IF THE KAISER SHOULD COME: DEFENDING KENT DURING THE GREAT WAR

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Despite the national importance of Kent's defences during the Great War these have been a neglected and less understood historical theme. Only as the centenary of the start of the war drew near, have the home defence arrangements for the county become prominent. This has been stimulated by the work of the Defence of Swale Project, managed by Kent County Council and supported by the offshore wind farm London Array as well as by English Heritage.

Kent and the South-East were significant during the war not only because of their vulnerability to invasion arising from their closeness to the Continent on which the main land war was taking place but because of the presence of surrounding and connecting vital sea lanes which had to be defended at all costs. Added to this, the skies over Kent were crossed by enemy aircraft intending to attack British targets and so the county became a vital countering zone for defending air forces. Kent was also an important corridor for the transit of troops and supplies to the Western Front as well as being a place, among others, where troops were encamped and trained for service overseas.

The defence of Kent functioned as the sum of its land, sea and air elements.[1] These comprised: (i) land forces, coastal gun batteries and anti-invasion fieldworks (ii) naval forces, minefields and anti-submarine nets as well as (iii) air forces with airships, interceptor and bomber aircraft, backed by ground-based anti-aircraft guns. There was also provision for passive air defence.

For decades before the Great War the possibilities of a Continental conflict and an invasion of Britain were, with prudent geopolitical and strategic concern, a preoccupation of successive governments and the heads of the armed services, Kent being seen as a probable avenue for a landing and conquest.[2] Increasingly, this topic also became of interest to the public, stimulated by the appearance of, for book and newspaper publishers, a lucrative war-scare and invasion literature, symbolically begun by the publication of Chesney's *Battle of Dorking* in 1871. Moreover, an atmosphere of national anxiety and a perceived need to be resilient against possible threats did no harm to vested interests, such as the arms manufacturers, warship builders, the construction industry and their profits. In Kent the resultant creation of defences deposited a legacy of forts and batteries in concrete, brick, earth and steel. During the Great War there was a vast elaboration of new defences along the coast and across the landscape. However, many were fieldworks or otherwise of

a transient nature and, following the end of the conflict, much of the ground they occupied was restored. With important exceptions they have, therefore, left a less obvious physical presence and, after a hundred years have, other than in some local folk memory, become largely forgotten. Yet tantalisingly much survives, whether as surface traces or as buried archaeology.

The defensive responses in the county during the later 19th century had derived from concern about France, Britain's super-power contender in Europe.[3] Politically there was a competing sense of national pride and a sense of world mission and destiny; the French felt a need to heal the sores of failure during the Franco-Prussian War of 1870 through a renewal of actual and perceived greatness, while the British were driven by an imperative to maintain and extend their prestigious and dominant position which had grown since the end of the Napoleonic Wars. Technologically, there was also an arms race to achieve superiority, especially at sea. In 1889 it was decided to expand the British fleet to counter the navies of a combination of two other powers – the possibility that the French fleet might be joined with that of an ally, perhaps Russia – being feared. Combined with colonial rivalry, particularly in Africa, all this served to produce a 'Cold War'. Occasionally this became charged by pronouncements of one or two French politicians that Britain would soon be humbled and its ports burnt by a victorious fleet,[4] no doubt including Kentish and other Channel harbours. Relations with France were eased by the Entente of 1904 but this was not a recipe for instant friendship and trust. It was regarded by some French opinion as a limiting bridle on national ambition and, on the British side, mistrust of France continued for several years.[5] Balancing an historical concern about France there had already been a rising unease about the intentions of Imperial Germany, whose unification had set it on the path of becoming a major power on the European Continent. It had also become a player in the 'Scramble for Africa', and now figured more in British eyes as the future 'bogey-man' of Europe. Its expanded and modernised fleet that followed the enabling Navy Laws from 1898 to 1912 was correctly seen by the British as a calculated challenge to the existing naval balance. In this aim the Kaiser and Admiral Von Tirpitz were at one. Increasingly Britain began to view the expanding German fleet as a threat, perhaps ready when strong enough in the future to cross the North Sea to contest Britain in a new Trafalgar, leading to countering warship construction, including at Chatham. There was also the rise of the German mercantile marine and its potential to transport invading troops to Kentish and English shores.[6]

Again, British fictional literature came to the fore. Just before the Entente, Erskine Childers' *Riddle of the Sands* (1903) appeared, envisaging a German invasion north of the Thames. This was followed by such stories as William Le Queux's *The Invasion of 1910* (1906), also imagining a German assault. No one in Britain wanted a conflict but there was, in some degree, a sense of probability or even an inevitability of this, expressed in *Cassell's Magazine* of 1903 with its plea that 'Far off be the day when Britain and Germany shall be active foes', which turned out to be a forlorn hope.

The question of handling invasion had been debated over many years: the military or 'Bolt from the Blue' lobby contended that no amount of expenditure on the fleet could guarantee immunity from invasion while, against them, the naval or 'Blue Water' interests argued that large expenditure on the army and fortifications

would be better directed at modernising the fleet.[7] This, they asserted, could prevent invasion in the first place. By 1903 the Blue Water School had largely won, with its assurance that with new, more powerful ships appearing in the Royal Navy or about to do so, invasion could be prevented.[8] Despite an admission that raids remained possible, the joint naval and military Owen Committee appointed in 1905 prompted cuts in British coastal defences, including in the Thames and Medway. At the same time Admiral Fisher began to concentrate the British fleet in home waters aided, over time, by treaties and understandings with a number of other powers to help secure imperial interests across the world, without needing to maintain large naval resources in the areas concerned.[9] The introduction of the revolutionary new Dreadnought class of battleship from 1906 seemed a further affirmation of the Royal Navy's primacy.

However, the continuing rise of Germany's fleet, also including her own programme of Dreadnought construction and the appearance of other vessels began to temper British naval confidence. Indeed, after 1907, an invasion by 70,000 men was thought possible, with large stretches of coastline, including parts of Kent, considered vulnerable.[10] Just under a decade earlier and with anticipatory bravado given the limited size of Germany's fleet at the time, its general staff had envisaged the future possibility of crossing the North Sea to invade Britain either via the Thames, with a rapid advance to London in mind, or from a landing elsewhere along the East Coast. Indeed, this had been a British assumption during its naval manoeuvres of 1912.[11]

1914 – The threat of invasion looms

The greatest fear of the potential for invasion arose from a sense of vulnerability following German occupation of the Belgian coast in October 1914, and from a growing anxiety that capture of the French channel ports of Dunkirk, Calais and Boulogne might soon follow, providing a short sea route for a landing in Kent. As well as this, the dramatic success of a single U-boat, the U9, in sinking three British cruisers in under 2 hours in September 1914, later followed by German naval raids on the English coast seemed to add up to a 'game changer', that placed considerable doubt on the vaunted superiority of the Royal Navy and its ability to protect Britain.[12] For many, these experiences raised the spectre of grey-clad hordes wading ashore, whether in north Kent or East Anglia and of occupation by 'The Beastly Hun' as the Germans were commonly labelled by the British at the time.

Had things gone badly for the Franco-British allies following their retreat from Mons, with no 'Miracle of the Marne' to follow, and had the Western Front not been stabilised where and when it was, it is at least possible that despite the existence of the Royal Navy an invasion of Britain would have been considered by the Germans, especially if they had possession of the Channel ports. As it was, the energies and resources of both sides became pre-occupied with a need to fight and sustain a Continental war of deadly attrition. Despite the alleged discovery in December 1914 of a secret plan for a German descent in the Thames estuary,[13] the Kaiser's personal appetite for launching an invasion became blunted by the primacy of Von Tirpitz's objections and his policy – chiefly to become carried out

by submarine warfare – to defeat Britain by *guerre de course*, aimed at cutting off her food supplies, and delivered in four phases, culminating in an unrestricted campaign from 1917. This was also a reaction against allied efforts to blockade Germany.

Already, as a pre-planned procedure deriving from existing defence schemes, in the days immediately before and after the outbreak of war on the 4th August, the main military ports of the Thames and Medway, as well as Dover were placed on a war footing, the permanent defences and their guns being activated.[14] This process included the formation of extemporised additional protection in the form of the beginnings of flanking and/or rear-protecting fieldworks.

Fear of a serious reverse by the allies on the Continent creating conditions favourable to invasion endured in the minds of home defence planners. It was this that led, episodically, to a massive expansion of anti-invasion defences, on a scale not seen since the Napoleonic Wars. These included fieldworks along the coast and inland, not least of which was work on a shielding arc to protect the capital, with an extension east to the Chatham Land Front between Detling and the Swale Channel.

Added to the terrestrial threat, home defence planners had now also to face new challenges arising from attack from the air which could outflank traditional forms of protection.

Evolving British defence strategy

Kent's security against invasion, as for Britain generally, derived from the earlier mentioned defensive triad. Defensive strategies benefited from intelligence information about German intentions gathered by staff of the famous Room 40 within Admiralty premises in Whitehall.

As the traditional first line of defence, the fleet was charged with applying its dissuading influence and to project its countering power by the presence of major striking forces of capital ships, cruisers, destroyers and submarines which, when needed, were to confront the German navy in the North Sea. This, the Royal Navy was to control, as well as acting to impede enemy access to the Atlantic Ocean and south-west past Dover through the English Channel. Behind the main British forces were coastal defence flotillas and local naval forces, based especially along the east coast.[15]

The sites of Britain's naval bases had, in the main, been determined by the need to confront the threat from Spain, the Netherlands and, especially, from France (**Fig. 1**). At the start of the 20th century, Sheerness and Chatham were the only bases with an outlet to the North Sea and the German threat, although there were designated war anchorages at Ramsgate, Dover and Harwich. But being so far south, Sheerness and Chatham were not ideally located against the German navy, expected to operate from Kiel, Wilhelmshaven and Danzig as well as perhaps from other nearby harbours and ports. That is why pre-war this weakness started to be addressed by establishing new British naval bases at Rosyth and Cromarty on the eastern side of Scotland and further to the north at Scapa Flow in the Orkney Islands, a process not entirely complete by the start of the war. These were chosen to face the direction from which an attack might come and where naval actions would likely take place as, indeed they did, at Heligoland in 1914, at the Dogger Bank in 1915 and, spectacularly, at Jutland in 1916. Yet Chatham and Sheerness

