

## Original Documents.

IN the indenture printed at p. 131 of this volume will be found the instructions or ordinances under the privy seal of the king for working the silver mines of Byrland or Beer, in Devon, during the 29th and six following years of the reign of Edward I. In the introductory notice of that document I pointed out that, incidentally, it threw light on the relation and dealings between the king and the great Florentine firms of bankers to whom he resorted for financial assistance in carrying on the costly wars in which the first and third Edwards were constantly engaged both within the four seas and beyond them.

I now propose to supplement that paper by the accounts rendered to the Exchequer by Thomas de Sweyneseye (Swansea?) who had been appointed to be the Custos or Warden of a part of the royal mines in Devon.

The mine or mines (*minerae*) on which the works were carried on, were in fact wholly in that county on the Tamar river; though the indenture and workings under it incidentally refer to places on the Cornish side of the river, such as Altonon, Calstock, and the adjacent woods, near which the refineries for desilverizing the lead, and the timber used for superficial, or underground, work on the mines, were situate.

The accounts rendered by the Warden to the Crown extend over seven consecutive membranes, forming one roll, in which each membrane contains a single year, or part of a year, to which it relates. Substantially, each account refers to the receipt of the moneys, &c., supplied to the works during one year, and the sources of the money or funds so supplied, the work done, and all the expenses incidental to the works, down to the time of the delivery of the proceeds, so far as regards the silver, to the Mint at the Tower of London, or of cash balances paid into the Exchequer on tallies. These particulars form, in effect, a complete conspectus of the practical operations on the mines from the bringing up of the ore, called, in its natural, unmelted state, *black work* (*nigrum opus*), till the fusion by metallurgical processes into *white silver* (*argentum album*) in a state fit for delivery at the Mint in mass.

So long as the ore is in its unbroken, or black state, the process of dressing it is not materially different from that employed in other metallic mines in the West; the pick, the gad, and the shovel, are the implements common to all, as well as the clearing of the underground cavities from water by wheel and bucket, and drawing up the rough produce to be dealt with in the lavatories by washing (*lotura*). But the separation of the precious metal from the less valuable stuff, which contains it, is a process of more difficulty, and is not common to all metallic

ores. Whether the particulars in these accounts are sufficient to enable an intelligent reader to detect the nature of this last process adopted at these mines is for consideration hereafter.

The notes introduced under the text, together with the supplemental observations at the close of it, may serve to explain some technical difficulties or doubts in the record itself. The accounts will be found among the Foreign Accounts of the above years among the so called "County Bags," Devon, 9a.

## MEMBRANE I.

The first part of this membrane has been torn and mutilated, and can only be now partially read. I have therefore selected only the second membrane to be transcribed *verbatim*. It is plain, however, that the account rendered in the first contained, generally, matters of the same kind as the rest. It shows, also, that the works were not in new or untried ground ; for the earliest items begin, as might be expected, with the clearing and repairing of the old adits, and drawing out the water from the works both underground and superficial ; and the wages then paid to the miners imply that they were employed chiefly on what is now called "tut-work," that is, work measured, not by the value of the ore returned in gross, called "tribute," but task-work.

## MEMBRANE II.

The following is an office copy of the entire roll for the year 29 & 30 Ed. I.

Compotus Thome de Sweyeseye clerici custodis minere domini Regis in comitatu Devon. et Cornub. a festo Sancti Michaelis anno Regni Regis Edwardi 29 usque idem festum S. Mich. proxime sequen. anno 30.

*Recep. denariorum de Vicecom. Devon'*] (The headings of the several entries, which are in the margin of the original roll, are here indicated by italics followed by a bracket).

Idem respondet de 20£. recept' de Thomā de Ralegh' vicecomite Devon' apud Exon' die mercurii prox. post festum S. Hilarii anno regni Regis 30. Et de 30£. recept de eodem apud Exon die mercurii prox' post festum S. Gregorii pro anno supradicto. Et de 30£. recept' de eodem apud Exon' 23 die martii anno supradicto.

