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THE
VICTORIA HISTORY
OF THE COUNTY OF
SURREY

EDITED BY H. E. MALDEN, M.A.

VOLUME TWO



JAMES STREET
HAYMARKET

1905

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of the new manufactory carried on at York House in Battersea, and never yet exhibited to public view, consisting of snuff boxes of all sizes, of great variety of patterns, of square and oval pictures of the Royal Family, history and other pleasing subjects, very proper ornaments for the cabinets of the curious, bottle tickets, with chains for all sorts of liquors and of different subjects, watch cases, toothpick cases, coat and sleeve buttons, crosses and other curiosities mostly mounted in metal double gilt.¹

The manufactory with all its stock-in-trade was sold by auction in the following June. Among the engravers employed was Robert Hancock, who, being no longer required at Battersea, joined the Worcester Porcelain Company, who were then adopting the process of black printing upon the glaze. Specimens of Battersea enamels bearing Hancock's mark R.H.F. are extant. His subsequent engravings for the Worcester Company obtained for him considerable notoriety.¹

Although it has been said that 'the printing in black and other colours upon enamels on the surface of the glaze reached the highest degree of perfection at York House, Batter-

sea,' the means employed to decorate these enamels do not appear to have been confined to transfer printing. Many well known artists were employed in the work. Probably the largest collection of Battersea enamels ever brought together was that of the late Mr. Charles Storr Kennedy. This collection was exhibited in the Guelph Exhibition of 1891, and from the description in the catalogue it appears that from 1770 to 1780 the works were under the management of a man named Brooks, so that the manufacture was continued for some considerable time after its founder's failure. The specimens exhibited embraced a considerable variety of articles such as tea-caddies, inkstands, bonbonnières, writing-cases, étuis, scent-bottles, cups, card-trays, and boxes of different descriptions, and the subjects illustrated included landscape views, miniature portraits of contemporary and bygone celebrities, genre pictures, flowers and the like.

According to the opinion of a recent writer the York House establishment at Battersea and a rival one set up by George Brett at Bilston in Staffordshire were both 'ill-judged attempts to compete with pottery.'²

GUNPOWDER

The interest of the early history of the manufacture of gunpowder in Surrey is political rather than economic. The first real establishment of the industry in England dates from the reign of Queen Elizabeth, and under her the appointments of makers to the government were held, almost wholly if not quite so, by a succession of Surrey men. Under the economic policy of the first two Stuarts these appointments grew into monopolies, so that until close upon the eve of the outbreak of the great Civil War the only authorized powder mills in the kingdom were in Surrey. This fact, combined with its share in the iron ordnance trade of the Weald, and other causes that need not be entered into here, made the possession of Surrey a point of strategic value to both the combatants engaged.

That prior to the reign of Elizabeth gunpowder was to a certain extent made up in England from materials imported from abroad cannot be doubted. Even as early as the

year 1378, accounts prove the purchase in London of saltpetre and sulphur, in quantities very nearly of the same proportion to each other as are used to this day.³ Provided the ingredients could be obtained of sufficiently good quality, to compound them into serviceable gunpowder was not a work which demanded any extraordinary amount of skill. There must always have been a certain number of men in the country who understood the art. But besides the fact that saltpetre and sulphur were purchased abroad to be mixed in England into gunpowder, we have also that of the purchase in large quantities of foreign gunpowder already made. These quantities it was the practice to store in the English factories abroad, at Antwerp chiefly, in the period immediately preceding the reign of Elizabeth, there to await shipment at such times as convenience or necessity might dictate.

For the transportation of these stores from a foreign port it was necessary first to obtain the consent of the sovereign in whose do-

¹ The above facts relating to the Battersea manufactory have been taken chiefly from Mr. R. W. Binn's *A Century of Potting in the City of Worcester, being the History of the Royal Porcelain Works from 1751 to 1851* (ed. 2, London, 1877), 53-7.

² J. Starkie Gardner on 'English Enamels' in *Some Minor Arts* (London, 1894).

³ J. E. Thorold Rogers, *Hist. of Agriculture and Prices in England*, i. 649; ii. 574.

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minions the port was situated. Thus in the reign of Mary we have a list of stores which include both gunpowder and its ingredients saltpetre and sulphur, for whose shipment, presumably from Antwerp, the King of Spain's licence was required.¹ It will be readily understood that the peculiarly delicate nature of Elizabeth's diplomatic relations with the different powers of Europe made such a state of affairs well-nigh intolerable. That she should be dependent upon the goodwill of any one European prince for her supplies of one of the most necessary muniments of war was a contingency which the best minds of her statesmen were set to avoid. It was from no mere desire to foster a home industry at the expense of a foreign one that the most earnest attention of the government was called to the problem of securing not only that gunpowder in quantities sufficient for the needs of the State and of its merchant vessels should be made at home, but also that its most important ingredient should be produced entirely in this country.

The most important ingredient of gunpowder is saltpetre or nitre, the nitrate of potash. Six parts of saltpetre to one of sulphur and another of charcoal became, as we shall see, the accepted proportions for well made powder. Saltpetre however is not a natural product of the continent of Europe, but is found most abundantly in India and Persia and some other eastern countries. Hence there had in early times been a difficulty in obtaining it in sufficient quantities, and the attention of European scientists had been directed to its artificial production by imitating the conditions of its natural formation. Long before the reign of Elizabeth this art must have attained almost its full development on the continent, but until that period its secret had been religiously guarded from Englishmen, to whom it would seem to have been entirely unknown. But to the presence in the country at that time of the large number of foreign refugees driven from their own countries through religious persecution or reasons of state policy, Englishmen could look for the discovery of many erstwhile industrial secrets. A German captain, one Gerrard Honrick, who could claim a perfect knowledge of the art of making saltpetre 'in the best fashion and much in use beyond the sea' was before long forthcoming. His services were requisitioned by the government, and on 13 March 1560-1 an agreement was made between the queen on the one part and Honrick on the other, by which for a

sum of £300 the latter agreed to instruct the subjects of the former in the art.² From the date of this agreement may be said to begin the real history of the English manufacture of gunpowder.

The early history of the Surrey gunpowder industry is so much that of the gunpowder industry of the whole kingdom, and the question of an adequate supply of the home-made commodity was so largely dependent on a sufficiency of saltpetre, that some account is necessary here of the conditions under which saltpetre was artificially produced or otherwise obtained, before the difficulties which beset the gunpowder trade in England can be properly appreciated.

With the note of the agreement with Honrick in the state papers is a copy of 'The trew and perfect arte of the making of saltpeter to growe in cellars, barnes, or in lyme or stone quarrees.'³ Although we hear of nothing more of Honrick at this time we may presume that he carried out his bargain, and that this exposition of his art represents the art as it was subsequently pursued in this country. Eighty years later we find that the government's gunpowder-maker had by him a copy of the contract, no doubt because it contained instructions which were still followed.⁴ The extraordinary process which is here detailed covers four closely written pages, but for our present purpose it is only necessary to summarize its general principles.

Briefly then the artificial development of saltpetre may be said to consist in the mixing together of earth—'the blacker the better'—and animal excrement with lime and ashes. The lye had to be exposed to the air in dry and cold places, and watered at intervals with urine. After this had been done a sufficient number of times and the heaps continually turned over, the earth was lixiviated and the salt crystallized. In order that saltpetre enough for the needs of the kingdom might thus be prepared, it is obvious that the supply of animal matter in adequate quantities imposed a task of great difficulty upon those who were charged with the making of saltpetre, unless an undue interference with the liberty of the subject was to be permitted. For the patents of appointment of the saltpetre men strictly enjoined all whom it might concern to allow these men to enter and dig the earth in all dovehouses, barns, stables, stalls, outhouses, empty places in cellars, vaults and warehouses. No other part of any inhabited house was to

² Ibid. Eliz. xvi. 30.

³ Ibid. 29.

⁴ In 1641; *ibid.* Chas. I. cccclxxxvii. 75.

¹ S. P. Dom. Mary, xiv. 14.

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be interfered with. To lessen the general inconvenience which such courses were likely to bring about, the saltpetre men were ordered to re-erect at their own charge any buildings that might be pulled down or undermined in the work, and to level the earth in all places where they had dug. Disputes between them and the owners of buildings thus disturbed had to be referred to the arbitration of the justices of the peace in the neighbourhood. No place where the earth had been dug was to be again worked within a certain number of years. When John Evelyn and his fellow patentees tendered for a new patent in 1604 they offered to fix this period at six years, except in cases of an unusually increased demand for powder.¹ Four years seem to have been the recognized limit. In the same tender pigeon-houses are mentioned as 'the chiefest nurses of saltpetre or the kingdom.' That the pigeons might not be unnecessarily disturbed the contractors were willing to confine their operations to a half hour in the day, and were prepared to compensate the owners for any pair of pigeons or any eggs lost. Charles I.'s proclamation of 13 April 1625² allows the saltpetre men to work two hours a day in the dove or pigeon houses, but no longer, and then only at convenient times. That the saltpetre mines might be maintained and increased, owners of pigeon houses, stables and the like were at the same time strictly prohibited from paving them with stone or brick, flooring them with boarding or laying them with anything but good and mellow earth.

At first the gunpowder makers were charged with the business of producing their own saltpetre, and by letters patent from the Crown received their appointments of makers of saltpetre and gunpowder. When in the reign of James I., as we shall have occasion to show more fully later, the duty of contracting for the supply of both these commodities was deputed to commissioners, afterwards to become identified with the officers of the Admiralty, the two functions were divided. The kingdom was marked off into districts for the purposes of saltpetre making, each district generally consisting of a group of two or more counties. To each of these districts the Commissioners of Saltpetre and Gunpowder appointed a certain number of saltpetre men. Sometimes, if not always, they were guided in making these appointments by the recommendation of their gunpowder contractor. A certain quantity of saltpetre to be provided every week was fixed for each district, the

quantity varying in accordance with the extent or estimated resources of the particular district. Thus in 1630 we find that in some of the districts the yield was expected to produce as much as 10 cwt. weekly, while in others it was fixed as low as 1 cwt.³

It is not surprising that the adoption of such drastic measures as we have described in order to obtain the greatest possible production of saltpetre should have provoked complaint. A memorandum,⁴ drawn up apparently for the use of Sir Robert Cecil in the year 1600, of the benefits of the manufacture of gunpowder within the realm, refers to the discontent which had been manifested in Parliament in consequence of the necessity of dealing with the grounds of the better sort 'not before meddled with,' as well as with those of inferior persons. 'The making of saltpetre,' it is asserted, 'will be complained of, though performed in the best manner that can be devised, as breaking of earths and taking of carriages needful by many of the ruder sort cause great discontent.' Notwithstanding the proclamation of 1625 complaints occur of difficulties put in the way of the saltpetre men in their efforts to supply the proportions assigned to them. Thus in 1634 one of the saltpetre men sent up to the secretary of the Admiralty a list of names of those people in Oxfordshire and Warwickshire who had lately carried away the earth from their pigeon houses.⁵ Unless some course was taken others, it was feared, would do the same, and the saltpetre men in consequence would be unable to supply their proportions. On the other hand complaints of the way in which the makers of saltpetre performed their work are not wanting. Thus in June 1637 the rector of Knoyle in Wiltshire, Dr. Christopher Wren, the father of the great architect, exhibited to the commissioners a bill for damages done by digging for saltpetre in the pigeon-house of the rectory.⁶ There had been two diggings, one about eight years before, the other in March 1636-7. On the first occasion the pigeon-house, which was built of massive stone walls twenty feet high, was so shaken that the rector had to buttress up one side. On the second occasion the foundation was so undermined that the north wall fell in. The saltpetre men had refused to make any compensation.

The other cause of the discontent resulting from the establishment of the native manufacture of saltpetre and gunpowder, and noticed

¹ S. P. Dom. Jas. I. ix. 68.

² Pat. 1 Chas. I. pt. 4, No. 9d.

³ S. P. Dom. Chas. I. clxv. 50.

⁴ Ibid. Eliz. cclxxv. 76.

⁵ Ibid. Chas. I. cclxxvii. 52.

⁶ Ibid. ccclxi. 8.