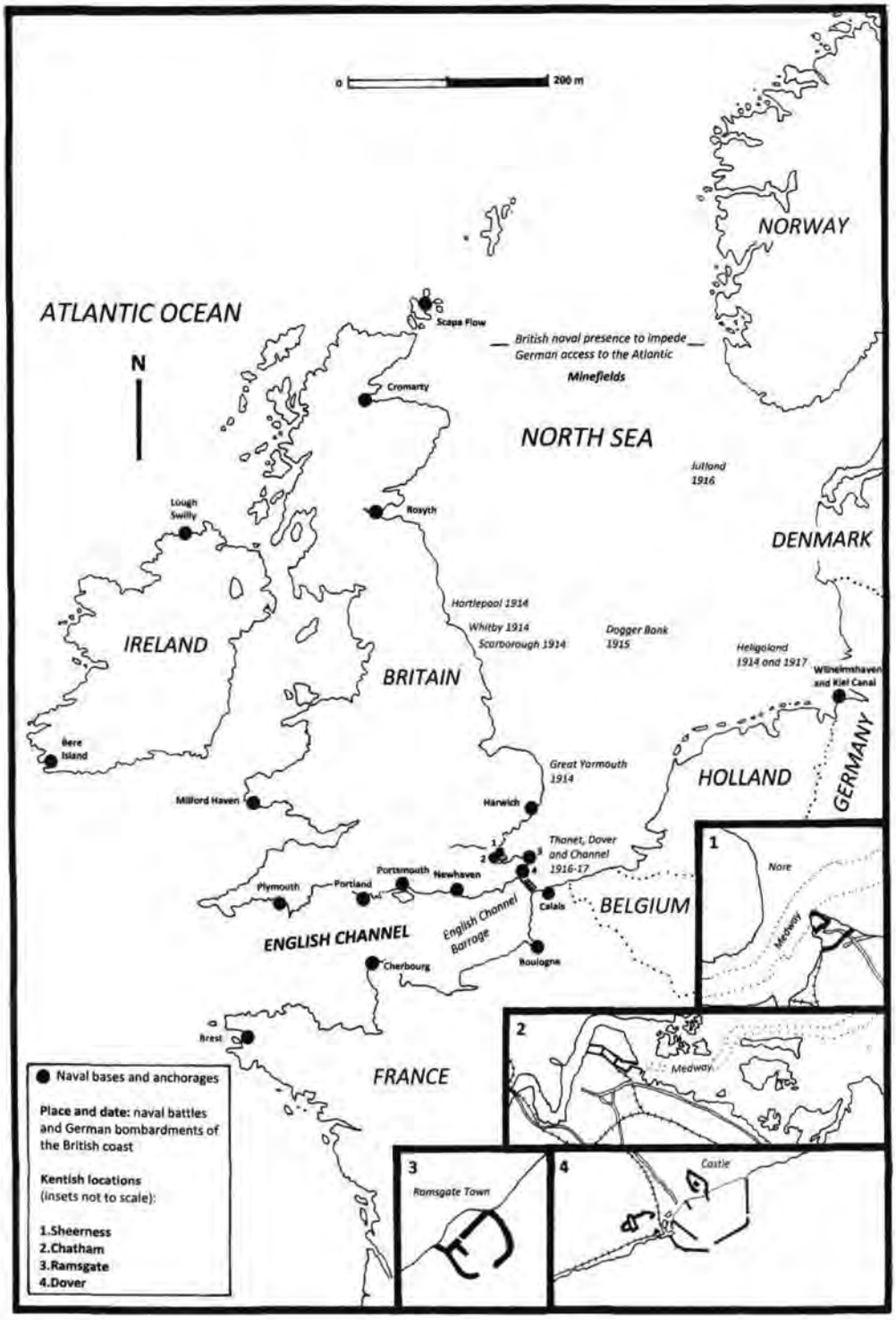

Fig. 1 Naval bases during the Great War, including commercial ports used for naval purposes. There were other minefields in the North Sea, including off the east coast of Britain (Victor Smith 2015).

remained important throughout the war as bases for naval operations. Although not suitable for handling the larger Dreadnought class of warship, Chatham in particular had a key role in the repair of damaged warships and for special projects. There were river anchorages for the fleet in the reaches between Chatham and Sheerness, as well as the Nore anchorage off the latter, suitable for vessels with a deep draught.

Not long after the beginning of the war, Admiral Fisher became concerned that Admiral Jellicoe's concentration of major warships in the north was detrimental to the protection of the east and south-east against coastal raids. These, as had been predicted, happened in 1914 against Hartlepool, Whitby, Scarborough and Great Yarmouth. Fisher called for some precautionary redeployments to reinforce local flotillas and pre-Dreadnought battleships were moved to some harbours along the east coast, soon including five of the 5th Battle Squadron brought south to be stationed at Sheerness. These joined the existing forces in the estuary consisting of 18 destroyers and 20 torpedo boats as well as 9 coastal defence submarines.[16]

Within Nore Command, the Thames was a vital artery on which the nation depended for the import of foodstuffs and other supplies. It therefore needed a full and dedicated defence (**Fig. 2**). With other naval forces based at Dover and Harwich, the South-East became a nexus for the operation of ships to patrol the waters from the southern North Sea to the English Channel as well as to provide ships to bombard the enemy-held Continental coast. Bombardment vessels were mostly monitors which were armoured shallow-draught vessels, some mounted with heavy guns of up to 15-in. calibre. The flotillas of minesweepers and submarine patrols based on the Thames and Dover to which – over time – were added vast arrays of defensive minefields and miles of submarine nets, contributed not only to defence against enemy offensive mining of the ports and anchorages but to the wider, strategic restriction of the scope and sphere of action of the German fleet.[17]

Soon after the arrival of the 5th Battle Squadron at Sheerness, its *HMS Bulwark* blew up in an accidental explosion and the remaining capital ships were moved to new strategic deployments, not to return given the perceived vulnerability of such important assets to submarine attack.[18]

Coastal artillery in Kent – and elsewhere in the country – was intended to hold off German naval units and to prevent disembarkation until the main British fleet arrived but doubts remained whether such resistance could be maintained for sufficient time. There were uncertainties about whether Britain's largest coastal defence gun, the 9.2-in., could compete with 11-in. and 12-in guns mounted even on the older German battleships firing at a longer range. However, the progress of naval defence, especially of anti-submarine protection, had reached a level of confidence by 1916 that the 3rd Battle Squadron, led by the famous and indeed seminal *HMS Dreadnought*, became based at Sheerness for a period. From time to time, and as early as September 1914, in or not far from the Thames estuary, the monitors supplemented their primary function with a protective presence, sometimes being seen off Sheerness before deployment.[19]

At the strategically important eastern end of the English Channel, Dover was the only naval port between Chatham and Portsmouth. It was a tempting 'Gateway to England' for an aspiring cross-Channel invader, being possessed of excellent harbour facilities and road and rail routes inland. The legendary Dover Patrol was

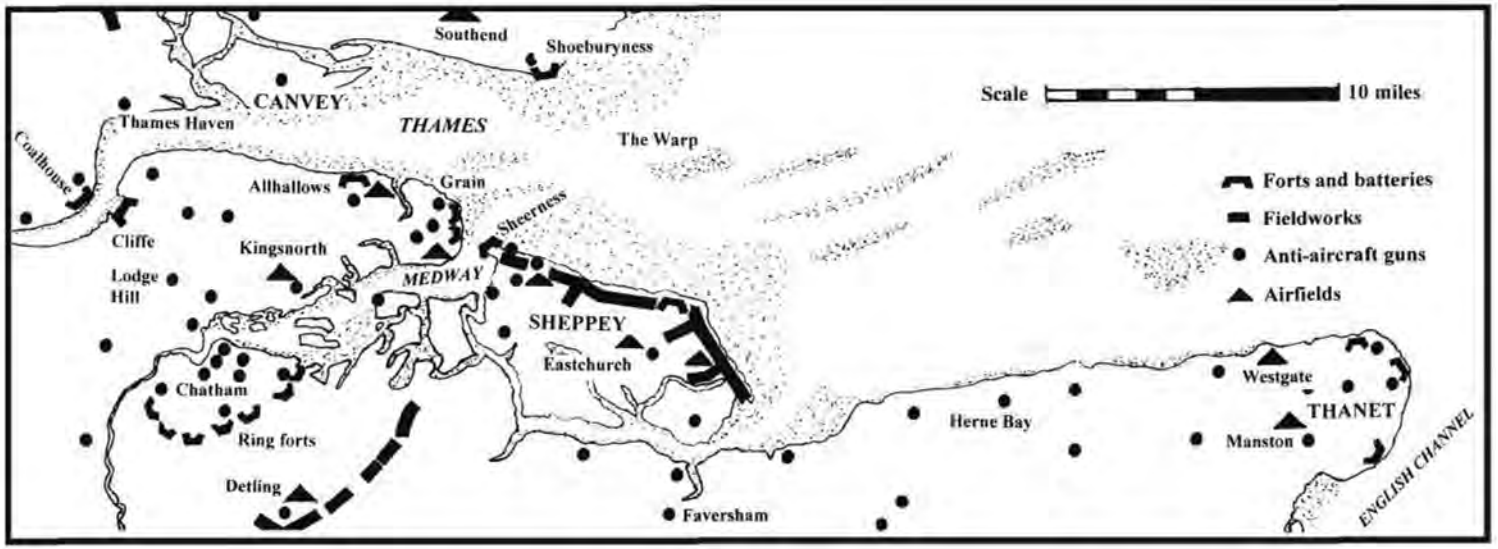

Fig. 2 Simplified map of the Thames defences, from several sources (Victor Smith 2015).

largely based at its military harbour and coaling station, whose breakwaters had been created less than 10 years before and enclosed a space of 610 acres. This was, in theory, large enough for 16 battleships and 12 cruisers as well as for a force of destroyers.[20] Within the scheme of national defence, the role of the Dover Patrol was designed to:

(a) keep the Dover Strait open for the transit of allied and friendly shipping and to deny it to the enemy
(b) ensure safe passage of troops crossing the English Channel to reach the Western Front and
(c) in a coastal bombardment role, attack enemy-held ports in Belgium and the flank of the enemy where it reached the coast, so defending the left flank of the opposing allied forces.[21]

British control of the sea lanes was achieved through a process of applying a gradually tightening stranglehold. This included the creation of the 28-mile South Goodwin to Dunkirk line of nets and mines and of the 22-mile Folkestone to Cap Gris Nez multi-level minefield, coupled with naval patrols, including by the French, and daily minesweeping (**Fig. 3**). On the English side, and under mandatory security measures, shipping was constrained to enter the secure Downs Anchorage, through which there were over 120,000 ship movements during the course of the war. This was protected by the presence of the Goodwin Sands and an 8-mile stretch of net mines extending north-east. The waters of the Channel further to the west were patrolled by British local naval forces based at Newhaven, Portsmouth, Southampton, Plymouth, Portland and by the French, partly from Brest. These ports also received troops from the Empire (later from the United States) and dispatched forces and supplies for the Western Front. They were defended by coastal artillery and minefields.[22]

Towards the end of the war a scheme for strengthening the Channel barrage in the Dover Strait led to the start of construction at Shoreham Harbour of giant floating concrete towers to be sunk in a line across the water way and joined by nets and mines. The war ended before completion but one, called the Nab Tower, was later placed off the Isle of Wight for use as a lighthouse.[23] Troops travelled securely between the two Channel minefields from Dover and Folkestone to the Western Front as did supplies from a new military harbour established at Richborough.

