Defence since the application of gunpowder: 1380-2000

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Resource Assessment

Introduction

Geographical factors and influences

Historically, much of Britain’s coast has been at risk from raid or invasion. This is especially true of the south-east, whose closeness to the Continent via the short sea crossing, so favouring communication and trade, also made it vulnerable to a landing, rendering the broader land mass open to conquest. The region therefore figured prominently in Defence of the Realm. At its northern extremity the Thames trading route penetrates inland to London and the English heartland and was, therefore, a tempting target for an invader. Nearby the Medway estuary was also vulnerable. From there to Thanet and particularly along the Channel Coast to Chichester Harbour were a number of beaches suitable in varying degrees for the landing of troops as well as ports and inlets where an invader might find shelter and unload supplies. Dover, the ‘Key to England’ was an important port for an invader to seize (Coad 1995: 12).

The discontinuous rampart of chalk cliffs and areas of marshland along the Channel coast were places of difficulty for an invader and advantage to a defender. Some ports were usable to the defenders for the basing of naval squadrons. Naval bases with building facilities and river anchorages were established in the 16th and 17th centuries in the Medway at Chatham and Sheerness (Saunders 1989: 55 and 92). These were important for defence against an enemy approaching across the North Sea and to protect the eastern end of the English Channel. From the 16th century there was government naval shipbuilding at Deptford and Woolwich on Thameside, added to which was production from private yards in the Thames and Medway. The Thames was also used as a base for naval operations. There were sea anchorages at the Nore, The Downs and Dungeness. Later Dover and Ramsgate became designated as naval Harbours of Refuge. To the west was the Portsmouth naval base which, with its more distant counterpart at Plymouth, provided naval forces for Channel defence (Saunders 1997: 29 et seq).

As a national border, the coast’s security was an enduring concern. The availability of the fleet as a first line of protection, backed by defences on land, underpinned the
strategy for Defence of the Realm, supplemented in the 20th century by the need for air defence.

But the coast has not remained constant: changing sea levels, erosion and silting waterways required adjustments to invaders’ and defenders’ strategies, influencing where defences were built. In the hinterland, rivers, valleys, roads and hills, suggested invasion routes and holding positions for a defender. The distinctive Downs cross the region from east to west. The North Downs, in particular, were well situated for defence, especially where close to London, whose capture would have been an invader’s primary objective (Smith 2001: 7).

Defences tell a story of thrust and counter-thrust, with new defensive measures needed to respond to innovations in attack. Advances in military technology and artillery rendered fortifications more vulnerable to attack, forcing a rethink of design, and gradual height-reduction from lofty and visible structures to attempted near invisibility by the end of the 19th century and the use of new approaches to construction. Many fortifications displayed Continental planning influences, which were greater before the 19th century, after which British innovation in design became more assertive. Fortifications were, however, one element of the broader interaction of the field army, the fleet, and later the air force. Transport was an all-important dimension for field forces, including use of roads, water routes and, later, the railways, a subject needing to be adequately explored. Gaining pace from the early 19th century was a spread of facilities for the military training of home forces and for those to serve overseas. These included training grounds and firing ranges for the army, the militia and the volunteers. Among them were annual training camps at Coxheath and elsewhere. But there were many other training areas, for example in north-west Surrey and at Chatham, Shorncliffe, Hythe and Lydd (Douet 1998: 129). During the two World Wars areas for training proliferated on a huge scale. There are a number of commendable publications on military remains covering the region (Brown 2003; Burridge 1997; Butler 2007; Butler 2008; Coad 1995; Coad and Lewis 1982; Firth 1921; Goodwin 1985; Goodwin 1994; Longstaff-Tyrell 1999; Longstaff-Tyrell 2000; Longstaff-Tyrell 2002; Mace 1996; Mace 1997; Rootes 1980; Saunders 1989; Saunders 1997; Saunders and Smith 2001; Smith 2001; Smith 2004; Woodburn 1999). Work undertaken as part of the Defence of Britain Project and English Heritage’s Monument Protection Programme (Lake 2000) is now being published into national synthetic works on certain types of site, which often give good coverage to the South-East, as well as the appreciation of how these sites worked in the landscape and in relation to each other (Dobinson 1996a-h; Dobinson 2000; Dobinson 2001; Foot 2006a; Foot 2006b; Lowry 1996). Such cumulative lists of sites need to be studied in a wide framework, to look at themes such as the response of defence to the development of new technologies/weapons systems (Palmer 2004).

**The meaning of the region’s defences**

Fortifications and other defences symbolised England’s determination to safeguard her freedom against foreign aggression. Yet they were more than that. In an age when Britain and her Continental neighbours settled their differences by warfare, they
were protection against militant reaction from states with which the nation was engaged in political and economic competition, sometimes with the exacerbation of religious differences. The economic dimension began particularly with the 17th century mercantile wars with the Dutch (Saunders 1989: 83). Competition moved on to the acquisition of overseas colonies, becoming part of an imperial agenda, with national pride to consider. A state like Britain which asserted its aspirations at the expense of others, needed to be strong against rivals. The region’s fortifications and naval bases are therefore emblems of all these things. Mostly they were provided during war against imminent threats. Years of peace could be ones of neglect but, at times, especially from the mid 19th century, defences resulted from planning to achieve a deterrent balance against a perceived future rival.

From the late-medieval period there was also raiding by pirates and privateers. Private enterprise ventures and semi-private state-sponsored seizing of ships in ports and offshore reinforced the need for defences. In addition to those provided by the state, some originated from the initiative and payment of local communities (Goodwin 1985: 3).

At times, the conception of the defences reflected the strength and weakness of kings and governments, changing relationships of the Crown with the aristocracy, municipalities and communities as well as evolving attitudes of society to the military. Defences also manifested emerging national, political and economic policies and the inter-relationships between military, naval and, later, air defence interests.

Cross-fertilisation of military and civilian technology was part of the country’s industrial progress. The national economy benefited from the creation of war industries, for example gunpowder manufacturing centred on Faversham and Chilworth, with explosive manufacturing elsewhere. Utilisation of forests fed a timber industry for the building of warships and there was a Wealden iron industry. There were government ordnance factories and proof grounds at Woolwich and Plumstead. From the 19th century private companies had a steadily significant place in what came to be labelled the military-industrial complex. Local economies were stimulated by the presence of garrisons and of naval bases, with social consequences when, as at Chatham, Sheerness and Dover, civilian townships grew around them, in time influencing urban development. Victualling of the military and supply of building materials for forts and barracks will have affected local agriculture and industry, meriting exploration. Finally, fortifications of any size were also communities of people and the gradual improvement of the living conditions for troops (Douet 1998) is another topic deserving of greater study.

Where study has focused on individual fortifications, defensive systems and weapons, it is the foregoing contextual dimensions which also demand exploration to understand defence more holistically, and to show how home defence and warfare moved from being a minority activity until the 20th century’s total war, when the whole of the population was affected. From the mid-19th century war and defence also claimed their place in popular, and often campaigning, literature and later in film, making them ever more issues of public exposure. Finally, it should not be forgotten
that fortifications and other defences influenced the appearance of landscapes, by adapting, modifying or preserving them by retaining fields of fire.

**The defence heritage resource**

The region’s military heritage offers a wealth of sites, demonstrating their place in the Defence of the Realm and sometimes a role in security of the empire. Sites may be visually prominent; others less obvious or underground. The potential for archaeological discovery to learn more is considerable. Finds reported under the Portable Antiquities Scheme have also provided valuable insights. As a genre defence sites offer an important heritage tourism and educational resource. A number have been developed for that purpose through restoration and interpretation. The take up of Kent County Council’s *Walking the Walls* and *Front-Line Kent* has demonstrated a public interest. A knowledge and appreciation of our military past and, within that of our historic fortifications, is part of a sense of national identity. At an international level the Historic Fortifications Network and the Crossing the Lines initiatives have shown that by comparing British and Continental defensive architecture, strategic approaches and technology, positive connections and common frames of cultural reference can be created. This promotes the notion that historic fortifications are a shared European heritage asset.

**The beginning of the Age of Gunpowder**

**Gunports in castles and town walls**

The discovery of gunpowder is outside the scope of this study but from the later 14th century, the influence of firearms on defence is clear in the surviving structures, particularly in Kent’s and Sussex’s coastal areas: for example in the key-hole and circular gunports at Bodiam, Cooling, Saltwood, and Dover castles as well as in Canterbury’s Westgate and town walls, all of which otherwise manifest building traditions of the medieval period, with the use of high stone walls. A royal castle on an innovative concentric plan was built at Queenborough, known from documentary and pictorial evidence, and provided with firearms (Saunders 1989: 20). Nothing of it remains above ground, its only trace being a low mound (Saunders 1989: 20). In the early 15th century, gun loops were provided at Herstmonceux and Hever Castles, visible at both (Saunders 1989: 15-33). Gun positions were also built to defend Rye and Sandwich, the latter having possible traces of an artillery bulwark (Smith 2001: 15). Shurland Hall on Sheppey, rebuilt in the early 16th century, has gunports (Guy 1980: 213-4). Gunports have been subject to historical critiques of their design and fields of fire (Kenyon 1977). But guns were not dependent on specially designed gunports. They were fireable from any suitable opening in a fortification.