Summa 89£ [erased by a line across].

*Recept' denariorum de stagmine.*<sup>1</sup> Et de £52 18s. 8½*d.* recept' de exitibus et proficuis stagminarie Regis in comitatu anno supradicto. Et de £26 13s. 4*d.* recept' de abbate de Tavystok de quodam fine facto cum domino Rege pro licentiā habenda super appropriationem ecclesiarum de Whyte cherche et Westleye.<sup>2</sup>

Et de 128£ 17s. 7½*d.* recept' de exitibus et proficuis maneriorum Regis de Bradenesh, Lydeford, Dertemore, Kenton, et Wyke ut patet per computum inde in Scaccario Regis redditum hoc anno.<sup>3</sup>

<sup>1</sup> *Stagmen* is one of the old forms for stannum.

<sup>2</sup> This shows that the crown had authorised the payment of this fine directly to the Custos.

<sup>3</sup> No doubt the rents and issues of these five manors, parcel of the Earldom of Cornwall "in manu Regis," had been paid to the Custos, and allowed in account by the Exchequer.

Et de 8s. receptis de placitis et perquisitis Beremoti in minera hoc anno.<sup>4</sup>

Et de 5s. recept' de quodam quarrerio rupto ad conservationem minere prius deputato, vendito abbati de Bocland.

Summa 294£ 2. 7½.

*Expense.*] Inde computat in vadiis Mathei de Hetchcote clerici supervisoris minere supervidentis operationes et operarios in eadem et in anidod' etc. ut supra, percipientis per diem sex den' per 351 dies prece- dentes, 8£ 15. 6., sicut continetur in rotulis de particulis<sup>5</sup> inter custo- dem et contrarotulatoreum indentatis. Et in vadiis forestariorum custodientium boscum Regis de Kalistok et boscum de Bucombe per tempus supra dictum, 71s., sicut continetur ibid'. Et in vadiis Henrici de Pridie providendis cepum et facientis candelas pro luminar' in minera, percipientis per septimanam 17d. per tempus supradictum, 88s.; sicut continetur ibid'. Et in vadiis fabrorum facientium diversa utensilia pro minera et in aliis operationibus ibid' per idem tempus, 6£ 18. 10, si- cut continetur, etc. Et in ferro et calybe per diversa precia pro diver- sis utensilibus in minera, et aliis diversis operationibus ibid' inde facien- dis cum car'<sup>6</sup> de diversis locis 8£ 8s. 4d. sicut continetur, etc. Et in cepo empto per diversa precia ad candelas pro minera et affinationibus et aliis operationibus ibid' inde faciendis per tempus supradict' cum car'<sup>6</sup> de diversis locis 22£ 19. 8d. sicut continetur, etc. Et in cordis canab.<sup>7</sup> empt' ad aquam, terram, et lapides de minera et veteribus anidod' extra- hend' et minerarios, merem', 'et utensilia avaland'<sup>8</sup> per idem tempus cum car' de diversis locis, 10£ 15s. 4d. sicut continetur, etc. Et in coriis bovinis empt' per diversa precia pro bulgis inde faciendis ad aquam de minera extrahendam, et foll(ibus) fabrorum reparandis et emendan- dis cum car' de diversis locis per tempus supradictum 11s., sicut con- tinetur, etc. Et in factura bulgarum predictarum per tempus supradict' 3s. Et in carbone more empt' fabricis Regis in minera cum car' de diversis locis 108s. 3d., sicut continetur, ibid'. Et in uno batello empto ad passagium inter Birland, ubi minera existit, et Calistoke ubi mora<sup>9</sup> Custodis minere, bole, fornelli, et affinationes et operationes diverse existunt, 8s., sicut continetur ibid. Et in emendatione cujusdam veteris batelli longi cum bordis et clavis emptis ad eundem 13s. 3d.; et in expensis cujusdam nuncii euntis de minera ad London ad dominum

<sup>4</sup> The "beremote" here referred to was not, I apprehend, named from the place where the mine was situate,—viz., Bir or Byr,—but from the local court and plead- ings therein, which it was the practice of the Crown to establish for the conve- nience of the miners. In the Derbyshire mining district it is still called the Bar- mote, and is equivalent to the court of the *Bergmeister* of the German mines. See the notes of the reported case of *Vice v. Thomas*, heard by the Lord Warden of the Stannaries in 1843, and published in London in that year.

