The Defence of Calais and the Development of Gunpowder Weaponry in England in the Late Fifteenth Century

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This article challenges the prevalent perception that the development and use of gunpowder weaponry in England in the late fifteenth century differed markedly from that in France and Burgundy. This is done in the light of the evidence of the Calais victuallers’ accounts. Calais was England’s most important military and commercial frontier, and the unique survival of large amounts of archival material allows its gunpowder weaponry to be reconstructed in detail. The accounts show that from the 1460s the Crown systematically increased and modernized the ordnance in Calais and, moreover, extended increasing royal control over it, bringing English gunpowder weaponry and its use in line with that of France and Burgundy.

The accepted picture of the state of English gunpowder weaponry in the latter half of the fifteenth century is a dismal one indeed. In France and Burgundy, it is argued, increasing royal control over gunpowder weaponry and its use formed an important part of the military revolution. In England, however, the monopoly over such weapons, so apparent in the late fourteenth century, was allowed to lapse, and their ownership and use multiplied in the small-scale internecine strife that characterized that period of English history. Most recently, Kelly de Vries, commenting on the apparent absence of gunpowder weapons in the main battles of the Wars of the Roses, has written that ‘after nearly a century and a half of strong royal control over gunpowder weaponry in England, such weaponry had almost disappeared by the middle of the fifteenth century and would not reappear until the middle of the sixteenth century’. English kings, he continues, ‘simply never had strong royal control similar to that held by their continental counterparts’.1 As a result the last half of the fifteenth century

constituted the 'dark ages' of English military technology and saw English military power fall behind that of France, Burgundy and the empire.

This abject picture is largely obtained from the evidence of contemporary chronicles and scattered documentary references. Both stress the use of gunpowder weaponry by rebels as well as royal forces during the Wars of the Roses, and highlight the incidents of use by 'smaller political entities' in their own private conflicts 'without ever involving the king'. The burgesses of Norwich, for example, attacked the abbey with guns in 1443 and they were used during the siege of Caister castle in 1469.² It would be wrong, however, to overestimate the extent of the crown's monopoly over gunpowder weaponry. This had not been complete even during the fourteenth century: the great gun, for example, used by Bishop Despenser at the siege of Ypres in 1383 probably belonged to the chapter of Canterbury cathedral, while the rioters who assaulted Huntercombe manor in 1375 were armed with guns.³ Moreover, by the end of the fourteenth century both town defences and private residences, for example Cooling castle in Kent, had been adapted to house privately owned gunpowder weapons.⁴ In a society where the king relied on his great nobles and local communities for assistance in the defence of the realm, a royal monopoly over gunpowder weaponry was neither attainable nor even desirable.

There are also important caveats in the interpretation of chronicle evidence. The use of guns in battles during the late fifteenth century was often not made explicit because they were a commonplace. Only when something new occurred, such as when Warwick used Flemish handgunners at the second battle of St Albans, did chroniclers consider gunpowder weaponry worthy of mention.⁵ Guns and gunpowder, compared with other weapons, were also relatively cheap. In 1486, for example, the merchant Richard Cely bought ‘four small serpentines . . . two greater serpentines, three “hacke boschys”, two hand guns’ as well as bows, arrows, lead pellets and other necessaries to arm his new ship for £4.⁶ In 1471 the Calais victualler paid a little over 5s. each for iron handguns; the same year he sold steel crossbows for 18s. each.⁷ The Wars of the Roses, moreover, were characterized

⁷ PRO, E 101/197/12, fos. 7,28. Steel crossbows, of course, also needed windlasses to draw back the string. These cost around 5s. each.
not by sieges, which relied on the effectiveness of gunpowder weaponry, but by pitched battles. After a short exchange of missiles, sometimes including gunshot, battles were decided by short and bloody mêlées, in which the bravery and skill of the fully armoured man-at-arms was of primary importance.\(^8\)

The impression that gunpowder weaponry declined in relative importance in England in the latter half of the fifteenth century, and that the crown lost in advantage over private citizens in the manufacture and acquisition of such weaponry, is also due to the loss of important documentary evidence concerning the acquisition, manufacture and use of such weapons by the crown.\(^9\) This lacuna is, in part, because of administrative changes. During the late thirteenth century the privy wardrobe at the Tower of London had emerged as the principal centre for the acquisition and storage of royal weaponry. Originally this was part of the king’s chamber but by the 1360s it had gone ‘out of court’, gaining its own institutional identity and an independent supply of money from the exchequer.\(^10\) The extent of its operation is clear from the extant documents produced when successive keepers of the privy wardrobe rendered account at the exchequer.\(^11\) By the 1380s, however, the scale of its operations with regard to weaponry was in decline, and there are no inventories after 1402. This may be due to the fact that royal weapon acquisition had again moved to the remit of the king’s chamber. As its treasurers were not accountable at the exchequer but only to the king himself, very few of its records have survived. Although appointments to the keepership of the privy wardrobe persist throughout the fifteenth century, it is clear that this office had more to do with the king’s beds than with his cannons.\(^12\)

Nevertheless, there survives important documentary evidence of the use of gunpowder weaponry in the late fifteenth century that remains,

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\(^9\) This point has been picked up by most writers on early English gunpowder weaponry and used as an excuse to bypass the fifteenth century completely. Brigadier Hogg, for example, assures us that ‘the loss is more apparent than real because from such contemporary writings as there are we know that there was little or no advancement in either gun construction or performance during this period of twilight sleep’: O.F.G. Hogg, *English Artillery 1326–1716* (London, 1963), pp. 14–16. See also R.B. Smith, ‘Artillery and the Hundred Years War: Myth and Interpretation’ in Curry and Hughes, *Arms, Armies and Fortifications*, pp. 151–3, on the paucity of modern research into gunpowder weaponry during the fourteenth and fifteenth centuries.