The Dover Patrol's monitors raided the German-held ports of Zeebrugge and Ostend as well as the coastal end of the enemy front line on at least 28 occasions, sometimes needing to be obscured from German counter fire by smoke screens and heeled over for their guns to achieve a greater elevation and hence longer range. The large number and calibre of the German guns along the affected coast were vastly more powerful than any counterpart grouping in England.[24]

Constructed at Chatham were large 2,400-ton floating piers or pontoons for a projected landing by a Division on the coast of Belgium, to outflank the German front line. However, this was cancelled due to related preparatory and supporting advances by the British Army elsewhere not materialising. Although this ambitious venture, codenamed Operation Hush, did not take place, there was a raid on Zeebrugge in 1918, supported by assets from Chatham, Sheerness and Dover.[25]

Under the tenure of Admiral Reginald Bacon and his successor Admiral Roger

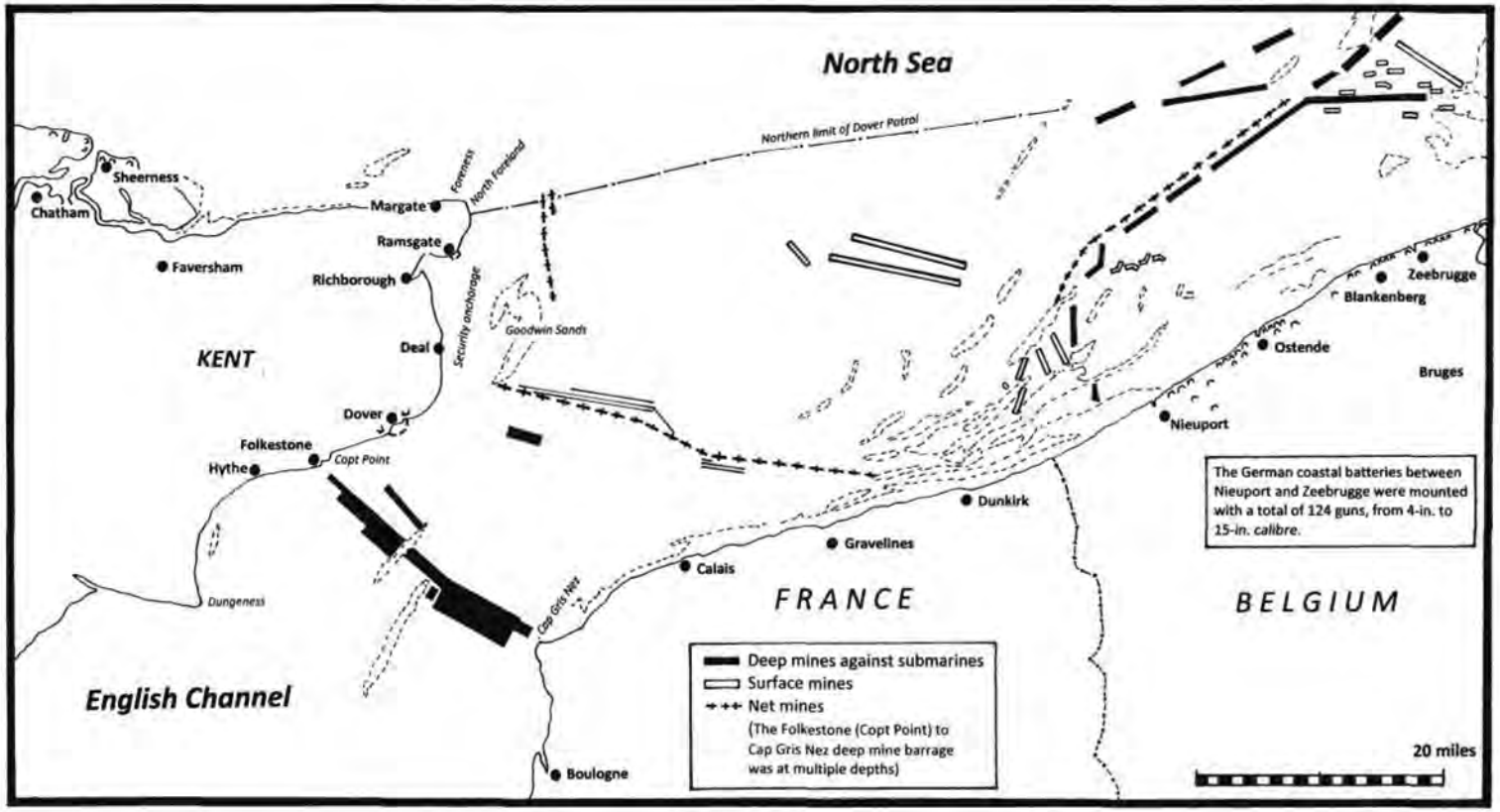

Fig. 3 Map of the Dover Patrol mine and net barrages on 31st December 1917, based on a map in Sir Reginald Bacon, *The Dover Patrol, 1915-17* (1919) (Victor Smith 2015).

Keyes, the Dover Patrol effectively lessened the ability of German submarines and indeed of surface vessels to pass through the Channel. It has been remarked that during the war more operations were initiated and carried out by Dover Command than under any naval command since the Napoleonic Wars. These exploits are commemorated in the Dover Patrol monument at St Margaret's Bay.[26]

DEFENDING THE KENT COAST AGAINST THE GERMAN NAVAL THREAT

At the start of the war the *Thames and Medway* (as well as Dover) were the only gun-defended ports in Kent and the south-east corner of England. The other Kentish ports and harbours were, at least initially, designated as undefended. This remained the case except for minor additions during the war at Whitstable, Herne Bay, Ramsgate and Deal, with a greater effort on Thanet.

The main targets for a bombardment or 'hit and run' raiding in the Thames were the Sheerness naval base and the oil stores at Port Victoria and Thames Haven, with subsidiary targets in the Port War Signal Stations (important gatherers of naval intelligence) and wireless stations at Slough Fort, Allhallows and Garrison Point as well as naval and mercantile shipping in the vicinity. Although battleships might have been used in an attack, a more expected adversary was cruisers and an incursion of torpedo boats, perhaps with submarines penetrating as far upstream as the waters between Sheppey and Southend, placing vessels at Sheerness and the Nore Anchorage at risk. The Swale Channel was also considered a theoretical vulnerability, with the memory of two British torpedo boats racing along it during the Jubilee Year manoeuvres in 1887, though their commanders were not possessed of charts.[27] An attempt by surface units might also have been made to advance upstream in the Thames but this would probably have been at the same time as an attempted landing with, as its object, an advance on London. Attacks on other possible targets such as Chatham dockyard, the naval magazines on the Hoo Peninsula and the airfields at Eastchurch, the Isle of Grain and Kingsnorth would have been attempted only after a successful landing.

Contemporary British doctrine was that:

9.2-in. guns could defend against battleships and heavy cruisers
6-in. guns could handle light cruisers
4.7-in. QF guns could act against boom smashers and block ships
12-pr. QF guns could deal with torpedo boats.[28]

Any combination of weapons might have come to be used. All these calibres were present, sited to cross their fire over the estuary from outer line sites at Grain (2 x 9.2-in., 3 x 6-in. and 2 x 4.7-in.), Sheerness (2 x 9.2-in., 3 x 6-in. and 8 x 12 pr.), Allhallows (2 x 9.2-in.) and from Shoeburyness (2 x 6-in. and 4 x 12-pr.), collectively covering 20 miles of river downstream to a line between Foulness and Shellness. Added to this was an inner line where the Thames narrows upstream at the eastern end of Gravesend Reach (where there were 4 x 6-in.).[29] These guns commanded a 7-mile stretch down to about Thames Haven. Between these two lines, some 5 miles of the river called Sea Reach were uncovered by fire, a consequence of the Owen Committee reductions from East Tilbury and from the left wing battery at

Fig. 4 Left-hand 9.2-in. B.L. gun at Fletcher Battery, Sheppey during the Great War (Royal Engineers Museum and Library).

Slough Fort, Allhallows. Defence Electric Lights were provided at key places for night firing. Penetration of the Thames by an enemy naval force would not have been easy, given the firepower available on the land, offshore minefields in front of Sheerness and Grain, difficult to navigate river channels, the presence of sand and mud banks on which to run aground and the removal of river buoyage. There was a boom defence between Grain and Sheerness and there is a folk memory of another, however short-lived, extending north from Sheppey. In December 1914 the Admiralty commended laying an observation minefield between Holehaven and the south bank of the Thames and higher up at the Lower Hope, close to where arrangements for mine defence had already been made pre-war.[30] The armaments were modified during the war, with 2 x 6-in. being added at Grain, 2 x 12-pr. replaced by 2 x 4.7-in. at Sheerness and 2 x 9.2-in. removed from Allhallows and installed in 1918 at the new Fletcher Battery east of Sheerness on Sheppey (**Fig. 4**).[31] The latter extended the reach of the guns of the outer defences to a line from Whitstable to Foulness.