**The role of firearms in fortifications as part of the strategy of defence**

The significance to be attached to the provision for firearms and their role in the defence of the realm in the age of the castle needs to be addressed. In their earlier days, wherever firearms appeared, they can have been little more than supplements to the traditional weapons, such as bows, lances, swords and torsion engines. As in all periods, while local defence of key strategic assets was crucial, what mattered in
the end was the availability of a strong home army to defeat the forces of an invader in the field. There is an unresolved debate about the extent to which gunports were more a form of martial display at some castles (Coulson 1993: 3-15). Undeniably moves to firearms in fortifications were in areas most vulnerable and subject to continental raid or invasion, not least the south-east of England (Saunders 1989: 19). Moreover, this occurred in the Hundred Years War with France (1337-1453), when enemy coastal descents were an uncomfortable reality, being experienced at Gravesend, Sandwich, Winchelsea and elsewhere (Smith 2001: 14; Turner 1971). Within this consideration the port of Dover and the important node of road communication at Canterbury were strategically necessary to defend. The Cinque Port towns of Sandwich and Rye were also important commercial and national assets, requiring protection on their own account (Saunders 1989: 19). The addition of guns to these places was a rational enhancement for the protection of assets both local and national in value. A strategic value may be assigned to the castle next to the planted royal town at Queenborough (Allen Brown 1976: 134) but the expectations for it need to be better understood. Time Team’s trial excavations represent an important insight but were limited in scale. Shurland Hall has been the subject of archaeological investigation, the results of which are due to be written up soon (Kendall 2011, pers comm).

Rochester’s town walls controlled access to the bridge of the strategic lower Medway crossing, and were suitable for defence by firearms. Dover Castle was given firearms, (Coad 1995: 12) and the walls of the port below it might have been similarly protected.

**The new age of long range artillery defence**

**The decline of the castle and walled town**

Castles as defences gradually declined. Firstly, as badges of feudal government, their military function faded as that institution diminished and, as from early in the 15th century, centralised royal government strengthened (Allen Brown 1976: 128 et seq). Increasingly, responsibility for defences fell upon the Crown and ultimately upon Parliament, but some towns felt compelled to maintain and arm defences, perhaps where the Crown was reluctant to pay (Goodwin 1985: 3). Secondly, high walls for defence were becoming vulnerable to more powerful gunpowder artillery, demonstrated during the bombardment of castles and town walls in the French invasion of the Italian peninsula in 1494 (Hughes 1991: 62). In the region, artillery used by Sir Thomas Wyatt’s rebel forces at the siege of Cooling Castle in 1554, helped bring about its surrender (Cruden 1843: 181). In the broader scheme of things, the role of the knight at arms and associated levies lessened in favour of reliance upon militias, controlled by royal Lord Lieutenants, as well as upon small regular forces and contract troops raised for the duration of need (Allen Brown 1976: 128 et seq). Parallel with this, the siting up of some of the Cinque Ports compromised their function, and in consequence reduced their prosperity, and hence their ability to contribute ships to the defence needs of the Crown (Lawson 2004a). Increased attention was given to the launching of royal warships for a Crown fleet.
And now, ships of the European states were also armed with artillery. Many ships were built in private yards, before royal yards predominated (Howard 1979: 13 et seq and Rule 1983: 14 et seq).

Although no longer premier defensive architecture, castles could be made defensible if need be. Because it overlooked a key port, the royal castle of Dover continued in use, later embraced within more modern defences (Coad 1995). Canterbury’s walls were falteringly maintained, but this city remained strategically important as a node of road communications in East Kent (Turner 1971: 148-54).

**The strengthening of the Crown and a new emphasis on systems of defence**

By the start of the 16th century royal control of government and of defence had become stronger. Protection against external threats gained more emphasis. Beginning under Henry VII and gaining pace under Henry VIII most defences, whether coastal forts or warships, were conceived, built and controlled by the Crown. The greatly enlarged fleet established by Henry VIII, much of it based at Portsmouth, was virtually a home defence squadron for maintaining naval supremacy in the English Channel. The region drew its maritime protection from this (Saunders 1997: 31). Governmental attitude to naval and coastal defence of the nation became increasingly strategic in scope. On land this expressed itself in systems of defence rather than as individual works (Hale 1982: 367-401). With this went increasing self-sufficiency and the fostering of an English gunpowder manufacturing industry and the casting of guns, for example at foundries in the Weald (Saunders 1989: 22-52).

**New approaches to the design of fortifications**

By the 1520s-30s the progress of artillery meant that land based defences could now fight enemy ships at long range, beginning the centuries-long ship/shore competition for superiority. Unlike earlier fortifications which adapted earlier design traditions to gunpowder weapons, the new ones were designed around the use of the gun, resulting in buildings lower in height, with rounded forms and shaped parapets to deflect incoming shot or with earthworks which absorbed them, sometimes both (Morley 1976). These developments were elements of what Geoffrey Parker has labelled a European ‘Military Revolution’, characterised by a range of distinct changes in the organisation, weaponry and place of war and of defence in society (Parker 1988).

**Focusing the building of defences on the most important strategic points**

It was unrealistic to defend the whole coastline, so efforts were concentrated upon securing the more important anchorages, harbours and landing grounds with permanent works. These could be supplemented with extemporised works in war. There were no successors to the earlier castles inland, and therefore no rear-echelon defences. Even London’s walls were falling into decay, although the Tower of London was a royal citadel, if sometimes challenged politically by the animosity of the elite of the surrounding city (Smith and Kelsey 1998).

In the region, modernisation for artillery began in the early 16th century, with a round gun tower at Camber (later supplemented with additional works) to defend a then
existing harbour (Biddle 1982b: 415). Two other round towers (no longer existing) protected Dover Harbour. Although this port was strategically important to England, at least one of the towers at Dover appears to have been built by the local community (Biddle and Summerson 1982: 729). In 1539-40 the Crown planned and built five small artillery blockhouses crossing their fire from the banks of the Thames to defend the approaches to London: two at East Tilbury and Higham in an outer line and three at Tilbury, Gravesend and Milton forming an inner line (Smith 1974: 142-8). The D-shaped Gravesend blockhouse is exposed to view and the Milton one is surface indicated (Colvin and Summerson 1982a: 602). Multi round-bastioned forts guarding the Downs anchorage and landing beaches at Walmer and Deal are impressively intact, with a ghost of a third fort at Sandown (Biddle 1982a: 455; Lawson 2004b). Connecting banks and bulwarks between Walmer and Deal might have left traces, perhaps discoverable archaeologically; the excavations at Camber have shown the potential of these sites (Biddle et. al. 2001). A fort at Sandgate displays rounded forms and commanded an important coastal road and an anchorage (Biddle 1982c: 569-70). To defend the port of Dover, from which warships might control the narrow seas, were three, later four, small bulwarks (no longer extant). Study is needed to explain why for such an important place, these defences were so rudimentary and outside the mainstream of contemporary design. In the last year of Henry VIII’s reign, a need to protect the approaches to the evolving fleet anchorage in the Medway led to construction of a blockhouse at Sheerness and two others on Sheppey and Grain (Colvin and Summerson 1982b: 477-8). Although something is known of the plan of the multi-angular Sheerness blockhouse the others need investigation. Queenborough Castle was also re-adapted for artillery (Colvin and Summerson 1982b: 479) but details are unclear. Requiring explanation, the West Sussex coast appears to have been left undefended, so far as Crown initiatives were concerned, but a bulwark existed at Brighton (perhaps built 1497, possibly a local initiative) and this may have been armed with artillery (Goodwin 1985: 3).

The context of design
These new defences had a north-west European frame of reference, apparent in their plans, shapes, gunports and smoke vents. A Moravian engineer, Stefan Von Haschenperg, was influential in the design of two of them (Saunders 1989: 44). The experience of European warfare by the English designers is apparent in the others, but, interestingly, Henry VIII may have personally contributed to the designs (Hale 1982: 367-401). In 1545-7, an early angular bastion was added to Milton Blockhouse at Gravesend (Smith 1980: 341). This form ultimately originated from the influence of design innovation in Italy during the 15th century.

When it came to the French raiding of 1545, however, it was not Kent and Sussex but the Solent and the Isle of Wight which were attacked (Saunders 1989: 50).