\(^11\) The inventories and particulars of account of the successive keepers are preserved in PRO, Exchequer Accounts Various, E 101 amongst the Wardrobe and Household accounts, while from 1344 until 1408 final accounts were enrolled amongst the ‘foreign accounts’, E 364: *Lists and Indexes xxxv* (Kraus repr., New York, 1963), pp. 241–8; *Lists and Indexes xi* (Kraus repr. New York, 1963), p. 106. A selection of these records are printed in Tout, ‘Firearms in England’, pp. 688–702.

\(^12\) In 1458 John Norman and John Davy, granted in survivorship the office of keeper of the privy wardrobe in the Tower, felt the need to stress that this office was the same as that of keeper of the king’s beds: Calendar of Patent Rolls, 1452–1461, p. 422.
on the whole, unexplored by historians. These are the accounts and inventories of the victualler of Calais. 13 Calais fell to Edward III on 4 August 1347 after a protracted siege, and was the most tangible benefit of the Crécy campaign. It remained in English possession until 1558. After 1450, and the loss of Normandy, it emerged as the ‘principal jewel’ in the English crown and, as such, became a formidable military fortress and a fulcrum of the dynastic struggles of the later fifteenth century. 14 From 1399 until 1495 the victualler accounted separately at the exchequer for all victuals, building materials, arms and munitions he received for the safeguard of the town and marches. 15 In the particulars of his account the victualler inventoried the stock in his hands at the beginning of the accounting period, recorded any receipts in the form of arms and armour from England, any purchases he made or items expended during the period of the account and, finally, inventoried his final stock. Moreover, the working papers of the last incumbent of the office, William Rosse (1468–92), are also preserved. These consist of records of purchases made, Rosse’s involvement in the invasions of France of 1475 and 1492 and the Scottish campaign of 1481–82, and inventories of military equipment in the various fortresses in the marches of Calais. 16 With these documents it is possible to reassess the development and use of gunpowder weaponry in Calais in the last half of the fifteenth century and attempt to place it within the historiographical framework of the ‘military revolution’.

I

By the end of June 1450 the situation for the English held lands in France looked bleak. Caen, the last bastion of Lancastrian Normandy, had fallen on 24 June and there were daily rumours of first a Burgundian and then a French attack on Calais and its surrounding fortresses. 17 The Calais victuallers’ accounts of the third and fourth decades of the fifteenth century demonstrate that English military attentions were


16 From the 1430s the English-controlled area around Calais was known as the ‘Pale’: PRO, SC 1/38/47.

firmly focused on Normandy and Gascony and that the gunpowder weaponry in Calais, though apparently abundant, was not modernized nor significantly increased. In March 1446 there were 64 iron guns for stones, one for ‘springalds’ and 13 for pellets, as well as 37 assorted brass guns for firing stones and three for pellets.\textsuperscript{18} A significant proportion of these, however, had been in place since the early fifteenth century and the great bombard \textit{London}, brought over from England to counter the Burgundian siege of 1436, was still lying broken in two pieces. Throughout the late 1440s there were occasional purchases of new ordnance from the smiths working in conjunction with the royal armourers at the Tower of London. In period 1447–49, for example, the victualler of Calais, Robert Mansfield, took delivery of three ‘great iron guns for stones’, two ‘great fowlers each with two chambers weighing 1398 lbs’ and an ‘iron serpentyne with two chambers’ from the London smiths Thomas and Stephen Clamparde.\textsuperscript{19} The largest purchases of ordnance occurred in 1450–51. The apparent imminence of a French or Burgundian attack galvanized the Lancastrian government into action: 24 new iron guns for stones were purchased, as well as large stocks of gunpowder, saltpetre and sulphur. Moreover, two bulwarks were constructed on the walls of Calais to offer the most modern means of defence against a besieging army’s own guns.\textsuperscript{20} After the expected attack failed to materialize, the expansion of the gunpowder weaponry employed in the defence of Calais came largely to a halt. Between 21 November 1451 and 28 December 1458 the victuallers’ accounts only record the purchase of two iron guns for stones in 1455–56.\textsuperscript{21} This was not part of a general neglect of Calais’s defences, however. As Sir Howard Colvin has shown, between 1440 and 1460 more money was spent on the material defences of Calais – the fortifications and waterworks – than ‘on any other military construction since the time of Edward I’.\textsuperscript{22}

The slowness with which new weaponry was introduced to Calais typified the Lancastrian government’s response to French military initiatives in general. Under Charles VII (1422–61) the French artillery train had been centralized under the new masters of artillery, Jean and Gaspard Bureau, and it had been instrumental in their victories in the final phases of the Hundred Years War.\textsuperscript{23} This was driven by the king’s personal interest in artillery and a wider appreciation of the need for military reform. Charles, mindful of the hostility caused by the requisition of horses for the artillery train, even commissioned the design of a gun-carriage that was not horse-drawn.\textsuperscript{24} In England the experi-

