

Rejoinder: Stannator Fabulosus

By IAN BLANCHARD

IN considering, by way of a rejoinder, the broad sweep of mining history scanned by Dr Hatcher in his reply to my article on the miner and the agricultural community in late medieval England,¹ it will perhaps be convenient to group the arguments outlined in the preceding pages under four main headings. The first two concern the miner as a producer:

I seeks to differentiate the Cornish and Devonian *stannator* from other miners,² and particularly those in the lead industry on the basis of differences in

- (a) the size and
- (b) the degree of concentration of production in the Stannaries;

II seeks further to differentiate the tin miner because of his involvement in a different form of industrial organization.

The next section, III, considers the miner as a consumer and seeks to establish that he was dependent on his work with a pick for a livelihood and accordingly bought a significant proportion of his bread-grain in the market-place.

Finally under point IV may be grouped a series of disparate criticisms of my original study.

In the following pages each of these arguments will be considered in turn from two aspects, namely whether (1) the picture presented therein is a factually accurate one, and (2) the point made is a relevant one to the original argument.

I

Firstly, it is suggested that miners in the tin and lead industries were differentiated, in some undefined way, because of the greater size of and degree of concentration in the former industry. Factually, this alleged difference does not exist, and logically the size and degree of concentration of the industries are irrelevant to whether the late medieval miner should be characterized as a "farmer, to whom mining was an insignificant side line" or a person "with only a small plot of land and perhaps a cow" who was "dependent on his ore sales for a livelihood."³ Concerning the size of the two industries, the lead-production data presented above, drawn not always accurately from the records of one or two minor jurisdictions,⁴ reveal very imperfectly the size of this major English industry which so impressed one Italian visitor that he wrote of this realm as possessing "... an infinity of lead and

¹ *Agric. Histi. Rev.*, 20, pt II, 1972, henceforth referred to as *loc. cit.*

² Due to the constraints of an article, I restricted myself to examples from the two industries which contemporaries thought of as important—tin and lead (see, e.g. *Camden Soc.*, O.S. xxxvii, 1847, pp. 10–11). In the light of the criticisms above, however, other examples, from outside the two great staples, are given below.

³ *Loc. cit.*, pp. 98, 93.

⁴ Of the lead-production statistics presented, the only accurate one is that for Priddy in 1457/8. Concerning "Chewton" production and labour force, a manorial figure for manpower is juxtapositioned with an output figure drawn from an extra-manorial jurisdiction (J. W. Gough, *Mines of Mendip*, 1930, p. 65, n. 7). With regard to the "Wirksworth calculation," a somewhat more satisfactory result would have been obtained in tracing the derivation of the "unenlightening" fig. IV if the sources quoted (*loc. cit.*, p. 102, n. 4, referring to p. 101, n. 2) had been consulted. These give all the relevant data: total value of lot and cope (*R*, in shillings); nature of dues; nature of measures (1 load = 9 dishes); price of ore (*P*, in shillings per load), from which total output may be derived (*T*, in loads) by applying each of these variables to a formula derived from the nature of the dues:

$$R = \frac{1}{13} TP + \frac{6}{13} T$$

This formula, moreover, would have given better results than those obtained by either combining a series of *Wirksworth* lot and cope revenues (I. Blanchard, *Economic Change in Derbyshire in the Late Middle Ages, 1272–1540*, unpubl. London Ph.D. thesis, 1967, p. 307) with a formula for converting seigneurial dues on *Mendip* (*ibid.*, pp. 273–4) and then converting the whole by a smelting ratio of unknown origin or simply multiplying the total revenue from lot and cope by a multiplier of 13.

tin."¹ Accordingly in table I some preliminary research statistics are presented to facilitate inter-industry comparisons.²

The two industries thus emerge, in terms of output by weight of the finished product, as being very similar in size.³ Again, with regard to the degree of concentration therein the differences are more apparent than real. The tin industry is described above as comprising

at some undefined date five stannaries or fields of which two held a major position in the industry, and three, including the Dartmoor field (which up to 1450 produced about 50 tons per annum), assumed a minor one. Unfortunately, no means of disaggregating total production is provided,⁴ and it is hoped that the following approximate description does not violate reality too much as it may have existed

TABLE I
LEAD AND TIN PRODUCTION IN ENGLAND AND WALES DURING
THE LATER MIDDLE AGES: SOME PRELIMINARY FIGURES
(in tons)

Date	Devon	Tin Cornwall	Total	Derbyshire	Lead Durham	Others	Total
1300	35	365	400	380	Nil	335	715
1400	50	500	550	220	45	120	385
1450	50	350	400	130	70	200	400
1500	100	500	600	425	100	100	625

in the 1430's. At that date the greater part of tin production seems to have been concentrated within Penwith-and-Kirrier and Blackmore Stannaries which probably produced about 125 tons of tin each annually, whilst the minor centres including Dartmoor produced about 50-60 tons each per annum.⁵ Viewed within such a framework, the industries do not seem so different, for within the lead industry

there were the same large fields with their satellites of small ones. The morphology of the lead-fields was unstable over time but the picture of the 1430's would not be very different from other periods, only the names would be changed. In the 1430's the Peak lead-field (Derbyshire), slightly smaller in area than either of the major stannaries, produced about 150 tons of lead each year, a figure not much

¹ C. A. Sneyd (ed.), 'A relation, or rather a true account of the Island of England about 1500,' *Camden Soc.*, O.S. xxxvii, 1847.

² For a full description of these statistics, the reader will have to await the publication of my book on the lead industry. However in the interim he may examine their derivation, at least with regard to the Derbyshire fields between 1190 and 1505 and Durham in the early sixteenth century, by reference to two articles in *Northern History*, viii, 1973, and *Derbys. Arch. Journ.*, xci, 1972, which it is hoped will be in print by the time this note appears.

³ In value terms (which are not relevant to this point), the tin industry is larger, though as no series of prices is provided above it is impossible to say by how much. Even the figures in p. 55, n. 6, suggesting a price differential of 1:6/7, lacking provenance and derivation, are not very helpful, for both the Beveridge and Rogers price statistics derived from county of origin (a statistic inferior, for our purposes, to smelting price) suggest a ratio of only 1:2.