Continuing defensive measures and the emergence of the Spanish threat
Despite a number of the coastal defences being abandoned in 1553 to cut costs (Smith 1974: 148), the growing importance of the Medway naval anchorage led in 1559 to the building of Upnor Castle for its defence. This had a single storey barrack
with end towers, and another new-style angular bastion projecting into the river. It was improved between 1599 and 1601 (Saunders 1967: 8). We need to know how the defences at Grain and Sheerness fared during this period. Elsewhere, guns were mounted within Dover Castle to overlook the harbour (Coad 1995: 54) but precise details are unknown. In 1559, a no-longer-extant tower was built on Brighton’s seafront (Goodwin 1985: 16). There may have been other local defences along the coastline, knowledge of which should be sought. The fleet figured increasingly as a defence and in 1579-86 Dover’s harbour was enlarged, enhancing its potential as a base for naval operations and increasing its value as a safe haven (Biddle and Summers 1982: 729).

English diplomacy prevented direct involvement in Continental wars. But English assistance in 1585 to the Dutch seeking independence from Spain, and attacks on Spanish interests in the Americas and the execution of Mary, Queen of Scots, in 1587, were seen by Spain as provocative. Known to English intelligence, Spain began preparations to invade (Smith 2001: 25 and Martin and Parker 1988).

**Measures to defend against the Spanish Armada**

During the Armada the Thames and Medway were protected with boom defences (Boynton 1967: 13), perhaps at Dover also, with additional temporary fortifications being built (Smith 2001: 26). Earlier defences at Brighton may have been activated (Goodwin 1985: 54). There were fire beacons at observation points along the coast, with others on lines of sight inland and arrangements for mobilisation of the field army or militia were set out in documents (Kitchen 1986; Martin and Parker 1988: 265). The Lord Lieutenants of Kent and Sussex were instructed to report on vulnerability of the coast and to recommend points needing to be provided with works. Evidently English warships had been resupplied with ammunition from coastal batteries along the Sussex coast (Goodwin 1985: 9). Even the Armada defence map of the Thames (Adams 1588), as well as associated contemporary documentation, raise as many questions about the extent of defensive measures as they provide answers. Defensive additions at Gravesend and Tilbury by the Italian engineer Gianibelli are suggested (Adams 1588). Local initiatives at various coastal points and havens could have been taken but evidence is currently lacking.

**The 17th century – the Stuarts, Civil War and the Dutch threat**

The period following the Armada’s defeat offered something of a breathing space, whilst Spain rebuilt her fleet. There were, however, invasion scares in the 1590s and in 1601, when the Spanish landed in Ireland (Martin and Parker 1988: 264). The early Stuart period was therefore generally a period of inaction and decay for the coastal defences. There are some exceptions, most notably in the rebuilding in 1640 of Archcliffe Fort at Dover, whose land front survives (Welby 1991: 5). The batteries at Baye and Warham might also owe their origins to this period, perhaps dating to 1603 (Saunders 1967: 9).
The Civil War
From the start of the Civil War much of the region came under Parliament, being part of its south-eastern powerbase (Duffy 1979: 148). London was provided with an 18km ring of lines and forts, whose design may have been influenced by the form of fieldworks built or observed by English engineers in recent Continental campaigns. Some archaeological traces have been found of these short-lived emplacements (Smith and Kelsey 1998: 117). Farnham, near the western fringe of the region became a Parliamentarian stronghold. In 1642, Parliament authorised Chichester to make fortifications (Harrington 2003: 16) and royalist Arundel Castle was besieged by Parliament in 1643 (Goodwin 1985: 23). Kent was the seat of a royalist rebellion in 1648 with skirmishes in and around Maidstone (Smith 2001: 29). The Thames blockhouses were security posts (Smith 1974: 154), as was Dover Castle (to which a bulwark, later called Oliver’s Mount, may have been added) (Coad 1995: 56). There was an earthwork at Barham Down (O’Neil 1960: 37) and there was perhaps another defence at Squerryes court (Saunders and Smith, 2001). In other respects, most – though not all – of the region was outside the main war action (Duffy 1979: 145). The few defence works that were constructed, plus the sites of the skirmishes that did occur, do hold potential for careful survey (Foard 1995; Howe et. al. 2005).

The Dutch Wars
With the Commonwealth (1649-60) came commercial tension with the newly independent Dutch state, whose fleet was defeated off Dover in 1652. Post-Restoration, strained relations continued, still largely caused by the competition for commercial opportunities overseas. War resulted from 1664, symbolised by the Dutch raid on the Thames and Medway in 1667 when, within sight of the enemy fleet, temporary defence works were hurriedly made (James 1967). In the Medway the Dutch slighted the unfinished new English fort at Sheerness, also overcoming extemporised batteries and a cross-river boom upstream at Hoo Ness and Gillingham. In the Thames, a new battery, Trinity Fort was built at Gravesend, with blockships across the river joining with Tilbury (Smith 1994: 39). Not knowing where the Dutch might have struck next, there may have been other places, not least at Dover, at which emergency measures were taken (Smith 1994: 39-50).

Greater is the evidence for the post-raid defences designed by De Gomme to secure Sheerness, Cockham Wood (with substantial remains) (Smith 1993: 55) and Gillingham (Saunders 1989: 92). De Gomme’s greatest achievement was the large new bastioned fort on the north side of the Thames at Tilbury. This incorporated both French and Dutch design influences (Saunders 1960: 158). By the War of the Grand Alliance (1689-97), with England and Holland allied against France, three batteries were added at Grain in the Medway, with the two between Cockham Wood and Upnor restored and a new battery at Hoo Ness (Saunders 1989: 92). Some may be traceable from fieldwork and yield important evidence. Upnor Castle was no longer a gun platform, having been converted into a storage magazine for gunpowder to supply the fleet. Going against the trend of decreasing profiles to better withstand artillery attack, it was also increased in height, giving it the appearance it has today, though this anachronistic development is not fully understood (Saunders 1967: 15).
The 18th century – reaction to Continental wars and major new schemes of fortification

The 18th century opened with a succession of French wars and invasion scares, leading to major fortification schemes, particularly between the 1740s and 1780s. New defences in the Medway reflected its growing importance as a naval base and for warship building and repair; expansion of Chatham’s dockyard led in 1755 to its enclosure by extensive bastioned lines, displaying a European universality of form (Saunders 1989: 120); enlargement of the dockyard at Sheerness also resulted in protection by lines and outworks in the 1780s, leaving impressive but later refaced survivals (Saunders 1989: 128). This was paralleled by the building of counterpart fortifications for the Portsmouth naval base, so important for Channel defence (Saunders 1997: 59).

Naval victualling centred at Deptford in the Thames, with supply bases at Sheerness and Chatham, Deal and Dover (Coad 2007, pers comm). Dover’s strategic importance led to the castle’s modernisation for artillery in the 1740s- 50s, noticeable in its truncated medieval towers and other works (Coad 1995: 58). During the later 1770s fieldworks were made on the Western Heights. This major strategic move allowed the port to be used if need be as an entrenched camp for a field army to act against an invader landing elsewhere in the region (Coad 1995: 58 and 66). New batteries were built from the 1760s to defend the smaller harbours along the Sussex/Kent coasts, leaving traces at Folkestone, Littlehampton and Rye (Goodwin 1985: 21). Other sites were Langley, Newhaven, Brighton and Seaford (Goodwin 1985). There was further activity during a French invasion scare in the later 1770s, with new batteries on Thanet (Maurice-Jones 1959: 51) and in the Thames, with modest alterations to Tilbury Fort and the building of a new fort to cross fire with it at New Tavern, Gravesend, both with visible traces (Smith 1998).

A more strategic approach

Although executed over several decades, these schemes of defence began to manifest an increasingly strategic approach, which left less necessity for local communities to take their own action. Particularly at Chatham, Sheerness and Dover, there was more emphasis on the provision of barracks. This reflected an understanding that better living conditions, within a controlled military area, produced better and more disciplined soldiers (Douet 1998: 29). Military communities (and at Chatham and Sheerness, naval ones) had a stimulating effect on local economies, through both the personal spending of individuals and the need for the Crown to make some of its supply purchasing locally. There was also the use of army training camps during the summer at Chilham, Barham and Coxheath (Douet 1998: 129). At local level, there has been exhaustive research on the Chatham bastioned lines and on Dover (Coad and Lewis 1982; Kendall 2007/2010; Kendall and Holman forthcoming), but less so Sheerness.
The French Revolutionary and Napoleonic Wars (1793-1815)

During the Revolutionary-Napoleonic wars Britain faced invasion by unprecedentedly large forces. In a departure from earlier perceived defensive practicalities, attempts were made to defend whole lengths of the region’s coast and hinterland (Bloomfield 1987; Smith 2004). This was not as a single event, but a process carried out over 20 or so years. Moreover, the effects of war were increasingly felt by the civilian population, in the preparations made for defence and the demands made on them by the militia ballot (Glover 1973).