\textsuperscript{18} PRO, E 101/194/6, fo. 4.
\textsuperscript{19} \textit{Op. cit.}, fos. 27–27v.
\textsuperscript{20} PRO, E 364/87, 31 Hen. VI, rot. Gd-H.
\textsuperscript{21} PRO, E 364/91, 35 Hen. VI, rot. A.
\textsuperscript{22} \textit{The History of the King’s Works}, ed. H.M. Colvin (6 vols, London, 1963–82) 1, p. 432.
ence of Henry VI’s kingship could not have been more different. ‘The arrival’, we are told, ‘at nominal adulthood of a king for whom the word “incompetent” is a pale reflection of the grisly reality turned out to be more than the polity could bear.’25 While historians are in debate about the extent of Henry’s involvement in the government of the realm, the fact that he failed to fulfil the expectations of a medieval king as leader of his realm in war seems indisputable.26 His inability to unite the nobility behind him in a reconquest of lost French possessions engendered factionalism as the noble consensus which had governed in the king’s name during his minority fractured. In the early 1450s effective royal government was also hampered by parliament’s refusal, or inability, to fund new military campaigns and its attacks on the king’s leading counsellors, such as the Duke of Suffolk. In 1453 the king finally lost all semblance of personal authority when struck down by mental illness. Without strong leadership from the centre the gunpowder weaponry in the hands of the nobility, often provided at royal expense for the defence of the French possessions or Scottish marches, was available to further their own political ambitions. The problem, then, was not so much that royal government lost its control over the supply and use of gunpowder weaponry, but rather that Henry VI lost control over royal government.

The Calais victualler’s accounts make this problem explicit. From 1455, when Richard Neville, Earl of Warwick, was appointed captain of Calais in the wake of the Yorkist victory at St Albans, Calais emerged as a important arena for the conflict between York and Lancaster. After the débâcle at Ludford Bridge in September 1459 the Yorkist lords – Warwick, Salisbury and March – fled to Calais while the Lancastrian government attempted to replace Warwick as captain by the Duke of Somerset. Somerset was refused access to Calais by the Yorkist garrison and instead moved to the outlying castles of Guisnes and Hammes, whose commanders, Thomas Fynderne and Sir John Marney, had declared for Henry VI. There then ensued a struggle between the Yorkists and Lancastrians within the Calais Pale. Lancastrian reinforcements failed to land in March 1460, and on 23 April that year Somerset was defeated in open battle at Newenham Bridge. After the news of the Lancastrian defeat at Northampton, Somerset surrendered Guisnes and was allowed to retire to Dieppe. The defenders of Hammes, however, held out after the final defeat of Henry VI’s forces at Towton in March 1461. In April and again in September that year the Calais garrison besieged the defenders of Hammes. The first attack was beaten off with French assistance but the castle finally capitulated on 25

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October.27 The account of John Clay, victualler of Calais, reveals the use of gunpowder weaponry by both sides during the two sieges of Hammes. Both sides used guns, powder and shot which were, in name at least, royal property. The outgunned defenders only fired 270 gunstones as opposed to 998 fired by the besiegers and used only 242 lb of powder compared to the attackers’ expenditure of 1120 lb. Moreover, the Yorkists ‘broke’ three large iron guns firing stone shot.28 Although there is no direct evidence, it seems logical that during the other battles in the Wars of the Roses in which Warwick and contingents from the Calais garrison took part the royal ordnance stores at Calais were similarly employed by both sides.29

II

In contrast to his predecessor, Edward IV took an active interest in warfare and military technology. He had won the throne through his prowess in battle, and in the early 1460s the Yorkist hold on the throne needed to be consolidated by defeating the last Lancastrian rebels in the North of England. Edward’s particular interest in artillery was commented upon by observers, especially after 1471 and his experiences in exile in Burgundy. In 1475, for example, the Milanese ambassador reported, in relation to the preparations for the invasion of France, that ‘every day he inspects all his artillery . . . Notwithstanding that he has a very large number of bombards, he has fresh ones made every day.’30 This interest was apparently shared by his brother, Richard, Duke of Gloucester. In 1480 he thanked Louis XI of France for a gift of a bombard: ‘I have always and still take great pleasure in artillery.’31

In the first years of Edward’s reign, however, there is little evidence that this royal interest in artillery was felt in Calais. This was due in part to the pressures of consolidating Yorkist rule in England, but also to the fact that the defence of Calais was almost entirely under the control of its captain, Warwick.32 Warwick used his control of the royal
arsenal in Calais in his campaign to reduce the Lancastrian strongholds in the north of England in 1464. In June of that year Warwick laid siege to Bamburgh Castle with a formidable artillery train, including the *Newcastle*, *London* and ‘Dysyon, a brazen gun of the king’s’ which ‘smote through Sir Ralph Grey’s chamber oftentimes’.

The *London* may or may not have been the bombard from Calais which had been broken during the Burgundian siege of 1436, but it seems certain that ‘Dysyon’ was the *Dijon*, the great brass and copper bombard captured from the Duke of Burgundy during the 1436 siege of Calais. This gun, along with its 16 gunstones, had been a constant feature of victuallers’ inventories since that date. In 1464 the bombard and other supplies were shipped from Calais to the siege of Bamburgh by one William Federston, a member of the Calais garrison and Sandwich ship-owner.

Despite this example of the effectiveness of the gunpowder weaponry held at Calais, there is no evidence of significant purchases of new ordnance by the victualler between 1461 and 1466.

Two events in the late 1460s were instrumental in the development and modernization of the gunpowder weaponry at Calais. The first of these was the securing of adequate and guaranteed funding for the defence of Calais. In 1466 the crown concluded the Act of Retainer with the wool merchants of the Calais Staple. This allowed the merchants to collect the customs and subsidy on wool in return for an annual payment of £10 022 for the wages of the Calais garrison and maintenance of the defences. The mayor of the Staple also became *ex officio* treasurer and victualler of Calais. This solved one of the most enduring financial headaches of late medieval English governments.