⁴ Unfortunately, in Cornwall the coinage towns were not located in a position synonymous with each of the stannaries, and further although there were five such towns mentioned in the 1305 charter, G. R. Lewis, (*The Stannaries. A Study of the English Tin Miner*, 1908, henceforth referred to as Lewis 1908) believed that only two were used throughout most of the period before the sixteenth century, Lostwithiel for the eastern stannaries and Truro for the western (Lewis 1908, p. 149). Yet again with regard to the distribution of the labour force the restriction of tribulage accounts to Blackmore and Penwith-and-Kirrier prevents inter-stannary comparisons with the "smaller fields" (*ibid.*, pp. 140-1).

⁵ This is based upon the assumption that Dartmoor is not atypical of the other minor fields and that the residual from total output is divided between the two major ones.

greater than the output emanating from the neighbouring Yorkshire mining area which if anything covered a slightly smaller geographical area.¹ About these two larger centres were a number of smaller ones such as the Derwentwater (Cumberland) or Mendip (Somerset) complexes which were like the Weardale (Durham) field that covered an area similar to Dartmoor and produced about 45–50 tons of lead each year.² Other dates could be chosen and the analogy would be the same but lacking disaggregated stannary information through time this one comparison will perhaps suffice to show that in terms of size and structure the two industries were very similar, a fact which contemporaries were well aware of.³

Yet having gone to some length to establish statistically a fact which contemporaries in a somewhat more elegant, if imprecise, way had already done, it may well be asked of what relevance this is to the problem in hand, viz. the nature of the late medieval miner. Those factors which caused an entrepreneur, within a given technology, to desire a permanent labour-force, as opposed to those which, like demographic pressure, forced the farmer into the position of an industrial worker through lack of land, were rooted not in the size of the industry or even the field *but* in the nature of the basic productive unit—the mine. This

being the case, the real division within the late medieval mining scene was not between tin- and lead-mining which shared basically similar production techniques⁴ but, as previously noted,⁵ between the silver-lead industry and other mining industries, be they tin, iron, or lead. In the Middle Ages silver was notoriously the only metal which required for its successful production the most extensive and costly mining equipment. The geology of argentiferous deposits requires that silver-mines must be driven deep into the ledge, creating a whole complex of tunnels and drainage adits. Fixed capital costs were thus high, and the shafts had to be continuously worked and maintained to prevent decay. Every rainstorm threatened extensive flooding, every earth movement, the collapse of a tunnel. Thus a *sine qua non* of such hard-rock operations was a full-time labour force with as many as 200 workers in the one mine.⁶ This is however, a far cry from other late medieval mining operations, when each summer individuals scratched along an exposed lead-rake, excavated an iron-stone bed, or dug their shallow trenches in the beds of alluvial tin. Such work was characterized by a high degree of seasonality, which was particularly pronounced in the tin industry, and which contrasted markedly with conditions in silver production.⁷

¹ For the geographical extent of the Stannaries, see J. Hatcher, *Rural Economy and Society in the Duchy of Cornwall 1300–1500*, 1970, fig. 1; for the Peak field, fig. 1 of the article in *D.A.J.*, xcii, 1972 referred to in p. 63, n. 2, and for the Yorkshire mining area, A. Raistrick and B. Jennings, *A History of Lead Mining in the Pennines*, 1965, and B. Jennings, *A History of Nidderdale*, Huddersfield, 1967. For production in these centres, see p. 62, n. 4, and p. 63, n. 2. To set the Wirksworth “field” (referred to above, p. 55) in perspective during the 1430’s the output emanating from each of the sub-constituent parts of the Peak field (not published in *D.A.J.*, 1972) are given below: Wirksworth, 6 fothers (4 per cent); High Peak, Forest Jurisdiction, 34 fothers (22 per cent); extra-forestral jurisdiction, 110 fothers (74 per cent); total 150 fothers. Sources: *Rutland MSS.*, 1092, 1098; *P.R.O.*, DL29/183/2908–16, 184/2917–19; 22/376–80.

² On the geographical extent of, and size of output from, the Weardale complex in the 1430’s, see *Business History* xv, 2 (July 1973), pp. 97–100.

³ See the anonymous quotation referred to in G. N. Clark, *The Wealth of England*, 1947, p. 49.

⁴ It is hard to see what can be said about “the extensive capital equipment” allegedly used in the late medieval tin workings (above, p. 58), for on p. 55 above it is declared, in accord with Lewis, that tin came “almost exclusively from the ‘streaming’ of alluvial deposits.” Yet amongst the miscellaneous collection of items listed on p. 58 are adits and pumps, neither of which have anything to do with streaming, but which are applicable to vein working, a practice only begun in the late sixteenth century (Lewis 1908, pp. 8–9). A full explanation of late medieval tin-mining and dressing technology is given below.

⁵ *Loc. cit.*, p. 98, n. 6.

⁶ On what contemporaries regarded as the optimal labour force for such a silver-mine, in this case one of the Devon mines, see *P.R.O.*, E368/69, m. 51, c. 2.

⁷ See table II. Sources: lead, *loc. cit.*, p. 99; tin calculated from p. 59, above. The figures for each of the three quarters between 29 Sept. and 28 June are averages and do not show possible interquartile variations. Silver, *P.R.O.*, E101/262/20. It is good to see (above, p. 58) that the influence of weather conditions, which reinforce the socio-economic factors elsewhere, may be eliminated in Cornwall.

TABLE II
QUARTERLY VARIATIONS IN LEAD, TIN, AND SILVER
PRODUCTION DURING THE LATER MIDDLE AGES
(quarterly production expressed as a percentage of annual output*)

	Lead†	Tin		Silver
		Cornwall	Devon	
29 December–28 March	9	10	3	11‡
29 March–28 June	54	10	3	21
29 June–28 September	28	70	91	30
29 September–28 December	9	10	3	38
Total	100	100	100	100

* For absolute levels of annual *per capita* output, see table III.

† In the case of quartile distributions of lead production, the time periods vary slightly: 29 Sept.–1 Jan., 2 Jan.–3 April (average); 4 April–25 June (a loss of nine days in the quarter); 25 June–28 Sept. (a gain of three days to the quarter).

‡ The first quarter's lowness is partly explicable by the loss of three weeks' labour due to the Christmas vacation.

