossed on the pipe (P.R.O. E.372/169 m. 30).  
<sup>7</sup> The mines were leased to the de la Fordes from Michaelmas 1324-5 at £125 p.a. and then from Michaelmas 1325—20 June 1326 at £100 p.a., the lessees being held accountable for £75 for this period and for £7. 9s. 1d. for the period to the 24th inst. Of the £75 only a part was paid at the time of the account, viz.: in lead worth £52. 16s. 9½d.; £22. 3s. 2½d. remaining outstanding, bringing the total due on the 24th to £29. 12s. 3½d. which was finally delivered in 1332. The mines then passed to the de Denums who never paid the "farm" and were pardoned in 1327 (P.R.O. E.372/170 m. 38).  
<sup>8</sup> R. Somerville, *op. cit.*, 31, n. 2.  
<sup>9</sup> 3 November 1399, Wirksworth Wapentake (P.R.O. DL.30/47/546).  
<sup>10</sup> Penal charge of £10 of which only £3 paid.  
<sup>11</sup> The period of missing accounts, 1464-73, coincides with the grant of these manors to the Duke of Clarence [R. Somerville, *History of the Duchy of Lancaster*, Vol. 1, 1265-1603 (1953), 241-2] and possibly with a period of administrative negligence, for in 1474 in a fit of zeal the farm was raised to £26. 13s. 4d. This farm seems at first to have overestimated the size of production to sustain it, and it was not until 1479/80 that the farmer was able to clear his arrears:

*Payments to the Receiver by Ralf Fitzherbert, farmer of Wirksworth mines*

Date	"Charge"	Payments to Receiver	Arrears owing
	£ s. d.	£ s. d.	£ s. d.
1474-5	26 13 4	13 6 8	13 6 8
1475-6		26 13 4	9 0 0
1476-7		29 0 0	6 13 4
1477-8		20 0 0	13 6 8
1478-9		33 6 8	6 13 4
1479-80		33 6 8	Nil
1480-4		26 13 4	Nil

Sources: P.R.O. DL.29/403/6468-76; 184/2932-9.

Thereafter, where it can be checked, the farmers paid their rents regularly (e.g., P.R.O. DL. 29/185/2939-45 or 186/2946-9), at least until the widespread evasion of the 1520s.

<sup>12</sup> 1509-13 charged at £66. 16s. 8d. in accounts.

## APPENDIX D

Throughout this study the fother referred to is the fifteenth-century London measure of 2,184 lbs. and the "load" is the contemporaneous Derbyshire ore measure. The former unit was never used in Derbyshire during the period covered by this study but is utilised here in order to standardise comparisons between fields. The measures actually used in Derbyshire are detailed below:

### 1. The measurement of lead

In the thirteenth and fourteenth centuries the basic unit of measurement was the *carreta* or *carreta aquata*<sup>1</sup> which according to the Assise of Weights and Measures<sup>2</sup>

comprised thirty formels of 70 lbs.<sup>3</sup> The *carreta*, therefore, amounted to 2,100 lbs. (i.e. the *avoir du pois* pound of 15 Troy ounces). This measure seems to have been in common use in the county, both in crown purchases<sup>4</sup> and in the accounts of the lead smelters.<sup>5</sup> Further, under the name "fother", the thirty formel unit again appears in the fifteenth-century leadmasters' accounts.<sup>6</sup>

At an earlier date, there seems to have been a distinct Derbyshire measure of 24 formels of 70 lbs., or 1,680 lbs. which is contrasted with the above London measure of 2,100 lbs., but this seems to have fallen into disuse by the thirteenth century.<sup>7</sup>

In the fifteenth century, however, the *carreta* of 2,100 lbs. seems to have been displaced by the fother of 2,184 lbs.<sup>8</sup> as the London measure; so that by the late sixteenth century the author of the *Geometry upon Waightes and Measures called the Art Statike*, after discussing at length the London fother of 19½ hundred, makes only a passing mention of the "load" of thirty formel.<sup>9</sup> There is only one piece of evidence of the use of a unit of 2,184 lbs. in Derbyshire in the period 1272-1540, however, in a transaction between the sheriff of Nottingham and Derby and one Richard de Derstall of Tamworth which took place in Derby in 1352<sup>10</sup> in which the following measures were used:

$$\begin{aligned} 1 \text{ carreta} &= 12 \text{ wagis} \\ 1 \text{ wagis} &= 26 \text{ clavis} \\ 1 \text{ clavis} &= 7 \text{ lbs.} \end{aligned}$$

$$\text{Therefore, } 1 \text{ carreta} = 2,184 \text{ lbs.}''^{11}$$

but the unit seems to have been so unusual that the divisions of the *carreta*, mentioned above, are outlined in full in the indenture drawn up on the delivery of the lead to Westminster, whilst in all extant references to orders dispatched or received by the sheriff of Nottingham and Derby the size of the *carreta* and *formel* is taken for granted.