From 30 September 1466 the victualler received an annual sum of some £3340 from the wool customs. The second important development was diplomatic. In November 1467 a treaty providing for ‘free intercourse of merchandise’ was concluded between Edward IV and Charles the Bold, Duke of Burgundy. This new rapprochement was further strengthened the following year by the marriage of Margaret of York to Duke Charles.

Although the treaty specifically limited the free trade in ‘Armures, Artilleries, Canons, Pouldrez & autres Choses as one of the retinue of the Earl of Warwick, was rewarded for attacking Spaniards on the high seas (C 76/143, m. 3).


PRO, C 76/151, m. 12. It is not clear what happened to the *Dijon*, although the *London* was scrapped in 1472–73, yielding 2250 lb of iron: E 101/197/14, fo. 23.


faictes semblables & Invisibles’, it significantly widened access by English merchants to the marts of Brabant where the specialized arms trade flourished. Through the office of the victualler, now in the hands of the merchants of the Staple whose established trading partners operated in the commercial milieu of the Low Countries, the English government was ideally placed to exploit these new opportunities.37

This soon had an impact on the weaponry employed in the defence of Calais. Although the mayor of the Staple was nominally the victualler, the day-to-day work was carried out by William Rosse.38 Rosse used his experience of the marts of the Low Countries, gained as a merchant of the Staple, to procure arms and munitions. In 1466–67, for example, he purchased 810 lb of gunpowder from Outre Henrykisson of Flanders at 5d. per pound.39 The following year one iron and 20 brass handguns (the first mention of such weapons in the victuallers’ accounts), two brass serpentines together weighing 700 lb, six iron culverins, one large iron gun weighing 1985 lb, three separate gun chambers and an iron serpentine weighing 858 lb were purchased from various merchants in the Low Countries. Moreover, Robert Potte, the master gunner of Calais, and his assistants travelled to Brussels to test-fire the guns before their delivery to Calais.40 Nevertheless, although this represented a significant step towards the modernization of Calais’s gunpowder weaponry, it did nothing to increase royal control over their use.

The Earl of Warwick’s rebellion in 1469 and his subsequent support of Henry VI’s readeption again demonstrated the lack of royal authority in Calais. From the mid-1460s Warwick had become increasingly estranged from Edward IV due to differences over the direction of the king’s foreign policy and his marriage to Elizabeth Woodville.41 That Calais was still one of the centres of Warwick’s power is evident from the marriage of his daughter to George, Duke of Clarence there in 1469. At the height of his rebellion against Edward IV in 1470, the Calais garrison adopted the earl’s badge of the ragged staff in defiance
of royal authority. Although the Calais garrison apparently played little part at the battle either of Barnet or of Tewkesbury, they formed the backbone of the force that Thomas Fauconberg led in support of Warwick in the attack on London in May 1471. The London chronicles make it clear that in their assault on London Bridge, Cripplegate and Aldgate Fauconberg’s rebels employed large amounts of gunpowder weaponry.

In the wake of Edward’s victory over the Lancastrian army at Tewkesbury, the reassertion of royal authority in Calais was one of the king’s priorities. Although generous pardons were extended to most of Warwick’s former retainers in Calais, Edward signalled his intentions to exercise strong and effective royal government in Calais by appointing his household chamberlain, William, Lord Hastings, as his lieutenant there. Many other minor offices in the Calais garrison were filled by members of the royal household and, it has been argued, by 1471 Calais resembled an ‘outward office of the king’s chamber’.

In relation to gunpowder weaponry this royal interest in Calais had important effects. As stated earlier, Edward had a personal interest in artillery, and during his exile in Burgundy this may have been strengthened. On landing in Holland in October 1470 Edward was received and lodged with Louis de Bruges, lord of la Gruthuyse. Gruthuyse was clearly aware of the potential of the latest gunpowder weaponry: by 1465 he had adopted a bombard as his badge, with the motto Plus est en vous. We know that in other areas, such as literature and architecture, Edward was impressed by his host, and after he regained the throne many of the books in Gruthuyse’s library were added to the royal collection. The same thing may have happened in relation to gunpowder weaponry. During the campaign of 1471 Edward’s army included 500 Flemish handgunners. Soon after Edward’s recapture of the throne the gunpowder weaponry in Calais was significantly increased. Between April 1471 and April the following year the Calais victualler purchased 223 brass handguns at Antwerp. It is possible that the king’s experiences in exile and the use of these weapons in

48 PRO, E 101/197/14, fo. 8v. There were also significant purchases made of armour, gunstones (some 6000), iron cannonballs and saltpetre from suppliers in the Low Countries.
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Edward’s host at Tewkesbury and Barnet prompted the modernization of the gunpowder weaponry of the Pale.