<sup>5</sup> These particulars were the vouchers produced and showed to the officer who audited the account, but they do not

generally appear in these rolls, which are only abstracts. They were no doubt produced to the "visores" or viewers of account present personally in the court. —Madox, *Excheq.* vol. 2 (ed. 4to.), pp. 292-3.

<sup>6</sup> Cartage from place to place.

<sup>7</sup> Hempen ropes.

<sup>8</sup> *i.e.*, to lower miners, timber, and tools.

<sup>9</sup> "Mora" is interlined above the two adjacent words below it. It seems that the situation, or place, where the refineries were, and where the warden resided, were on the opposite side of the Tamar.

Thesaurarium super statum minere certificandum, eundo, redeundo et morando, 3s., sicut continetur ibid.

Summa 79£ 13s. 2d.

*Solutio pro facturâ anidodorum et reparatione minere ad buscam.*] Idem computat in solutione facta Hugoni de Morneshale et sociis suis minerarum, Thome Robyn et sociis suis minerarum, Roberto filio Ricardi et sociis suis, et P. Le Hore et sociis suis,<sup>1</sup> in partem solutionis 1026d. in anno preterito prescript' pro factura anidodorum et reparatione minerarum per conventionem cum eisdem minerariis factam prout patet in indenturis inter Custodem et contrarotulatorem ex parte una, et dictos minerarios ex altera [parte] confectis per tempus supradictum, 343£ 18s. 5½.

*Vadia Custodis minerarum.*] Idem computat in vadiis ejusdem Custodis minere predictæ a die Sancti Michaelis anno 29, usque ad eandem diem S. Michael' proxime sequentem, anno regni Regis 30 per annum integrum, videlicet, per 365 dies, ult' die comput', percipientis per diem,

Summa [blank].

*Vadia contrarotulatoris.*] Et in vadia R. abbatis de Tavystoke contrarotulatoris minere predictæ per tempus supradictum, videlicet, per 365 dies, ultimo die comput', percipientis per diem.

Summa [blank].<sup>2</sup>

#### MEMBRANE III.

Of the five remaining membranes the substance will be here stated in a mere outline or abstract, specially including those words and descriptions, which tend to illustrate the nature of the works executed in the course of the extraction and preparation of the black mineral or ore, and in the further process of separating the silver (white metal) from the sulphide of lead, or galena, and preserving each product separately.

Compotus Mich. 30 Ed. I., and Mich. 31 Ed. I.

"De argento albo de exitu minere nil respondet quia plumbum fusum inde proveniens non peraffinatur hoc anno, sed in custodia coram Custode et contrarotulatore remanet, et in cakis<sup>3</sup> plumbosis usque ad annum sequentem."

It seems that in this year the lead had not been sufficiently desilvered, but was retained in its mixed state for future treatment.

"De 4s. . . receptis de corticibus venditis provenient' de busca prostrata ad meremiandum et suppodiandum, et ad minam comburendam et fundendam per bolas et fornellas, et domos affinatorum et aliarum officinarum inde faciend' et construend'."<sup>4</sup>

The timbering and propping must have been chiefly for pit work.

"In 159 ladis, 5 discis, mine lote et mensurate emptis, de quibus 143 lade, 5 disci, mine decimalis sunt empt' de rectore de Byr, precii

<sup>1</sup> These working miners and their fellows, or "pairs" (as they are now called), had no doubt made contracts to repair the mine by task-work.

<sup>2</sup> Neither amount nor rate of wages is here stated in either of the two last items of account.