Dover had several attractions as a target for enemy action: (a) to fire on shipping in the harbour (b) to destroy harbour facilities and to block its entrances so denying its use as a War Anchorage and (c) the reverse of the last, by naval and land action to seize the harbour as a base of operations, whether in support of an advance inland, other naval actions or both. Forms of attack would have been adapted to their object but could have included use of blockers, minelayers, torpedo boats, boom smashers and submarines. Heavy cruisers might also have been used or even

battleships, although the latter do not seem to have been anticipated in pre-war planning.[32]

Dover had a powerful armament and in a report of May 1914 no addition was thought necessary. High up on its western flank at Citadel Battery on the Western Heights were 2 x 9.2-in. and on the eastern flank at Langdon Battery were 3 x 9.2-in. and 2 x 6-in. Lower down, almost at sea level on the breakwaters and piers were 4 x 6-in. and 7 x 12-pr. The breakwaters were linked by booms which could be opened and closed at will.[33] The western entrance of the harbour was blocked by having ships sunk in it. These were the *Spanish Prince* and the *Livonian*. Also mainly on the harbour breakwaters were searchlights to illuminate the approaches at night.[34]

With 9.2-in. guns having a range of 15,000 yards (becoming 17,000 during the war), this armament was considered to be able to command the sea at long range from Folkestone to the South Goodwin Lightship, including the southern entrance to the Downs.[35] Other guns were more concerned with defending the middle distances and the approaches to the harbour itself. The expectations for the heavy guns at long range might have been optimistic, given the need for advance positions for observation and range finding and the possibility of needing to divide fire to compete with the possibility of multiple attacks. But with British command of the English Channel for much of the war, and the presence of minefields, Dover had not been at significant risk. Folkestone was within the protection of the Cap Gris Nez minefield, but might also have benefited from some degree of coastal artillery, although none is yet known to have been provided.

By February 1915, if not before, a limited armament had been provided for *Ramsgate Harbour* in the form of 2 x 12-pr. field guns loaned by the navy, and later a searchlight. An armament listing of June 1917 shows that by then 6 x 15-pr. field guns had also been provided at *Herne Bay*, with 10 x 15-pr. at *Margate* and 4 x 15-pr. at *Deal*, being described for all three places as for 'general defence'.[36] These could have countered landing vessels and disembarking troops but not warships. More powerful were 2 x 6-in. guns shown on the same listing as having been mounted, supported by Barr and Stroud rangefinders at *North Foreland*, and 2 x 6-in. at *Foreness* (**Fig. 5**). These, which appeared after German naval raids on Broadstairs and Ramsgate in March and April of the same year, would have been able to fire on the northern entrance to the Downs Anchorage, as well as on the general waters within range and against an attempted landing on Thanet. For a time, monitors were deployed off Ramsgate and Broadstairs for additional defence.

Fletcher Battery, one of only two new permanent and semi-permanent batteries built in Kent during the war (the other being Whitehall Battery at Grain – see **Fig. 6**) survives in a caravan park at Swanley Farm on *Sheppey*.

There is a good showing of surviving pre-existing batteries used during the war at East Tilbury and Shoeburyness in Essex and, in Kent, at Cliffe, Allhallows, Grain, Sheerness and Dover, where emplacements, magazines, fire control buildings and other structures remain. Slough Fort at Allhallows is the best-preserved of the heavy (9.2-in.) batteries used in Kent during the war.

CONFRONTING GERMAN LAND FORCES ON KENTISH SOIL

High cliffs or marshland on the one hand or flat dry ground on the other, offered

Fig. 5 6-inch B.L. gun at Foreness during the Great War (James Brazier).

Fig. 6 6-inch B.L. gun at Whitehall Battery, added during the Great War at Grain (Royal Engineers Museum and Library).

difficulties or opportunities for a landing; rivers, valleys, roads and hills suggested ways in for an invader to penetrate inland and also holding positions for a defender. Ports and anchorages could be used as bases for defensive naval operations but were also attractive points of entry for an enemy including, as earlier mentioned, Dover. Indeed it was expected that early on an invader would seek to capture a port for re-supply purposes, perhaps with troops landing on open beaches not far away to attack it from the flank, although in the case of Dover there were flanking ramparts of chalk cliffs for some distance. Corps of cyclists were to watch on shore and report an approaching landing force.

During the course of the war there was an ebb and flow of anxiety about the extent of the invasion risk and the size of a force that might arrive on the English coastline. This rose from 70,000 to 160,000, diminishing for a time to 30,000 before returning to the original 70,000.[37] Partly a strategic reaction to the emerging submarine menace starting in the early part of the war and its perceived lessening effect on the ability of the British fleet to prevent invasion from action at sea, these figures may, in some degree, have reflected the influence of good news or bad from the military situation on the Western Front as well as the pessimism or optimism of changing senior naval and military commanders, perhaps also reflecting something of the earlier-mentioned 'bolt from the blue' versus 'blue water' contest. In 1916 'The coast from the Wash to Dover was considered open to the attack of up to 160,000 men the enemy might be able to land' but only if Germany ceased besieging Verdun in France to release sufficient forces for this purpose.[38]

The size of the home defence army varied at different periods. In April 1914 it was judged that 360,000 men would be needed to counter invasion and the aspirational strength for a home defence army was subject to debate throughout the war, increasing or diminishing according to prevailing opinion at the time and the expected size of a German invasion force. The approach for defeating an invader evolved in the later 19th century called for engaging the enemy in the interior of England. This was not to be followed during the war but rather an evolving approach for an initial contact by local forces, followed by action by a reserve called, in the first part of the conflict, the Central Force deployed between the coast and London, and positioned ready to deliver a counter-blow to push the invader back into the sea.[39] By late 1914 the Central Force had reached 130,000 men, rising by early 1915 to 200,000, mainly Territorials, added to which were regular elements and others in garrisons (**Fig. 7**). The generality of troops in Britain being trained and readied for the Western Front were also available for home defence. Altogether more than 750,000 men in various categories were, in theory, available.[40] On the 14th day of mobilisation on 19th August 1914 Kent came under the Home Counties Division of the 2nd Army of the Central Force, with infantry brigade headquarters at Maidstone, Canterbury (where there was also a mounted brigade and a cyclist battalion) and Sittingbourne, together with a cyclist battalion at Ashford.[41] Deployments altered during the war and by November 1915 the 57th Division had infantry formations at Maidstone, Ashford and Canterbury, with cavalry and cyclists at the latter. Infantry were also at Tenterden, Tunbridge Wells, Tonbridge and Sevenoaks, the IX Provisional Brigade based at Margate having subsidiary formations at several coastal outstations.[42] High numbers of troops remained in Britain. An excellent rail network served both the coast and the

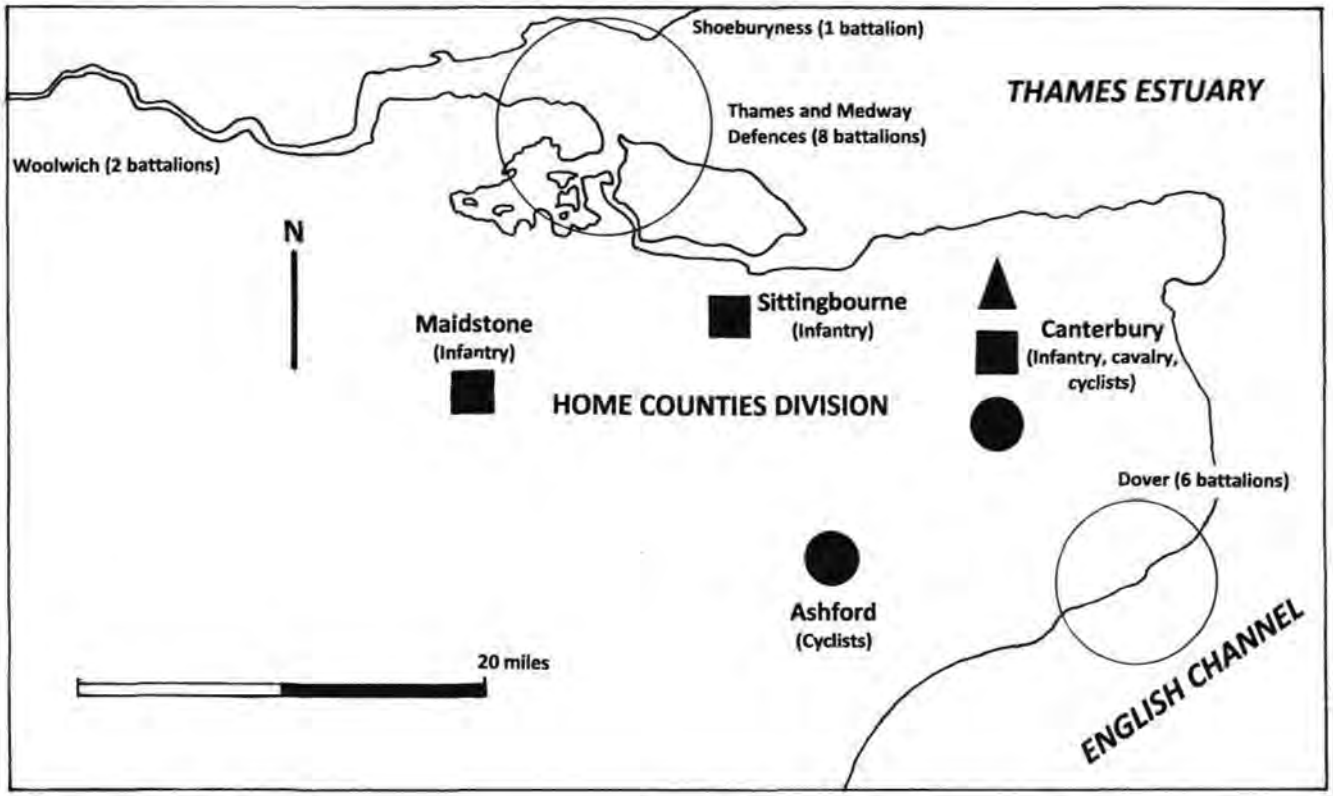

Fig. 7 Map of the Central Force in Kent, 19th August 1914, based on map 2 in TNA WO153/425 (Victor Smith 2015).