Indeed, seasonality and discontinuity of operation were such common characteristics in the mining of base metals that the authors of the late medieval mining codes, in framing the normal "year and a day" clause, took such temporary abandonment as being the normal situation, for in spite of a basically different geological base the lead and tin industries both enjoyed a similar mining technology which is noted for its low fixed-capital intensity.¹ The ore was normally excavated simply by sinking a shallow trench, rarely more than 18 feet deep,² into the metalliferous deposits, which in the case of the tin industry had been exposed by the diversion of a stream over the potentially stanniferous soils.³ Timbering was usually unnecessary⁴ but where it was used the annual cost rarely exceeded a few pence.⁵

Initially the ore could be thrown up from the working on to the edge of the "groove" or "mere", the length along the vein which constituted one working, but with greater depth some method of hoisting ore and "dead work"—the non-metalliferous rock—to the surface was required. This took the form of a simple windlass which was used to lower a bucket on a rope.⁶ By this means ore and rubble were raised to the surface. In the case of the lead industry this method was used for bailing any water out of the workings, whilst in the alluvial tin deposits of the Cornish valleys water evacuation was accomplished by digging a trench or "level" to the nearby river. This, then, was the mining operation. Within the workings the miner required some rope, a leather bucket, a pick, some wedges, a

¹ See Figure 1. It is hoped that this diagrammatic representation of late medieval mining and ore-dressing technology will prove helpful to the reader in following the outline of that technology presented below.

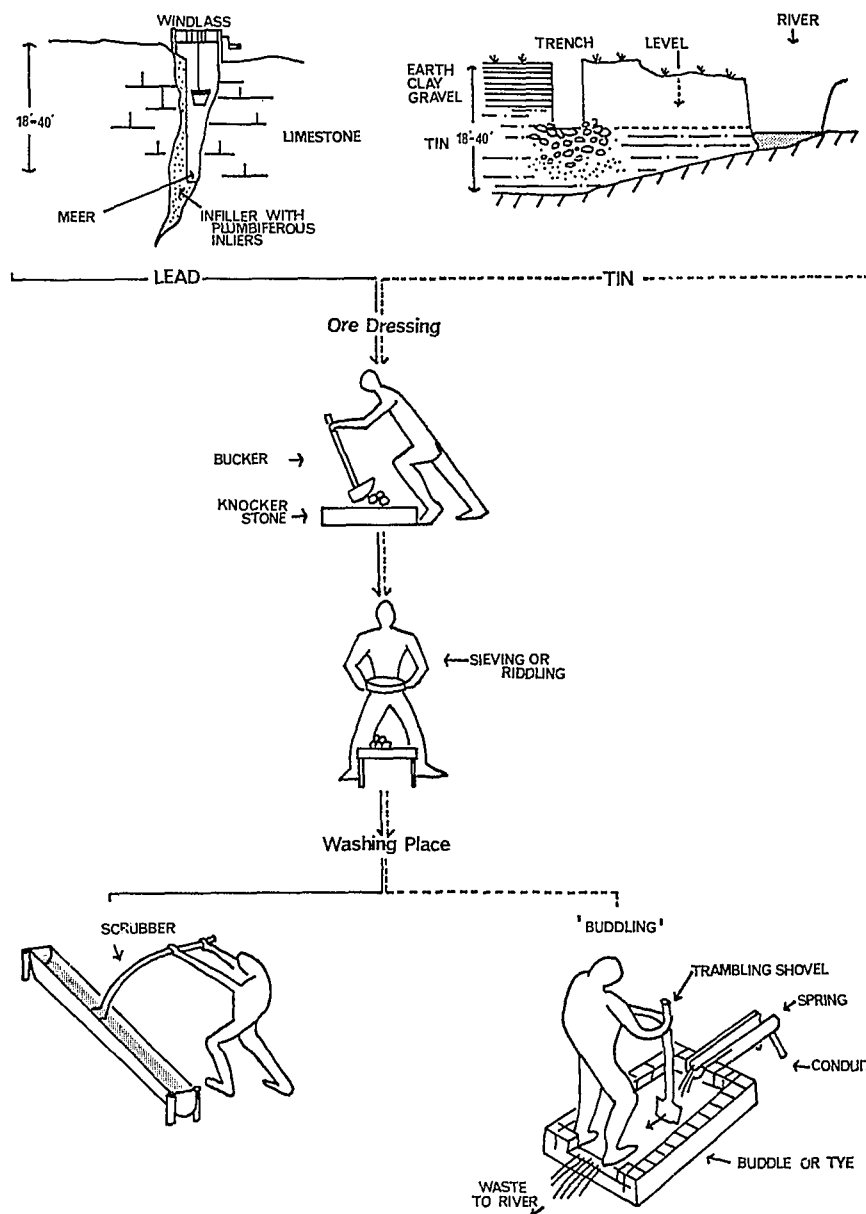
² The deepest lead-mine I have discovered was the Harthope mine, Co. Durham, which was sunk in the fifteenth century to a depth of c. 54 feet, about the same as the maximum potential depth of a "stream work."—Lewis 1908, p. 9.

³ *Ibid.*, pp. 4–5.

⁴ For an illustration of a vein excavated by such methods to a depth of about 40 feet without any need for timbering, see N. Kirkham, *Derbyshire Lead Mining through the Centuries*, Truro, 1968, facing p. 19. For similar methods of tin excavation, Lewis 1908, pp. 6–7.

⁵ Unfortunately, to my knowledge, no contemporary financial accounts of a "stream works" or smelting-plant in the tin industry have survived. Accordingly the figures below relate to costs in the lead industry as derived from a number of such accounts which exist therein, e.g. *Rutland MSS.*, 1013.

⁶ *Ibid.*, 1014.



1. Lead and Tin Mining and Ore Dressing Techniques in the Later Middle Ages

"maule" or long-handled hammer, and a shovel, and if the mine went to any depth some candles. Total cost would be at most a few shillings,¹ and all would be taken home at the end of the season, leaving only the "groove," which would hardly come to any harm over the winter, and the windlass, which would take about a day to repair or rebuild should it be necessary.