<sup>3</sup> A cake is still a technical term for melted silver-lead.

<sup>4</sup> The word "*mine*," whether in Latin or English, usually applies to the ore as detached from the rock or matrix, and not to the place of operation or extraction here called the "*minera*."

lade 11s. de quibus subtrahuntur eidem rectori 9 den<sup>r</sup>. de qualibet lada decimali ad opus minerariorum, nomine loture ejusdem mine decimalis, 37£ 9s. 9d.; unde de nigra mina 120 lade, 1 discus; et de albâ mina 31 lade, 4 disci—Novem disci faciunt ladam."

It should seem that the Warden bought of the rector the tithe of the ore dug on his glebe; or that tithe was paid to the rector as such, deducting the expense of washing, without which the ore would have been of little value. That the produce of mines was at this time supposed to be titheable in Cornwall and Devon, appears from other authorities. A fixed sum was, and still is, claimed by the bishop as, and for, tithe; but the origin of this claim is obscure.<sup>5</sup>

The following expenses appear under that head: The wages (*vadia*) of Walter de Horsham, for superintending the works above and below the surface, and also the smelting (*fusiones*), refining, and measuring, as contained in the roll of particulars. The wages of the keeper of the woods of Calistoke; of the workmen and their assistants or helps; of the "*bolarii*" burning and fusing by boles; of the "*fornellarii*," "*cum conflatoribus et fundentibus nigrum opus, et albam minam*;" for clearing a conduit of water running to the furnaces (*fornellas*); for cutting wood and blocks (*blockas*) for boles, and "*trunks*" for the refiners; and carpenters for building and repairing the huts, &c., of the refiners.

The expense of a certain "*bola*" in Byrland; of sawing planks, and breaking stones; repairs of boats and barges; timber for the mines, and for the ferry over the Tamar; hay for horses; iron and steel for various purposes; an anvil for the king's use; tallow for candles; cords and hemp for bringing up the ore, water, earth, and stones from the "*anidods*": cowhide for making "*bulgi*" (buckets or leather bags); charcoal for fusing black ore for the furnaces; moor coal and sea coal; canvas for sacks; and the expense of assaying and washing the ore, and making a pit (*puteus*) on the works, to be used as a prison for malefactors and bad workmen.

#### MEMBRANE IV.

Comp. Mich. 31 Ed. I. to Mich. 32 Ed. I.

Among the receipts of this year are the following: Receipt' 130£ 6. 5½. in moneta in cambio Regis London' per pondus 21 die Decemb' provenient' de 132£ 5s. argenti albi in massâ de exitu minere Regis Devon., appreciat' ad libram per 3d.½ in decremento, et de 27s. 2d. de incremento per numerum, provenient' de dictis 130£ 6. 5½. receptis in moneta ut supra; viz. ad libram 2d.½ Summa denariorum cum incremento 131£ 13s. 2¼d.

Among the receipts for "*barren lead*" (*plumbum sterile*) sold, are £39 and 3¼d. for 13 carrats and half a quarter of a foot (*pes*) of lead from the cinders resmelted (*refusus*), and after being so resmelted sold at 65s. per carrat, each carrat containing 24 feet (*pedes*), and every foot 70 lbs of lead, at 2s. 6d. per foot.<sup>6</sup>

<sup>5</sup> As to the tithe of tin see the reference in the appendix to the Report of Vice v. Thomas, pp. 11 & 25, referred to *ante*, in note 4; citing records of 18 Joh.; 10 Ed. 2; 33 Ed. 1 (Rot. Parl. vol. i. p. 164, printed edition). The entry

of miners on church glebe was objected to temp. Ed. 3; yet the cemetery of Helston church has long been regarded as subject to tin bounds, and therefore liable to be worked.