The individual charged with the modernization of the Pale’s gunpowder weaponry was William Rosse. Rosse, as we have seen, served as the victualler in all but name from 1468. It was Rosse who organised a foundry in Calais itself, melting down old and damaged ordnance and subsequently remaking new guns. In 1471–72 Rosse received from Robert Potte, Giles Gonner and the other gunners of Calais 675 lb of ‘old iron’ from five broken guns and seven gun chambers and 2250 lb of iron from the bombard London.49 The following year the smiths of Calais, Giles van Rasingham and John Smith, delivered to Rosse ‘fourteen iron guns called fowlers each with chambers and iron bindings weighing 5707 lbs’, five iron serpentines weighing 2058 lb and a single iron cannon weighing 1324 lb. Moreover, a further 610 lb of old iron was recovered from old and broken guns.50

Two grants made by the king to Rosse in 1473 show that the development of gunpowder weaponry in Calais was an integral part of the modernization of such weapons in England as a whole. On 5 March that year all smiths, carpenters and other workmen receiving royal wages were ordered to assist Rosse in all ways possible and provide all manner of supplies necessary to ‘faciend necnon ad bumbardos, canones, culverinos, fowleres, serpentynes & alios canones quoscumqes ac pulveris sulphuris, saltpetir, petras, ferrum, plumbem & omnimodus alias stuffuras pro eisdem canonibus’.51 The following month, on 13 April, a second grant allowed Rosse £273 10s. for the manufacture of artillery and other provisions of war over and besides that already paid to the victualler according to the terms of the Act of Retainer. Rosse was not to render account of this sum with those sums expended by the victualler’s office, but was to present a separate account supervised by Lord Hastings and a household knight, Sir John Scotte, at the Calais exchequer.52 These two grants demonstrate Edward’s intention to wield effective royal control over the manufacture and supply of gunpowder weaponry.

Rosse’s account of how he spent this money has survived.53 Between 6 April 1473 and 6 April 1486 he received a total of £3622 in Flemish money of account, the majority of it between 1473 and 1478. Rosse bought ordnance from the Low Countries as well as having it made in Calais. In total he purchased 75 brass and iron serpentines, 12 iron fowlers, one great bombard, 116 brass hakeguns and 8 iron hakeguns. The most important piece of ordnance was the Great Edward of Calais, an iron bombard made in 1474 by Giles van Rasingham in Calais for

50 PRO, E 101/197/20, fos. 2v, 20. The new guns made that year at Calais utilized 3494 lb of ‘old iron’ from the guns melted down in 1471–2: op. cit., fo. 25.
51 PRO, C 76/157, m. 31.
52 Op. cit., m. 28.
53 PRO, E 101/55/5.
£414 Flem. The weight of this great bombard is not given in the account, but it was clearly a large and impressive piece, as the 54 iron serpentines made by Gerard Husker and his fellow smiths in Calais together weighed 32 275 lb and cost £322 15s. Flem. Moreover, it is clear that many of these guns were intended for the field. The ‘long iron serpentynye’ made by John van Meighlyn of Brussels was supplied with a cart with four wheels shod with iron. The 20 brass serpentines supplied by Henry Forshaker of Antwerp were mounted upon carts made by Thomas Whelewright of Calais. Whelewright also supplied 30 pairs of iron wheels and 56 limbers for the ‘king’s ordnance’.

The impetus behind the king’s moves to augment and modernize the Crown’s gunpowder weaponry in 1473–74 probably originated in the growing tension between England and France. In October 1472 Edward had announced his intentions to lead an army into France in person. Preparations to secure adequate victuals, weapons and transport to ensure that this was the ‘finest, largest, and best appointed force that has ever left England’ were under way in earnest by 1474. Despite some recent doubts by historians, it seems clear that Edward was in deadly earnest in his intention to reclaim his French inheritance. This was certainly the opinion of Louis XI of France who embarked on his own military preparations to meet the English threat and laboured to break the crucial Anglo-Burgundian alliance. In the final analysis, Edward’s failure to conduct an effective campaign in France was due more to the reticence of his erstwhile Breton and Burgundian allies than to his own reluctance to wage war.

Rosse’s surviving accounts attest to the king’s determination to invade France with a modern and well-equipped army, able to meet that of Louis XI on equal terms and one that would not be outshone by that of his ally, Charles the Bold. They are also one of the few sources that reveal the extent of the ordnance stored at the Tower of London under the master of the ordnance, John Sturgeon. On 29 September 1475 Rosse concluded an indenture with Sturgeon in which he acknowledged delivery of certain pieces of ordnance and other military supplies. In all Sturgeon delivered 13 guns to Rosse, all mounted on ‘chariots’. There was one ‘gret bombard’, accompanied by 215 gun-

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54 In 1474 the English pound sterling was worth between 21 and 23 Flemish shillings. By 1478 Rosse used an exchange rate of 25s. Flem. to the pound sterling: Hanham, *The Celys*, p. 182; PRO, E 101/55/5, m. 1.


57 PRO, E 101/55/7. Rosse copied this indenture into his own rough account-book: E 101/198/13, fo. 32. The indenture was known to Scofield, who reproduced the list of guns, many of which were individually named: Scofield, *Edward the Fourth*, ii, pp. 119–20.
stones, but five were described as fowlers, suggesting that they were relatively small pieces. The remainder were described as a ‘gret gonne of yron’, ‘a gret brasyn gonne’, three ‘potte gonnes’, ‘a gret bastard gonne’ and a bombardell called the Little Edward. It may be that the manufacture and storage of ordnance in the Tower was on a smaller scale than that in Calais. Rosse’s importance in providing the weaponry needed to conduct a modern field campaign is highlighted by a special account he rendered specifically for ‘the royal voyage into France’. This was separate from the sums granted to him in 1473. Rosse received £2711 12s. 1/4d. mainly from the Staple company but also £300 from John Elrington, Edward’s treasurer of war. With this sum he purchased a further 45 iron serpentines as well as gunstones and lead pellets, including 4000 pellets for handguns. The guns purchased by Rosse were clearly intended to see action. The Great Edward and the ‘long serpentyne’ made by van Meighlyn accompanied the royal host as far as Faquemergues in Artois. In the event, however, the English army and its new ordnance did not have the opportunity to prove itself in battle. Nevertheless, the impression it had on contemporaries should not be underestimated. When it is considered that the artillery train included the guns purchased by Rosse as well as those provided by Sturgeon from the Tower, it is plain to see why ‘one surprised Italian observer pronounced [it] to be even finer than the Duke of Burgundy’s’. Indeed after the disasters at Murten, Grandson and Nancy and the resulting loss of most of the Burgundian artillery and death of Charles the Bold, his widow and daughter may have sought the assistance of the Calais garrison and its ordnance to defend Burgundian territory against French attacks.