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in the above-quoted memorandum of 1600, was the 'taking of carriages.' This meant the obligation which the terms of the patents to the gunpowder-makers imposed upon all who were able to comply, to provide carriage for the conveyance of the saltpetre and gunpowder to the king's stores at the rate fixed in the letters patent. This rate was at first settled at 4*d.* a mile.¹ John Evelyn and his company in their tender of 1604 for the office of gunpowder-maker offered to dispense with cart-taking.² Their patent, however, renewed this general exaction, but directed that each load was not to exceed 20 cwt., and the mileage was to be reckoned from the dwelling-house of the owner of the cart.³ The king's storehouse for saltpetre was in Southwark, and it became one of the items in the contracts with the powder-maker that the latter should provide this house at his own cost, as well as pay £20 a year to the clerk whom the commissioners appointed to weigh the saltpetre brought in.⁴ From the year 1632 the certificates made at intervals usually of half a year by this clerk to the commissioners of the total amount of saltpetre received are in existence. When the Chilworth makers secured the gunpowder contracts they seem to have erected a saltpetre house at Kingston-upon-Thames.⁵ The men of the hundred of Kingston, who had to find carriage for the saltpetre from this town to Croydon, complained that the saltpetre men only allowed them to reckon the distance as seven miles, whereas it was really eighteen. The rate which they were now entitled to demand was 6*d.* a mile, but the saltpetre men insisted upon an abatement of 18*d.* on every load, and moreover subjected them to needless delays and annoyances.

Such were the difficulties which beset the artificial production of saltpetre in England. It is small wonder that before long the supply should have shown an increasing tendency to become inadequate to the needs of the country. The wonder is that for so long, up to the meeting of the Long Parliament in fact, the authority necessary to secure this supply should have been found not in any parliamentary sanction, but solely in the exercise of the royal prerogative as it was understood by the Tudor and Stuart sovereigns. The officers of the Ordnance, who in 1641 could only quote acts of state and royal proclamations as the

authority for the drastic measures which had been put in force in order that the soil of England might produce saltpetre, were very ready to express their assurance that these measures could not have been effected without the consent of Parliament.⁶ Nevertheless the fact remains that up to this year the statutes of the realm are destitute of all reference to the production of saltpetre.

In December 1625 the question of increasing the saltpetre supply of the kingdom was engaging the serious consideration of the Council. Lord Carew, the Master General of the Ordnance, writing to the Privy Council on the 6th of that month⁷ to excuse his attendance at the board on the following day, proposed that English merchants should bring over considerable quantities of saltpetre from Germany and the east countries, somewhat illogically arguing that, as in those times there was more use of this commodity than formerly, more would be made in those countries than there were mills enough left by the devastation of the wars to convert into powder. Ireland moreover he thought would prove a fertile field for saltpetre, 'though the wisdom of former times has been careful to keep the manufacture thereof from the knowledge of the Irish.' Mr. Secretary Coke, writing on the same day to his colleague Lord Conway, says: ⁸ 'The chief care then to be pressed by their lordships is to have as great a quantity of saltpetre to be made as the kingdom will afford without exhausting the mines . . . I know that in Italy the mines of saltpetre are improved by art . . . But a sure way were to require our merchants, especially those who trade to the Eastland and to the East Indies, to ballast their ships homeward bound with saltpetre. . . . No doubt many will undertake to provide from Dantzick as the East Indian Company now did, who had one hundred barrels taken out of our ships returning to Elsenor, because they had not his Majesty's licence for it.'

The incorporation of the East India Company, and the consequent opening out of the trade with India, had indeed furnished a means of importing large quantities of saltpetre without any of those economic and political complications with the continent of Europe which had in the early years of Elizabeth's reign led to the development of the home manufacture of this commodity. The government was not long in availing itself of this means to such an extent that in October 1629⁹ we find the Council issuing a warrant to allow the Com-

¹ Pat. 31 Eliz. pt. 8, m. 10 (25).

² S. P. Dom. Jas. I. ix. 68.

³ Pat. 2 Jas. I. pt. 7, m. 25.

⁴ S. P. Dom. Jas. I. cxx. 102.

⁵ Ibid. Chas. I. cccxli. 69, 78.

⁶ Ibid. cccclxxxiii. 83.

⁷ Ibid. xi. 27.

⁸ Ibid. xi. 24.

⁹ Ibid. cl. 108.

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pany to export fifty tons of saltpetre brought from India together with a thousand barrels of gunpowder, as the king's stores and Mr. Evelyn's were sufficiently supplied. But before long there was again a want of saltpetre. For the eight months preceding 20 March 1632-3 the account of saltpetre brought into the store records a deficiency of 297 cwt.,¹ and following accounts show a similar state of affairs.

The price which the gunpowder maker was to pay for saltpetre had been fixed by the terms of his contract at £3 3s. 4d. the hundredweight of 112 lb.² This also we learn in November 1635 was the price which the government had contracted to pay for a certain quantity to be imported by the East India Company.³ But in the following year it is stated that the Barbary merchants supplied saltpetre at 45s. the hundredweight, whereas the making of the same quantity cost an Englishman £3 15s.⁴ In 1637 the Admiralty agreed to pay the East India Company at the rate of £3 10s. the hundredweight for all saltpetre they should bring over.⁵ Cordwell, the Chilworth powder maker, had petitioned that he might be allowed to have all that the Company had imported, as otherwise his mills must stand still.⁶ His petition was granted, and he was authorized to charge £4 11s. 8d. per hundredweight for so much of his saltpetre as he should refine. At the end of the same year we find Cordwell still complaining of a want of saltpetre to keep his mills in work, and in consequence that the Ordnance officers were directed to have a price set on 20 tons of the same which had been bought in Barbary by a Dutch merchant of English factors, contrary to the terms of the king's contract with these factors to have all that should be made there. This saltpetre had been brought to London and there put into the Custom House.⁷

Against Cordwell's complaints of the insufficiency of the saltpetre supplied we must put the fact that in an undated petition, which has been assigned to this same year (1637), the saltpetre men complained that he refused to take their saltpetre off their hands.⁸ If the grievance was well founded it would seem to prove that the artificial product of this country did not compare favourably with the naturally produced one from the Indies.

On 9 February 1638-9 the clerk in charge of the saltpetre storehouse was ordered to keep a distinct register of the

product of each parcel of foreign saltpetre delivered to the gunpowder maker.⁹ A little more than a year previous to this order he had begun to state separately in his periodical returns the quantity brought in by the saltpetre men and that received from merchants. Thus from May to November 1637 out of a total supply of 128 lasts 1 qr. and 13 lb., 35 lasts 15 cwt. had been brought in by the latter.¹⁰

In the same order of February 1638-9 it is stated that all the saltpetre made in the kingdom was not enough by above 40 lasts to make the proportion of powder which the powder maker was obliged by his contract to supply every year. In November 1641 the total deficiency is returned as 89 lasts, and this in spite of the fact that some saltpetre had been supplied by three saltpetre men not by virtue of the royal commission, but as a commodity sold by way of merchandise.¹¹

With the abolition of monopolies on the meeting of the Long Parliament the authorized manufacture of gunpowder in the kingdom ceased to be exclusively a Surrey industry, consequently we are no longer concerned with the general conditions which regulated its production. But having now endeavoured to ascertain the circumstances under which the gunpowder makers obtained their supplies of the chief article of consumption in their trade we are in a better position to understand the history of the successive contracts into which the government entered with these makers from the reign of Elizabeth until the outbreak of the great Civil War.

The earliest notice we can quote of a gunpowder mill in Surrey occurs in February 1554-5, when Henry Reve is said to have erected such a mill upon a parcel of pasture ground called 'the Crenge' in Rotherhithe, which had formerly belonged to the abbey of Bermondsey, and to which Reve was alleged to have no just title. He was accused too of having weakened the banks against the mill by reason of the great abundance of water which came in at the flood-gates and sluices made for it, so that the ground of the Crown's tenants thereabouts was surrounded and drowned with water. Moreover by enclosing the ground with ditches he had stopped up a common highway there and forced the inhabitants of those parts 'to go far about' to their great loss and hindrance.¹²

¹ S. P. Dom. Chas. I. ccxxxiv. 28.

² Ibid. Jas. I. cxx. 102.

³ Ibid. Chas. I. cccli. 119. ⁴ Ibid. ccxlii. 70.

⁵ Ibid. ccxcii. 48. ⁶ Ibid. ccclvii. 38.

⁷ Ibid. cccliii. fo. 75. ⁸ Ibid. ccclxxvi. 155.

⁹ Ibid. ccxcii. 97. ¹⁰ Ibid. ccclxxi. 3.

¹¹ Ibid. ccclxxxv. 45.

¹² Ct. of Requests Proc. Phil. and Mary, vol. 24, No. 119.

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Presumably at this date he must have been dependent upon foreign supplies for his saltpetre.

Not quite a year had elapsed since Honrick had agreed to instruct the English in the art of saltpetre making when, on 26 February 1561-2, the Bishop of Winchester, then Lord Treasurer, forwarded to Sir William Cecil a bill or tender put to him and the lieutenant of the Ordnance for making of gunpowder, 'which,' he writes, 'the lieutenant and I allow very well for that the realm shall be served within itself without seeking of any foreign countries.'¹ The tender was made by three gunpowder makers, who stated that they had erected at great cost five new powder mills with which they could supply the queen yearly with a hundred lasts of fine cornpowder and another hundred of serpentine powder over and above all that was required by the merchants and others of the kingdom. The cornpowder they would supply to the queen at the rate of £3 5s. the hundredweight, the serpentine at £2 16s. 8d., the price to private subjects being 8d. per pound for the former, 7d. for the latter.

The terms here used, as they appear to have remained fixed throughout the period we are now especially dealing with, may be briefly explained.

Cornpowder, as may be inferred from its higher price, was the superior powder of the two, being well corned or granulated and better able to withstand the effects of damp. The last, the usual term in which gunpowder was reckoned in consignments of any large quantity, consisted of 24 cwt., the hundredweight in the case of gunpowder being always exactly 100 lb. With saltpetre, on the other hand, it is always stated in the later contracts that the hundredweight is to be of 112 lb., the extra 12 lb. being the quantity which the powder maker was permitted to allow for waste in the process of double refining, before converting it into gunpowder.

The names of the three makers who were thus prepared to contract for the gunpowder supply of the whole kingdom were Brian Hogge, Robert Thomas, and Francis a Lee, or Francis Lee as he is called in later documents. Of them the last at any rate was a Surrey man. In 1578 he is described as of Rotherhithe (Redreff), and was still gunpowder maker to the queen.² It is possible he then owned the mill which Reve had set up some time before 1555. In November

1566 he was appointed to the office of a gunner in the Tower of London.³

But little evidence is forthcoming respecting the way in which these three makers carried out the terms of their contract. On 3 April 1564 the lieutenant of the Ordnance, writing to Cecil to complain of the terms which certain foreign makers of gunpowder were willing to make with the government, adds his opinion that 'our powder makers be talked withal and to learn what price they will demand and what quantity they will take upon them to make and in what time for I see no reason to seek for powder beyond the seas if it may be made as good cheap at home. Two of our powder makers not long since offered me to deliver for ready money twenty lasts between this and midsummer.'⁴

It is evident that at this time and indeed for some time later the government did not venture to be wholly dependent upon the home produced powder. As late as 1589 we hear of it being brought from abroad into the queen's store, the price being as high as 12d. the pound, or half as much again as that for which English makers were prepared to supply it.⁵ Moreover the accepted method of making saltpetre was apparently not at once altogether satisfactory, for experiments were being tried in other methods. Thus in 1575 John Bovyat had a grant for twenty-one years of the exclusive privilege of manufacturing saltpetre and gunpowder from stone minerals.⁶ Of this we hear no more. Nor indeed do we of the experiments at Fulstone in Yorkshire, reported successful in 1583, of making saltpetre from a mineral substance found in the cliffs.⁷

The year of the Armada, 1588, was one of those periods, not very rare in our history, when the country was perforce awakened to its unpreparedness for war. According to a memorandum made in 1600,⁸ and based upon the accounts of the ordnance up to the year 1588, there had never been above 20 or 30 lasts of English gunpowder delivered into the queen's stores. This was partly because of the want of skilled makers, but chiefly because no certain person was enjoined to bring in any fixed quantity. Even with all that foreign merchants could provide the supply was greatly deficient, so that it is not surprising that, once the business of the threatened invasion was disposed of,

³ Exch. of Receipt, Auditors' Pat. Bks. ix. fol. 140.

⁴ S. P. Dom. Eliz. xxxiii. 40.

⁵ Ibid. cxxiv. 110.

⁶ Ibid. cvi. 53.

⁷ Ibid. clxi. 11.

⁸ Ibid. cclxxv. 76.