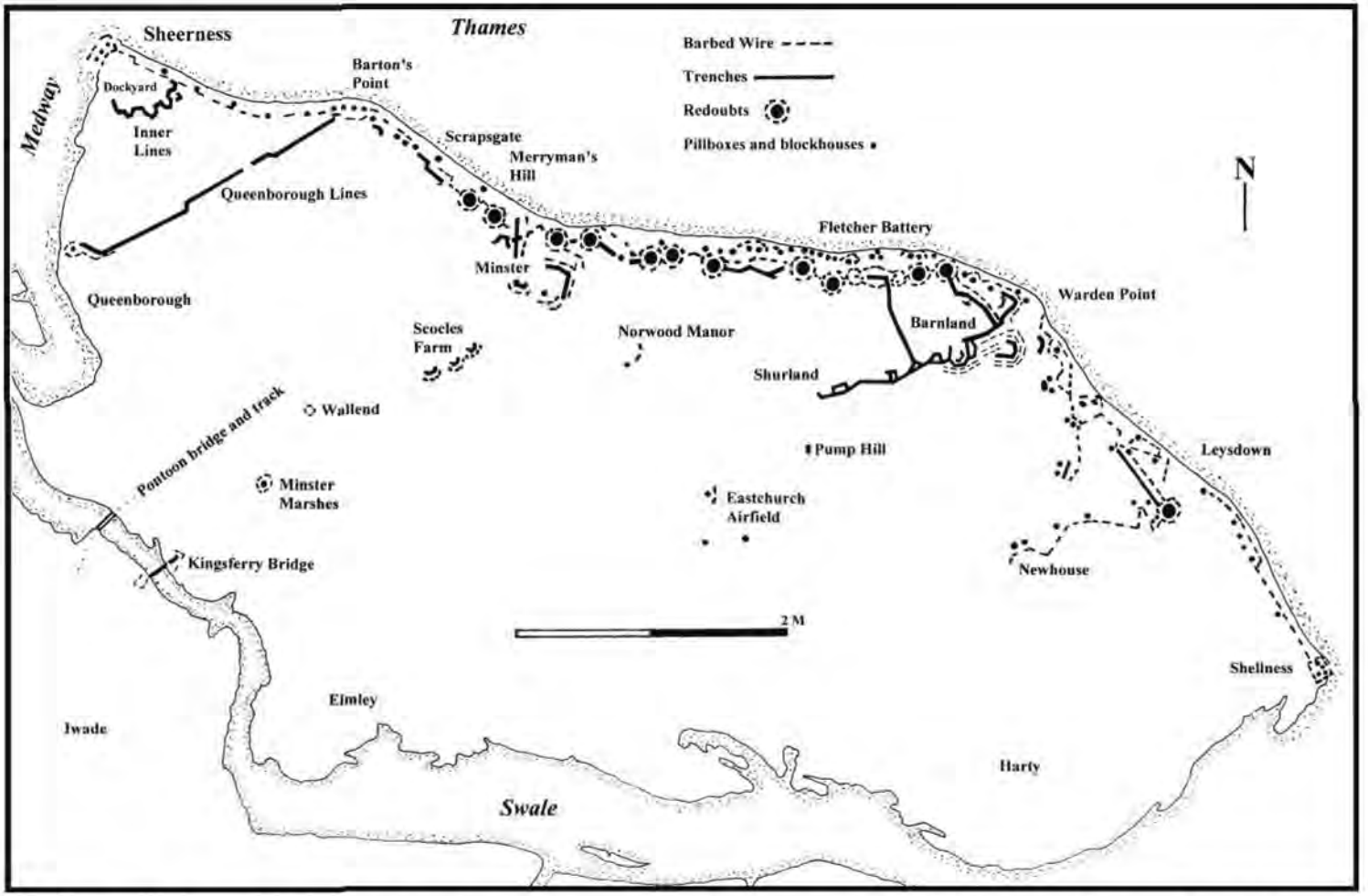

Fig. 8 Simplified map of the fieldworks on the Isle of Sheppey, based on maps in TNA WO78/4427 and 4431 as well as other sources (Victor Smith 2015).

interior of Kent and there were contingency plans for bringing forces by train to threatened coastlines in the event of invasion, including large manpower available west of London. An extensive supply organisation existed for the delivery of food and ammunition.[43] In addition, there were reserve forces, first called the Volunteer Training Corps (renamed the Volunteer Force). This had a good showing in Kent, rising nationally to almost 300,000 men by the end of the war although, for a time, there appeared to be doubts about whether it was effective enough to be confidently included in the order of battle.[44]

In the *Thames and Medway* the greatest provision of fieldworks was on Sheppey, an island bounded to the north and north-east by the River Thames, to the west by the Medway and to the south by the Swale Channel, separating it from the mainland (**Fig. 8**). Other than the rising ground of the Isle of Harty, the southern part of Sheppey is marshland or low-lying. The northern part of the island has at its centre a line of clay hills, eroded as friable coastal cliffs, with low marshy ground at either end, the western end being occupied by Sheerness dockyard. It was along this zone that the defences were concentrated. Forming part of a larger strategic plan for the defence of the Thames and Medway estuaries they were to defeat an attempt at a landing to capture and utilise the dockyard. Sheppey might also have been used as a place from which an invader could advance over the Swale on to the mainland, giving the presence of coastal guns and fieldworks an added defensive value.

The field defences along the coast of *Sheppey*, were formed, extended and strengthened, probably in a number of increments during the war, by the Royal Engineers, assisted by troops of the Rifle Brigade and the King's Royal Rifle Corps as well as by others. As with defensive trenches elsewhere in Kent, these measures were also useful for training purposes. In their final form they were epic in scale, spectacularly recorded in contemporary photographs and plans.[45] They consisted of an 11-mile long coastal line of barbed wire with trench systems running east from Garrison Point. The section from Scrapsgate to Warden Point was joined to wire-protected redoubts with intervening trenched strong points and provided with enclosed emplacements for six two-gun batteries of field guns (mainly 15-prs.), perhaps chiefly constructed in 1916,[46] for use against landing forces in small vessels approaching the shore and to fire at any troops that had succeeded in gaining a lodgement (**Fig. 9**). The wire line then descended to Leysdown (**Fig. 10**) and resumed along the beach (partly also as a defence of the airfield at East-church) to Shellness where there was a final strongpoint. At intervals along the line concrete pillboxes were later added, sometimes in groups. From the coastal line arms extended inland at several places. In varying degrees the trenches along the coast and in the arms inland had both front and second line elements. There were also detached positions along the southern scarp of the northern high ground overlooking the island marshes as well as others guarding the Kingsferry Bridge over the Swale and its approach road. The design and placement of the defences was intended to channel the attackers into killing zones where rapid fire from rifles and machine guns could be used.

Crucially, defensive resilience was greatly strengthened by the support of the long-range guns at Sheerness and, by 1918, those of Fletcher Battery at Swanley Farm, which could be turned to fire inland as far as Faversham in one direction

Fig. 9 15-pr. field gun in a mock hut at Merryman's Hill, Sheppey during the Great War (Royal Engineers Museum and Library).

Fig. 10 Leysdown Redoubt and communication trench, Isle of Sheppey during the Great War (Royal Engineers Museum and Library).

and to cover the northern section of the Chatham Land Front. Added to these were the guns across the Medway at Grain, collectively able to fire on, and over, the island. To a prepared battle plan, the guns were to saturate invasion beaches with fire and, in the event of a successful lodgement, to turn and obliterate nearby roads and railway lines to deny their use to an invader, as well as to rain shells down on any part of the island according to tactical need, including on the bridge at Kingsferry.[47]

The need for security arising from the possible presence of spies became a preoccupation, from time to time suspicious lights being reported. As for other areas in Britain, by 1916 Sheppey became designated as a Special Military Area, with strict security restrictions on entering and leaving.[48]

Of the fieldwork systems aerial photographs show infilled lines of trenches surviving on Sheppey, and some of these should be capable of archaeological investigation. There is a surviving pillbox at Sheerness and another at Mud Row, together with the remains of a 2-gun battery for field guns nearby at Barnland. There may be others.

On the *Hoo Peninsula* for the protection of Slough Fort at Allhallows a map shows trenches, barbed wire entanglements and blockhouses, similarly at Grain embracing the line of coastal defence batteries, also with positions on their landward side. Other systems of wire and blockhouses defended the airship sheds and manufacturing facility at Kingsnorth and the sea plane station at Grain, as well as the anti-aircraft batteries at Beacon Hill and Lodge Hill. Security of the ammunition stores at Chattenden and Lodge Hill was reinforced by redoubts and trenches (with remaining traces) as well as barbed wire, although many fieldworks there were for experimentation and practice.[49] There was also a still-surviving species of concrete bullet-shaped one-man pillbox, at or near the pre-existing Dacoit perimeter fencing of the stores (**Fig. 11**). Similar pillboxes were built at the Upnor Ordnance establishment and at Chatham Dockyard, perhaps a design unique to Kent.

Across the Thames, Thames Haven was secured by blockhouses and barbed wire, with other provision at Shoeburyness, with a battalion of 1,412 men allocated to Shoeburyness, 8 battalions (12,076 men) assigned to the generality of Sheerness and the Thames and Medway.[50]

Consistent with the approach adopted at other Channel ports such as Newhaven, Portsmouth and Plymouth, the port of Dover was defended against an attack from the land by an enclosing 5-mile arc of redoubts and strong points, barbed wire obstacles, abattis (felled trees and bushes laid on the ground as an obstacle) and trenches, carefully adapted to the undulating terrain, together with a fronting screen of outposts defended by 5 companies (**Fig. 12**). This ran from the cliffs at Fan Bay on the east side of Dover, via Old Park, Coombe Down, and Whinless Down to the cliffs at Lydden Spout to the west. There were designated places for field guns but it is also possible that some of the coastal guns could have been turned to fire inland. As with other locations, landward anti-invasion defences appear to have been enhanced incrementally, for example the provision of a trenched grouping known from a contemporary aerial photograph to have been added in 1917 on the slope of the Dour Valley immediately east of Dover Castle. There were inner defences formed of the pre-existing Western Heights fortifications and

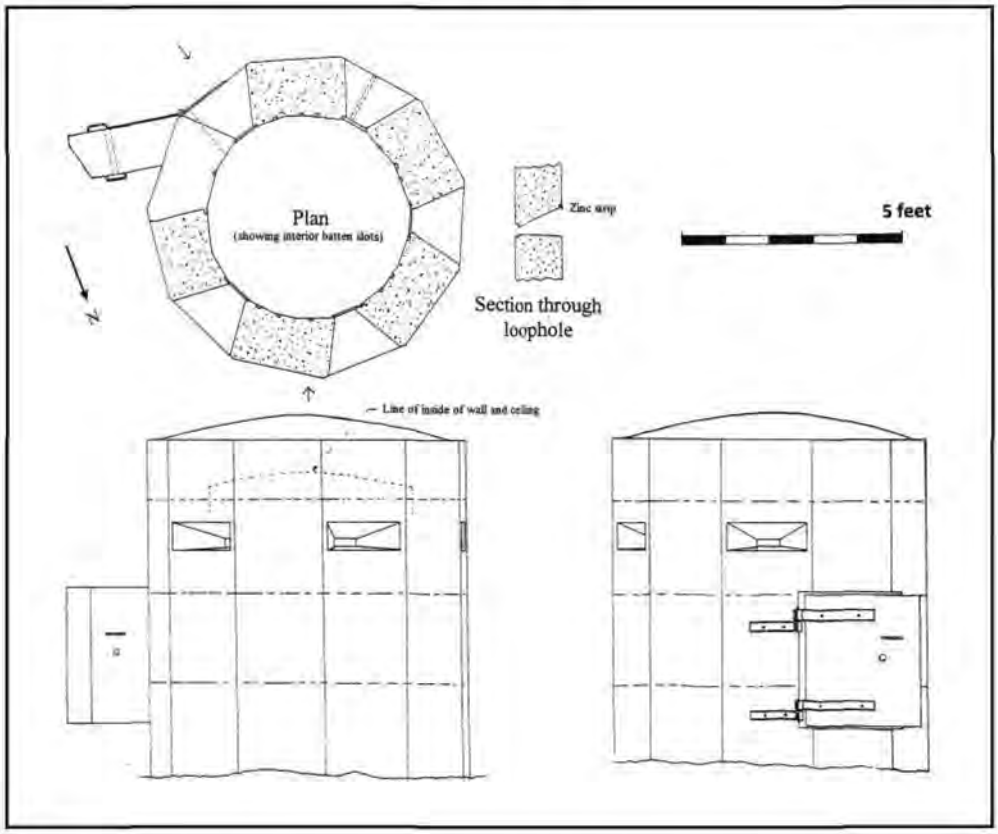

Fig. 11 One of the bullet-shaped pillboxes near the Gillingham Gate at Chatham Dockyard (Survey by Victor Smith 1997).