A series of inventories taken in the latter years of the reign demonstrate the success of Edward IV’s efforts to augment and modernize the gunpowder weaponry of the Pale. A commission dated 1 March 1481 ordered Sir Richard Tunstall, Hastings’s deputy at Calais, Sir Humphrey Talbot, Sir Ralph Hastings, Sir John Donne, the lieutenant and constables of the Staple, Adrian Whetehill, the comptroller of Calais, and Robert Allerton, an usher of the king’s chamber, to survey and list all ordnance and military supplies in Calais and the castles at Guisnes and Hammes and Rysbank tower. Their return, dated the

58 PRO, E 101/198/13, fo. 101r. His purchases also included armour, bills, bows and other ‘habilments of war’.
59 PRO, E 101/55/4, fo. 37r. It may be that these cannons were brought to Faquemergues for the meeting of Edward IV with the Duke and Duchess of Burgundy there on 23 July: C. Weightman, Margaret of York, Duchess of Burgundy (Gloucester, 1989), p. 99.
60 Ross, Edward IV, p. 220.
61 PRO, E 101/198/13, fo. 8v. This is an undated list of ordnance and other military supplies delivered by Rosse on Hastings’s orders. It includes two serpentines and two ‘hake Gunnes’ delivered ‘To the Castell in the Wode of Nepe in flaunderes longyng to my lady of Burgonne’.
following 6 May, survives amongst Rosse’s papers.\textsuperscript{62} Within the town of Calais and on its walls and bulwarks 125 pieces were listed, including five bombards, 45 fowlers and 65 serpentines. There were also 39 ‘hakeguns’, 26 handguns and a ‘ribaudequin’. At Guisnes castle there were 66 cannons of various descriptions, 12 ‘hakeguns’ and 33 ‘hand culverins’. In all 233 cannons were inventoried as well as the numerous handguns.

Calais’s importance as a store for the royal artillery was highlighted in 1481–82 during the campaign against the Scots. On 12 May 1481 Rosse sealed an indenture with William Comersale listing ‘certayn stuff & habilmentes of warre . . . for the kyngis Ryall vyage into Scoteland’. The ordnance transferred included the Great Edward, the Little Edward, the Messenger, the Fowler of Chester, ‘the greate Brasen Gonne’ and two ‘pot guns’, as well as 100 ‘hakeguns’ and 150 handguns.\textsuperscript{63} The Little Edward, the Messenger, the Fowler of Chester, the brass gun and the potguns were amongst those pieces delivered by John Sturgeon from the Tower of London in 1474. This suggests that Calais may have superseded the Tower in the late 1470s as the main centre for the royal ordnance. A month or so later 31 serpentines were shipped from Calais to Tynemouth.\textsuperscript{64}

Thus at the end of Edward’s reign Calais was most likely the largest store for royal ordnance. That the new weaponry was stockpiled there is evident from a list of ordnance in ‘king’s store’ at the castle of Guisnes. This was under the charge of Richard Whetehill, Hastings’s deputy there, but after Whetehill’s death in 1478 it was transferred to the custody of the victualler, being entered thereafter as a separate list in his account. This store comprised 14 iron fowlers, 13 iron serpentines, 22 other various iron guns, two brass ‘culverins’ and 32 handguns.\textsuperscript{65} In terms of the number of pieces of artillery, this store and those inventoried in 1481 represent a significance increase on that in place at the start of the reign. In 1461 there were 110 iron guns and 26 brass guns inventoried in the victualler’s account. In many cases, however, these can be traced through the victuallers’ accounts, which show that many pieces had been in Calais since early in the

\textsuperscript{62} Op. cit., fos. 77–85\textsuperscript{v}, 90–90\textsuperscript{v}. This commission may have resulted from the fact that the victualler’s account appears to have ceased to be an accurate list of the ordnance in the Pale. As Rosse began to account separately from the formal account rendered by the mayor of the Staple, so the king may have wanted regular updates of what ordnance was actually where. A similar inventory was taken in 1476: op. cit., fos. 63–72\textsuperscript{v}. Alternatively, it may have been prompted by the king’s decision to invade Scotland. An edition of these inventories is currently being prepared for publication by the Richard III and Yorkist History Trust.

\textsuperscript{63} PRO, E 101/198/13, fos. 6–6\textsuperscript{v}.

\textsuperscript{64} Op. cit., fo. 8.

\textsuperscript{65} PRO, E 101/199/6, fo. 9. This is a very detailed list giving the individual weight of each piece. Presumably these pieces were incorporated in the inventory prepared in 1481. A comparison with the pieces purchased by Rosse with his special ‘artillery fund’ shows that many of these guns were delivered to the store at Guisnes: E 101/55/5.
The real importance, then, of Edward IV’s policy towards the gunpowder weaponry of the Pale lays in the fact that the amount of ordnance was not only expanded but systematically modernized. This was driven by the personal enthusiasm of the king for artillery and ensured that when he died in April 1483 the gunpowder weaponry of the Pale, and by extension of England as a whole, was comparable with that of his contemporaries.