¹ S. P. Dom. Eliz. xxi. 56.

² Ibid. cxxiv. 8.

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the Council should have set about to remedy the evil and to bring about an entirely new order of things. For the first time they now contracted with certain makers for the supply of all the gunpowder required for the State to be made at home, and we now enter upon that stage in which the history of the whole English gunpowder industry may be said to be peculiarly that of the Surrey industry.

On 28 January 1588-9 George Evelyn, Richard Hills (or Hill) and John Evelyn, a son of George, were licensed by royal Letters Patent to dig and get saltpetre within the realms of England and Ireland, except in London and within the radius of two miles from its walls, and in the five most northern English counties, and to convert the same into gunpowder for provision of the queen's stores. The licence was to endure for eleven years, and the justices of the peace, the mayors and other local officers were enjoined to assist them in the carrying out of their work.¹

In the letter written by John Evelyn and prefixed to Aubrey's *Natural History and Antiquities of Surrey* the writer says: 'Not far from my brother's house (at Wotton) upon the streams and ponds since filled up and drained stood many powder mills, erected by my ancestors, who were the very first who brought that invention into England, before which we had all our powder out of Flanders.' That the second part of this statement is not altogether correct has already been shown. It does not appear moreover that the Evelyns ever worked any of the mills in the neighbourhood of Wotton, at any rate in early times. George Evelyn was of Long Ditton and his son John is described in 1589 as of Kingston-upon-Thames.² Manning and Bray are of opinion that the gunpowder mills commonly called Malden Mills at Long Ditton, and in their time worked by William Taylor, probably mark the place where the Evelyns carried on their work.³ Their first mills were undoubtedly situated on the little stream known as the Hogsmill river, which, rising in Ewell, flows into the Thames under the Clattern bridge in Kingston. By this stream the Evelyns, father and sons, must have carried out their successive contracts with the government until 1613 or sometime before when John, the son, had transferred his mills to Godstone.⁴

The further statement made by Evelyn in his letter that the gunpowder patent remained in the family of the Evelyns of Godstone until the outbreak of the Civil Wars is also incorrect, that family, as will appear shortly, having ceased to hold the monopoly in 1636.

That there were however early gunpowder mills near Wotton is probably true, for the Evelyns' partner in their first patent of 1589, Richard Hill, is described as a gentleman of Shere in Surrey.⁵ The Evelyns and Hill did not work their mills together as a joint stock business, but, apportioning among themselves the total amount of powder to be supplied, worked independently of each other. Hill took into partnership in the first year of his patent George Constable of the Minories, Aldgate, and John Grange of Stapleford Hall Abbey in Essex.⁶ Grange soon afterwards relinquished the partnership, and a new one was entered into by Hill and Constable.⁷ From the fact that the three partners, and afterwards the two, agreed to pay the clerk of the deliveries at the Tower during their co-partnership a yearly pension of £30 in consideration of his seeing that Hill had his just third of all the saltpetre brought in, it is to be inferred that the co-patentees had divided equally between themselves the total amount of business that fell to them under the conditions of the patent.

Some idea of the extent of this business in the first year of the patent may be learnt from a note of the saltpetre brought into the Tower by the saltpetre men between 28 February 1588-9 and 25 September 1589, and delivered to the powder makers. In all 45,583 lb. were supplied to Evelyn and 19,754 lb. to Hill.⁸ During this period, as we have seen, powder was still being supplied from abroad at the rate of 12*d.* the pound. In 1595 it was stated that the English makers were prepared to provide the queen with powder at 8*s.* and 7½*d.* a pound.⁹ Even then the government were still contracting for supplies of foreign powder at 12*d.*¹⁰ Among Lord Burghley's 'notes of things to be performed' in September of that year are bargains for saltpetre and powder from Stade with the Merchants Adventurers, and 'underhand' by Sir Francis Vere with the merchants of Amsterdam.¹¹ The importance however which was attached to the English industry

¹ Pat. 31 Eliz. pt. 8, m. 10 (25).

² S. P. Dom. Eliz. ccxxvii. 4.

³ *Hist. of Surrey*, iii. 12.

⁴ He is described as 'John Evelyn, esq., of Godstone, Surrey' in September 1613 (*Analytical*

Index to the Remembrancia of the City of London, 218).

⁵ S. P. Dom. Eliz. ccxxix. 33.

⁶ *Ibid.*

⁷ *Ibid.* cxxli. 48.

⁸ *Ibid.* ccxxvii. 3.

⁹ *Ibid.* cclv. 63.

¹⁰ *Ibid.* ccliv. 64.

¹¹ *Ibid.* ccliii. 103.

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may be judged from the fact that on 28 April 1597 the Masters of the Court of Requests were especially urged by the ordnance officers to defer until Michaelmas term the hearing of a suit in which one of the saltpetre men was a party, because there was great need of his service for making saltpetre to be used by Evelyn for making gunpowder, which could not be so conveniently done as in summer.¹

The patent of 1589 expired at the end of 1599, and on 7 September of that year a new one was granted.² Both George Evelyn and Richard Hill now retired from the business, and the new patentees in addition to John Evelyn were his brother Robert, Richard Hardinge, John Wrenham and Simeon Furner. In the preamble allusion is made to the damage done to the queen's subjects in the previous making of gunpowder within the realm, by the great consumption of wood, and also by their being excessively charged with the finding of the carriages required in the work. As some palliative to these inconveniences it is stated that John Evelyn and his fellow patentees were reputed to have contrived some means by which the consumption of wood and fuel and the number of carriages required were likely to be greatly reduced. What this invention was we are not informed, and we hear no more of it. The scope of this new patent was extended by the inclusion of the right to the Evelyns and Hill, so soon as a then existing grant to George Constable, already mentioned as the partner of Richard Hill, should have expired, to dig and work saltpetre within those northern counties which had been excepted in the former patent.

The queen was now to be served with 100 lasts of powder yearly at 7*d.* the pound, a saving, as remarked in the contemporary notes, before referred to, on the benefits derived from the home manufacture of gunpowder, of no less than £5,000 in the year. If required a further quantity of 20 lasts was to be supplied each year. What the powder makers could make over and above the queen's requirements, they were allowed to retail to merchants and other subjects at 10*d.* the pound.

A certificate made by the officers of the ordnance after this patent had been in operation for two years and eight months shows that the patentees had not failed to fulfil their covenant, and had monthly supplied the stipulated quantity of 8 lasts 8 cwt. of good cornpowder.³ Not only this, but

¹ S. P. Dom. Add. xxxiii. 80.

² Pat. 41 Eliz. pt. 4, m. 8.

³ S. P. Dom. Eliz. cclxxxiv. 10.

they had offered to serve a much greater quantity if required, and the amount of stock lying in their hands was increasing to such an extent that it was recommended that a request made by Sir Noel Caron for 30 lasts of powder and 10 of saltpetre for the States General should be granted. So that at this time not only was it possible for England to produce sufficient saltpetre and gunpowder to satisfy her own needs, but she was able also to supply the very country from which formerly she had drawn her principal supplies of these commodities.

Besides supplying new powder the patentees had also agreed to renew all such powder as should have grown unserviceable whilst in the Crown's stores. A Pipe Office account shows the total amount of decayed powder issued to John and Robert Evelyn for repair from 22 September 1595 to 9 January 1603-4, the quantity of double-refined saltpetre they had received from the Tower stores, and the amount of repaired powder which they had returned.⁴ The total quantity of decayed powder which they had received was 117 lasts 21 cwt. 53 lb., and the total renewed and returned by them 96 lasts 3 cwt. 93 lb. Allowing 1 last 5 cwt. 59 lb. for waste, this meant a net deficiency of 20 lasts 12 cwt. 1 lb., which at various rates per pound was valued at £934 11*s.* 11½*d.* Of saltpetre they had received 20,413 lb. and had returned 638 lb., the deficiency of 19,775 lb. at 8*d.* per lb. being valued at £659 3*s.* 4*d.* Thus the total amount which the Evelyns were accounted to owe the Crown was £1,593 15*s.* 3½*d.*, but against this had to be set various sums of money owing upon debentures to them and their late father for powder, recompense for divers losses, and money advanced by them to the auditor for his expenses. At the time the account was made up the Evelyns had by payment into the Exchequer of two sums of £558 15*s.* 0½*d.* and £30 4*s.* 1¾*d.* settled the debit balance against them.

The patentees were not allowed to enjoy the exercise of their royal licence without some cavilling. A number of arguments drawn up by the law officers of the Crown probably in 1602⁵ aim at proving that the patent of 1599 did not constitute a monopoly but was useful in policy, equity and by common law, and was not impeached by a proclamation of 28 November 1601. That the patentees were not the sole makers of gunpowder in the realm may be seen in the occurrence of the name of another maker

⁴ Pipe Office Declared Accts. 2708.

⁵ S. P. Dom. Eliz. cclxxxvi. 42.

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within our own county, Richard Neede of Rotherhithe in the year 1600.¹ Possibly his mill was the old one which Henry Reve had set up by the year 1555, or, if it was not the same, that of Francis Lee. In 1603 Evelyn and his fellow patentees complained that since the queen's death the validity of their patent had been vexatiously questioned, and requested the Council's letters of assistance to confirm it.²

The patent had been granted for a term of ten years, but one half only of this term had elapsed when it was cancelled on the requisition on 18 October 1604 of the two Evelyns and Hardinge.³ Of the two remaining patentees Simeon Furner was now dead,⁴ and John Wrenham, if still alive, had evidently relinquished all his right and interest in the undertaking to the others. Simultaneously with this surrender the three makers were granted a new patent,⁵ for which they had previously made their 'humble offer.' The terms of this offer or tender, so far as they relate to the production of saltpetre, have been already commented upon. The petitioners represented that they had effected a saving to the treasure of the kingdom of £20,000 a year, and were maintaining 1,000 people with their families who had no other trade of life. They offered to serve the Crown with 100 or 120 lasts yearly, but prayed that they might have all houses and grounds fitting the service, and a year's warning before their contract should be determined.

By the terms of their new compact with the Crown they were to supply 120 lasts of cornpowder yearly at 8*d.* the pound, 10 lasts to be sent in every month. Cornpowder required over and above this amount, both for callivers and cannon, was to be paid for at the rate of 10*d.* the pound.

The term of the present patent was enlarged to twenty-one years, and a penalty of £50 for every monthly default on the part of the powder makers was imposed. The preamble sets out in detail the advantages which had been gained by the making of powder within the realm. These are said to include, besides freedom from the caprice of princes who might demand unreasonable rates, and from the hazards of contrary winds at sea and shipwreck, the riddance of that special bug-

bear of the old mercantile theory of commerce, the necessity, that is to say, of sending ready money out of the kingdom.

This patent had been in operation for a little more than two years and a half, when it would seem to have been superseded on 8 May 1607 by one granted to the Earl of Worcester, to make and work for all manner of saltpetre and gunpowder within the realms of England and Ireland for twenty-one years.⁶ The preamble to this makes mention of 'such inconveniences as have grown through the abuses of some such as have had the dealing in making of saltpetre,' to avoid which the Crown had sought to furnish its stores from the parts beyond the seas, a course which however had proved expensive and impracticable.

Then follows a period of ten years during which we hear little of the supply of gunpowder, and are left in ignorance as to whether the earl himself turned powder maker or whether he deputed his powers to others, and if so to whom. At any rate powder more than sufficient was supplied to the Tower stores, for in January 1610 the king licensed the earl to send 1,200 barrels abroad to friendly nations, and afterwards 'all such as shall not be required in our stores.'⁷ Probably John Evelyn continued to work his mills, for he was able, when the Earl of Worcester relinquished his patent on 28 March 1617, to continue the service. In December 1620 we find him again accounting for decayed powder and saltpetre received from the ordnance stores, and for new powder supplied in place of the same.⁸

Hitherto the sovereign had kept in his own hands the business of appointing his gunpowder contractors, but about this time it is evident that he was endeavouring to make some new arrangement and to depute his authority. For a short time the whole gunpowder business seems to have been in an unsettled state. On 24 January 1619-20⁹ the king granted the licence to make gunpowder to his Lord High Admiral, the Marquis of Buckingham and some others, and again on 21 September of that year¹⁰ to a commission which included the same officer and the Masters of the Ordnance and of the Court of Wards. These commissioners would seem to have no sooner assumed their functions than they were anxious to be rid

¹ *Surr. Arch. Coll.* xi. 117.

² *S. P. Dom. Jas. I. i.* 64.