Dover Castle itself, with its outlying Fort Burgoyne. The garrison of Dover was 6 battalions, totalling 9,278 men.[51] It is likely that, as on Sheppey, buried trenches remain, possible traces being noted in various places. A circular pillbox at Fort Burgoyne is thought to date from this period.[52]

Kitchener had reported in December 1914 that the process of entrenching possible landing places was in full operation along the coast of England.[53] The whole extent of this is not yet clear but planning existed for rapid creation of fieldworks at any threatened place in case of need. With sketched suggestions in 1915 Major Powell-Cotton asked General Du Cane whether it would be advisable to protect certain bays west of Margate with physical defences, at the same time drawing attention to the absence of coastline patrols in those areas.[54] To the west, contingency arrangements had been made to sink a barge as a block ship to prevent entry into Whitstable harbour. The earlier-mentioned 15prs at nearby Herne Bay may have been associated with fieldworks yet to be identified. The seafront of Margate was, at least in part, protected by a barrier of pickets and barbed wire and

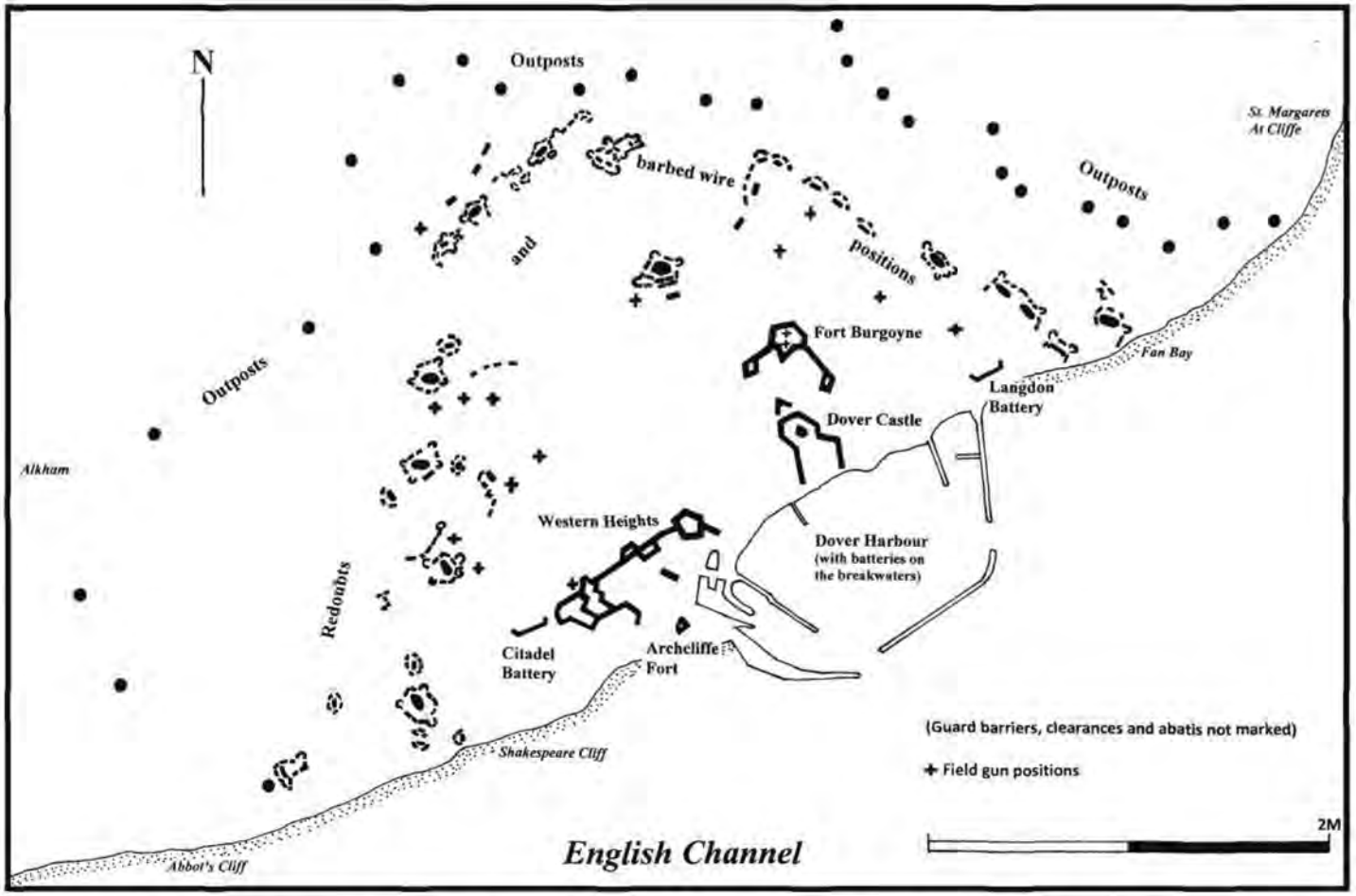

Fig. 12 Simplified map of the land-facing and coastal defences at Dover, based on a map in TNA WO78/4424 (Victor Smith 2015).

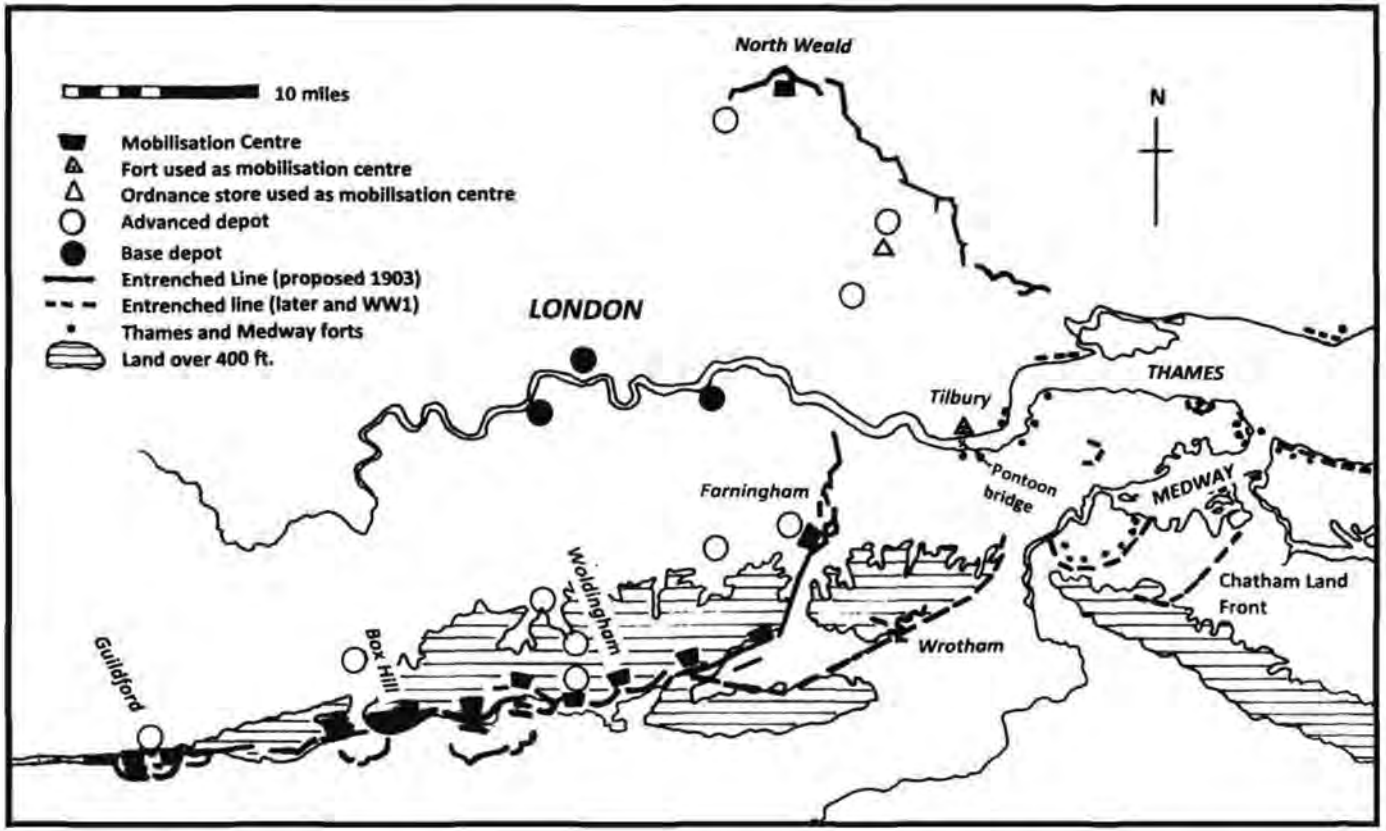

Fig. 13 London defence scheme as set out in 1903, with Great War extension, based on TNA WO106/6188 (Victor Smith 2015).

there were the 15prs nearby. Aerial photographs of various dates seem to show indications of trenches or breastworks at several locations, for example seemingly linking Martello Towers at Seabrook, at Deal on or close to the beach with another battery of 15-prs, and at Sandwich Bay.[55] The evidence is growing to suggest that there might have been an extensive system of fieldworks on the potential landing beaches, demanding discovery and investigation.