Grand strategy applied to home defence

From around 1793-1800, what was in effect a defensive line was made along the region’s coast, consisting of a large number of batteries, some having a new, distinctive triangular plan, and ammunition magazines (Bloomfield 1987: 180). There were ‘stop’ lines inland, apparently including fieldworks (Bloomfield 1987: 103; Goodwin 1985: 65). New camps and barracks were provided for the defence forces, giving them the ability to deploy to threatened areas. Inland were further ammunition and food stores (Douet 1998: 67). Shorncliffe became a major military centre (Bloomfield 1987: 41 and Douet 1998: 86 and 134). As part of the defensive preparations a chalk ridge communication road ran along the North Downs in Surrey (Saunders 1989: 144). The initial phases of defence were elaborated upon from 1805-8 with construction of coastal Martello Towers (Clements 1999; Sutcliffe 1972; Telling 1997) and the Royal Military Canal (Clements 1999: 17; Vine 1972). The fire beacons were put back into service and a new shutter telegraph network with stations at the ports and inland also offered speedier communications for directing military and naval forces (Goodwin 2000; Wilson 1976). At Dover the Western Heights were rebuilt into a permanent system, with other additions at the Castle, several containing caponiers (Coad 1995: 82), elements of what came to be polygonal fortification. There were several - now vanished - batteries at Brighton (Goodwin 1985: 66) and at the eastern end of Gravesend Reach in the Thames at East Tilbury, Shornemead and Hope Point (Smith 2002: 17). Inland at Rochester and Chatham were built Fort Clarence with a connecting line, as well as Fort Pitt, and extensions to the Chatham Lines (Gulvin undated; Kendall 2007/2010 Saunders 1989: 144). New barracks in towns (e.g. Brighton, Guildford, Deal, Dover, Canterbury and Maidstone) came to affect the urban development of those places (Douet 1998: 67). Indeed, though the increase in barracks in the late 18th century was fundamentally due to the French wars, it was also in part due to the increase in radicalism at home (Ballinger 2000; Douet 1998; Hudson 1986). Most barracks have since disappeared though some sites still have a few buildings preserved and some limited historical work has been done on individual sites (Smith 1995).

The Region’s defences had been conceived on an epic scale, not equalled until the Second World War. Some demonstrate architectural and technological advances which were to become long-lasting features of English defences; bomb-proofing of barracks, gun positions and magazines within protective casemates and the use of traversing platforms to turn guns more rapidly on to target (Saunders 1989: 137).
Documentation of defence during the French wars has been reviewed and considered in several places (e.g. Bloomfield 1987; Glover 1973) but its possibilities are far from exhausted. Undated military earthworks, such as those at Dunkirk, Kent, now visible as cropmarks below the later radar station, may date to this period, or to the subsequent. Such temporary emplacements could be more numerous in the region than previously recognised, potentially relating to troop movements or invasion scares. Indeed, the sites of numerous tented camps are known such as those in the Ashdown forest (Butler 2007) where a number of 18th-century field kitchens were studied (Margary 1965). Generally archaeological work on sites of this period has been limited (cf. Smith 1996), even on distinctive major features such as the Royal Military Canal (Greatorex 1995).

**After the Napoleonic Wars and before the Royal Commission**

After the Napoleonic Wars ended in 1815, defence construction was rapidly completed or suspended, some defences being given over to ‘care and maintenance’, many being disarmed. The coast blockade occupied some Martello Towers. Despite defeat, France recovered and there were invasion scares in 1825 and 1830 (Smith 2001: 54), which stimulated defence planning, but it is unclear if there was consequential upgrading of works. However, there ensued an important and revolutionary technological advance at sea which appeared to threaten the defence of Britain. This was the use of steam power for the propulsion of warships, which could reach the English coast in a few hours, perhaps without warning (Saunders 1989: 160-1). A spur to defensive action was the perception of this risk during a period of invasion anxiety from 1847-52 arising from revolution in Paris and the coup of Napoleon III (Saunders 1989: 162). Dover had been earmarked as a naval harbour of refuge in 1840 and the Admiralty Pier was begun in 1847 (Coad 1995: 91) but it is unclear whether it had defences (Smith, 2001: 55). Considerable enhancement of Dover Castle’s defences and those of the Western Heights followed from the 1850s, leaving a substantial structural signature of new works, batteries and casemated barracks at both places (Coad 1995: 92). Rejection of the bastion system was expressed in the innovative Shornemead Fort built in 1848-52 in the new polygonal style, perhaps reflecting Prussian design influences (Smith 2002: 20). There were two lunette forts at Littlehampton (1854) and Shoreham (1857), (Goodwin 1985: 37 and 46) both with French-influenced Carnot walls, and with caponiers at Shoreham. There was also a lunette at the entrance to Newhaven harbour (1855) (Goulden and Kemp 1974: 8). A late Martello Tower was built at Grain (1855) (Smith 2001: 56). There were numerous examples during the same period of older, existing batteries being upgraded with more powerful weapons (e.g. Bayle Battery at Folkestone).
The forts of the Royal Commission

Technological causation
The continuing progress of technology and an anxiety about the intentions of France towards Britain led to the Report of the Royal Commission on the Defence of the United Kingdom (1860). Following this ensued a major programme of defence construction to correct the obsolescence of the existing coastal forts against the new French steam warships, which were now encased in shot-resisting iron, and armed with new long-range rifled muzzle-loaders outranging the smooth-bores hitherto used (Hogg 1974: 27 and Saunders 1989: 171). Alongside re-fortification was major expansion of barracks to provide soldiers' accommodation, increasing the number of the militia and volunteers, the building of drill halls and of additional rifle ranges (Douet 1998: 151). At sea a start was made on modernising the fleet to counter the French threat. Once again, the Portsmouth naval base – with its western counterpart at Plymouth, had an enhanced importance for Channel defence, especially following the construction by the French of a threatening new naval base at Cherbourg. The first steps were also taken at Chatham to modernise its dockyard for the construction and repair of the new classes of warship which were starting to appear.

Arming and construction
In the Thames and Medway the need to counter the French naval threat was exemplified in new forts armed with rifled guns mounted on mechanical carriages behind iron shields set in massive granite emplacements and served with ammunition by lift from underground magazines illuminated by safe-lighting systems (Burridge 2001; Crowdy undated; Gulvin 2000; Hughes 2002; McDougall 1980; Saunders 1960: 167; Smith 2002; Smith 2004; Wilson 1963). These expressed the achievements of the maturing industrial revolution, the ability to form metals into the new weapons of war and advances in chemical engineering for propellants and explosives.

This period also saw the setting out of the Queenborough Lines as advanced landward defences for Sheerness and its naval dockyard (Saunders 1989: 131), the completion of Dover’s Western Heights defences making it into a large and powerful fortress, additions to the defences at Dover Castle and the construction of Fort Burgoyne in front of the castle (Coad 1995: 98). No armour was used at Dover, most of whose defences were less vulnerable to fire because of being high up on cliffs. The armament of the more vulnerable Archcliffe Fort down at water level was given protection by being mounted on disappearing carriages (Welby 1991: 10; Smith 2001: 62). Although not part of the Royal Commission scheme, a battery at Dungeness (Smith 2001: 62) was rearmed with rifled guns and the powerful fort was built on the cliffs at Newhaven on the East Sussex coast (Saunders 1989: 187). Work has been done on the development of these defences through time (Smith 1985) though only limited excavation work has been undertaken (Anon 2003: 306-7). Particular care was given to creating living spaces for soldiers at all these places, reaching a high point not to be later significantly improved upon. Parallel with this, Cardwell’s Reforms resulted in the distribution and localisation of regimental
Dispersed defence, magazine rifles, machine guns and the Chatham ring fortress

In the last quarter of the 19th century the approach to the defence of land fronts changed in response to advances in artillery. This was reflected in the evolution of the new Chatham ring fortress built from 1875-99 to defend the expanded Chatham dockyard. Exposed caponiers planned for ditch defence were mostly rejected and less vulnerable recessed counterscarp firing positions were substituted (Lloyd 1883: 164-79). Ultimately though, advances in the power and accuracy of artillery, especially the new breech-loaders and the use of high explosive fillings in shells, outpaced the fort designers and rendered the forts too vulnerable to act as fixed gun positions (Smith 1985: 113). What followed was a fundamental shift for British fortification in that heavy artillery was to be positioned in dispersed fieldworks outside the forts, making them more difficult for an enemy to see and, therefore, to hit. In another departure, the defence of the fortress against infantry assault was to be from rapid firing magazine rifles and machine guns. Light moveable quick-firing guns were also allocated to the forts, now becoming infantry redoubts in support of the externally placed heavy guns. The innovative Twydall Redoubts in the north arc of the Chatham ring fortress achieved near invisibility of form. The developments at Chatham fostered a new tactical doctrine for English fortress warfare (Smith 1985: 11). The fortress displays novel characteristics and design, together with the extensive use of concrete in construction, contrasting with the earlier ring fortresses at Portsmouth and Plymouth (Saunders 1966). Eventually these fortifications were effectively outcompeted by advances in technology and rendered obsolete. They enjoyed a subsequent phase of use as the subject of practice siege operations, similar to those carried out on the Chatham Lines since the 1830s (Kendall 2007/2010). Exercises were carried out in 1907 against Forts Luton and Bridgewoods (Royal Engineers 1907). This caused some damage, but the forts were reinstated (Smith 1978: 87).