Following the excavation of the ore it had to be prepared for smelting, an operation which normally took place at the "washing place" or "streamworks".² The object of this was to grade and concentrate the ore. After an initial hammering³ the larger ore stones—"bing" in lead production—were set on one side, whilst the remaining "bouse" was carried to the "knocker stone."⁴ This was a round, flat, hard stone on which the ore was crushed by a man using a "bucker"—a heavy piece of iron with a curved under-surface and a handle—who by rocking the implement produced small pieces of ore and rock.⁵ To grade this "bouse" it was passed through a sieve or "riddle" and the fine deposit was ready for separation.⁶ Here the two technologies diverged. In the lead industry the ore was washed in a large trough with a long-handled "scrubber", the action of the water against the "bouse" causing the heavier lead to be deposited at the head of the trough, the lighter limestone at the base.⁷ In the tin industry the same process was carried out in a "buddle" or "tye"⁸—a trough made of wood or stone, some 6 feet long by 3 feet wide by 1 foot

deep—to which water was directed from a spring via a "conduit"—usually a hollowed-out trunk—and in which a man stood with bare feet. With a "trampling shovel" he threw the ore to the head of the "tye" and, as the water moved the fine ore down a slight slope, separation was caused by his agitation of the material with the shovel and his feet. The waste materials flowed out with the water into the river, there, with the deposits engendered by the initial prospecting operations, causing a nuisance to navigation.⁹ Again, the most expensive items were the metal implements (the "bucker", "riddle," and "scrubber" or "trampling shovel") and these would barely cost a pound. Moreover, they would be taken home at the end of each season and used over and over again. The immovables (the "knocker stone," "buddle," and "trough") would cost even less, and would hardly deteriorate during the dead seasons—where made of stone they have survived to this day.¹⁰ Accordingly the late medieval miner, be he *stannator* or *plumbarius*, was under no technological constraint continually to work his mine,¹¹ and with the removal of demographic pressures, which had deprived him of land, he could again become a farmer to whom extractive work was an insignificant sideline.

II

Secondly, the tin-miner is said to have been differentiated from other miners because of his involvement in a "capitalistically" organized

¹ See *ibid.*, 1013.

² E.g. P.R.O., SC6/1146/11. In the lead industry the ore had to be carried some distance to the washing place from the arid limestone uplands where the veins existed, whilst in the Stannaries mining and washing operations were closely juxtapositioned.

³ *Ibid*; Lewis 1908, p. 14.

⁴ The distinction between "bing", "bouse", and "water" or "wash" ores (i.e. the "bouse" after washing operations are completed) is found in many ore accounts, e.g. P.R.O., SC6/773/1.

⁵ P.R.O., SC6/1146/11; Lewis 1908, p. 14. ⁶ *Rutland MSS.*, 1013; Lewis 1908, p. 14.

⁷ N. Kirkham, *op. cit.*, p. 74.

⁸ The "buddle," according to Lewis 1908, p. 15, n. 1, is first mentioned in Cornwall at the very close of the Middle Ages. It was not introduced into Derbyshire until the late seventeenth century when the washers were accused of poisoning streams.

⁹ In addition to the references given above, p. 58, n. 5, see also Lewis 1908, p. 4, n. 2.

¹⁰ Lewis 1908, p. 14, nn. 2, 5.

¹¹ Nor did the requirements of the smelter in either the tin or lead industries necessitate a continuous flow of raw materials, thereby creating a desire on his part for a year-round labour force in mining. His plant, be it "bole" or "blowing house," cost little to build, and was normally operated for only a few days each year and then closed down. See, e.g., Lewis 1908, p. 17; *Cal. Carew MSS.*, 1867, 270.

industry, and accordingly the wage-labouring *stannator* is contrasted with the free-mining lead-miner.¹ Such a distinction in the form of organization in the two industries is no more real than their supposed differences in size. Both wage labourer and free miner existed side by side in tin- and lead-mining. The self-employed miner who worked his own "mere" was found in both industries.² Yet equally characteristic of both was the wage labourer who worked in a "groove" not owned by himself. From Yorkshire, Derbyshire, Wales, and even that home of free mining, Mendip, examples may be given of labourers who, in the later Middle Ages, worked in "meers" owned by others, to set alongside those recorded as working in the Stannaries.³

Moreover, it may well be asked again what relevance this has to the discussion. The question originally posed was not whether the late medieval miner was a labourer or not, but whether he (as either a wage labourer or a free miner) was a "farmer to whom mining was an insignificant side line" or a "person with only a small holding who was dependent on his ore sales for a livelihood." The status distinction was irrelevant in a period when economic differentiation was virtually non-existent. Examples may be given of the careers of labourers, which will not only further widen the evidence available to the reader concerning the nature of the late medieval miner but also illustrate the dangers of translating by analogy the socio-economic stigmatism applied to mining labourers in a later age back to the century and a half before the demographic explosion of the sixteenth century.

Those despised, poverty-stricken "... Lewd vagrant and wandering persons ..." who "waste their goods in most lewd and viscious

manner"; those mining labourers⁴ of the late sixteenth century were no more characteristic of the late medieval mining labourer than were the poor late Tudor free miners comparable with their prosperous late medieval counterparts. William Oldeland, for instance, was a contemporary of John Philipps, jun.,⁵ on Mendip and a fellow miner, though he worked not his own "meer" but that of another at Hasildon (Chewton parish), and accordingly enjoyed the status of labourer. His labours yielded him a similar amount of ore to that mined by his contemporary, though this three-quarters of a ton belonged to another. Yet like John Philipps, jun., the true centre of his life lay not on the barren wastes of Stock Hill, where he spent some weeks each summer, but in the villages of Blagdon and Ubley, for in the latter he was heir apparent to the largest landholding and in the former he worked with his father the substantial holding which made him one of the richest men in the village.⁶ Certainly he was not a typical labourer but his story does illustrate that whether a man was a labourer or not was irrelevant to his position in either the village or the mining camp. It also provides a salutary lesson concerning the dangers inherent in translating by analogy stigmas of a later age, when wage labouring and landlessness were becoming synonymous, backwards through time. Much more typical of the mine labourers' story are the final two examples, chosen from outside the two great mineral staples, from the coal and iron industries of the first quarter of the sixteenth century. Robert Walker was a labourer who worked for Thomas Leek, digging ironstone in Shittlewood, Bolsover. During one year of his service for his master he excavated slightly more than two and three-quarter loads of

¹ Above, pp. 55-6.

² Most of the works listed above, in p. 56, n. 5, where they concern themselves with free miners, provide references to the existence of this group in both industries.

³ On the labourer in the Stannaries, see Lewis 1908, p. 189, as well as those references given above, pp. 56, 58. On the labourer in the lead industry, see, amongst many other references, Jennings, *op. cit.*, pp. 67-73; references below, in n. 6, and Blanchard, *thesis*, 299-300.

⁴ Gough, *op. cit.*, pp. 122-3. Similar contemporary descriptions of mining labourers will be found in Lewis 1908, pp. 216-17, which may be set in a general context by reference to C. Hill, 'Pottage for Freeborn Englishmen: Attitudes to Wage Labour in the Sixteenth and Seventeenth Centuries', in C. Feinstein (ed.), *Socialism, Capitalism and Economic Growth, Essays Presented to Maurice Dobb*, Cambridge, 1967.