Defence of London

Wherever an invader should land, their ultimate objective would have been to occupy London, dealing a mortal and indeed moral blow. A start was therefore made to activate a contingency plan of 1903, originally conceived against the French (**Fig. 13**).[56] This had been intended to defend against an overland advance from the south and east by the creation of a 70-mile shielding arc of field defences, creating a strategic entrenched camp to be used as a base for defending forces around London itself. This scheme, at least partly implemented, was to run along the defensible escarpment of the North Downs of Surrey and Kent from Guildford in the west to Sevenoaks, then north up the Darent Valley to Dartford, resuming on the left bank of the Thames at Vange in Essex, curving round along the rising ground north-west to Epping. Some preliminary works were undertaken at Westerham and Darenth by labourers supplied by Kent councils and labour forces were designated in reserve in case of need. In 1916 a 20-mile line was laid out by General Lloyd between Roydon and Norton Heath.[57] As part of the London defences a vital strategic pontoon bridge was formed between Gravesend and Tilbury for the purpose of transferring reinforcements from one side of the river to the other.[58] Early on in the war, formations of armoured cars manned by the Royal Navy were designated for basing at Dartford and Gravesend, ready to move to assist in the defence of a threatened sector if needed.[59]

A 25-mile extension of the shield running east via Wrotham Hill (where it blocked the way north to the Thames corridor and another way to London) ended at Halling near the side of the Medway, resuming at Detling (but perhaps starting a little to the west of this) in an arc to Iwade, to form the earlier-mentioned Chatham Land Front. Evidence for the existence of the main London shield is intermittently traceable in aerial photographs and gleaned from documents as well as known from earlier-recorded personal recollections. For its extension east to the Medway there are the results of a LIDAR survey, showing trenches but indications of redoubts and batteries have not yet come to light.[60] In 1918 certain 9.2-in. and 6-in. howitzers from siege schools which would not be used for mobile reinforcements were to be utilised on the London defences only.[61]

The Chatham Land Front

The Chatham Land Front was formed by the Royal Engineers, assisted by the work of various infantry battalions (**Fig. 14**).[62] Evidence for this line is plentiful. This consists of nine remaining pillboxes, three oval and the remainder rectangular, all in reasonably good condition. There are also partially backfilled trenches, the 150ft or so near Detling airfield being particularly well preserved, together with

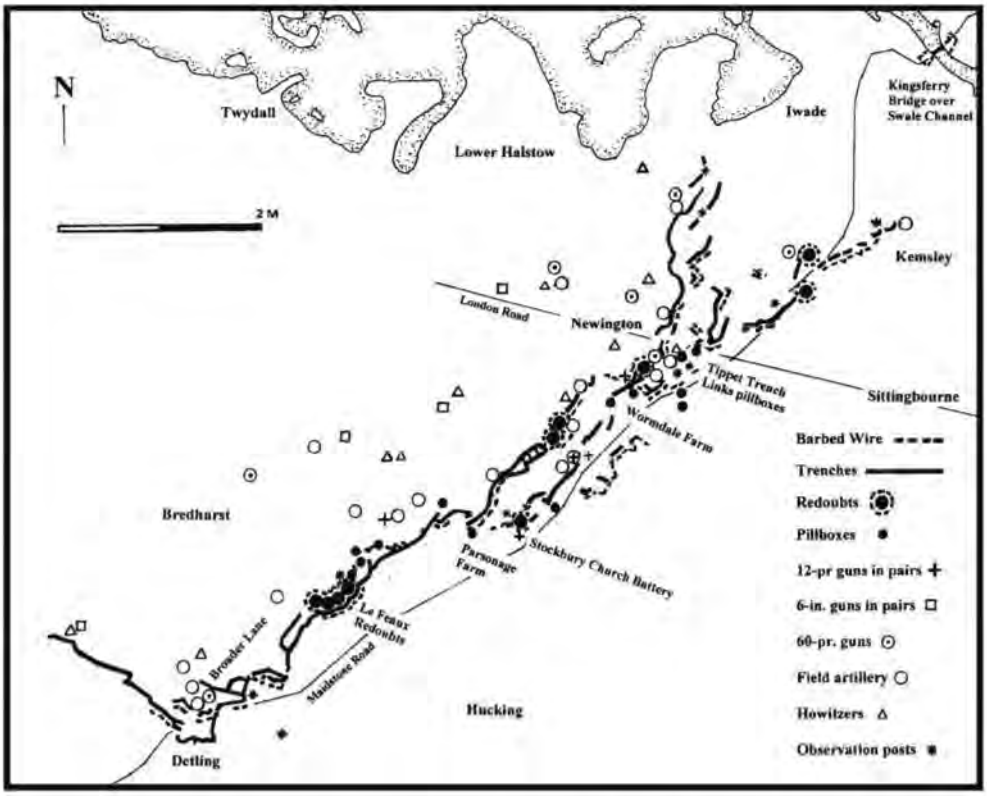

Fig. 14 Simplified map of the fieldworks south of the Swale, known as the Chatham Land Front, based on maps in TNA WO78/4431 (Victor Smith 2015).

redoubts which can still be seen. There is one building at Yelsted, which formed part of a designated Brigade HQ complex that seems to have been strengthened for this use. The mosaic of 1940s aerial photographs shows much of the trench line, as do many of the modern satellite images, including one dugout believed to be extant 20ft below the surface. This is without mentioning the excellent maps and photographs left by the Royal Engineers. The Chatham London Front was a stop line straddling the arterial Watling Street which, passing through Chatham and over the Medway crossing to the west, connected the Channel ports and the east Kent coast to London. The works that comprised it were supported by both fixed and mobile artillery positions. The fixed batteries of 6-in. and 12-pr. in pairs seem to have been installed using obsolete naval and coast defence guns early in the war when modern weapons were in short supply. Later, as more modern pieces became available, mobile 60-pr. and howitzer batteries are shown in maps of the batteries, together with the older fixed sites. It is also to be expected that older field guns such as the 15-pr. BLC and the 5-in. howitzer would still have been in use in addition to the modern 18-pr. QF and 6-in. BL howitzer. As mentioned earlier, an ancillary purpose of many of the earlier-mentioned coastal guns on the

Isles of Grain and Sheppey was also to support the northernmost fieldworks of the Chatham Land Front. By the latter stages of the war the artillery defences of this front were very powerful indeed.[63] As a double-security, the 6-mile arc of later 19th-century ring forts built to defend Chatham Dockyard from a land attack were reactivated and the spaces between them filled with trenches and barbed wire. There were also extensive shelters in the inner or Lower Lines.[64]

There might have been fieldworks at various tactically important towns and villages as well as to impede roads. Trench digging occurred at Tonbridge. With its concentration of home forces, and as a key node for road and rail communications in east Kent, Canterbury had a special defensive significance. This was both to impede the advance of an enemy along arterial communications passing through it and as a focus for a defending force to strike out eastwards. Road blocks may have been provided around Canterbury and there are aerial photographs showing trench systems on its north-east side, although these might have had a training purpose.[65]

In 1916 500,000 men were allocated to home defence but there were another available 1,050,000 who were drafts, administrative services, cadres, reserves or sick, convalescent absentees.[66] However, the times of plentiful available *effective* manpower for home defence began to lessen, many of the best troops being transferred abroad, especially to the Western Front. This left in Kent and Britain mostly those under the age of 19 who could not yet be drafted abroad and those judged medically unfit. With some changes to deployments in Kent, by this time the original arrangements for the Central Force had been merged into the Southern and Northern Armies, but the principle of an initial coastal or near coastal contact and counter-attack by rear forces was retained, with the availability of a central and emergency reserve. A map produced in this year showed detraining points in Kent, with a block north of Canterbury.[67] In 1917 the Commander in Chief of Home Forces had called for a force of 500,000 to resist invasion. The authorised figure was reduced to 401,000 by the end of the year but the actual strength in January 1918 was 411,000, added to which continued to be a large number of others not specifically allocated to home defence.[68] Although the Channel and other Kentish coasts were considered less vulnerable to a landing on account of minefields guarding the approaches, the nearby presence of naval forces and the power of coastal artillery at Dover and in the Thames, the possibility was thought to still exist.[69] However, and until the end of the war, the state of home defence forces was criticised by their commanders, citing the inefficiency of the generality of troops and a shortage of (a) rifles which, at times, comprised an eclectic variety of types, and (b) of artillery. In the context of the latter, the 15-pr. field gun which featured extensively in home defence was obsolete even before the start of the war. This general situation was in part to be explained by the need to continually reinforce the army on the Western Front with fresh troops of the highest available efficiency and to supply them with a flow of the best and most modern weapons, which acted to the detriment of manpower and materiel resources available for home defence. How much this weakened home defence would merit further study and judgement. In reciprocation, it was however thought that in case of need forces might be brought back to Kent from the Continent.[70]

The councils administering Kent, whether on the coast or inland, were required to provide lists of the labourers who would be activated to make defences and

cut entrenchments in designated places or wherever they were needed in the county in a hurry in the event of an invasion. For this purpose some equipment was stockpiled ready for operations and foremen of works were given necessary training.[71] As late as 1917 Field Marshal French was organising further internal lines in Kent, with 6-in. howitzers and 60-pr. guns provided for artillery support.[72] Perhaps one of these was a long line 'being prepared by the Royal Engineers' to the south-east of Canterbury from Ackholt Colliery to Holt Street, through Golgotha (a railway tunnel) to Coldred and Temple Farm, finally connecting with the defences of Dover, a length of about 8 miles.[73]

The initial impetus of the German Ludendorff offensive of 1918, partly made possible by the release of forces from the Eastern Front after the Treaty of Peace with Russia, caused concern, but this did not become a general invasion scare. Nevertheless, contingency plans were made to mobilise the Volunteer Force in Kent as elsewhere and Admiral Keyes, commander of the Dover Patrol, made arrangements to disable the French Channel Ports should there be signs that they would be captured by the Germans and used to invade Britain, probably through Kent. There was a little scaremongering in Britain, with one senior politician visualising the capture of Canterbury and that of Maidstone, perhaps within 3 days of a landing.[74] However, the offensive had been Germany's 'last gasp' on the Western Front and was halted by the allies. Moreover, the earlier entry of the United States into the war had, by 1918, led to a large flow of fresh American troops into the Western Front to be deployed against an exhausted German army. By this time the troops in Kent were organised as the Kent Force, headquartered at Canterbury, with infantry formations there, at Herne Bay, Margate, Minster, Wingham, Sandwich, Lydd and Tunbridge Wells as well as the port garrisons at Chatham, Sheerness and Dover. Tank forces also started to be allocated to home defence, a squadron being based at Canterbury. After the Armistice home defence armies were withdrawn from war stations, a process indicated in maps of February and May 1919.[75]

The design of the fieldworks in Kent: the emphasis on trenches and barbed wire in Kent as elsewhere reflected the age of the spade, the machine-gun, rifle and moveable artillery, in which fieldworks were seen not only as an obstacle and a retreat but more aggressively as a secure base from which to launch offensive/defensive operations (**Figs 15-17**). The evolution of the Chatham ring fortress in the later 19th century had also been a pointer to the future in which a decentralised defence with movable artillery in contingency outside positions with fieldworks had been largely substituted for heavy guns in permanent forts as the main line of defence, existing forts being seen more as reinforcing redoubts armed with light mobile guns. This new doctrine was extrapolated on a grand scale to the London Defence Positions of the 1890s. Use of trenches and barbed wire during the Russo-Japanese War of 1904-5 was influential for the future and led to the experimental siege operations at Chatham in 1907 for the British army to relearn its techniques.