The continuing march of technology

Much of the later 19th century continued as a ‘cold war’ with France, kept alive by old enmities and exacerbated by colonial competition (Moon 1968). The technological advances that had outpaced the Royal Commission forts continued apace and led to the most significant change of the period, the switch from the older muzzle-loading guns to the new breech-loaders. An epic last gasp of rifled muzzle-loading was the building in 1878 of a massive armoured turret for 2 x 16-in. guns on the Admiralty Pier at Dover (Burridge 1987), one of the more important defence heritage assets remaining in the region from the later 19th century.

Modernisation to breech-loading began in the later 1880s/early 1890s, continuing into the first years of the 20th century (Saunders 1989: 196). The new guns were on centrally-pivoted mountings in less visible low-profile concrete emplacements.
allowing a wide field of fire. Initially some were on disappearing carriages which conferred protection upon them. But development soon concentrated upon the less complicated barbette mountings which relied for the protection of their detachments on shields fitted to their carriages. Some of these coastal battery sites have been subject to demolitions and burial. Examples may however be seen in the Thames and Medway, at Dover and Newhaven, whether added to the roofs of existing forts or in new battery structures. These had Battery Observation Posts, utilising the science of optics, trigonometrical calculation and electro-mechanics for range finding and command and control, further important technological developments of the period. The military application of lighting was pioneered in the region at this time, with experiments in the 1860s in relation to signalling developing into searchlights by the 1880s (Kendall and Holman forthcoming). The earliest see-saw searchlights, for use in defence of fortifications and for naval purposes, were trialled at Sheerness and later Chatham (Kendall and Holman forthcoming). Searchlights were eventually provided for coastal batteries, harnessing electrical and carbon-arc technology to allow illumination of targets at night (Smith 2001: 107; Maurice-Jones 1959: 174). Technological innovation is also apparent in the short-lived wire-guided Brennan Torpedo installed at Cliffe and Garrison Point forts in Kent in the 1890s, with a factory for their construction at Chatham (Smith 2001; Smith 2002). Electric telegraphy and telephones facilitated rapid and indeed instantaneous tactical communication. The restored and re-armed sites at New Tavern Fort in Kent and Newhaven Fort in Sussex are the best surviving examples from this period.

**Naval defence**

The land-based developments of this period (breech-loading and associated improvements in artillery) were also seen at sea; Britain and France developed new and more strongly armoured warships to carry the new breech-loading weapons. These were less reliant on sail power to supplement their engines, and their designs soon evolved to include sufficient power units and fuel storage to eliminate sails. The result was an arms race with France to achieve superiority (Saunders 1989: 195). The demands of the modernising Royal Navy led to a need to create massive new base facilities and ammunition storage capacity, seen in the continuing enlargement of Chatham Dockyard into the 1880s (MacDougall 1981: 114), and in the building of ammunition depots in the Medway at Lodge Hill, Chattenden and Upnor (MacDougall 1981: 116). The basins of Chatham and Sheerness dockyards and the Dover breakwaters are further reminders of this phase of naval development (Smith 2001: 71).

**The land defences of London 1890s-1906**

Measures taken for defence evolved in a competition between the 'Blue Water' lobby arguing for basing defence on the navy which it considered better able to prevent an invasion, and the 'Bolt from the Blue' opponents who contended that strong military forces and fortification on land were vital because they believed the navy could not guarantee immunity from invasion (Moon 1968). The military influence was in the ascendent with the inception of the London Defence Scheme of the 1890s. It
involved peacetime construction of preparatory, permanent focal points for a 116km line of entrenchments which, utilising techniques of concealment, were to be made along the escarpment of the North Downs when invasion threatened (Ardagh 1888). Trenches were to run from Guildford to Westerham, then to the Thames near Dartford, resuming downstream at Vange in Essex to Epping. On mobilisation, labourers were to arrive with tools and defending forces were to bring guns and small arms by railway. The permanent works, labelled Mobilisation Centres, were 13 ammunition/tool stores, defensible in the form of a redoubt (Smith 1975; War Office 1903). Several with a command of the country could be utilised for the mounting of artillery. They drew upon the designs of several works of the nearly contemporary new Chatham land defences, including the new Twyddall Profile developed there. As at Chatham, the defensive artillery was to be in dispersed entrenchments, with close defence against infantry provided from magazine rifles and machine guns, a combination of weapons which gradually revolutionised land warfare (Smith 1985: 125-38). A powerful force was to be positioned within the area enclosed by the defences, ready to act against a land advance on London. The naval lobby eventually won out; the 1905 Owen Committee, heavily influenced by naval opinion, recommended swingeing cuts in the numbers of batteries and guns around the coast of Britain. The London Defence Positions, abandoned in 1906 with this revived confidence in the navy to prevent an invasion, were an unusual occurrence in the development of British fortification.

The survival of many of the mobilisation centres represents an important historical resource. The Reigate mobilisation centre has been subjected to individual study (Smith 2000 and Beanse 2000) and has been interpreted for visitors. The Box Hill and Henley Grove centres also have limited public access. In Surrey the western commons were used for military training from the mid 19th century, a tradition that still continues. A complex series of practice earthworks, forming a later 19th century redoubt have been surveyed at Hungry Hill, near Farnham, overlooking the Aldershot ranges (English 2005).

The 20th Century

Interest in 20th century military sites was primarily stimulated by Henry Will’s work on pillboxes (Wills 1985, now overhauled by Osbourne 2008) which led to more local and national surveys (Shepherd and Crocker 2004; Denison 2002; English Heritage 1998; English Heritage 2000a; Loopholes 1992; Lowry 1996). Over 3,300 sites have been listed in the region for the Defence of Britain Project, most of which are Second World War defensive positions.

The First World War

The 1904 Entente improved Franco-British relations and Germany was increasingly seen as the more likely future enemy and invader. With the greater confidence in the ability of the Royal Navy, the Defence Committee now considered that invasion was basically a naval problem, preventable by the fleet. Yet when war with Germany
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came in 1914, this optimism evaporated (Cab. Paper 3/3/81 1914). The remains of the First World War are less well known than those of the Second World War despite their huge diversity (Grieves 1999; Smith 2004; Smith and Killingray 2004a). Sites include coastal defence batteries, defence lines, airfields (Ashworth 1990; English Heritage 2000b), seaplane and airship bases (Johnson 1999; Smith 1999), concrete sound mirrors and POW camps (Bird 2006), amongst others. The ferries on the south coast were involved with transporting huge amounts of troops and supplies, in addition to the remarkable military port which was created at Richborough, in order to supply the British armies in northern France and Belgium. There were also numerous army camps in the region, often associated with practice trenches (many of which still survive as earthworks). Such sites can often be studied from aerial photos though some limited excavation work has been done at Polegate and Seaford (M. Brown and Luke Barber pers comm.).

Coastal and anti-invasion defence
A rush to improve coastal defence was addressed by reinforcing and supplementing the existing defences of the Thames and Medway (Smith 2002: 39), Dover (Burridge 2001) and Newhaven (Goodwin 1985: 75). In the Thames and Medway this involved adding gun positions to existing forts and building new batteries at Grain and on Sheppey. Others were built at minor harbours in East Kent but knowledge of them is superficial.

An unrealised scheme to block the English Channel at Dover with concrete gun towers to be towed out and sunk on the seabed and connected with torpedo nets is represented by one tower (built at Southwick in Sussex), now standing off the Isle of Wight (Goodwin 1985: 80-3). In an unprecedented move, the Channel was seeded with mines (Goodwin 1985: 77). The Dover Patrol, based at Dover Harbour, provided an important naval presence in the Channel (Burridge 2001).

Anti-invasion defences are a less researched theme. There is evidence that the London Defence Positions, which had been discontinued just 8 years before, were activated, with trenches being cut in Surrey and Kent (Smith 1985: 143-4). There is also documented evidence of remarkable and extensive fieldworks on Sheppey, as well as between the Swale and Maidstone, with another system around the Medway towns and at Chattenden and Lodge Hill, (Smith 1985: 143). An extensive system enclosed the land side of Dover (Burridge 2001). There are traces of First World War trenches at Shorncliffe, perhaps both for training and defence (George 2004 et al, 31), and anecdotal suggestions of schemes elsewhere in Sussex (Goodwin 2007, pers comm). Considerable networks of trenches are visible as cropmarks in the modern landscape, across Thanet, inland from Deal and at Kingston near Canterbury, but have been little investigated; some are presumed to be practice works but others potentially relate to defence emplacements or other military uses of the landscape.