⁵ On whom see, *loc. cit.*, 96.

⁶ Somerset Record Office, C924/DD/WG 16/6; P.R.O., E179/169/169; Bristol R.O., *Ashton Court MSS.*, AC/M.21/8, 9.

"drosse yrenstone" worth 2s.-3s.¹ What he was paid we do not know but it could have been of but small importance to a man whose bequests to his son made the latter the second-richest man of the neighbouring village of Stainsby.² Similarly in the case of his contemporary John Spittlehouse, *colyer*, who laboured in the neighbouring coal-mines leased by James Marsden from the king, his labouring activities were but a minor sideline to one who was a member of the largest landholding family in Bolsover.³ It is hoped that these examples will suffice to show that the late medieval miner (be he labourer or free miner) cannot be adequately described by a process of analogy with his late sixteenth-century counterpart, with regard to either his material welfare or his social position.

III

Turning to the third point, the miner comes under consideration as a consumer rather than as a producer and the question posed is whether he should be characterized as a peasant farmer who met most of his requirements for bread grains from his own holding or as a person who, with only a small plot of land and perhaps a cow, was dependent on his ore sales to buy the major part of the grain required for his livelihood, thereby as in the late sixteenth century providing the basis for a grain trade, such

as described by Carew in 1602.⁴ Concerning this point, a number of points are made above, two of which may be dealt with very quickly, for as no details of "the now extensive literature" regarding the demands of late medieval mining communities for food or of their "major influence in stimulating commercial agriculture" have been cited,⁵ it is perhaps necessary to pass on to the evidence of the mining laws and Stannary court rolls. The latter record transactions involving those in the industry which illustrate the variety of wares which it is claimed they could not produce on their holdings.⁶ These products might be found not only in Cornish commerce but in the trade of any county: they represent the purchases of lord and peasant alike, for few would claim that the late medieval farmer was self-sufficient in pepper, wine, meat, cloth, canvas, or at all times even for grain—harvest failures were not unknown!

Of the mining laws and the allegedly "most common of the ancient privileges granted to miners", viz. exemption from toll to allow the purchase of necessities,⁷ a perusal of these documents reveals how singularly uncommon this clause is. None of the mining laws of Derbyshire, Mendip, or the Welsh fields records its existence, nor for that matter do the later iron-mining laws of Dean.⁸ As to the

¹ P.R.O., DL3/4 RI, C. 6. The local measures contained herein are to say the least, obscure. However, a comparison of the prices in this account with those of contemporary or near-contemporary iron-masters' accounts suggests that the "dozen" (of sacks) is approximately equivalent to the cart "load" (or about 18 hundredweights). If this identification is correct, then there were about six "horseloads" each of two "sacks" to the "dozen". The "horseload" is normally reckoned at about 3 hundredweights. Thus Walker's average annual output would be reckoned at about 2½ tons. This, however, represented an output well below that of his fellow workers whose labours yielded about 20s. of ore *per capita* per annum. Yet in making inter-industry comparisons the difference between shovelling ore from open beds of ironstone and working veins of lead-ore should be borne in mind, for this resulted in the above-average production, yielding 20s., being the product of less than three weeks' work. I should like to thank my colleague Dr G. Hammersley for many helpful discussions on iron-mining. Of course, the responsibility for any conclusions derived from these is entirely mine.

² P.R.O., DL3/4 RI CI-8; E179/91/91.

³ Nottingham University, Dept. of MSS., Clifton MSS., CL.M. 125. P.R.O., E179/91/91; CP40/1048A.

⁴ R. Carew, *Survey of Cornwall* (1769 ed.), p. 19 quoted p. 59 above. ⁵ Above, pp. 57-8.

⁶ Above, p. 58. ⁷ Above, pp. 57, 60, and n. 3 therein.

⁸ Derbyshire: *Victoria County History, Derbyshire*, II, p. 326; *Cal. Inq. Misc.*, III, 222 (1288); Sir John Pettus, *Fodinae Regales*, 1670, p. 93; P.R.O., E101/273/4 (1550-4); Nottingham University, Dept. of MSS., *Middleton MSS.*, 4/126/11 (1566). Wales, Flint: A. Jones (ed.), 'Flintshire Ministers' accounts, 1301-28', *Flints. Hist. Soc.*, III, 1913, p. 9 (reference to a code of c. 1282, now lost); D. L. Evans, 'Some notes on the history of the principality of Wales at the time of the Black Prince', *Trans. of the Soc. of Cymmrodorion*, 1924-5, App. 4, pp. 107-10 (1352). Wales, Minera: D. Pratt, 'The Lead Mining Community at Minera in the Fourteenth Century', *Trans. Denbigh Hist. Soc.*, XI, 1962; B.M. Add. MSS., 10013, fols. 33-4v (1391). Mendip: the mining customs of the various mineries were not codified before the sixteenth century. The Chewton customal dates from the second quarter of that century (Gough, *op. cit.*, p. 76) whilst the general codification dates from 1554 (J. W. Gough, 'Mendip Mining Laws and Forest Bounds', *Somers. Rec. Soc.*, XLV, 1930). Dean: C. E. Hart, *The Free Miners of the Forest of Dean and the Hundred of St. Briavels*, Gloucester, 1953, pp. 37-45.

references to the Derbyshire miners' alleged exemption, none refer to Derbyshire and only one refers to such an exemption—in a code drawn up in 1486 for the guidance of the newly established *silver-mines* administration.¹ And this highlights the one clear case where such an exemption was made, namely for the one mining industry where, as has already been noted,² the existence of a permanent labour force did require an adequate supply of foodstuffs.³ Regarding the Stannaries, the evidence is to say the least ambiguous. The charter of 1305 (but not that of 1201) declares that the miners are quit of a variety of dues on their own goods,⁴ presumably their tin, a presumption confirmed when amongst the levies is recorded stallage, that is, the due for hiring

a stall. Why else should they wish to hire a stall, in their capacity as tinnerns, but to sell tin?