³ See the 'vacatur' clause at the end of the indenture enrolled on Pat. 41 Eliz. pt. 4, m. 12.

⁴ Pipe Office Declared Accts. 2708.

⁵ Pat. 2 Jas. I. pt. 7, ms. 20, 25.

⁶ Pat. 5 Jas. I. pt. 11, m. 41*d.*

⁷ *S. P. Dom. Jas. I. Add.* xxxix. 114.

⁸ *Ibid.* Jas. I. cxviii. 74.

⁹ *Ibid.* Grant Bk. 281.

¹⁰ *Ibid.* Docquets.

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of them, for on 4 November following they suggested a plan whereby the king by suppressing some of the officers in the ordnance and resuming to himself the saltpetre manufacture might effect a very considerable saving.¹ Their arguments were objected to as fallacies by the officers of the ordnance. Meanwhile John Evelyn, accused of the non-fulfilment of his contract with the commissioners, complained that no agreement had been ratified.² But in 1621³ we find that the commissioners were the Marquis of Buckingham, Lord Carew and Sir Lionel Cranfield, and from this time until the meeting of the Long Parliament the business of contracting for the supply of gunpowder and saltpetre was vested in the Lords of the Admiralty, who in the exercise of this function are almost invariably termed the Commissioners for Saltpetre and Gunpowder.

On 21 April 1621⁴ the first of a series of contracts, each contract being for a period of three years, was entered into with John Evelyn by the Commissioners. In a report made by the officers of the Ordnance⁵ when the last of these contracts was expiring, Evelyn's contracts are given as four in number, dated respectively 21 April 1621, 1 July 1624, 16 March 1626-7, and 7 July 1632. This omits one which would seem to have been made in April 1630.⁶ The general principles upon which these different contracts were based remained the same, such modifications as were introduced into the later ones being chiefly concerned with the quantities of powder to be supplied and with the price. To illustrate therefore the conditions under which our Surrey gunpowder makers worked for a period of twenty years we may recapitulate here the terms of the Commissioners' first contract with John Evelyn, as they are set out in a State Paper of the date. The more important modifications in the later contracts will be briefly noted afterwards.

The chief points are these:—

(1) The deputation made by the Lords to Evelyn was to continue for three years from 21 April 1621, if the Lords' commission should continue so long in force.

(2) Evelyn was to provide a storehouse in Southwark or within a mile thereof for the storage of the saltpetre made by virtue of the king's patent, and was to notify the allowed saltpetre men of the fact.

¹ S. P. Dom. Jas. I. cxvii. 54.

² Ibid. cxviii. 72.

³ Ibid. Grant Bk. 287.

⁴ Ibid. Jas. I. cxx. 102.

⁵ On 4 April 1637, *ibid.* Chas. I. cccliii. 27.

⁶ See *ibid.* clxv. 50.

(3) He was weekly and from time to time to buy from all the saltpetre men all the saltpetre made by virtue of their patent.

(4) The quantity of all saltpetre before it was received by Evelyn was to be entered in a ledger by a clerk appointed by the Lords, and Evelyn was to subscribe the entry or to give bills for every receipt.

(5) Within six days of the delivery and receipt of the saltpetre Evelyn was to pay the saltpetre men at the rate of £3 3s. 4d. the cwt., accounting 112 lb. to every cwt. In case of any of the saltpetre being adjudged faulty by the proofmaster appointed by the Lords such abatement was to be made as should seem reasonable to two men appointed the one by Evelyn and the other by the deliverer of the saltpetre in question.

(6) Evelyn within a convenient time of receiving it was to double-refine the saltpetre at his own charge, allowing for waste 12 lb. in every cwt. of 112 lb.

(7) Evelyn within convenient time of double-refining the saltpetre was to convert it into gunpowder for the use of the king and his subjects, and was yearly to deliver at the Tower 80 lasts in even monthly portions of 6 lasts 16 cwt., 'well conditioned, corned, cooped, and dried and well barrelled and casked in good cask of seasonable oak without sap, well hooped, closed, and dried,' accounting twenty-four barrels to the last and 100 lb. net to every barrel.

(8) If the petre delivered was not enough to make 120 lasts every year, Evelyn was to deliver to the Tower but two-thirds of all the powder he should make and sell the remaining third to subjects, except upon any special demand for the king's stores.

(9) Evelyn, over and above the said quantity of 80 lasts, was to deliver such greater proportion of powder as at any time the Lords should require upon the Crown's behalf, provided that the saltpetre received was sufficient to make it. All powder brought into the king's stores should be proved by the officers of the Ordnance and defects supplied from time to time.

(10) Evelyn was to be paid upon the four officers' certificate to the Lord Treasurer and Chancellor, at the rate of 7d. per pound for every monthly delivery of 6 lasts 16 cwt., and for every pound of powder delivered by the Lords' warrant over and above the annual proportion of 80 lasts, 10d.

(11) If the Lords should think fit that the whole quantity of 80 lasts be not delivered to his Majesty's use Evelyn was to allow £30 for every last so forborne.

(12) Every last of gunpowder was to be

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made of the temper and commixture of 18 cwt. of double-refined saltpetre to 3 cwt. of brimstone of Naples or of other parts of Italy, 'if it be to be had within the realm,' and 3 cwt. of charcoal.

(13) Any of the gunpowder delivered becoming defective within seven years and not having been issued for service was to be exchanged by Evelyn without any payment to be made to him for so doing.

(14) Should Evelyn fail in his monthly delivery of 6 lasts 16 cwt. from any other cause than the want of the full proportion of saltpetre to be delivered for the making of 120 lasts yearly, he was to pay the king £200 for every default *nomine pænæ*.

(15) In the event of Evelyn's being unpaid within twelve days of the delivery of his first monthly proportion and being unpaid for both within twelve days of the delivery of the second month's, he could forbear the delivery of any more to the king's stores and sell all such powder forborne to the king's subjects at the rate below fixed, until full payment of arrears was made to him.

(16) All powder sold to the subject was to be first proved and allowed by the Ordnance officers, and was not to be sold above the rate of 10*d.* the pound.

(17) Should neither of the parties to this contract signify disapproval before the expiration of the first two years, then at the end of the third year Evelyn was to tender to the Lords for a like contract for a further three years.

(18) Evelyn was to pay to the Lords or to such person as they should appoint £20 yearly by even quarterly payments.

Such were the general conditions under which, save for the subsequent modifications now to be noticed, a leading Surrey industry was for twenty years to be carried on. It will be gathered from them that the total amount of saltpetre which the saltpetre men were charged to produce every year was estimated to be sufficient for the making of 120 lasts of gunpowder. Two thirds of this total amount were appropriated to the government's stores, the remaining third being the portion assigned for the requirements of merchant seamen and other private subjects. In Evelyn's second contract with the Commissioners of 1 July 1624,¹ the yearly quantity to be delivered to the Crown was raised to 240 lasts or 20 lasts a month and the price

to 8½*d.* per pound. In addition no limit was set to the rate which the contractor might demand for such powder as should not be taken off his hands by the government. In Evelyn's succeeding contracts the same yearly proportion was observed, but in the last, that of 1632, the rate per pound was reduced to 8*d.*

How far Evelyn kept to the terms of his successive contracts is set out in the Ordnance report of 1637. How far the government on its part observed its obligations to him may be gathered here and there from the State Papers. From the report it appears that under the first contract 6 lasts 16 cwt. of powder were duly delivered every month for the first fifteen months, making a total quantity of 100 lasts of the total value of £7,000. For the remaining twenty-one months of the term of the contract not a single pound seems to have been delivered. Sir John Coke, complaining of this deficiency in March 1624,² states that thereby the king's store was deficient and that the king had lost his ratio of 3*d.* in the pound on a large quantity. This would seem to show that it was the practice for the government to retail a considerable amount of the powder in its stores to subjects at 10*d.* the pound. But the fault of the deficiency was not Evelyn's. Sir Francis Nethersole, writing to Sir Dudley Carleton on 18 April 1624,³ says that the heaviest charge against the Lord Treasurer was his neglect to pay the gunpowder maker, so that the then supply of powder was very small, and on 26 August 1625, during the term of the second contract, Sir John Coke writes to Mr. Secretary Conway that the king was in debt to Evelyn £2,250, and that the answer of the Treasurer was that there were no moneys for him.⁴ Under the second contract Evelyn delivered his first twenty months' total proportion of 400 lasts, but nothing for the remaining sixteen months. By this second contract £2,000 had been imprested to him both for security of the future payments to him and in regard to the new mills which he was then erecting at Godstone. This sum was allowed to continue in his hands by the contract of 1627, and in 1628 was released to him altogether by the king.⁵ In the latter year Evelyn's affairs seem to have become desperate. He himself in 1627 had complained that no payment had been made to him for six months, and that owing to the manufacture of gunpowder by others, a liberty

¹ See the above quoted Ordnance report of 1637 for notes of the principal modifications made in the successive contracts, and how far Evelyn was able to carry out the terms of each.

² S. P. Dom. Jas. I. clxi. 13.

³ Ibid. clxiii. 3.

⁴ Ibid. Chas. I. v. 85.

⁵ Ibid. cxxiv. 9.

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which he asserts had been given to none but himself and his ancestors for over sixty years, he had no sale for the powder made by him for the king.¹ But on 12 January 1627-8, the Earl of Totnes² complains to Buckingham of the inability of the Ordnance Office to arm an intended fleet of a hundred ships, and says that Mr. Evelyn was sinking under the burden of the great sums due to him. No more was to be expected of him until he had been satisfied. Not more than 50 lasts were in store, and the proposed fleet would require near 250. To remedy this state of affairs in the government stores some attempt seems to have been made, previously to this, to import foreign powder. The report on this attempt was distinctly unfavourable.³ Philip Burlamachi had delivered in July 1627, 56 lasts of Dutch powder at a price nearly double that of the powder supplied by Evelyn. Moreover this powder had proved so inferior that 4 lb. of it were less effectual than 3 lb. of English, so that, it is added, if the money had been found for Evelyn the king might have had, instead of these 56 lasts of Dutch powder, within the same space of time, 60 lasts of English at almost half the price and of one fourth better quality.

Notwithstanding Evelyn's difficulties in getting payment for his powder from the government, there were not wanting rivals who in this same year were prepared to blacken his name by representing him as the owner of a large fortune derived from the ill-gotten gains of deceits practised upon the Commissioners. In some memoranda existing amongst the State Papers and assigned to the year 1628 the damage sustained by the Crown in seven years by the contracts for converting saltpetre into gunpowder is computed to amount to £106,925, and it is offered to prove to the Commissioners that Evelyn and his agent Pygott by their monopoly, giving bribes, deceiving the king, abusing the subject, and out of other men's labours had got an estate of near £40,000 within four years.⁴ Such objections to Evelyn's performance of his contracts were doubtless not altogether disinterested, and were presumably estimated at their proper value by the authorities.

In one of these papers however is recorded a transaction of the government, whereby it appears that whilst putting off the evil day of payment, it endeavoured to retain some part of the gunpowder delivered, and for a lengthened period to preserve its option of ultimately

purchasing the remainder. One Sir Thomas Bludder had proposed to the Lords to pay Evelyn himself when the Treasurer made default, and to take over the powder, of which he would give the king the tenth part for nothing and sell the residue at 10*d.* the pound. This offer had been accepted by the Lords by their order of 24 January 1627-8, with the provision that all the powder should first be sent to the Tower, and, if paid for within fourteen days of delivery and proof, should be put into the king's stores. Otherwise Bludder was to take it away, but with the option reserved to the Crown of purchasing any that had not been retailed to subjects at 8½*d.* the pound. By means of this little arrangement it is stated that Evelyn had brought in to the Tower two months' more proportion than otherwise he would have done. This quantity had been acquired by Bludder and sold by him at 10*d.* to Sir Paul Harris, who had again sold the same to a merchant at 11¼*d.* Objections had been raised to this transaction, which are answered in the document under notice. One of these had been to the selling of the powder out of the royal stores, to which the answer was, that 'being in the Tower was not being in the stores and that as good sell it from there as from Evelyn's own storehouse.'

The subsequent history of Evelyn's contracts varies little from the preceding, save only that the getting of any money out of the Treasury seems to have been a work of increasing difficulty. For only twelve months of the whole thirty-six for which powder was to be supplied by him in accordance with the terms of the contract of 1627 was he able to deliver the required quantity. By the contract of 1630 a further sum of £2,000 was to be imprested. This contract is omitted from the before-quoted report of 1637, and how much powder Evelyn may have supplied whilst it was in operation cannot be stated. Probably he fared no better than before. At any rate during the last of his triennial contracts, that of 1632, only nine months' proportion of powder was sent in by him.