Air defence
The war also saw a new technological challenge in the form of attack from the air, both by airships and aeroplanes. This proved to be the first fundamental shift in
strategic consideration for the 20th century and brought warfare not only to the coast but also to the interior of England, including to its general population. Because of the presence of military targets and of London, the region was a particular target for bombing or over flight. Defence became based on concentric layers of protection radiating from London into Kent, Surrey and Essex. These consisted of gun batteries, barrage balloons, searchlights, fighter interceptors at a number of airfields and ground observers. The military and naval assets around the river Medway came within this protective scheme. There were outer barriers of gun defences between Romney Marsh and Whitstable and along the East Kent coast between Folkestone and Margate (Wood 1992: 9-20). There are early survivals of anti-aircraft gun batteries in the Medway area, particularly at Lodge Hill, and possible sites elsewhere (Smith 2001: 82). There were also several sound locators in East Kent, and at Biggin Hill, to detect enemy aircraft at long range (Smith 2001: 77). A mirror at Selsey has been linked to this period (Baker 2007, pers comm). In addition, there were airship and seaplane bases for coastal and maritime patrols, perhaps with unrecognised field evidence (Osborne 2004: 111; Smith 1999). There was also civil defence against air attack, but its extent is unclear, although shelter tunnels are known at Ramsgate, Dover, Broadstairs, Deal and Walmer (Kent County Council 2006).

Interwar defences
Post-war, absence of an identifiable enemy induced uncertainty about priorities for defence. After initial disarmament, the achievement of a balance of air power with France evolved as a politico-strategic requirement (Collier 1957: 11). Recruitment of volunteer ground observers of the new Observer Corps to warn of incoming enemy aircraft began in 1925 (Wood 1992: 18). By the mid-1930s, preparations focused on Germany and the likelihood of large-scale air bombardment of Britain in a future war (Collier 1957: 28). The popular and governmental fear was of apocalyptic and saturating raids, including the use of poison gas. This was graphically predicted in the film version of HG Wells’ Things to Come in 1936.

Sound mirrors and radar
Building on First World War experience, air defence counter-measures included a scheme of partly experimental/operational bowl, disc and strip concrete sound locators built along the south coast of Kent and on Sheppey in the 1920s-30s (Scarth 1999). This was sophisticated acoustic science. Six coastal locators are visible. All are important heritage assets. One on the coast of Sheppey is damaged, requiring recording before loss to coastal erosion and two others at Dover are buried. Two lines of experimental vertical searching discs were constructed flush with the ground surface behind the south coast in 1924/5 (Scarth 1999). However, sound location was a technological blind alley, to be succeeded by radio direction/range finding, RADAR, seen in the long-range Chain Home stations at Dunkirk and Dover (1936-8), followed by Rye, Pevensey and Poling by 1939 (Wood and Dempster 1961: 61). These have left structural evidence.

Airfields
From 1934, air force expansion led to an increased need for airfields (Francis 1996: 18). Expansion period airfields have been described in publication but have not
reached the limits of study. The main stations in the region were at Eastchurch, Hawkinge, Biggin Hill, Detling, Manston, Tangmere and Kenley, each with varying degrees of survival. These were brought to readiness during the Munich Crisis of 1938 (Collier 1957: 63). Because of the vulnerability of airfields to bombing, thoughts were given to dispersing living accommodation to sites away from airfields but within easy travelling distance. This began to be implemented over the next year. Examples of such sites are to be seen at Hawkinge, Detling and Gravesend.

Parallel with this was expansion of the Territorial Army, with new drill halls being provided, (Collier 1957: 30-5) typically of neo-Georgian design. Late interwar practice trenches have been suggested at Seaford Head (Baker 2007, pers comm).

Civil Defence
A significant but less researched topic is the introduction of civil defence from 1936 to the outbreak of the Second World War (Collier 1957: 26). This included civil defence control centres, air raid warden posts, bases for heavy and light rescue, emergency mortuaries, decontamination centres and public air raid shelters. There were hundreds of sites and an extensive organisation, all put on stand-by during the Munich Crisis, when many public trench air raid shelters were made (Dobinson 1996a.)

Anti-aircraft batteries
From 1937 the region shared in a massive programme for the building of new heavy anti-aircraft guns. These had new site layouts, improved range finding, command and control (Dobinson 1996b: 56). Because of delays in manufacturing the new guns, this network was not completely armed until the outbreak of war. Consequently, some batteries activated during the Munich Crisis, had to be armed with guns from the First World War (Dobinson 1996b: 59). There are surviving batteries, whether built then or later in the programme. (Dobinson 1996b: gazetteer). However, through demolitions, this is a diminishing resource. Munich Crisis defences, sometimes seen as little more than an historical blip in the lead up to the outbreak of the Second World War, are deserving of greater investigation in their own right.

The Second World War
Compared with earlier periods, there are many more remains in the region relating to the Second World War; these have received a great deal more interest from amateurs and so our knowledge of them is often more advanced than for earlier periods (Smith and Killingray 2004b; Leslie and Mace 1999; Shepheard and Crocker 2004).

After the outbreak of war, the positioning of allied armies on the Continent, able to block an advance west by German forces made invasion seem unlikely, although existing coastal defences were activated as a precautionary measure against sea raiding. However, Germany’s occupation of the Low Countries and Norway, and finally the defeat and ejection of the allied armies from the French coast in the summer of 1940 brought enemy forces uncomfortably close to England. Coordination from Dover of the evacuation of the allied armies from Dunkirk and elsewhere (Operation Dynamo) and the use of Kentish and Sussex ports for disembarkation gave the region a key part in this event (Collier 1957: 111).
Anti-invasion and coastal defences
After the Dunkirk evacuation, an attempt by Germany to invade seemed certain and this radically affected Home Defence measures (Smith 2001: 88). Demanding continuing research are the resulting vast systems of anti-invasion defence built from 1940-1 as a response to Britain’s new vulnerability, both as a coastal crust of protection and in layers inland. The latter comprised extensive defensive lines, with fortresses and anti-tank islands based on many towns, villages and road junctions, often with proliferations of pillboxes and anti-tank ditches (Dobinson 1996c: 14). The risk of paratroops landing behind the coast was recognised, use of such forces having been demonstrated by the German invasion of Crete in 1941, resulting in enhanced protection being given against such landings at airfields. Triple lines of defence for London radiated into North Surrey and North-west Kent (Osborne 2004).

The region’s closeness to the Continent and being on the route of advance to London for an invader made its security vital. South Eastern Command, created this same year, was nearly coterminous with the study region. There was to be decentralisation of government in invasion conditions, under Regional Commissioners. One of them was headquartered at Tunbridge Wells (Collier 1957: 103), these and other similar command centres often featured underground elements, such as the Nore Command HQ below Brompton Lines, amongst others in the region (Ellis 1996). There were also anti-glider and aeroplane landing obstructions in fields and road blocks. Additionally, there were structures constructed by the Home Guard (Graham 1998) and ‘hides’ and related structures prepared for the Auxiliary units to act as a resistance behind enemy lines in the event of invasion (Angell 1996; Fleming 1957: 270). There were also army camps (Ogley 1995), storage depots, POW camps, training areas, firing ranges, slit trenches (cut through a Roman temple at Chanctonbury: Rudling 2001), searchlight positions, Royal Observer Corps posts, military hospitals and bomb damage (as at Ashford: Stevenson 2013; Ogley 1992). All of this combined to definitively mark the region with a defensive signature; the region became virtually a militarised landscape, and a prepared battleground, with hundreds of sites and thousands of component defensive positions and features, all arranged into planned killing zones for enemy land forces (Dobinson 1996c: 14, 55).

Of these, pillboxes and concrete obstacle blocks are the most obvious and iconic survivals but there are others (Brown 1995), with more ephemeral defences often quickly removed after the war (Alexander 1999; Hall 2002).

As in the First World War coastal defences were centred on the pre-existing batteries in the Thames, Medway (Smith 2002: 41-4), Dover (Burridge 2001) and Newhaven (Goulden and Kemp 1974: 15-17). The Kent and Essex shores of the Thames were joined by anti-ship booms. As in the Napoleonic Wars, many further emergency batteries were added along the coast, particularly to defend landing beaches (Hogg 1974: 237). A sign of the times, many were protected with overhead canopies against strafing and bomb splinters from air attack. There were also coastal minefields, on land and offshore. Heavy railway guns to be used against invasion were held back from the coast in places from which they could be deployed according to need (Reed 1980). Unprecedented was the building of specialised batteries just to the north of Dover and armed with guns having ranges to reach out across and to almost close
the English Channel to movement of enemy shipping. These have left structural evidence, which has potential for archaeological investigation and interpretation (Reed 1980).