Finally, there is the question of capital flows in the industry which are regarded as being designed to provide individual tinnerns with the means of buying basic necessities.⁵ Such credit flows bear a strong resemblance to those present in the lead industry in the *late sixteenth century*, when finance passed from the London dealers to local smelters, and finally on to the capital-poor miner. However, there is again a grave danger inherent in translating such a picture backwards through time. During the late fourteenth and fifteenth centuries, in Derbyshire at least, the flow between miner and smelter was reversed, funding passing from the former to the latter,⁶ from farmer-

¹ This latter reference—*C.P.R.*, 1485-1494, 69-70—is dealt with below, in n. 3. The story of the other two references is a much more involved one for both relate, directly or indirectly to a corrupt edition of the 1352 Flintshire code. Lewis (*Lead Mining in Wales*, p. 33) refers directly to a translation of this code taken straight from the *Cal. Black Prince's Register*, III, 71-3. Unfortunately this mistranslates the relevant clauses:

Et serront mesmes les minours et marchantes quits des toune, pannage et toutes autres custumes es toutes choses touchantes la sustenance de eux . . .

See the Evans edition quoted in n. 2, p. 69, above, or the original from which the above transcription is taken, *P.R.O.*, E36/279, fols. 42 f., for this passage, which may perhaps be more accurately rendered:

And the same miners and merchants shall be quit of tonnage, pannage and all other customs and all things touching upon their livelihood . . .

This passage is particularly interesting in the context of the above discussion for it highlights the fact that in attempting to improve the miners' livelihood the Black Prince considered this would be best served by making exemptions from levies on agricultural production—pannage—by which the miner obtained the basic necessities of life; and by making exemptions on imported luxuries like wine—tonnage. Concerning the palatine levies on wine, see K. P. Wilson (ed.), *Chester Customs Accounts, 1301-1566*, *Lancs. and Cheshire Rec. Soc.*, cxi, 1969. The transference of this code to Derbyshire is based upon J. U. Nef's comment on the similarity of it with an unspecified "Derbyshire code," a text which from his description is probably the same as that referred to Lewis 1908, p. 164 (Lewis, *Lead Mining*, p. 39, n. 40, refers to Nef's comment in *The Rise of the British Coal Industry*, I, 1932, p. 276, n. 5). This document is a very inaccurately printed seventeenth-century pamphlet of English mining laws (B.M. Add. MSS. 6682, fols. 65-75v) which the Derbyshire antiquarian Wooley collected and annotated, and which includes various laws. The pertinent section (B.M. Add. MSS., fols. 67v-9v) is in fact printed not from exchequer documents as stated (B.M. Add. MSS., fol. 65) but from an undated and very corrupt copy of the Flint laws (*P.R.O.*, DL41/11/27), probably of sixteenth-century provenance, which some anonymous duchy of Lancaster clerk misattributed to "the Highest Peake, and in all other places in England and Wales."

² See above, pp. 64-5.

³ Administrative codes applicable to royal (silver) mines: "Carlisle mines": *Cal. Doc. relating to Scotland*, II, 41; *Cal. Inq. Misc.*, III, 81; *C.P.R.*, 1354-8, 459-60; *C.C.R.*, 1354-60, 281-2. These documents of the thirteenth and fourteenth centuries represent the attempts of commissioners, appointed by the Crown, to reconstitute on the basis of witnesses' evidence the lost "laws" of the twelfth-century mines; Devon mines: the basic code of 1298 (*P.R.O.*, E368/69, m. 51) was supplemented by various administrative orders. See *C.P.R.* and *C.C.R.* 1292 *et seq.* Each of these codes remained in force until the administration of the silver-mines was unified under Royal Commissioners. On the occasion when a new group of Commissioners was appointed in 1486 to administer the Crown's rights in the defunct "Carlisle mines," the declining Devon ones, and the unfruitful new workings in Cumberland, Northumberland, and Yorkshire, a new code was issued—*C.P.R.*, 1485-94, pp. 69-70.

⁴ Lewis 1908, p. 238 (1201); *ibid.*, pp. 239-41 (1305). ⁵ Above, pp. 55, 59.

⁶ See Blanchard, *thesis*, pp. 298-9, referred to above p. 55, n. 8. A pattern similar to, though not completely analogous with that in the contemporary wool trade.—E. Power, "The Wool Trade in the Fifteenth Century," in E. Power and M. Postan (eds.), *Studies in English Trade in the Fifteenth Century*, 1933, pp. 62-6.

miners with sufficient substance to be able to lend part of their income for industrial investment. Whether a similar situation existed in the Stannaries is uncertain. Accordingly, whilst reiterating a plea for more information on this relationship,¹ it is perhaps necessary here to present such evidence as a brief exploration into stannary history has brought to light. An examination of Blackmore Stannary during the early years of Richard II's reign reveals a great diversity in mining conditions. On the one hand, there were rich mine owners like John Treggorak, who possessed mine workings and employed labourers therein.² These were men of considerable substance who leased large agricultural properties, such as the 160 acres of wood and pasture rented by Treggorak in Tewington or the fisheries and mills which also formed part of his landed empire. Alongside them were lesser men like John Symon, who probably laboured in his own mine workings and who held a peasant farm of about 25-30 acres, or John Kendal, jun., who lived with his widowed mother Alice on their 7-acre tenancy at Penlyn. These latter were the men who, with the anonymous but undifferentiated labourers, formed the backbone of the industry. Travelling each day during the summer months from their homes to the nearby stream workings,³ they produced the ore upon which the fortunes of the industry were founded.⁴ Whether opulent mine owners or sturdy farmer-miners, however, they had one thing in common, they delivered their tin *in advance of payment* to

another group of individuals who did not hold land in the villages, and who as purchasers of tin may perhaps be identified as local merchants or at least as intermediaries thereto.⁵ This study most certainly cannot be presented as conclusive—it is too restricted in time and space for that—but some evidence is required on this point and it is suggestive at least that in the tin industry, like the lead industry, the late fourteenth and fifteenth centuries witnessed the existence not of an impoverished capital-poor miner but of a man who was of sufficient substance to stand alongside his more opulent entrepreneurial brother in providing some small part of his income for industrial investment.

IV

These, then, are the three main substantive points. The remaining criticisms of the original study may perhaps be grouped together under one heading. Firstly, concerning the alleged statements supposedly made in that work on mining in other periods than the late Middle Ages,⁶ the reader may perhaps be referred to the original statement contained therein (*loc. cit.*, pp. 93-4). It hardly constitutes a denial of the historical existence of the "miner-husband-man." The question originally posed was not whether the farmer-miner was characteristic of pre-industrial England⁷ but whether the *poor* farmer-miner of the late sixteenth and early seventeenth century, lacking an adequate holding and largely dependent on his ore finds for his subsistence,⁸ was the product of a speci-

¹ *Loc. cit.*, p. 95, n. 1.