In the closing days of the term of this contract there seems to have been considerable uncertainty on the part of the Commissioners as to the future conduct of the gunpowder business. Various tenders were made; amongst them were those of Sir Arthur Mainwaring and Andrew Pitcairn, who offered to supply powder at 8*d.* the pound, and of the Earl of Newport and Sir John Heydon, who were ready to provide powder, if upon the king's stock of £4,000 at 7*d.*, if upon their own stock at 8*d.* the

¹ S. P. Dom. Chas. I. lxxxix. 9.

² Ibid. xc. 64. ³ Ibid. xciv. 105.

⁴ Ibid. Add. dxxix. 88, 89.

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pound.¹ None of these were accepted, and eventually John Evelyn agreed to supply for a half year from 1 May 1635, 16 lasts monthly at his previous rate of 8*d*.² On the expiry of this term a further agreement was made with him, this time for a whole year from 1 November 1635.³ He was now to serve 20 lasts per month, but it is to be remarked that a reduction seems to have been made in the capacity of this measure, for, while it was still to consist of twenty-four barrels, each barrel was to contain 60 lb. only, instead of 100 as before.

The determination of this contract brings to an end the Evelyns' connection with the gunpowder industry, at least in an official capacity. For not immediately did John Evelyn cease to work his mills. He probably had some store of the government's saltpetre remaining in hand, for in the second month of their contract his successors complained that he was converting the saltpetre which should be theirs to the prejudice of their works.⁴ In Evelyn's final petition to be discharged of his contracts, he claims allowance for 1,135 barrels of gunpowder made with his own saltpetre as well for all his losses sustained by the erection of his mills and workhouses for the public service.⁵ His successors were also Surrey men, the owners of the Chilworth mills. But before considering the history of these latter works, it may be convenient to note here a few makers who, notwithstanding the alleged monopoly of John Evelyn, seem to have carried on some trade in the supply of the commodity.

The most formidable of these competitors was the East India Company. We first hear of the proposed erection of mills in England by this Company on 2 March 1624-5, when Lord Carew, one of the commissioners for saltpetre and gunpowder, wrote to Sir John Coke that it would open a floodgate and diminish the king's profits from the poundage he received on all the powder made by Evelyn.⁶ Shortly after this, on 13 April following, Charles I.'s proclamation for the maintenance and increase of the mines of saltpetre and the true making of gunpowder was issued. The provisions of this chiefly relate to the production of saltpetre and have been already noticed. One of them however prohibited any one from making 'gunpowder of any saltpetre for service against any enemy or for sale but by his majesty's warrant.'

Such warrant must have been obtained by the company, for on 26 August of the same year we hear that it had set up mills in the skirts of Windsor Forest, which owing to the prejudice received by the deer it had been necessary to stop.⁷ However a few days later the secretary, Conway, wrote that he saw no reason why the company should not proceed in their powder works. Windsor Forest was held to extend into Surrey at this time, but its exact limits and those of its purlieu or skirts were matter of considerable uncertainty, and it does not appear from the State Papers where these first powder mills of the East India Company actually were. But probably about or soon after this time its mills at Chilworth were set agoing. Vincent Randyll (or Randall) in 1654⁸ states that his father, Sir Edward Randyll, leased several powder mills near his dwelling in Chilworth to the East India Company for twenty-one years. Since that time they had been rented by yearly tenants. But the date of Sir Edward Randyll's lease to the company is not given. The Company may perhaps have first set up its powder mills only with a view to supplying the requirements of its own service. But for the manufacture of gunpowder on an extensive scale it had exceptional facilities in the large supplies of naturally produced saltpetre which it could bring over from the Indies in its own ships. Certainly Evelyn's complaint, made about the year 1627,⁹ that the competition both of the Company and of one Michael Waring prevented the sale of his own powder conveys the impression that the Company did not then limit the output of its mills only to what sufficed for its own needs. By 1631 the Company's works must have been prohibited, for in that year Evelyn complains that notwithstanding the prohibition, Collins, the company's workman, still continued them and had repaired two of the mills, where he was making thirty barrels of gunpowder weekly.¹⁰ The mills were still at work in the next year, for there is a memorandum for an order to be given to the Attorney-General to prohibit the Company from making powder.¹¹ But in November 1635 Edward Collins of Chilworth contracted with the Commissioners for Saltpetre and Gunpowder to convert for one year into gunpowder to the quantity of 100 lasts the saltpetre which the king had arranged for the

¹ S. P. Dom. Chas. I. cclxxxiii. 13.

² Ibid. cclxxxix. 61. ³ Ibid. ccxcii. 191.

⁴ Ibid. cccxxviii. 49. ⁵ Ibid. cccxli. 79.

⁶ Ibid. Jas. I. clxxxv. 6.

⁷ Ibid. Chas. I. v. 85.

⁸ Ibid. Interr. lxxvii. 7.

⁹ Ibid. Chas. I. lxxxix. 9.

¹⁰ Ibid. clxxxiv. 4.

¹¹ Ibid. ccxi. 79.

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East India Company to bring over from foreign parts.¹ From the terms of this contract it would not appear that the mills were then held by the Company, for it was agreed that Collins should buy its saltpetre at a price thereby fixed, and should be able to dispose of the powder made from it to his own use if it were not paid for by the government within fourteen days of delivery. The rate at which this powder was to be sold to the Crown was 7*d.* the pound, or a penny less than that paid for Evelyn's. Collins died before the term of this contract was completed. On 9 June 1636, direction was made for the issue of a warrant for payment to his widow and executrix of certain sums due to him for his pains in double-refining saltpetre and making a last of powder.² When the appointment of powder maker to the king was taken away from John Evelyn and given to the tenants of the Chilworth mills, the mills were in the occupation of Samuel Cordwell and George Collins.

Of the others with whom John Evelyn found himself in competition, Michael Waring has been already mentioned. We hear nothing more of him and do not know where he worked. The powder makers of Bristol are first mentioned on 24 February 1631-2, when we hear that their names were to be taken from Evelyn and they themselves sent for by warrant.³ On 8 March 1633-4 the names of four of them are given in a warrant for their appearance before the Council.⁴ But the warrant does not appear to have been actually issued, owing to Evelyn having given no charge in writing against them. The Bristol makers appear more frequently during the period of the monopoly of the Chilworth mills, and on 19 December 1637 the mayor was directed to search and suppress all the works in the city.⁵ One Baber seems to have been particularly refractory and persistent in continuing his manufacture. He is no doubt the William Baber or a relative of the man of that name who after the Restoration petitioned the king for payment for the large supplies of powder worth £1,500 with which he had furnished Charles I. at Bristol.⁶ Another Bristol maker, Parker, had obtained the king's licence for his manufacture. In 1640 the Commissioners in order to increase the sale of the government's powder, advised the revocation of this licence and the suppression of the mills.⁷

In Surrey we hear of a case in 1630 in which one of the saltpetre men had become a gunpowder maker, namely Thomas Thornhill, who had set up a horse-mill on the Bankside in Southwark.⁸ This was an obvious disqualification for the office of a saltpetre maker to the government. Illicit gunpowder-making seems to have gone on in Southwark, for ten years later, when there were some riotous proceedings there and at Lambeth, a large quantity of powder was discovered in a house close by the place where a session of oyer and terminer should have been held, and it was reported that gunpowder had been secretly made in Southwark for sale in foreign countries.⁹

But to take up the main thread of our history from the time when, on the expiry of the government's last contract with John Evelyn, Samuel Cordwell and George Collins of the Chilworth mills became on 1 November 1636 the only authorized gunpowder makers in the kingdom. The previous history of these mills has already been related in connection with what has been said of the East India Company's manufacture of powder. The terms of the contract with the new makers did not materially differ from those of the preceding ones.¹⁰ A sum of £2,000 as before was to be imprested from the Crown for building mills, storehouses, and workhouses, and for providing utensils, but all of these on the expiry of the contract were to be delivered to the king, who was also to pay the rent for the waters and lands, hired for the work, for the residue of the term of the lease, should he employ any other makers in the service. Two hundred and forty lasts were still to remain the full yearly proportion to be supplied, only the holding capacity of the barrel was restored to its original quantity of 100 lb. A sum of £3,000 was to remain in the hands of the lieutenant of the Ordnance as a guarantee for due payment being made to the makers during their first year. The price at which the government were to purchase the powder was reduced to 7½*d.* the pound.

On 25 September 1636, a few days before this contract came into operation, an order was sent by the Council to the mayors, sheriffs, justices and other local officers, directing them that as there was occasion of carriage of powder from his majesty's powder mills at Chilworth to Hamhaw and thence to London, they were to assist Cordwell in taking up at the king's prices such

¹ S. P. Dom. Chas. I. ccii. 119.

² Ibid. ccxxv. 83.

³ Ibid. ccxi. 79.

⁴ Ibid. ccxxviii. fo. 126a. ⁵ Ibid. cccliii. fo. 76.

⁶ Ibid. Chas. II. xxix. 76; ccxxxii. 193.

⁷ Ibid. Chas. I. cccclxi. 35.

⁸ Ibid. clxv. 54.

⁹ Ibid. cccclvi. 44.

¹⁰ Ibid. cccxix. 69.

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carts, hoys and barges as should be necessary for the purpose.¹ The saltpetre house was by the terms of the contract to be still in Southwark, but either it was early transferred to Kingston or another was set up there, for in 1636 we find one of the saltpetre men complaining of the refusal of two men to supply carts to carry liquor from Cheam to his majesty's saltpetre house in Kingston.² On the other side we have in this same year the complaint of the hundred of Kingston against the unjust exactions of the saltpetre men, a complaint to which we have already had occasion to refer.

Perhaps the most remarkable circumstance in the history of the manufacture of gunpowder by the Chilworth contractors was the constitution of the Crown as the sole powder merchant of the realm. The industry was rigidly treated as a monopoly, and the most active efforts were made to suppress all other makers. To meet the cost of the minimum proportion that was held necessary for the service of the State out of the total quantity supplied, it became the object of Charles I. to sell all the surplus at greatly enhanced prices. Thus in 1637 the retail price was raised from 12*d.* to 18*d.* per pound,³ and no powder was allowed to be sold but by licence of the Earl of Newport, the master of the Ordnance.⁴ As may be readily supposed, the result of this policy was to give increased impetus to the illicit manufacture of the commodity. The case of Southwark has been already mentioned. A newsletter of 8 June 1640 states that the secret manufacture there had been going on ever since powder had borne so great a price.⁵ The Bristol makers have also been noted. Cordwell himself, in some points he offered to the consideration of the Council in February 1639-40, drew attention to the fact that Bristol, in respect of its being the greatest shipping town in the realm, with the exception of London, must vend much powder, and suggested that the farmers of the Customs should return accounts of all sold there.⁶ The suggestion was acted upon by the Council, and an order directed to be made as had been done previously in the case of Southampton. The case of a maker in London is interesting, because incidentally it proves that in gunpowder making we have another of those industries between which and themselves the citizens of the capital preferred to put the whole breadth of the River Thames. The maker, Robert Davis by name, had at some

time carried on his trade in Whitechapel, where he had had his house blown up.⁷ Since then he had worked in Thames Street, to the great disquietude of his new neighbours, who were fearful of some unhappy accident.

The high price of the authorized powder and the increase of the illicit manufacture had their natural result in a very small demand for the king's gunpowder. In view of the small sale of his powder, Charles I. seems to have resolved in May 1637 upon trying the experiment of selling it in foreign parts, and an order was made by the gunpowder commissioners for six barrels to be sent into France to be disposed of to the king's best advantage.⁸ In September of that year one of the provisioners of the gunpowder for shipping, who had in the previous year taken out of store £10,000 worth of powder at 12*d.* the pound, refused to take out his licence again now that 18*d.* per pound in addition to 1*d.* per pound to Lord Newport and other petty charges were demanded.⁹ On 28 July 1640 the Commissioners advised the king to reduce the price to 16*d.*, and to issue a proclamation to this effect with all speed in order that sufficient money might be raised to pay Cordwell the sum of £4,000 due to him, for want of which his works were in danger of being stopped.¹⁰ On 9 October of that year we find the retail price of gunpowder at its old rate again of 12*d.* the pound.¹¹ Cordwell, who seems to have become the sole manager of the Chilworth mills, for we hear little further of his partner Collins, succeeded in carrying out his contract with the Commissioners to the complete satisfaction both of them and of the Ordnance officers. For the first and third years the full supply of 240 lasts was sent in,¹² and it was certified that only the deficiency in the supply of saltpetre prevented him from sending in more than 200 lasts in both the second and fourth years.¹³ To effect an economy in the manufacture he seems to have cut down a number of fees which his predecessor had paid to different officers of the Ordnance. Thus the surveyor of the Ordnance on his own statement had had £50 a year from Evelyn. This had been discontinued by Cordwell. Similarly, annuities of £40 each paid to the clerk of the Ordnance and to the keeper of the stores had been stopped by Cordwell.¹⁴ At the same time he suffered losses. A fire at his works

⁷ Ibid. ccccxviii. 69.