<sup>6</sup> *i.e.*, a foot of lead so re-smelted con-

Under necessary expenses are the wages of smiths; of bolarii for burning and smelting "per bolas," and keeping the ore safely by self and helps; of the fornellarii with their fellow blowers of the black and white ore, and of woodcutters preparing wood and blocks for the boles; for the purchase of moor coal and sea coal for the King's works; for making charcoal for the smelting of black ore at the furnaces and hearths (*astra*) of the refiners; for the cinders, or ashes of tan (*cineres de tanno*) bought for the refiners; and for the breaking and washing of the black ore (*nigrum opus*); for canvas to make sacks; and for the carriage of the white silver "in massa de exitu minere usque turrin London' ad cambium ibidem . . . ."

## MEMBRANE V.

Computus from Mich. 32 Ed. I. to Mich. 33 Ed. I.

The receipts this year from the Mint of London are £122. 18s. 6½*d.* by weight on 1 Oct., for £124 9s. 8½*d.* of white silver in mass reckoned at 3*d.* per pound "in decremento;" and 25s. 7½*d.* "de incremento per numerum" coming from the said £122 18s. 6½*d.*

There were several other deliveries of silver at the Tower by weight (per pondus) in the same year. One receipt is for the sale of bark from timber cut down for timber and pit work.

Another receipt is of "dishes" of ore measured and bought of the Rector of Byr as part of his tithes, as in computus No. 4, supra.

Among the necessary expenses are "aqueductus pro lavatoriis; ferrum, cepum, cannabum et cordas de cannabo; bulgi ad aquam de minera et anidod' extrahenda," and also in factura bulgeorum, et cum uncto pore' ad conreatoream.<sup>7</sup>

In uno cribro crineo cum tribus cribris ligneis emptis pro cineribus affinatorum cribrandis 16*d.*<sup>8</sup>

In extractione aque anidod' in minera de Foxwalle.

In scrutinio mine facto juxta Plympton per R. de Dunteshale et alios. The account closes with the delivery to the King's Chamberlain at the Exchequer of the issues of the mines—£200 by tally.

## MEMBRANE VI.

Comput. Mich. 33 Ed. I. to Mich. 34 Ed. I.

Among the receipts are monies "provenient' de argento albo de exitu minere per cambium, etc.," as in former accounts, viz.

"Respondet de £243 18¼*d.* recept' in moneta ex cambio Regis London per pondus, provenient' de £2491 6s. 2*d.* argenti albi in massa de exitu minere Regis, Devon, appreciati ad libram per 6*d.* in decremento; et de 5s. 7¾*d.* de incremento per numerum, provenient' de dictis £243 18¼*d.* recept' in moneta ut supra, videlt. ad libram 2½*d.*—Summa cum incremento £245 12s. 2*d.*

Among the expenses are the purchase of "1321 lade, 3 disci minere lote et mensurate, de quibus 1189 lade, 2 disci mine decimate sunt

tained 70 lbs., and a carrat contained 24 feet at 2s. 6*d.* per foot. It appears that the lead so desilverized (*i. e.*, minus the pure silver) was sold at 65s. per carrat, and applied to the general expenses of the works.

<sup>7</sup> *i. e.* the purchase of bacon fat for

currying the leather buckets. The forms "bulga," "bulgus," and "bulgeus," and fornella, or fornellus, are used indifferently in these accounts.

<sup>8</sup> These sieves of hair, &c., were evidently used for the separation of the silver in the furnace.

minerariis empt' de rectore de Byr precii lade 2s.; de quibus subtrahuntur eidem 9 denarii de qualibet lada decimali ad opus minerariorum nomine loture ejusdem mine ipsum rectorem contingent' per breve Dom. Regis Custodi predicto super eo directum, £310 10s. 3½*d.*; unde de nigra mina 1235 lade, 7 disci; et de alba mina 85 lade, 5 disci—Novem disci faciunt ladam."