² Mine owners with as many as fifty people in their employ were found in the stannaries (Lewis 1908, p. 189, as well as above, p. 58) as they were in the contemporary lead industry (Henry Vernon, for instance, employed some twenty-four men within his "meres" on Nestles rake alone in 1470.—P.R.O., DL43/1/25, bk 1, fol. 13). Yet there is no direct economic relationship between the size of the unit of ownership and the unit of production. These owners held domain over a multitude of nuclear one- or two-man "meres" such as described above, on p. 65.

³ Reference to the ordnance survey map will show the close proximity of the village of Penlyn to the stream works on the alluvial deposits on the Fowey immediately below Lostwithiel, or the ease of access that the inhabitants of Tewington manor had to such rich deposits as the "stream" of tin on St Austell moor, three miles south of the old town.

⁴ The evidence is slight but certainly does not support the unsubstantiated statements made above (p. 59) about the long-distance migratory habits of the late medieval tinner.

⁵ The preceding section is based upon: P.R.O., E306/2/3, E101/263/19, and SC2/156/27-8.

⁶ See above, pp. 56-7.

⁷ Indeed in *loc. cit.*, pp. 104-6, it was declared that this is what is to be expected in pre-industrial societies.

⁸ As described above, on p. 58, as well as in many of the works listed in *loc. cit.*, p. 93, nn. 1-3, and in the studies of late Tudor and Stuart mining listed above, in p. 56, n. 5, and p. 57, n. 1. Indeed evidence from

fic situation of overpopulation; or whether, as suggested by so many writers, he should be regarded as the archetype for all miners, including those of the late fourteenth and fifteenth centuries, in pre-industrial England; or indeed, as suggested by one author, as the archetype for all miners up to and including those of the twentieth century.¹

Secondly, with regard to the declared disbelief that the miners, whose careers were originally chronicled, were either miners or typical.² Some considerable effort was expended to show that these were miners,³ and the word "typical" was chosen with some care. For absolute clarity, however, the usage of the original study may perhaps be usefully specified here. Take for instance John Philipps, jun.,⁴ whose identification as a miner was based on his inclusion in the records of Chewton minery, on rolls which record the levies exacted from "diverse workmen upon the lord's hill of Mendip."⁵ He was certainly not the least or the most substantial member in his mining community, but enjoyed a typical or more precisely a modal position therein.⁶

Thirdly and lastly, as to the alleged "dubiousness" of the original arguments about the influence of mining activity on rents,⁷ the specious basis of the alleged exemption of Derbyshire miners from toll has already been

exposed,⁸ and now it remains necessary only to look at the supposed evasion of the Wirksworth tolls. Whilst not questioning that all tax records must be used with caution, the "quotation" from another work of mine does seem somewhat strange,⁹ for an examination of the passages on Derbyshire tolls referred to will reveal that the remarks quoted relate to evasions in High Peak during the stewardship of the Blounts,¹⁰ an administration notorious for its slackness, and not to the more southerly Wirksworth jurisdiction. Indeed, on the same page it is stated of the Wirksworth tolls that such evidence as was available was "at least suggestive of the veracity of these toll records."¹¹

Moreover, by a somewhat emotive evaluation of the statistical data presented in the original study, the view is presented above that the "slight" fluctuations in Wirksworth lead production may be explained in terms of migrations of miner-farmers to and from the manor, movements which would have no effect on a land market "suffering from a severe and progressive contraction of demand."¹² Such a view need only be expressed in statistical terms to display the "reality" of its position. The amplitude of the fluctuations displayed in fig. iv¹³ amounted to as much as 200 loads, and was frequently in the range of

another study of mine is "quoted" in the preceding note, which shows the emergence, under conditions of overpopulation from 1520's, of just such a group of poor farmer-miners. Unfortunately the evidence is misdated therein (above, p. 57). An examination of the references quoted will reveal that (on p. 298, Blanchard, *thesis*) this practice was delimited to the period between the reigns of Henry VII and Elizabeth I, and then more specifically on the basis of the evidence presented in a case brought in Duchy Council and Star Chamber to the period from the 1520's to the 1540's (Blanchard, *thesis*, pp. 281-2).

¹ Above, p. 57 and n. 1 therein. ² Above, pp. 60-1. ³ *Loc. cit.*, pp. 94-5.

⁴ Whose career is traced *ibid.*, p. 96.

⁵ The heading runs, in unextended transcription thus: . . . *de divers' operar' super montem domini de Mendepp* . . . S.R.O., C/924, DD/WG 16/3 *passim*.

⁶ Established by plotting a frequency distribution of (a) value of holding, (b) taxable income of members of the Chewton mining community, as derived from S.R.O., C/924, DD/WG 16/3 f.; P.R.O., E179/169/143, E315/385 fols. 30v *et seq.*

⁷ Above, pp. 58-9. ⁸ Above, p. 70 and n. 1 therein.

⁹ Blanchard, *thesis*, pp. 341-2, quoted above, pp. 58-9.

¹⁰ The governance of High Peak was plagued by maladministration not only under the Blounts, who were the subject of a special investigatory commission in 1474, but also subsequently under Sir John Savage, who was dismissed for this reason in 1498. On their inactivity and its effect on tolls in High Peak, see nn. 4-5 and the discussion on pp. 341-2, Blanchard *thesis*, referred to above, p. 60. One of the documents referred to there has been subsequently printed in *Derbys. Rec. Soc.*, III, 1971, doc. A2, p. 25. For a wider study on the works of the investigatory commissions, see R. Somerville, *History of the Duchy of Lancaster*, I, 1953, pp. 249-51, 265.

¹¹ Blanchard, *thesis*, p. 342, n. 3. ¹² Above, p. 60. ¹³ *Loc. cit.*, p. 105.