⁸ Ibid. ccclv. 61.

⁹ Ibid. ccclxviii. 112.

¹⁰ Ibid. cccclxi. 35.

¹¹ Ibid. cccclxix. 73.

¹² Ibid. cccclxxi. 117; ccxcii. 71, 110; ccccxviii. 45.

¹³ Ibid. ccxcii. 86; cccclxxiii. 33; ccxcii. 123.

¹⁴ Ibid. cccclxi. 11, 12, 13.

¹ S. P. Dom. Chas. I. cccxxxi. 90.

² Ibid. ccclxi. 69. ³ Ibid. cccl. 19.

⁴ Ibid. cccclxviii. 112. ⁵ Ibid. cccclvi. 44.

⁶ Ibid. cccclxiv. 22.

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lost him his store and above 2,000 cwt. of powder. In February 1639-40 he found himself obliged to petition the Council that the imprest of £2,000 to him for the erection of his works might be released to him, and offered in lieu of the same to disclaim all his interest in the buildings used by him in his industry.¹ It was on his recommendation that the surveyor-general was ordered to view all the Chilworth mills and works, and to certify their value, with a view on the expiration of the lease to their purchase for the king's use.²

But whatever steps might have been taken to this end had matters political continued to follow the same course throughout the reign of Charles I., the whole conditions of the gunpowder industry were destined to be changed shortly after the assembling of the Long Parliament. The first note of the impending change comes to us in Cordwell's despairing petition to the king of 31 March 1641.³ He alludes to a petition to the House of Commons that every man that will might make gunpowder. In consequence he dared not make his provisions, as about that time of the year he was wont to do. For if he should make them, and the manufacture of gunpowder continued not in the king's hands, he would be ruined with the great stock he had already in hand and that he must further provide. His petition was referred to the Privy Council, but by 10 August 1641 the king had already set his hand to the Bill⁴ for putting down the restraint of making gunpowder.⁵ This was the Act 16 Charles I. c. 21, 'for the free bringing in of gunpowder and saltpetre from foreign parts and for the free making of gunpowder in this realm.'

Thus at one blow fell the monopoly of the gunpowder industry of the kingdom, which had for many years been held by a succession of Surrey makers. It is not perhaps a difficult matter to decide why Surrey should have been chosen as the home of the industry. Its contiguity to the capital, where were the Ordnance stores of the Crown, with the River Thames intervening to relieve the inhabitants of the city and of its more thickly-populated suburbs from any fear of danger to their lives through untoward accidents in the manufacture, would readily suggest its convenience for the purpose. Moreover about the streams on which the successive mills were erected there was no lack of wood from which the best charcoal

could be made. Aubrey notes at a later date the alders at Albury from which the charcoal that blacked the gunpowder then made there was derived.

But although the history of the gunpowder industry of Surrey now ceases to be that of the whole of England; the Surrey makers were not at once to lose their predominance. The experience which they alone had been free to win was likely to serve them in good stead in the troublous times which were to come. Cordwell, good servant as he had been to the government of Charles I., was not slow to enlist in the service of the Parliamentary party when the outbreak of the Civil War found that party in possession of the district immediately surrounding the capital. At least it may be urged on his behalf that he found his new employer a better paymaster than the old. The possession of the Chilworth mills was a point of strategic importance not likely to be overlooked by the party which enjoyed it. At the same time Chilworth was far enough off from London to be difficult of defence in the case of any sudden attack by the Royalists, and to prevent the possibility of any large stores of ammunition falling into their hands it was ordered by the Committee of Both Kingdoms on 18 March 1643-4 that all gunpowder should be sent up by Cordwell to the Tower as soon as made, and that not above 7 tons of saltpetre should at any time be kept at the mills.⁶ On 3 April following Robert Wallop was directed by the same committee to speak with the gentlemen of Surrey for securing the gunpowder mills near Guildford, and that a certificate should be returned of their condition and of what should be done for their security.⁷ On 11 April we have a reference to a contract made by the Committee of Safety with Samuel Cordwell.⁸ On 7 January 1644-5 Cordwell was again directed to send up from time to time such powder as he should make, and never to keep at the mills more saltpetre than was wanted for a week's work.⁹ On 13 April 1646 we hear that the Committee of Both Kingdoms had appointed two-thirds of all the saltpetre made by the saltpetre men of certain counties to be delivered to Cordwell, the remaining third to Beresford, another powder maker.¹⁰ In 1648 Samuel Cordwell was dead, and to his brother Robert, who succeeded him in the business, was allotted the same proportion.¹¹ On 22 September of the next year we find

¹ S. P. Dom. Chas. I. ccccliv. 23.

² Ibid. ccxcii. 115.

³ Ibid. cccclxxviii. 81.

⁴ Ibid. cccclxxxiii. 34.

⁵ Ibid. Interr. E. 7, p. 22.

⁶ Ibid. pp. 36-7. ⁷ Ibid. pp. 43-4.

⁸ Ibid. Interr. E. 8, pp. 60-2; E. 19, p. 178.

⁹ Ibid. E. 23, p. 67. ¹⁰ Ibid. E. 9, pp. 39-41.

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Robert Cordwell ordered to receive one-third of all the saltpetre bought of the East India Company by another powder maker, William Pannoyer, who was to keep the other two-thirds, the whole quantity to be converted into gunpowder for the service of the State.¹ Henceforward there are frequent warrants for payments to be made to Cordwell and other makers for gunpowder supplied by them until the year 1651, when Cordwell's name ceases to appear amongst those of the powder makers. He probably died in that year, for on 10 November 1652 there is a petition of Hester Cordwell, widow, for relief, which was referred by the Council of State to the Admiralty Committee.² The Chilworth mills continued to be worked, for we hear on 25 March 1653 that four wagons had been sent there to fetch what powder was ready.³ Cordwell's widow seems to have attempted to carry on the business herself, but finding the work beyond her powers, to have sold her stock to some merchants who for a year became the tenants of Vincent Randyll the owner. On the expiry of their lease Randyll on 2 March 1653-4 petitioned the Admiralty Committee to be allowed to serve the State himself with the same quantity of powder which the mills had before served, on his giving security to make it as good and cheap.⁴ In January of the following year we find him mentioned in conjunction with George Duncombe and John Woodroff as one of the masters of the Chilworth powder works.⁵

In April 1656 however we find that these works were held by Josias Dewy, who claimed for them that having a certainty of water they could work in a drought when other mills were stopped.⁶ Dewy may have been previously employed at these mills, for he states that he had supplied 150 barrels weekly during the Dutch War (1652-4) and had sent 1,800 barrels to Portsmouth. All that he had made had been Tower proof, and some of it had gone to sea three times and still proved good. At this date he had not sent any to the Tower for two years, and unless employment were given him he feared that the mills must be demolished to the great loss of the State.

It was at this time that some scandals which had come to light in the performance of the various contracts for powder, entered into by them, seem to have been exercising the minds

of the Admiralty Commissioners. The numerous makers employed by them on being approached in regard to these scandals joined one and all in pointing to some Hamburg powder, which had been sent to them for repair, as the cause of all the trouble. Some of them asserted that they had all along protested against this powder, knowing that it was made of bad materials and could not be made good.⁷ Certainly more than a year before the agent of Randyll and his partners at Chilworth seems to refer to some Hamburg powder which had been delivered and repaired at the mills and yet proved defective, when he excused himself on the ground that if there were any defect, it was his employers' concern and none of his.⁸ Dewy in his petition, already mentioned, of April 1656 had doubtless this powder in view when he said that if the old powder repaired by him did not hold good, he could not keep it. The Admiralty authorities were prepared to consider the suggestion that the faults in the gunpowder were to be traced to the foreign powder they had imported, and wrote to Richard Bradshaw their agent in Hamburg evidently desiring him to inquire into the frauds. For on 21 October 1656 he wrote back to express his wonder at the badness of the powder, and to exonerate the merchant who had supplied him from any ill intentions or wilful deceit.⁹ In turn he suggested that the fault might be in the powder already in store at home, as he had heard that the Hamburg powder was mixed with this. At any rate one-fourth of what he had bought had been sold at current price three years later and no fault found with it.

Whether or not the complaints against the gunpowder contractors arose chiefly from their inability to make anything out of the foreign powder supplied to them for repair, it is certain that amongst them were some to whom just exception on other grounds might be taken. The inquiries of the Admiralty resulted in the drawing up of a report upon the doings of six of the different makers or firms of makers. As out of these six three at least can be connected with the industry in Surrey, the following tabular analysis of the report to be found amongst the State Papers may here be given.¹⁰ If on the one hand the very worst of the makers was a Surrey man, on the other hand the two who were most favourably reported can also be associated with the history of the industry in that county :—

¹ S. P. Dom. Interr. I. 63, pp. 98-100.

² Ibid. I. 35, pp. 54-9.

³ Ibid. xlix. 83.

⁴ Ibid. lkvii. 7.

⁵ Ibid. xciv. 50.

⁶ Ibid. cxxvi. 58.

⁷ Ibid. 60.

⁸ Ibid. xciv. 50.

⁹ Ibid. cxxx. 66.

¹⁰ Ibid. cxxvi. 64. i.

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	Proved	Bad	Delivered in all	If the whole of what was delivered be judged according to what was proved, the bad will be	Repaired
	Barrels	Barrels	Barrels	Barrels	Barrels
Josias Dewy . . .	805	141	3,992	699	599
John Samyne . . .	1,132	536	3,686	1,745	1,092
John Freeman . . .	584	263	2,016	907	875
Daniel Judd . . .	261	139	1,138	606	760
Thomas Carter . . .	385	232	2,373	1,429	562
William Molins . . .	384	293	1,893	1,441	424
	3,551	1604	15,098	6,827	4,312

Of Josias Dewy as a powder maker of Chilworth mention has been made above. His powder was reported to be generally good, as was also that of John Samyne, to whom it was noted that the State owed large sums, for the want of which he had suffered much. He was, after the Chilworth makers, the largest contractor for powder to the State, and first appears in this connection in the year 1651. His name is spelt variously Samyne, Samine or Semaine, most commonly the first. In January 1654-5 he states in a petition to the Admiralty Commissioners that he had at a time when the State had greatly needed powder spent £2,000 in the erection of new mills, and that he had also undertaken to make saltpetre in the counties of Suffolk, Norfolk, and Cambridge.¹ From a petition of the inhabitants of East Moulsey in 1666 it appears that his mills had been erected in that parish.² The usurped powers, it was represented, had permitted him to erect two powder mills there, with the result that many of the inhabitants had seen cause to let or sell their houses. In addition to these he had then lately erected two others, one of which it was pointed out was opposite the king's own house at Hampton Court. It was prayed that an order should be made for the removal of all these mills to a distance, the petitioners no doubt being encouraged by the new condition of affairs in their attack upon one who had been of important service to the late government. The matter was referred to the Ordnance Commissioners, but with what final result does not appear.

The record of the third of the makers who can be associated with Surrey in the above report was very different to that of Dewy and Samyne. It was said of William Molins and his partners that they 'are in the highest rank of offenders and upon rational grounds may be conceived did act from a covetous dis-

position and willingly exposed the State to hazard by making the powder of bad materials.' Molins' principal partner seems to have been a certain Abel Richardson, and the two attempted to shield themselves behind their manager and the third partner, John Jarvis or Jervase of Carshalton Mills, and his chief workman John Pepper. Previously to this report, on 22 January of the same year, Lewis Fossan, the clerk of these powder works, had been examined as to the manner in which they were conducted. He stated that a ton of saltpetre purchased from the East India Company would make thirty barrels of powder, a quantity which Molins had always had made.³ Jarvis, who was security for Pepper, would have left the work to him without any restriction as to the quantity of powder to be made from each ton of saltpetre. Pepper used to find fault with the English saltpetre because it was only singly refined, but this the partners had alleged was in accordance with their contract. The partners, Fossan says, were behind in their contracts. From 27 August to 6 December 1653 they had received 7 or 8 tons of saltpetre and had delivered 360 barrels of powder in return.