III

Despite acquiring the throne by force at Bosworth in August 1485 Henry VII is generally acknowledged as a pacific king who was anxious to use diplomacy to keep England out of expensive foreign wars. Henry used cash, of which he amassed a great deal, in the form of bribes to Emperor Maximillian and Archduke Philip rather than cannons to ensure the internal and external security of the Tudor dynasty. Thus during his reign, it is argued, little or no effort was made to modernize the crown’s military resources and no advances were made in the field of ordnance, something in which the king himself demonstrated no particular interest. A recent note of discord, however, has been sounded by Ian Arthurson. Arthurson comments on the ‘apparent love affair with ordnance and gunners’ apparent in the army that was assembled to invade Scotland in 1497. Arthurson was unaware, however, of the developments in English artillery described above, and thus overestimated the novelty of Henry’s purchase of field guns and ‘greek-fire’. The real significance of Henry VII’s policy towards artillery was in the way in which the Tower of London was reestablished as the central supply depot and the way in which the manufacture and storage of ordnance was tied even closer to the royal household.

Under Edward IV Calais had been a bastion of loyalism to the crown, signified by the presence of Lord Hastings as the king’s lieutenant there. In the short reign of Richard III, however, many of these ties were dismantled. Richard usurped the throne and had Hastings executed; those office-holders loyal to him in Calais were replaced by Ricardian supporters. This resulted in an undercurrent of discontent in Calais, culminating in its involvement in rebellion in the south-east of England in 1484 and the declaration of the garrison of Hammes Castle for Henry Tudor in December of that year. Despite appointing

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his close friend, Giles, Lord Daubeney, as lieutenant, Henry VII had a more ambivalent attitude to Calais than did his father-in-law. Circumstances dictated that many former Yorkist office-holders remained in Calais, and there were constant rumours throughout the first ten years of the reign that the Pale was not entirely loyal to the new regime. The royal household in England, rather than in Calais, became the mainstay of support for the Tudors, and when Henry led an invasion of France in 1492 it was the household and office-holders in England which provided the bulk of the army and the logistical support rather than, as had been the case in 1475, the royal affinity in Calais.  

The realignment of these networks of loyalty is apparent in the king’s attitude towards William Rosse, the victualler of Calais. In 1492 Rosse was ordered to render account at the exchequer for all the money he had received since 1473. Henceforward the Calais accounts were to be audited in the king’s chamber by specially appointed auditors or even the king himself. This was part of a general concentration of the most important areas of royal finance under Henry’s personal supervision. Rosse’s importance had clearly declined after the death of Edward IV. His accounts show no new purchases of ordnance between 1485 and 1492. Moreover, at the end of the 1492 French campaign the ordnance used from Calais was returned to the custody of Sir John Turberville, the treasurer, and not Rosse. There is little evidence, however, of who took over the manufacture and custody of ordnance in Calais.

This is probably because ordnance was mainly manufactured in England, centred in the Tower of London. As early as June 1486 Thomas Roger, clerk of the king’s ships, purchased eight serpentines from Philip Loker, a smith from Southampton. By 1490 it appears that there was a flourishing gun-making industry at the Tower, employing foreign craftsmen but controlled by members of the royal household. For example, in Easter 1490 Sir Richard Guildford, the master of the ordnance, received £24 2s. 1d. for certain brass ‘bom-bards called Curtews’ made by Moraunt Corbelyn at the Tower. From the mid-1490s, in common with other areas of royal government, the manufacture of artillery came under the control of the king’s chamber,
as it had been during the early fifteenth century. After a flurry of activity during 1490 until 1492, corresponding with campaigns in Brittany and France, the payments for the manufacture of ordnance disappear from the exchequer rolls. It is likely that the lack of ordnance accounts for the later part of Henry VII’s reign can be explained in the same way as the disappearance of the privy wardrobe accounts after 1402. It is clear from surviving accounts of ordnance purchased for the 1497 Scottish campaign that account-books of the king’s ordnance did exist and were personally checked and signed by Henry.76

What meagre evidence survives shows that under Henry VII the crown’s artillery holdings were significantly larger than any of its subjects and that gunpowder weaponry was used to bolster royal authority at home and abroad. On several occasions between 1487 and 1492 teams of ‘gunners’ were sent to Calais from England to counter threats to the Pale’s security. In 1489 30 gunners were sent to Calais under William Alford, a member of the royal household, and probably took part in the successful attempt to lift the French siege of Diksmuide in Flanders. In 1490 two bombards were sent from the Tower to defend Winchelsea. For the 1497 Scottish campaign 237 guns were sent north, mainly from the Tower. Some of these guns may have been moved from Calais: a brass ‘curtowe’ called Cales and two brass ‘demi-curtowes’, Ruysbanke and Guysnes, were shipped north.77 It was, however, against domestic enemies that the royal artillery train demonstrated its importance. In 1487 at the Battle of Stoke the royal artillery train was larger than that of the earl of Lincoln and his German mercenaries. Ten years later, at Blackheath, the Cornish rebels were scattered in part because they were ‘ill-armed and ill-led, and without horse or artillery’.78 Thus by the end of the fifteenth century Henry VII’s use of artillery appears to conform to that characteristic of the early modern state: the potential of gunpowder weaponry was realized; the king controlled the manufacture of larger ordnance in his own hands; this weaponry was used to suppress domestic rebellion and the power of royal government subsequently increased.79