Other expenses, such as wages of W. de Horsham, clerk, supervisor of the "campus minerarum," and of the works below and above ground, and of the smeltings and refiners, and workmen there; and the mensurations of the ore, 21*d.*, and sometimes less, for the above time; and the wages of bolarii and fornellarii for the blowing and fusion of black work; the wages of the refiners, and woodcutters for timber and blocks for boles and trunks for the refinery with cartage and portage; wages of sawyers and carpenters employed in the making and repair of boles, furnells, houses, and other various engines (*ingenia*); and for carriers of timber and blocks, purchases of horses, of oats, harness and charcoal (*carbo de bosco*), water for the lavatories; buckets (*bulg'*) for drawing the water from the anidods; purchase of "*carbo maris et more pro fabricis Regis*;" the hire of eight pair of banastr'<sup>9</sup> to convey coal and ashes (*cineres de tanno*) for the refiners; the lotura (washing) of the black work; the hire of barges to carry ore from the mines to the river Tamar, and for the construction of a new engine "*cujusdam novi ingenii*" for smelting the ore; and for the carriage of the produce of the silver to the Tower of London "*ad cambium Regis ibid.*," and of a "*garcio*" (messenger) sent with the King's writ issued from the Court of Exchequer to search and inquire for miners of the King at the Peake ("*in Pecco*") 10*d.*<sup>1</sup>

This roll closes with an entry of a payment to the Chamberlains of the Exchequer of £1,200 from the issues of the mines, by 3 tallies.

#### MEMBRANE VII.

Computus from Mich. 34 Ed. I. to 13 May 35 Ed. I.

After the usual receipt in respect of white silver at the Mint, there is a receipt by sale of barren lead as in a former roll, viz. £95 14s. 1*d.* for 47 carrats and half, and 9 feet, sold at 40s. *per carrat*, and at 20*d. pro pede*. The account closes with a delivery into the Exchequer of £300 by tally. Here the roll of accounts ends.

I have already stated that the mode of clearing, draining, breaking, and bringing to grass the mineral contents of a lead mine is not likely to have differed much from the ordinary process in other metalliferous mines. The workings on behalf of so solvent an adventurer as the crown were probably on a large scale; yet I do not observe in the above par-

<sup>9</sup> *Banastre*.—See Ducange, sub tit. *Banasta*, *Banastura*. A large wicker basket for various purposes. A pair of these would be the load or double load of a pack-horse. In one of the examples above cited by Ducange it is described as a miner's heaped measure.

<sup>1</sup> The practice of impressing miners for

the king's mines in this mining district in Derbyshire is shown in other records. See the notes in the Appendix to the Report of Vice v. Thomas, a case decided by the Lord Warden of the Stannaries in May, 1842, and published, London: Saunders & Benning, 1843. See *Ibid.*, Appendix, pp. 93, 118-120, 121, 123, 124, E. S.

ticulars of the work, either subterranean or superficial, anything that seems to point out the use of stamping engines, or any unusual machinery for unwatering the excavations, vertical or lateral, of the underground diggings. Stamps, in the usual sense, are of comparatively modern use. Beckman (History of Inventions), does not carry them back, even in Germany, further than the fifteenth century, and I can easily believe that the hand mills, still occasionally found on the site of ancient mine-works, of which some on a large scale have been lately produced for our inspection, and are figured in the present volume of the journal of this Institute, may be relics of inartificial early modes of trituration. See also another instance noticed Beckman, under the same head, *ubi supra*.

It is probable that the "trunks" referred to among the items of expense in the above accounts (Membrane III.) may be the equivalents of the shallow vessels or troughs lined with timber, which are mentioned by Dr. Borlase in his description of the washing or buddling process in tin works, illustrated by a plate in his Natural History of Cornwall, and also described in De la Beche's Report on the Geology of Cornwall, &c., pp. 576 to 580. The "bulgi," or leather buckets, would also be applied to the draining of the adits or "anidods" which are noticed in almost all the above accounts, and are explained in my former paper in this volume. This word, written in the several forms of *amdod*, *anidod*, *avidod* or *awidod* (of which the last is probably the more correct), has been usually left unexplained by record agents. It is impossible for any one familiar with the technology of mining to doubt that it is a translation, or clerical misspelling, of the word "audit," of Carew, now spelt and called "adit."