**Air defence**

Although there were serious air attacks, starting with the bombing offensive of 1940 and followed by the Baedeker revenge raids of 1942, so destructive to Canterbury (Collier 1957: 305-11), bombing was less apocalyptic than imagined pre-war. Despite this, air defence had to plan for the worst. Completion of the anti-aircraft gun battery programme progressed with vigour (Dobinson 1996b: 66) but these sites are often unsurveyed. Included were the innovative offshore anti-aircraft forts, both Army and Navy, in the Thames estuary, of a nature replicated only in the Mersey (Turner 1994; Turner 1995; Turner and Stewart 1996). As the region was on the route to London for bombers from German occupied France and Belgium it was one of importance for the siting of interceptor airfields, notably used during the Battle of Britain, a period which saw active and sustained military conflict in the region and which has left considerable traces in the archaeological record, both in terms of scattered remains and crash sites (English Heritage 2002). Many airfields, together with landing grounds for returning damaged aircraft, were added to pre-war ones (Brooks 1993; Brooks 1998; Dobinson 1996d: 176; Humphreys 1981; Jacobs 2005; Ogley 1990; Willis and Holliss 1990). There were further radars for long-range detection of air targets and for the fire direction of coastal and anti-aircraft batteries (Dobinson 1996e: 16; Longstaff-Tyrell 1998; Martin 1999). Military and naval facilities, airfields, as well as some towns were provided with nearby decoy sites, to distract enemy bombers (Francis 1996: 20). They had standard forms of control room but varied in site layout and features or mechanisms present (Dobinson 1996f: 6). Some factories were camouflaged against spotting from the air and sometimes there were projectors to emit smokescreens.

**Civil defence**

Air attack threatened military and industrial assets and the population as never before. Civil defence (Collier 1957) received further and reserve control centres, gas decontamination centres, and emergency water tanks to provide supplementary supply. There were stores of food and fuel for emergency supply. New Blitzmerge arrangements were introduced. These involved planning cooperation between towns, mutual assistance, linked with reinforcement by civil defence forces from outside, should this become necessary. Public shelters proliferated and thousands of individual domestic shelters were provided - predominantly the corrugated iron Anderson type but many concrete ones were made by, or commissioned by, householders. Some large shelter complexes were constructed for workers in industrial premises and a variety of underground structures were either commandeered or dug-out for use as air raid shelters (e.g. Catford 2005: 3-31; Jarman 2010). Many of the shelters, particularly above-ground and private examples, were removed after the war and destruction of the remaining examples is still occurring, though attempts are now being made to record these before demolition (Barber 2010).
Operation Overlord
The region had special importance in the preparations for Operation Overlord, culminating in the landings in France on 6th June 1944 (Mallory and Ottar 1973: 200). There were additional airstrips, manufacturing sites for the Mulberry Harbours used in the invasion and pipelines were laid on the bed of the Channel to supply fuel needed by the liberation forces (PLUTO) (Turner 2001: 9-11). The region was both an element of deception plans to convince Germany that an invasion would take place in the Calais area (Operation Fortitude) and of real arrangements for invasion through Normandy (Reymond 1994). This has left evidence, not least in concrete invasion hards, for loading of landing craft with weapons, vehicles or other supplies destined for the French coast (Dobinson 1996g: 11) but also in training structures, such as the replica section of the Atlantic Wall near Farnham (Shepheard 2002).

The V-weapon offensive
Following the Allied invasion of Europe, a new phase of bombing commenced, more innovative than the earlier aerial bombardment; the V-weapon campaigns of 1944-early 1945 (Collier 1957: 345). Because London was the main target for those weapons, the region was on their route, having a place as a victim and as a defence. Under the DIVER scheme, new anti-aircraft gun batteries (including redeployments) were added in barrier lines across the region, mostly on temporary sites (Dobinson 1996h).

Investigating Second World War defence sites
The work to date on defence features of the 20th century has not exhausted the potential of these sites. Field evidence of both standing and buried sites, profuse documentary evidence, German aerial photographs/invasion planning maps and post-war air photographs suggest there is still much more to discover. Documentary research is essential to understand how these sites functioned, as they show defensive elements no longer extant (P. Hibbs pers comm.). Although pillbox design was generally decided by the War Office and standardisation was the general aim, local commands modified the designs/construction to suit local needs and building material supply before issuing plans to local contractors. As a result there is a surprising variety of forms and unique local types (Osbourne 2008; Saunders 2005). The importance of oral testimonies, particularly regarding the construction and camouflage of pillboxes, the latter often long since vanished, has been demonstrated (Collyer and Rose 1999). Very few pillboxes have been subjected to full archaeological survey though such work often picks out important detail otherwise overlooked (Russell and Barber 2005).

Not only should study be concerned with the nature and location of structures but more widely with the deployment of defensive forces as well as local defence tactics and strategy. Opportunities for documentary search, fieldwork and mapping are considerable. Kent County Council’s Defence of Kent Project shows a possible way ahead. William Foot’s study of a number of stop lines and the defence of areas points to a means of handling landscapes (Foot 2002). As well as this, it would be instructive to discover how much intelligence information the Home Forces had about German intentions and planning for an invasion of Britain and the extent to which
British defensive measures responded to that. In reciprocation, it should be possible to evaluate the quality of German intelligence of the region's defences.

There are also other elements to such sites which can often be overlooked. Wartime wall art and graffiti may be seen at some anti-invasion and coastal defence sites, for example the murals of Disney and other characters in the war shelters of the detached breakwater at Dover. Similar graffiti effectively recording personal experiences of the war can be found in public and private air raid shelters (e.g. Jarman 2010).

**The Cold War and the nuclear age**
Following the close of hostilities in Europe in 1945, military activity in the region obviously reduced. The tensions of the ensuing Cold War, however, meant that coastal defence continued post-war (Maurice-Jones 1959: 275; Smith 2001: 101), as did anti-aircraft gun defence (Hogg 1978: 136), with some new sites being built. The full developmental history of these activities is imperfectly known. The nature of warfare in the nuclear age rapidly led to these defences becoming outdated. By 1956, fixed coastal defences were discontinued, anti-invasion defence being provided by the air force and navy (Maurice-Jones 1959: 275). Heavy anti-aircraft gun defence also became obsolete, being incapable of coping with high-flying fast attack aircraft and guided missiles (Hogg 1978: 143). Gradually the fighter airfields in the region diminished in number and transferred northeast to handle an air threat across the North Sea (Cocroft and Thomas 2003: 143). Moreover, the NATO alliance came to emphasise forward defence by air formations in Continental Europe, by nuclear weapons carried by jet bombers, based in East Anglia and the north-east, as well as by strategic missiles in submarines at sea and others fired from the land mass of the United States (Smith 2001: 103).

Although most military (air force) Cold War sites are situated north of London, the region had a number of radar installations, elements of which still survive in good condition, but little detailed survey work has been done. One particular element of Cold War defence activity that occurred in the region was centred at Fort Halstead, Sevenoaks, which had an early key role in the UK's atomic bomb project (Cocroft and Thomas 2003: 246). Building Q14 at the fort was used from 1947 to construct the Mark 1 warhead, Britain's first nuclear weapon. The building has recently been listed (National Heritage List for England no. 1396578), with extended research having gone into the listing details regarding the history and activities that focused on the site, demonstrating the potential for improved designation processes and for the recognition of these modern but significant sites and buildings. Other nuclear activity in the region included Chatham naval base, which was used for refuelling nuclear submarines (MacDougall 1981: 158-9) until the 1980s when it closed.

From the later 1940s the region gained revived civil defence including a War Room at Tunbridge Wells and, in the 1960s, a Regional Seat of Government at Dover, later transferred to Crowborough (Coad 1995: 116). This period added a modest and sometimes still-remaining structural signature, such as control centres and radiation monitoring posts manned by the Royal Observer Corps (Wood 1992). The rise of civil
defence in the later 1940s, fall in the 1960s and short-lived revival in the later 1970s and 80s has a special interest, showing the manner in which home defence planners struggled, against the background of government financial cuts, to cope with preparing for the apocalyptic effects of an attack by not only conventional but nuclear, chemical or biological weapons (McCamley 2002). There is more to be discovered about individual civil defence structures, emergency provisioning facilities and the building and survival of private nuclear shelters. Buildings of this period are being lost, often with little or no recording. The Kent County Council control centre below the old Springfield site in Maidstone was one such case. Surviving examples should be recorded before further alteration or loss. By 1990, as part of the ‘peace dividend’ following the end of the Cold War, the last vestiges of a civil defence infrastructure was discontinued. The Royal Observer Corps was stood down in 1991 (Campbell 1982). By the mid 1990s, local authorities were no longer required to maintain war plans. Despite continuation of several important military depots, barracks and Territorial Army Centres, the last vestiges of regional-specific military, naval and civil defence ceased to exist.
Research Agenda

From the findings in the resource assessment it is evident that there are many under-explored and unexplored themes demanding attention. Some 66 research-need signposts have been identified. These are grouped together below under the section headings as they appear in the assessment.