50-100 loads, the production of some twelve to fifty farmer-miners. Now one question only need be asked: would the entry or exit of such a number of tenant-farmers not affect the land market of a township with a total tenant population of about ninety?¹ Yet the sudden augmentation of tenant population by a supposed 50 per cent between 1417 and 1421, for instance, merely resulted in a fall in the amount of land in use! Such a situation was rejected as hardly credible and the view substituted that what is being observed during these years is a village population producing on average 0.1 loads *per capita* in 1417-18 and slightly over 2.0 loads each in 1421-2, an increase in average *per capita* productivity not incompatible with the type of mining earlier described—an increase in productivity, moreover, which would certainly yield them a reasonable additional cash income from which it was suggested the lord levied a 3-4 per cent “tax” in increased rents.² Yet this last conclusion was deemed “bizarre”³ for taken to its logical conclusion would not this mean, firstly, that those who earned high wages would have a similar “tax” levied on their earnings and, secondly, that therefore the mass of the population would pay such a “tax” and rents all over England would rise. An examination of another study of mine reveals that the impact of wage-rate changes on rents had already been considered, and that some rents might include an element of payment for “the opportunities available for wage labouring on large farms” was deemed possible.⁴ Yet to jump from that position to the next one, that the mass of the population enjoyed increased wages and, therefore, rents all over the country would rise, was certainly not envisaged. Long ago Professor Postan suggested that the group

who received a significant monetary income from wage labouring was small and dwindling in numbers during the latter middle ages, an epoch when in England a peasant society displayed a high propensity to consume its own products.⁵

V

These, then, are the main points contained in the preceding discussion. The main difficulty inherent in any attempt to assess the degree of uniqueness enjoyed by the tin-miner in relation to his counterparts in other late medieval extractive industries unfortunately lies in the nature of the records themselves. The present author needs no reminder of the difficulties inherent in stannary documentation,⁶ for having abandoned in searching for the fabled tinner the coinage rolls, for reasons outlined in the original article and reiterated in the previous paper,⁷ some weeks were spent trying to track down certain *operarii* recorded on the Stannary court rolls whose existence might be corroborated in other documents of manorial, governmental, and judicial provenance. The results were slight, the difficulties of identifying the participants in the industry—miner, mine owner, smelter, tin merchant, and tradesman—immense.⁸ It is thus with some considerable pleasure that some slight, indirect evidence concerning the *stannator* of Penwith-and-Kirrier has come to light in the previous discussion, permitting certain comparisons which may be tentatively presented to the reader. Information concerning his productivity may be derived⁹ which can be presented comparatively in two ways. Firstly, the tin-miner may be compared with his counterparts in the lead and silver industries in his capacity as a producer.¹⁰

¹ On average output per man, *ibid.*, p. 99; for extent of fluctuations, *ibid.*, p. 105; and for the total tenant population of Wirksworth, P.R.O., DL42/4, fols. 72-6v.

² Total income generated by an increase in production of about 200 loads of ore is about £90 of which the lord of the lead-field takes about 13 per cent, the Church 10 per cent, and the manorial lord 3-4 per cent.

³ Above, p. 60. ⁴ *Econ. Hist. Rev.*, 2nd ser., xxiii, no. 3, 1970, p. 433.

⁵ M. M. Postan, ‘Some Economic Evidences of Declining Population in the later Middle Ages,’ *Econ. Hist. Rev.*, 2nd ser., II, no. 3, 1950, pp. 243-4, and the same author in *Cambridge Econ. Hist. of Europe*, II, Cambridge, 1952, p. 195.

⁶ Above, p. 61. ⁷ *Loc. cit.*, pp. 94-5, and above, p. 61. ⁸ *Loc. cit.*, p. 98, n. 2, and above, p. 71.

⁹ From information concerning labour force-size (above, p. 58) and output (above, p. 55, and also p. 61, n. 3).

¹⁰ See table III.

TABLE III

MINING PRODUCTIVITY IN THE TIN,
SILVER, AND LEAD INDUSTRIES OF THE
FOURTEENTH AND FIFTEENTH CENTURIES*
(in Derbyshire loads, *per capita*, *per annum*†)

Tin-miner	I
Lead-miner	4
Silver-miner	24

* Sources for the tin-miner, above, pp. 55, 58; the lead-miner, *loc. cit.*, p. 99; the silver-miner, P.R.O., E372/145, m. 22 f., E368/69 m. 51.

† The diverse ore measures have been standardized in the following manner. Average production of tin *per capita* converted to ore at the rate of 3 'footfates' to 105 pounds of refined metal (Lewis 1908, p. 5), and 'footfates' to Derbyshire loads at the rate of 8 quarts ordinary measure to 3 'footfates' (*ibid.*) and 20 quarts to a Derbyshire load (*D.A.J.*, LIX, 1939); for the relationship of the Devonshire to the Derbyshire load, see references in n. *, above.

In every respect the *stannator* and *plumbarius* are much more like each other than like the full-time professional silver-miner with regards to the level of production emanating from, and the amount of time spent in, their extractive work. Secondly, from regarding him as a producer the miner may also be considered as a consumer. If, as has been suggested, he should be regarded as a man who with his fellows provided the basis for a commercial grain trade, then how much grain could he buy with his mining income? Broadly his ore

sales would yield him 20s.-22s., or approximately the same as was earned by his lead- or iron-mining counterpart.¹ A pitiful sum for the support of a family, in providing it with the greater part of its bread grains, for this would buy but 3 quarters of grain a year,² or 75 per cent of what contemporaries regarded as the *minimum* sustenance of a *single* man. Such an income could not provide for the support of a mining family largely dependent for its grain on purchases in the market-place, but it could provide a useful cash supplement for a man who, having provided for his family's needs for basic foods from his own holding, now wished to purchase such luxuries as pepper, oysters, or wine, or who wished to set some cash aside to tide him over a bad harvest.

The evidence is slight, but suggestive; only with more examples, particularly from the Stannaries, will the picture become clearer. Until then, however, it may perhaps be tentatively suggested that such evidence as is available concerning time allocation to, and seasonality of, mining, as well as about the possible dependence of farmer-miners on purchased food grains, all reveals the elusive *stannator* not as a man apart from but as a member of that *communitas minerarum et rusticorum*, that body of workers in the late medieval extractive industries to whom mining was an insignificant sideline in relation to their more important agricultural pursuits.

¹ This may be derived in two ways (1) by taking average output of ore *per capita* (table III, nn. *, †) and multiplying by the price of ore per 'footfate' (derived by taking the 1290 price (Lewis 1908, p. 5) and adjusting it by a wage-inflationary index of 2), i.e. 22s., or (2) average output of tin *per capita* multiplied by the price of tin in Cornwall (p. 63, n. 3), although this may include a smelter's profit margin, i.e. 20s.

² Based on a grain price of 6s. 8d. a quarter. See J. E. T. Rogers, *A History of Agriculture and Prices in England*, IV, Oxford, 1866-82, p. 292.