With regard to the process resorted to for desilverizing the lead I have submitted the language of these accounts, and also of another instrument, nearly of the same date, recorded on the rolls of the Exchequer, among the memoranda of the Lord Treasurer's Remembrancer, 25 to 26 Edward I., to Dr. Percy, who informs me that the process can be recognized as the only mode or process known at the period to which the documents relate.

Of the document last mentioned, I will select a short extract :

"Que les carriages de mine face si tost come la mine seit mesuree jusques au boles, ou aillours, e qe les bolers e les autres fundours y'sceint en propre persons et meintenaunt la receyvont per taille come a ceo appeint, e q' toute la mine soit fondue par bone survese. E si toste come le plumb sera fondu et merche (marked) soit poise e livre as gardeyns en lour commune garde par les fondeurs e par taille faite entre les gardeyns, e les fondeurs . . . come avaunt ad este illocques usee ou de user sont caux comaunde et ordene. Et puis qe cele plumb seit livre as affinours pur affiner par quantitez, e a noubre de piez poises, e qil endemoergent chargiez en la manere q' ensuit, cest a savoir, si tost come le plumb sera descendu et avalee des trunks en la cendree avaunt q' le cendre eyt rien beu del plumb, q'om face cet plumb mover e medsler qe par tut soit ouiment bon est [that is to say, so soon as the lead shall have sunk and been absorbed by the trunks on the cinders, and before the cinders have imbibed (beu) any of the lead, let it be stirred, so as to be of uniform goodness]; q'om face prendr' meyntenaunt sus une come de la mountaunce de 6s. en le entrepoisant de plum, e q' cele une quant' soit partie en deus moites; e lune moitie sois livree al affineurs desus les seals de gardeyns,"

&c.—The record then goes on to direct that one of these moieties be assayed by the King's Assayer, in presence of the wardens and refiner, and that the refiner shall be charged to answer at the rate of that assay for the whole quantity so refined, &c.

The language of this part is not free from obscurity ; but I apprehend that it describes the manner of making a *test*, and thus ascertaining the probable proportion of the pure silver to the lead in the quantity of the lead submitted to it.<sup>2</sup>

Dr. Percy, who has kindly assisted me in this matter, considers that the lead was refined on a test made of consolidated wood-ashes ; that the lead was then removed as litharge ; and the silver left in the form of a cake. The passage last cited, and the other various entries in the accounts seem fairly to admit of this construction.

With regard to the *boles* referred to in the accounts, it is pretty clear that the foresters and wood-cutters were engaged in finding materials for them (see Membranes IV. and VI.) The articles of cinders and of ashes are also mentioned in regard to the smelting and refining processes, so that the *boles* (a term not unknown in old lead mining districts, both in Derbyshire and elsewhere, as denoting the sites of ancient smelting works, of which examples are pointed out in Dr. Percy's late work on the metallurgy of lead, p. 216) would seem to have been formed from wood ; unless, indeed, we are to conclude that the "bole" is itself the furnace or apparatus for separating the silver from the lead. This is a matter on which I can express no clear opinion. The word has ceased to be used except in reference to old, abandoned works. They are indirectly noticed in the Glossary at the end of Pettus's *Fodinæ Regules*, and in several other provincial glossaries.

The several kinds of fuel noticed in the accounts are *carbo maris*, i.e., coal from beyond sea or imported by sea ; moor coal, i.e., peat or turf, including perhaps furze and heath, both used as fuel formerly, and still so employed to some extent ; and also charcoal. It is possible that culm or anthracite may also have been also used ; but these quarries seem to be too far distant from the workings and boles at Beer to have been conveniently available.

E. SMIRKE.

<sup>2</sup> This passage is referred to and translated at pp. 247, 248, of the Appendix to De la Beche's Report on the Geology of

Cornwall and Devon, ed. 1839 ; but the copy of the original supplied to him was in some respects defective.