Introduction

The traditional focus of defence studies –fortifications and guns – has broadened considerably to make defence more holistic in its meaning, value and future for research. The general themes for exploration embrace:

- **Geographical** – (a) changes to coastlines and the extent to which these influenced defence (including within this the loss of sites through erosion and the redundancy of others through coastal accretion) and (b) the use of landscape for defence and the effects on landscapes of defensive systems, training areas and camps.
- **Strategic and organisational** – (a) evolution of defence as a relationship between fortifications, armies, the fleet and other elements of defence and (b) the extent to which defences were anticipatory and instruments of the theory of deterrence as well as reactive to imminent threats, when, where and why.
- **Political** – linked with this, a study of the political pressures and influences on the evolution of defence.
- **Influences on design** – the relative influences of the design of fortifications and defensive systems from Continental and other external sources, versus indigenous innovation.
- **Transport** - consideration of the evolution of the methods of transport for defence and for the movement of troops and their supplies within the region.
- **Science, manufacturing and the economy** – the influence of the interaction of science, technology, industry, manufacturing, supply and victualling of the army and navy on the development of the defensive infrastructure of the region and its economy.
- **People and communities** – (a) the socio-economic effects on communities of the presence of fortifications and barracks (b) lives and living conditions of soldiers and their relationships with the world around them and (c) the effects of war on people living in the region.
- **Archaeological investigation** – (a) where archaeological investigation/survey might address questions unanswerable by other means (b) where this might provide supplementary diagnostic information or (c) where this might preserve threatened sites in the record.
- **Statutory protection and heritage tourism** – (a) the need for further statutory protection for sites and (b) strategising the possibilities for interpreting and presenting the region’s defences to its communities and to visitors as part of a heritage tourism initiative.
The beginning of the Age of Gunpowder

- Better understand the role and extent of the use of firearms in the region’s defence during the 14th/15th centuries. How many castles and towns had them, including those without any signature of gunports? Particularly with reference to Rochester and Dover.
- Explore the question of the extent to which at some castles, gunports might have been as much for martial display as for defence.
- Consider the potential for archaeological excavation to resolve some historical questions – e.g. the structure, detailed design and evolution of Queenborough Castle and references to the movement of guns to Lydd and other coastal areas (Smith 2001: 15).
- Better establish the extent of planning for anti-invasion defence and the development and deployment of early-warning systems for raid or invasion, both on land (e.g. fire beacons) and at sea (e.g. deployment of pinnaces and other vessels for advanced sea observation). Also, consider the potential division between public and private provision of defence or warning systems.

The new age of long-range artillery defence

- Better understand the changing balance of public/private provision of defence, e.g. in relation to the smaller harbours.
- Establish the degree of continuation of firearms provision in castles and town walls into the 16th century.
- Research the breadth of warfare and design experience of the devisors of the new fortifications.
- Discover the interaction of gun and gunpowder manufacture in the region with supply to fortifications.
- Determine whether the connecting banks and bulwarks between Walmer and Deal Castles could be investigated archaeologically.
- Research and evaluate the imperfectly known defences of Dover, Sheppey, Grain and those on the coast of Sussex.

Continuing defensive measures and the emergence of the Spanish threat

- Establish a clearer understanding of the coast defence infrastructure during the first half of Elizabeth’s reign.
- Establish a fuller understanding of the nature and placement of defence in the region during the Spanish Armada, of which only part is presently known. Specifically, the nature of defences associated with field army camps, such as at West Tilbury (Cruden 1843: 239).
The 17th century – the Stuarts, Civil War and the Dutch Threat

- Determine the history of early fortifications dating from this period, such as the Baye and Warham batteries then existed downstream of Upnor Castle in the Medway, perhaps established as early as 1603 (Saunders 1967: 9).
- Establish what fortification work and military/defensive infrastructure existed across the region during the Civil War. Within that, assess the earthwork at Squerryes Court.
- Research and establish the sites and systems of defence generally in the 17th century, at present imperfectly known. Within that, those of the Dutch Raid in 1667 and the post-raid defences of the Medway.

The 18th century – reaction to Continental wars and major new schemes of fortification

- Establish the nature, longevity, activity and function of the various military training camps across the region.
- Better establish the sequence and strategy of defences built at the smaller harbours, in particular in relation to the George III Act of 1761.
- Better establish the full extent of the 1770s fieldworks on the Western Heights at Dover.
- Establish the evolution, extent and nature of the new and enlarged landward defences at Sheerness.

The French Revolutionary and Napoleonic Wars (1793-1815)

- Investigate the successive defensive stop-lines behind the region’s coasts to establish location, related infrastructure of supply and any surviving archaeology, with particular importance placed upon the pre-Martello and Royal Military Canal situation and also to undated apparently temporary sites, such as at Dunkirk, Kent.
- Establish the full extent of barrack provision during the French Wars and, with other documentation, seek to better understand and present the life of the common soldier during this period.
- Drawing together all the available evidence for the structures which constituted the defences during the French wars and their support infrastructure of barracks and setting them in their political, chronological and other contexts.

After the Napoleonic Wars and before the Royal Commission

- Investigate whether the invasion scares of 1825 and 1830 gave rise to any defence construction.
Investigate whether defences were provided at the new Dover harbour, begun in 1847.

Evaluate the known construction of pre-Royal Commission defence sites along the Kentish and Sussex coasts. These have been identified and studied on an individual basis but we need to discover how far they formed elements of a planned and related scheme of defence.

The forts of the Royal Commission

Set the defences of this distinct evolution of the industrial age in their wider European, technological and architectural context.

Consider the possibilities for further detailed site survey and report, building upon the RCHME surveys (e.g. Brown et al 1989).

The Chatham Ring Fortress

Historically survey and report upon the surviving forts and redoubts plus incorporate any archaeological insights into related outworks and associated land usage.

The continuing march of technology

Establish an understanding of the development of the new harbour of refuge at Dover and of the defences of its breakwaters.

Research and report the understudied transitional period for the region of the move from rifled muzzle-loading to breech-loading and the related infrastructure of new fire control and other attendant technologies.

The land defences of London

Study of the mobilisation centres.

Place the London defences in their continental context, specifically establish how they compared or contrasted with other contemporary schemes.

Determine the extent to which the transport and labour resource infrastructure was prepared in peacetime to ensure the activation of the defences.

The First World War

Establish a fuller understanding of the measures for coastal defence and inland stop lines.
Establish and map the distribution of air defence sites, including sound locators, anti-aircraft batteries, fighter airfields and other protective measures to better understand the organisation of this new form of defence.

Gain a fuller understanding of experimental and early aviation sites (e.g. on Sheppey and Grain) and of the manufacturing of airships and their operational use.

Investigate the little-known provision for civil defence.

Explore the infrastructure of barracks, camp sites and training areas as well as the effects of defensive measures on the landscape and agriculture, with specific reference to the trench networks currently only recorded by cropmark evidence.

Research the military port created at Richborough.

### Interwar defences

- Seek and record suspected archaeological evidence for vertically searching sound mirrors in the Kent coastal hinterland.
- Evaluate the generality of the evolution of air defence during the interwar period.
- Establish the evolution of air defence command and control system from the days of early warning based on sound location to radar.
- The provision of civil defence structures, particularly air raid precautions, needs fuller investigation.
- Determine the extent of the building of new drill halls in the region as part of the expansion of the Territorial Army.
- Gain a comprehensive understanding of the measures, military and civil, taken during the Munich Crisis of 1938.

### The Second World War

- Fully research the region’s role in Operation Dynamo.
- Embrace Second World War defence within an extension of the approach and methodology utilised in the Defence of Kent Project for the location, identification and recording of all categories of 20th century home defences and, by doing so, establish the wider pattern of the militarised landscape.
- As part of the above, collect personal contemporary recollections of the defences before eyewitnesses are no longer available.
- The construction of the Second World War defences, including the extent to which decision making was delegated to local levels, which contractors were used and the differences in nature and quality of their work warrants further attention.
- There is a need to list and collate the data from the main, and minor, military airfields and temporary landing grounds many of which are being built on.
Explore the arrangements for provision of railway guns and their role in defence.

Determine accuracy of German intelligence of British defences and British perception of German plans.

Determine the chronological staging and pattern of the civil defence infrastructure.

Aircraft crash sites (with or without war grave implications) need to be protected or subjected to proper excavation and recording. The standard of past recoveries has varied greatly and there are continuing concerns relating to the conservation of this archaeological resource.

Establish provision for Operation Overlord and Operation Fortitude, the deception plan.

More fully understand the Operation Diver anti-aircraft defence scheme and find the extent of site survival.

**The Cold War**

Determine scope of post-Second World War air defence, including protection by anti-aircraft guns, especially on new sites and possible survival.

Explore the key role of the Research and Development Establishment at Fort Halstead, including activities relating to the British nuclear weapons programme.

Establish the scope of provision for civil defence and the extent of survival of sites, particularly in reference to the nuclear age.
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