Molins and Richardson in their defence⁴ stated that they had had a commission to make saltpetre and had then contracted to make it into powder at thirty barrels a ton. But they confessed that this was a work in which they had no skill, and had therefore entered into partnership with Jarvis to carry it out, supposing the undertaking was fully provided for. Jarvis provided the other ingredients (the sulphur and charcoal), and the work was managed by him, Lewis Fossan, and Pepper, who were now attempting to acquit themselves by pretending that they were forced into an engagement to which they had willingly consented.

¹ S. P. Dom. Interr. xciv. 47.

² Ibid. Ch. II. clvi. 103.

³ Ibid. Interr. cxxiii. 60.

⁴ Ibid. cxxvi. 63.

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Of the other makers reported upon Thomas Carter is in 1660 described as a powder maker of London,¹ but the place of manufacture of Freeman and Judd cannot in the light of our present knowledge be determined. With Molins, Judd was declared one of the most guilty. The result of the report probably was that these two makers lost their contracts. Neither of them appears in a certificate made by the Ordnance officers on 10 February 1657-8 on the state of the various powder makers' contracts then in being.² This certificate, which shows the dates of the various contracts, the amount of powder contracted

for, and of that actually received, with presumably the date when the last consignments were made, is given here in conclusion of this account of gunpowder making in Surrey during the Commonwealth. The Chilworth mills, it will be seen, are now again represented by their owner Vincent Randyll, and Samyne still appears as one of the contractors. Thomas Fossan may possibly have been a relative of Lewis Fossan already mentioned, and in that case the quantity of powder supplied by him may represent the output of the Carshalton mills; but no positive assertion can be made on this point.

Contracts dated	Contractors	Contract barrels	Received barrels	Elapsed since
27 Oct. 1656 . .	Vincent Randyll . .	2,240	1,765	4 July '57
1 March 1656 . .	Thomas Warren . .	784	3	30 Dec. '57
27 April 1657 . .	Thomas Carter . .	268·80 b.	208	30 Sept. '57
6 April 1657 . .	John Freeman . .	560	510	30 Sept. '57
20 April 1657 . .	John Samyne . .	672	547	30 Sept. '57
27 April 1657 . .	Thomas Fossan . .	224	130	22 July, '57

Thus with the industry free to all, throughout the Commonwealth period the Surrey makers of gunpowder must have had a very large share of the government's contracts. So far there has been no lack of material to help us in our endeavours to form some estimate of the work done by them, and of its proportion to that of makers in other parts of the kingdom. Shortly after the restoration a change was made in the system, whereby the powder contracts were made and regulated, and the whole business relegated to the officers of the Ordnance. Henceforth a close study of the voluminous records of the Ordnance Office is alone necessary to ascertain the actual amount of powder supplied to the State by each maker. But the very voluminousness of these records makes the task an almost impracticable one within the scope of the present inquiry, if not indeed a somewhat unprofitable one from the fact that there is little or nothing in these records, without knowledge gained from outside sources to enable us to associate the different makers with any particular locality.

The first step in regard to the gunpowder business of Charles II. on his restoration was to recreate the office of sole gunpowder maker to the king very much in the same manner as the office had been held by the Earl of Worcester in 1607. The patent, to be held for twenty-one years, was given to Colonel

Daniel O'Neale, the third husband of the twice-widowed Countess Chesterfield.³ Amongst the actual makers to whom O'Neale delegated his authority we find several of those who have been previously noticed as employed by the Commonwealth government, including Randyll, Samyne and Dewy.⁴ Randyll of course worked at his own mills at Chilworth. In view of what we have learnt of his services as a gunpowder maker to the State in the latter years of the Commonwealth, it seems somewhat disingenuous on his part to find him in his humble petition of November (?) 1660 conveniently ignoring this episode in his business career, and only dwelling upon the sufferings he had endured in his estate, and the danger of his life he had been in 'in the beginning of the late unhappy distractions.'⁵ The Chilworth mills, it will be remembered, had been re-erected or extended by Cordwell with money imprested for the purpose from the Crown, it being a condition, when the repayment of this money had been forgiven him, that the mills on the expiry of the then lease should be regarded as the property of the Crown. This no doubt is what Randyll has in mind when he states in his petition that certain powder mills for the supply of the royal magazines and of the whole of the kingdom had been erected upon his inheritance by King Charles I. It was

³ Ibid. Chas. II. ciii. 125.

⁴ W. O. Ordnance Debentures, vol. lxxvi. passim.

⁵ S. P. Dom. Chas. II. xxii. 112.

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the royal licence to carry on these works that was the object of his petition.

Of John Samyne we already know that up to 1666 he was manufacturing gunpowder at East Moulsey. As to Josias Dewy, whether he still continued to work at any of the Chilworth mills or, if not, to what locality he had transferred his business, does not appear.

Colonel O'Neale died in 1664, and his patent was surrendered to the Crown by his widow. It was then that Charles II. decided to suppress the office he had recreated, and to commit the whole management of his gunpowder business to the Ordnance Office. This office was in consequence duly authorized on 17 November of the same year to conclude the contracts for the supply and repair of gunpowder.¹

According to the books of the office it would appear that powder was supplied from Vincent Randyll's mills in accordance with a contract of 25 March 1671 up to October 1674. John Samyne appears also as one of the most regular contractors to the government up to about the same period.² In the pedigree however printed by Manning and Bray, Vincent Randyll is stated to have died on 28 December 1673,³ and this date very nearly agrees with that given in an entry of 10 February 1675-6 in the Ordnance Bill Book, when Morgan Randyll, the son and heir of Vincent, was paid the sum of £515 for two years' rent of 'certain mills near Guildford' from 18 December 1673, 'the time when the said mills ceased to work.' It is stated in the same entry that the mills had been hired by the master and officers of the Ordnance for eleven years from 1 February 1671-2, the date of the contract, at the annual rent of £257 10s.⁴

Aubrey's *Natural History and Antiquities of the County of Surrey* describes the county as the writer actually saw it during a perambulation commenced in 1673, and continued during the following twenty years. His notes therefore on industries existing during that period are especially valuable. It is not possible to be precise as to the year in which he visited Chilworth, but the mills were then still in the ownership of Morgan Randyll, and the borough of Guildford still represented in Parliament by him as one of its two members. The number of powder mills 'in this little romancy vale' is given by Aubrey

in one place as sixteen, in another as eighteen, of which he says five were blown up in a little more than half a year's time. 'Tis a little commonwealth of powder makers who are as black as negroes. . . . Here is a nursery of earth for the making of saltpetre: there is also here a boiling-house where the saltpetre is made and shoots; a corning house, and separating and finishing houses, all very well worth the seeing of the ingenious. I had almost forgot the brimstone mill and the engine to search it.'⁵ At Albury the same writer notes that there were also some gunpowder mills, and that the charcoal which blacked the gunpowder was made of the alders that grew there, although Mr. Evelyn had informed him that the strongest powder was made of dog-wood coals.⁶ Aubrey's assertion that the powder mills at Chilworth were the first in England is not corroborated by what has been previously related here. Nor has it been possible to identify the Evelyns as the owners of the many powder mills near Wotton House which John Evelyn, in the letter prefixed to Aubrey's work states were erected by his ancestors 'who were the very first who brought that invention into England.' Evelyn remarks that a huge beam of 15 or 16 inches in diameter had been broken up in his brother's house upon the blowing up of one of these mills, but that no other mischief had been done. On the other hand a mill standing below Shere had shot a piece of timber through a cottage which had taken off a poor woman's head as she was spinning.

Aubrey adds of the Chilworth mills that the place was so proper for such dangerous and useful undertakings that they had been farmed out to several hands. One of the lessees was Sir Polycarpus Wharton, Bart., whose 'hard case' evidently set out not earlier than the year 1710 (Aubrey's work was not published until 1719) Aubrey was induced to add in his account of these mills at the request of a gentleman who had communicated it. The recital occupies some eight or nine of the small pages of the book,⁷ and although an *ex parte* statement, written perhaps by the gentleman most deeply interested, professes to be based on the books and accounts of the Ordnance Office. There is no need to doubt the truth of the statements made, and those facts of the case which enable us to form some idea of the extent of the works between the years 1677 and 1698,

¹ S. P. Dom. Chas. II. Entry Book 20, p. 36.

² W. O. Ordnance, Stores Issued, vol. xlvi. *passim*, and Ordnance Bill Books of date.

³ *Hist. of Surrey*, ii. 118.

⁴ W. O. Ordnance, Bill Book II. xviii. fo. 170.

⁵ Aubrey, iv. 56, 57.

⁶ *Ibid.* iv. 81.

⁷ *Ibid.* iv. 57-65.

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the period of Sir Polycarpus's lease, may be briefly epitomized.

Polycarpus Wharton was directed by the Ordnance to take a lease for twenty-one years of the great powder works at Chilworth, and entered into a contract to that effect on 1 January 1677-8. He had, it is said, been bred in the art of making gunpowder and seems to have been first employed to supply powder to the government on 30 July 1673.¹ The Chilworth mills were in so ruinous a condition when Wharton entered on his lease that the expenditure of a sum of £1,500, paid out of his own pocket, was necessary to make them serviceable. By the terms of the contract the rent, the growing necessary repairs, and the incidental charges, amounting in all to £1,000 yearly, were to be paid by the Ordnance when the mills were not employed by the Crown, and it is stated that they were not so employed during one-sixth of the term. Yet for ten years Wharton could obtain no reimbursement for his expenses, and then he was persuaded to waive his contract, to accept £2,000 by way of debenture of which he never could receive a penny, and to enter into a new contract for keeping the works at his own charge during the remaining eleven years of the lease. In return for this he was to supply 1,200 barrels of powder a year over and above his proportion with other powder makers. The date of this contract is given in the account of Wharton's 'hard case' as 22 December 1687, but the books of the Ordnance Office refer to one of the date 14 July 1688.²

The narrative goes on to relate how little the Ordnance officials respected the terms of their second contract with Wharton. Whereas from the date of it until 27 April 1695 the total amount of powder supplied to the Office by all makers was 98,920 barrels, of which Sir Polycarpus's proportion should have been 51,685, he was only allotted the making of 32,852. The making of the deficiency of 18,833 barrels had been apportioned to foreigners and others to keep their works employed while those of Chilworth stood still. Nor was this all the injustice he had met with. The annual quantity of 1,200 barrels over his proportion to be supplied by him was ignored by the Ordnance Office, so that by April 1695 he had been deprived of making the extra number of 9,600 barrels over his regular quantity, the total deficiency being 28,433 barrels, or very nearly a half of

the total quantity he could claim it as his just right to supply.

And all this slighting of the claims of the Chilworth maker had occurred, it is represented, in spite of the fact that at the beginning of the war that was then being waged, the great expense that Sir Polycarpus had been at in erecting new works and engines, had made his mills alone able to supply the stores with 325 barrels of powder weekly throughout the year, a quantity 'much more than all the other powder works in the kingdom could then furnish,' and for want of which 'it had been impossible that the fleet could have been timely supplied with powder both at that and other times since.'

Among Sir Polycarpus's other services to the State was that of imitating the German powder which was much esteemed for its great strength. In January 1680-1 he had at King Charles II.'s request been ordered to send two able persons to Germany to receive Prince Rupert's instructions in the art. This order had been countermanded and Wharton had been desired to imitate the powder in England, which he did, it is said, to such perfection that in one year his powder upon trial before the king and Prince Rupert was found to exceed the German powder greatly in strength and yet able to be made at a much cheaper rate. Encouraged by the king he had erected mills near Windsor, 'much differing from the common sort,' and sufficient to make forty barrels weekly of this powder. These mills had cost him £2,700, yet never could he receive recompense nor had he made any quantities of the new powder for the service of the State.

In all Sir Polycarpus is said to have been a sufferer by his twenty-one years' lease of Chilworth mills to the extent of £24,000. This includes a sum of at least £3,500 loss by blowing up of works and sinking of barges laden with goods, and also apparently the loss he had sustained by the payments to him during the last six years of his lease being made by tallies which he could only discount at from ten to thirty per cent. The result of all these hardships and injustice was that in 1710 Sir Polycarpus was languishing in a debtor's prison from which the dilatoriness of the government in considering his memorials and reporting upon his case seemed little likely to release him at the time when the story printed in Aubrey's work was related.