76 Arthurson, ‘The King’s Voyage’, p. 12; PRO, E 36/8, fo. 62.
77 For Diksmuide, see PRO, E 404/79/642; J.D. Mackie, The Earlier Tudors (Oxford, 1952), pp. 98–9. For the bombards at Winchelsea, see PRO, E 405/77, rot. 6d. For the Scottish campaign, see Naval Accounts and Inventories, pp. liii, 82–132. The ‘curtow’ and ‘demi curtows’ probably came from Calais in preparation for the invasion of France in 1492. Eight ‘demy-curtows’ and a ‘curtow’ were shipped from Calais to Sandwich by Sir Sampson Norton. At the conclusion of the campaign only seven of the ‘demi-curtows’ returned to Calais; the remaining one was transferred to the Tower: E 36/15, fos. 4v, 3v.
IV

This article has sought to challenge some of the basic assumptions that underpin our understanding of the role of gunpowder weaponry in England in the late Middle Ages by reference to the use of such weaponry in Calais. As England’s most important military, commercial and diplomatic frontier, Calais was at the forefront of the development of military technology. It is also unique in having an unbroken source of archival evidence which allows the use of gunpowder weaponry to be reconstructed in detail.

From the Calais evidence it is clear that the single most important factor regulating the development of gunpowder weaponry was the active involvement of the king. In both France and Burgundy kings, like Charles VII, and dukes, such as John the Fearless and Philip the Good, led the developments in ordnance. In the late fourteenth century in England, Edward III had been instrumental in the growth of the privy wardrobe as a centre of artillery production. A personal involvement in warfare and interest in military technology by the king was crucial to any developments in the royal armouries. 80 The subsequent apparent decline in the importance of gunpowder weaponry in England, and the apparent loss of royal control over it, can in large measure be attributed to gaps in the evidence and the crisis in royal leadership prompted by the long minority and later insanity of Henry VI.

Edward IV’s interest in artillery is, however, well documented. The evidence of the Calais victuallers’ account demonstrates that this royal interest was transformed into an effective programme to modernize the gunpowder weaponry of the Pale and place it on a par with that of the king of France and duke of Burgundy. Edward, moreover, exerted stronger royal control over his artillery holdings than his predecessor. William Rosse, as victualler and in his special role as the king’s principal purveyor of ordnance, was answerable to the king himself and to members of the royal household specially appointed by Edward’s command. Richard III shared his brother’s interest in artillery, but his failure to manage the polity as effectively as Edward curtailed his short reign before the effects of any changes in the artillery policy could be felt. As Ian Arthurson has shown, Henry VII was also aware of the potential of gunpowder weaponry. However, as king he was inherently distrustful of delegating authority, preferring to concentrate power around his own person. 81 This may explain the transfer of the centre of artillery production and storage from Calais to the Tower of London. By centralizing the means of production and using the largest artillery train in the country to bolster royal authority, Henry VII’s pol-

81 Bacon, King Henry VII, p. 149; Chrimes, Henry VII, pp. 298–322.
icy towards gunpowder weaponry approached that typical of the early modern state.

The second important factor, and one which particularly contributed to Calais’s importance in the development of gunpowder weaponry, was the influence of continental ideas and technology. In the late fifteenth century Calais was the entrepôt for the dispersal of European culture and merchandise into England. The position of the wool Staple at Calais ensured that the majority of Anglo-Burgundian commerce was conducted through the town and in areas such as the import of books into England Calais’s importance was paramount. Edward IV’s decision to court the Duke of Burgundy as a potential ally against France was a decisive factor in the modernization of England’s gunpowder weaponry. After 1467 the victualler of Calais had open access to the centres of armaments manufacture such as Brussels, Antwerp and Malines. During the reigns of Edward IV and Richard III the suppliers of ordnance and gunpowder to the Calais victualler were exclusively of Low Countries origin. The fact that Rosse, and other Calais officials, for example, Richard Whetehill, were merchants with established trading contacts in the Low Countries was also important.

Once again, Edward IV emerges as a crucial figure: his exile in the Low Counties in 1470–71 appears to have been formative in the introduction of large numbers of handguns into the arsenal of Calais and other technological innovations such as iron ‘gunstones’, which first appeared in 1472.

The pattern of ownership and use of gunpowder weaponry in England in the later fifteenth century, therefore, differs little from that on the continent. England was far from isolated from European trends in culture, politics and the art of warfare. Guns were never the exclusive preserve of one element in society. By the end of the fifteenth century, however, as in France and the Low Countries, the gunpowder weaponry of the English king was more numerous and more powerful than that of his subjects. The impression that the English crown had ‘lost control over gunpowder holdings’ comes from a simple lack of detailed research into the sources which allow us to reconstruct these holdings. The efforts of continental scholars have made available much of the primary material relating to French and Burgundian ordnance, and it is the use of these printed sources that has shaped much of our understanding of the development of gunpowder weaponry in the late

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83 For Whetehill’s activities in the Low Countries, see Bronen Tot de Gesniedenis van den Handel mit Engeland, Schotland en Ierland, ed. H.J. Smit (2 vols, The Hague, 1928) 1, p. 847.

84 PRO, E 101/197/14, fo. 9 for the purchase of 106 iron balls ‘called gunstones’ from Peter Gunmaker of Malines.
fifteenth century. Although many of the corresponding English sources are lost, the Calais victuallers’ accounts yield an unbroken source of information. The picture that emerges suggests that gunpowder weaponry in England in fact developed along similar lines to that on the Continent.

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