Thus it may perhaps be possible to suggest that at least from about the reign of Edward I to that of Henry VII the Derbyshire lead masters clung conservatively to the fother or load of 2,100 lbs. and that only gradually, thereafter, did the London fother of 2,184 lbs. gain ground in the provinces. The load (*carreta*) should, however, be carefully distinguished from the load (*lada*) and its division the dish<sup>12</sup> which are not measurements of lead at all but of lead ore.

## 2. The measurement of lead ore

One basic system of measurement seems to have been used throughout all the Derbyshire lead fields, whether they are the greater fields of Wirksworth and High Peak in the possession of the duchy of Lancaster, throughout most of the later middle ages,<sup>13</sup> or the smaller private fields like Calvour or Stywardsfield.<sup>14</sup>

$$\begin{aligned} 1 \text{ load} &= 3 \text{ burdon} \\ 1 \text{ burdon} &= 3 \text{ dishes} \\ \text{Therefore, } 1 \text{ load} &= 9 \text{ dishes} \end{aligned}$$

Before the sixteenth century, however, there seems to have been little standardisation in the dishes used in the fields,<sup>15</sup> although the standard unit for the measurement of the dues of lot and cope was the king's dish, which when heaped was said to be a full dish and when levelled with a board was half a dish.<sup>16</sup> This dish was standardised in the measure of 1512, which was kept in the moot hall at Wirksworth, and contained 14 Winchester pints.<sup>17</sup>

<sup>1</sup> The terms seem to have been used interchangeably. See, e.g., P.R.O. SC.6/1146/11.

- <sup>2</sup> The French (Ms. Eg. 2733 f. 174-5) and Latin (Ms. Reg. 9A IIF. 170b) versions transcribed on pages 9-12 of "Tracts and Tables of English Weights and Measures", (ed.) H. Hall and F. J. Nicholas, in *Camden Miscellany*, XV (1929), have been used and not the rather garbled version in *Statutes of the Realm*, I, 204.
- <sup>3</sup> I.e. six stones of 12 lbs. less 2 lbs.
- <sup>4</sup> E.g., PRO. E. 372/165.
- <sup>5</sup> E.g., P.R.O. Sc.6/1146/11.
- <sup>6</sup> E.g., *Rutland MSS.*, 1013.
- <sup>7</sup> And each formel comprises 14 cuts of 5 lb. each. See B. M. Cott, MS., Tiberius A VI f. 71, the twelfth-century *Inquisitic Eliensis*, printed in N.E.S.A., Hamilton (ed.), *Inquisitio Comitatus Cantabrigdiensis* (1876).
- <sup>8</sup> I.e. 19½C by C of 112 lb. (lb. *avoir du pois* of 16 oz. Troy. See "Noumbre of Weyghtes" in *Camden Miscellany* XV, 12.
- <sup>9</sup> *Ibid.*, 24.
- <sup>10</sup> P.R.O. E.101/580/36.
- <sup>11</sup> The carreta of 12 weighs is similar to that mentioned as a Troy weight in the Assise of Weights and Measures, but this unit in both versions printed in "selected tracts..." has a weigh of 14 stones which does not total to 2,184 lbs. whichever stone is used (12½ lbs., London, 12 lbs. used in statute, or 14 lbs.). However, in the version printed in the *Statutes of the Realm*, I, 204, it is of interest to note that in an unspecified printed version, the weigh is of thirteen stones and therefore
- |                      |   |            |
|----------------------|---|------------|
| 1 carreta            | = | 12 weighs  |
| 1 weigh              | = | 13 stone   |
| 1 stone              | = | 14 lbs.    |
| Therefore, 1 carreta | = | 2,184 lbs. |
- <sup>12</sup> For such a mistake see H. Hall and F. J. Nicholas, *op. cit.*, XIII, n. 2.
- <sup>13</sup> E.g., P.R.O. DL.29/183/2910, 22/382.
- <sup>14</sup> E.g., *Rutland MSS.*, no. 1015.
- <sup>15</sup> See, for instance, the evidence of James Else (P.R.O. STA/CHA. 2 15/141/50).
- <sup>16</sup> P.R.O. DL. 1/10 F2.
- <sup>17</sup> T. L. Tudor, "The lead miner's standard dish or measure", *DAJ.*, LIX (1939).