The Chilworth mills in the year 1700 consisted of three several works known respectively as the Upper works, the Middle works and the Lower works. They are so

¹ W. O. Ordnance, Stores Issued, vol. xlvi.

² Ibid. Bill Bk. II. vol. xxxviii. fo. 25.

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marked on the map prefixed to Aubrey's *Surrey*. But in 1704 it appears that the last of these three was converted into a paper mill.¹

Morgan Randyll, who was elected as one of the representatives of Guildford to various parliaments between the years 1680 and 1715, is said to have become so much in debt by the contests on these occasions that in 1720 he sold his estate to Richard Houlditch, esquire, a woollen draper. The estate is described as the manor of Chilworth with the appurtenances, amongst which two mills only, called Chilworth Mills in St. Martha, are mentioned. Mr. Houlditch was also a director of the South Sea Company, and on the bursting of the famous bubble the estate he had thus acquired was seized and sold towards indemnifying the victims. Sarah, Duchess of Marlborough, purchased Chilworth from the trustees and devised it by will to trustees for her grandson, John Spencer, the ancestor of the Earls Spencer. George John, second Earl Spencer, having succeeded to the titles and estate in 1783, sold Chilworth in 1796 to Edmund Hill, esquire, the owner of considerable powder mills near Hounslow.²

From the pages of Manning and Bray we find that during the first decade of the nineteenth century the long-established and once important Surrey industry of gunpowder making still existed in the county to no inconsiderable extent. The principal stream of the Wey then supplied a great number of corn, paper and gunpowder mills.³ On the Tillingbourn stream, which drove the Chilworth mills, there were four powder works, which had been originally, it is said, higher up the stream near to Albury. Until recent years these mills had been worked by pestles instead of stones.⁴ The little Hogsmill stream, the scene of the Evelyns' first venture in the art, especially abounded in gunpowder mills. There were four wheels in the parish of Ewell, each wheel working two mills. In Long Ditton there were two wheels, each similarly driving two mills. Thus in all there must have been no less than twelve mills, devoted to the manufacture of gunpowder, on this tiny stream.⁵ The mills at Long Ditton were then commonly known as Malden Mills, and were owned by Mr. William Taylor, whose business is described as extensive.⁶

Since that time gunpowder making has ceased to be one of the common industries of the county. So much was this the case in 1850 that the very full account of industries then carried on in Surrey, printed in Brayley and Britton's *History of Surrey*, makes no mention of gunpowder. But the industry has never ceased to be carried on at Chilworth, and at the present day the Chilworth Gunpowder Company, Limited, worthily enough, though alone in the county, enable us to reckon the manufacture of gunpowder as a still existing Surrey industry. Of this company and of its predecessors during the last century in the ownership of the Chilworth mills it now remains to speak.

In the year 1817 these mills were owned and worked by Mr. William Tinkler and Mr. Richard Mountford. In that year these gentlemen were indicted for erecting and maintaining certain powder mills called a corning-house, a dusting-house, a gloom-stove, etc., in the parish of St. Martha at Chilworth. The case was tried before Mr. Justice Dallas and a special jury at the Kingston Lent Assizes, and the full report of the proceedings, taken in shorthand, was afterwards printed in book form and may be read by the curious.⁷ The evidence gives much useful information as to the processes then employed in powder making, and also as to the then importance of the Chilworth mills. The defendants were stated to have been the owners of these mills for twenty-eight years, a statement which requires to be reconciled with that, already noticed, of Manning and Bray, that in 1796 Chilworth was purchased by Edmund Hill the Hounslow powder maker. The chief instigator of the prosecution was Mr. Rowland, the owner of the paper mills which had previously been the Lower powder works. The jury on hearing the evidence of the first-called and most important witness for the defence, Major By, R.E., the superintendent of all the king's powder works, and how all his previous recommendations for the safety of the Chilworth mills had been carried out to the letter, until in his opinion these mills were the safest in the kingdom, at once found a verdict of 'not guilty'. The prosecution was stigmatized by the judge as the most malicious he ever remembered brought into a court of justice.

On 4 March 1819 Mr. Tinkler leased the

⁷ *Chilworth Powder Mills; Trial on an Indictment charging them as a nuisance: by which they were proved to be not only no nuisance but as safe as any, if not the safest, powder mills in the kingdom.* Taken in shorthand by Thomas Jenkin, 2 April 1817; London, 1817.

¹ See the evidence in the trial of *Rex v. Tinkler and Mountford* in 1817 noticed below.

² Manning and Bray, *Hist. of Surrey*, ii. 118.

³ *Ibid.* i. p. ii.

⁴ *Ibid.* ii. 117.

⁵ *Ibid.* i. pp. iv. 475.

⁶ *Ibid.* iii. 12.

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mills to Mr. John Sharp, who was subsequently joined by his brother Thomas, and the business was carried on under the style of J. & T. Sharp.¹ Afterwards John's son Samuel became a partner, when the style was changed to J. T. & S. Sharp, and so remained until the business was sold in 1881 to Mr. C. Marcus Westfield, who began the manufacture of the highest class of black powder for the government.

Since this latter date the manufacture of gunpowder has been completely revolutionized in this country. In the first place the gradual increase in the size of guns, in order to compete with armour plates, necessitated the use of a slower burning powder that would at once less endanger the gun and at the same time give a greater velocity to the shot. The difficulty was met by forming the powder into hexagonal prisms with a hole through the centre. So long ago as 1868 this powder was adopted by Krupp for his breech-loading guns, but it was not until 1880 that Mr. Edward Kraftmeier, a present director of the Chilworth Gunpowder Company, introduced it to the notice of the British government. It then still consisted of the usual proportions of saltpetre, charcoal and sulphur, but about that time changes were made in its composition. The proportion of sulphur was reduced and a new kind of charcoal of a chocolate colour was employed. This gave the prisms the appearance of cocoa, and the powder was hence called brown or cocoa or prismatic powder.²

The second change that has completed the revolution in the manufacture of powder in recent years has been the introduction of cordite or smokeless powder. In being largely instrumental in securing the success in England of both these innovations, the Chilworth mills have played a part fully in accordance with the reputation which an unbroken existence of nearly three centuries has given them.

The representations of Mr. Kraftmeier having persuaded the British government of the superior results of the new prismatic powder when employed in heavy guns, it became necessary to obtain a supply. This however could only be done from the German manufacturers. But as it was impossible for this country to remain dependent on powder supplies from a foreign country, arrangements were made with the government by Mr. Kraftmeier

for the manufacture of this prismatic powder. The German inventors, Mr. J. N. Heideman and Mr. M. Duttonhofer, undertook to instruct the superintendent of the Royal Gunpowder Factory at Waltham Abbey in the manufacture of the military kinds of prismatic powder. Further, to secure the supply of this article in England, the Chilworth Gunpowder Company was formed to work the German invention and make the several varieties of the powder designed for military, sporting and blasting purposes.

Mr. Westfield's interest in the Chilworth mills, which now belong to the Duke of Northumberland as ground landlord, was acquired by the company in 1885, and arrangements were at once made for enlarging the works and fitting them up with every modern improvement. The board of directors included amongst others the two German inventors above mentioned. Mr. Kraftmeier and Mr. Westfield became the managing directors and Lord Sudeley the chairman of the company.

The business done by the new company necessitated a very great extension of the Chilworth mills, and they now stretch for nearly two miles along the valley and are one of the leading gunpowder mills of the world. Within a few years of the company's formation it was found necessary to open another factory at Fernilee in Derbyshire, so large were the quantities of the powder demanded by the British government, by Sir W. G. Armstrong & Co., Ltd., and by various foreign governments.

The company did not confine its attentions to the manufacture of the prismatic powders, but very shortly took up the manufacture of smokeless powder, for which the great improvements in the production of quick-firing guns began to create a demand shortly before the year 1890. At the gunnery trials of the Italian cruiser *Piemonte* in September 1889 experiments were made with the Chilworth powder, and although it proved not absolutely smokeless, the thin transparent fumes which arose from it were speedily dissipated, and there was an absence of that dense obscuration by the raising of which the use of black powder with quick-firing guns would have defeated the purpose of the new weapon. Moreover the merits of the new powder did not stop here. The muzzle velocity given by it was greatly increased, and this notwithstanding the fact that it was possible to considerably reduce the weight of the charge from that which would have been necessary of the ordinary black powder.³

¹ Ex inf. C. Sharp, Esq.

² Ex inf. Chilworth Gunpowder Co., Ltd. See also Wyman's *Commercial Encyclopædia* (1888) and the *Standard* of 23 May 1888.

³ *Standard*, 21 Sept. 1889.

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But in 1892 experiments with smokeless powder gave way before the introduction of ballistite or cordite, the manufacture of which was first started in this country in the Royal Gunpowder Factory at Waltham Abbey. The

Chilworth Gunpowder Company was however the first private factory in Great Britain to take up the manufacture, and this new undertaking of the company has again necessitated very great changes in the Chilworth works.

LEATHER

The history of the leather industry of Surrey in all its branches is of the first importance. The pre-eminence which Bermondsey and with it Southwark have for centuries past enjoyed as a chief seat of the manufacture in the kingdom would alone make it so. But in addition there is a long-established and still considerable branch of the industry in the south-western district about Godalming and Guildford, and other parts of the county have been in the past or still are associated with the leather trade.

The infinite variety of the uses which the conversion of the skins and hides of animals, whether into leather, fur or parchment, can be made to serve must have made the industry a first necessity from the earliest times. We may safely conclude that there never was a time, at any rate within the period with which we are here concerned, when tanning and the other occupations into which the manufacture of leather has become subdivided, were not carried on in Surrey. It may be taken for granted, says Mr. Thorold Rogers, that the tanning or tawing of leather was a bye-product in most villages.¹ But the very commonness of the manufacture accounts for the obscurity in which its early history is enveloped, and prohibits us from tracing with any certainty its gradual development from an almost domestic into a highly organized and centralized industry.

This change in the conditions of the industry, a natural one and inevitable as it must have been, was no doubt accelerated by the policy of a legislature singularly jealous of the right of the people to be assured that the first necessities of life were being supplied to them unadulterated and of perfect workmanship. The better to secure perfection in each one of them, recourse was first had to the expedient of dividing the processes necessary for the manufacture of the finished article and prohibiting artisans to engage in more than one of them. As early as 1351 the Statute of Labourers laid down that no shoemaker should be a tanner, or any tanner a shoemaker.² This policy became more clearly defined on the

accession of the Tudors, and in 1485 and 1503-4 we have Acts which sharply divide the operations of tanners, curriers, and cordwainers.³ Legislation dealing with deceitful processes, which had been resorted to in order to hasten what is necessarily one of the slowest and most tedious of operations, next follows,⁴ and finally we have the whole manufacture of leather and leathern goods, from the first moment when the hide is in the butcher's hands until it reaches the consumer in its last state, elaborately regulated in the Act of 1562-3.⁵ To carry out these regulations the appointment of official searchers and sealers was necessary, a duty which fell to the mayors or other head officers of cities and towns, and thus, as also happened in the cloth trade, the further development of the industry in the villages was checked by the necessity of insisting upon the old policy of prohibiting the manufacture and sale of the commodity outside market and corporate towns.

So much in brief outline of the general principles by which the legislature sought to direct the leather industry of the kingdom. We may now proceed to consider their special application to the Surrey industry, and what evidences we may have to enable us to gauge the extent and nature of the leather manufacture of the county during the period when these Acts were in force.

Notices of the tanning industry before the Tudor period would seem to be scanty, although we need not doubt the existence of a considerable trade in so necessary a commodity, more especially as, when the materials are amplified, we find the industry a well-established one in the county. We may notice however that in 1437 we find a tanner at Oxted in Richard Couper, who is a defendant in a Chancery suit, and is described with the other defendants, who comprise a London

¹ Stat. 1 Hen. VII. cap. 5 and 19 Hen. VII. cap. 19.

² Stat. 2 and 3 Edw. VI. cap. 11.

³ Stat. 5 Eliz. cap. 8. The Act was superseded by that of 1 Jas. I. cap. 22, which however confirmed the principles of the former Act, though considerably elaborating them.

¹ *Six Centuries of Work and Wages*, p. 46.

² Stat. 25 Edw. III. stat. 2 cap. 4.