The design of fieldworks in Kent during the war reflected recent fieldwork manuals and paralleled practice on the Continental Western Front. This is easier to see in the contemporary recorded and currently investigated lines in Sheppey and those of the Chatham Land Front. These had front and second line trenches on

a castellated plan, with communication saps connecting them. On Sheppey short detached trenches from first construction were later transformed into continuous lines or circuits. Notable on both Sheppey and the lines of the Chatham Land Front were concentrations of machine gun positions, whether in earthwork settings, covered redoubts or pillboxes intended to produce a massive zone of rapid fire from them. Barbed wire was arranged in a similar way to the Western Front and trenches

Fig. 15 A fire trench in Kemsley Orchard, Key Street in the Great War (Royal Engineers Museum and Library).

Fig. 16 Interior of Bobbing Redoubt, Bobbing, in the Great War (Royal Engineers Museum and Library).

were revetted in corrugated iron, hurdle work or timber boards. Breastworks were made of sandbags and earth. Redoubts, from pre-war design, could have overhead protection and be provided with timber-boarded loopholes. Sometimes there were tunnels. The blockhouses which featured from 1914 were formed of corrugated iron hollow walls infilled with ballast against bullet penetration and had probably been inspired by their British predecessors in South Africa during the Boer War. Concrete pillboxes or machine gun emplacements (**Figs 18-19**) might also in some small degree have been influenced by the South African blockhouses but their introduction at the date they seem to have been is more likely to have been

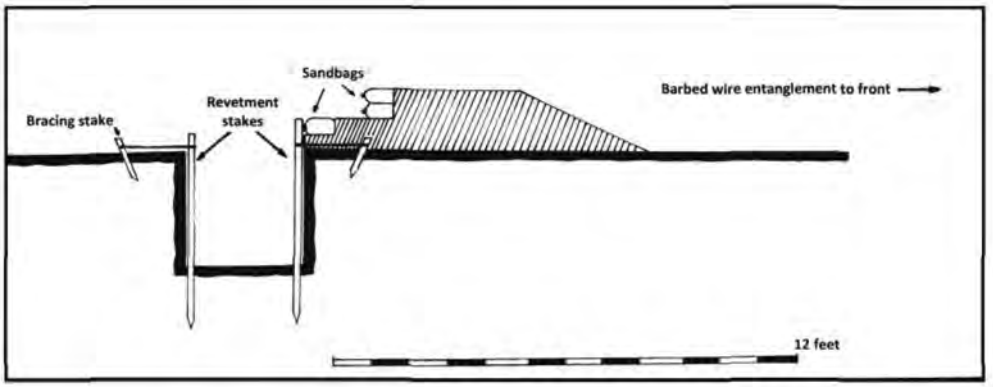

Fig. 17 Example of a fire trench on the cliffs near Lissenden Steps, north shore of the Isle of Sheppey, based on a drawing in TNA WO78/4427 (Victor Smith 2015).

Fig. 18 Fisher Hut machine gun emplacement at Grain during the Great War (Royal Engineers Museum and Library).

Fig. 19 Fisher Hut strong point and wire entanglements along the sea front and around the outer ditch of Grain Fort during the Great War (Royal Engineers Museum and Library).

stimulated by the shock effect of this device as faced by the British at the Battle of Langemarck in April 1917. Their shapes, whether square, multi-angular or oval can also be seen in German examples. The abattis, as used at Dover, had long been a feature of European field defences. The evolution of design of fieldworks during the war merits detailed study.

In the majority of cases the proliferation of fieldworks across the country disappeared to sight and, to a degree memory, as the ground was restored by infilling and levelling. In the case of those on Sheppey and the Chatham Land Front – and probably elsewhere – this was done by the labour of German prisoners of war, barbed wire and materials being auctioned for Exchequer funds.

Camps, training grounds and rifle ranges: across Kent, enhanced in increments during the war, were clusters of accommodation camps for troops, with nearby training areas and rifle ranges. For convenience many appear to have been co-located for both strategically positioned home defence forces and troops being readied for foreign service, whether on the Continental Western Front or elsewhere. Along the coast of east Kent, these were at Whitstable, Herne Bay, Margate, Ramsgate, Sandwich, Deal, Dover, Folkestone (Shornecliffe), Hythe (the School of Musketry) and Lydd (an artillery school) with, inland, large complexes at Canterbury and Ashford. In west Kent there were counterparts on Sheppey, Sittingbourne, Chatham, Sevenoaks, Tonbridge, and Tunbridge Wells, with further sites in other parts of the county.[76] Fieldwork and trench training may have been conducted at a number of these locations as it was on a large scale at Shornecliffe at which has been left a large and visible pattern of trench lines.[77] There a subsidiary defensive function cannot be ruled out as may have been the case elsewhere.

From time to time major invasion defence exercises were held in Kent, trailed by pre-war manoeuvres with the Germans in mind such as that on Sheppey in 1910, involving 5,000 men and the building of a temporary bridge across the Swale at Harty Ferry. One major exercise involving Canadian and other troops is known to have taken place in September 1917.[78]

Evacuation and sabotage: anticipating possible invasion, after the outbreak of war instructions were issued by central government to Lord-Lieutenants to introduce arrangements for the evacuation of elements of the population who chose to leave the threatened coastline and hinterland and for their escort to places of safety.[79] An actual or imminent enemy landing was to be announced by the use of sound signals. Routes for evacuation were planned in detail, being selected to avoid disruption to military movements for which specific roads were designated. The police were responsible for marshalling and guiding evacuees along their way. Behind the retreat signposts and milestones of possible directional value to the enemy would have been removed. An invasion on the north Kent coast would have seen people, livestock and vehicles travelling along designated routes into the Kent Downs and via Holmesdale to the west of London and relative, however temporary, safety. The railway system was mostly denied to civilian use in the event of an emergency. Feeding evacuees would have been challenging and arrangements were made for the establishment of food distribution points on the routes they were to take. These were to have been supplied both from government

stores and from the contents of shops requisitioned for the purpose. As well as evacuation, there was a scorched earth policy in which saboteurs would destroy facilities and materials to deny the invading enemy their use. In Faversham were arrangements for destruction of cranes in the creek, the blocking of the latter by the sinking of a steam vessel and the destruction of beverages at the Shepherd Neame brewery to avoid drunken atrocities. In other areas coastal piers were to be destroyed. Instructions were given for the requisition of useful tools and bicycles and advice given on the evacuation or slaughtering of livestock and rendering it inedible. For Dover, Hythe, Folkestone, Sheerness, Chatham and other ports there were parallel arrangements. Cattle from the country around Dover were to be driven in behind the perimeter of the field defences. All such arrangements were overseen by Local Emergency Committees which worked under the guidance of an overarching county Central Organising Committee, where necessary, in liaison with the military authorities. There were also rules of behaviour for those who stayed behind. Civilian armed resistance in the manner of *Francs Tireurs*, was forbidden for fear of reprisals.[80]

It is a moot point whether poison gas would have been used to gain advantage in a German attack or as part of a British defence. This is at least possible, with all the horrors for combatants and risks for the population at large this would have involved.

AIR DEFENCE

Around 1910, the new technology of air power began to be recognised as having a potential to circumvent the traditional terrestrial defences of an island nation. This was demonstrable in the 'bridging of the English Channel' by Bleriot's flight to Kent in his monoplane from France in 1909. Already the implications from the existence of dirigible airships, pioneered in the 19th century, had started to be considered by home defence planners.[81] These and aeroplanes came to be weighed by the appropriate government advisers and committees as to whether they would be used for reconnaissance or for the bombing of Britain in a future war. Both contingencies were thought likely. A realisation that there was no existing defence against such methods of attack brought about fundamental new thinking among home defence planners who evolved strategies for protection which embraced Kent and Britain generally. As with all aspects of Kent's defences, from pre-war beginnings, these progressed during the war through a number of improvements, in some degree benefitting from experience of air warfare on the Western Front.

Initially the focus was upon providing anti-aircraft gun defence for naval and military assets, including oil storage tanks. In Kent, the key places for such protection were at Grain, Sheerness, Chatham and Dover. London too was considered vulnerable to attack, a prediction all too devastatingly to be fulfilled.[82] All these targets were set within a distinctive geography, making them easy to spot from the air in clear conditions. By 1913 recognition of the air threat and thinking about how to defend against it had advanced. This was exemplified in a report of that year for the naval Nore Command, dummy air bombing having been carried out by British aircraft as part of a fact-finding experimental exercise. In attacking assets this report considered that formations as large as 20-30 aircraft might

concentrate to carry out bombing, probably diving from 5-6,000 feet having, it was thought, little chance of missing their targets with a rain of explosive ordnance. With a remarkably good understanding of the needs of the future, an embryonic scheme of air defence was framed for the Medway area, specifying the need for three methods of protection

(1) gun fire from batteries on the ground and from ships
(2) firing from interceptor aircraft and
(3) passive defence by the emission of clouds of chemically-created smoke to obscure ground targets.[83]

By April 1914, the aircraft element of defence was refined in a proposal for a pre-planned regime of air patrols, with standby interceptors ready and waiting for instant action. Also suggested was a network of coastal and inland look-out or observation posts, having signalling apparatus and field glasses.[84] Alongside the Royal Flying Corps, the Royal Navy Air Service was prominent in initiatives for air defence, with home defence naval air stations being established in Kent and elsewhere along the British east coast, by or before August 1914. Within Nore Command by February 1914, a number of high angle (anti-aircraft) guns had already been allocated to Lodge Hill and Beacon Hill, to Chatham Dockyard and further afield to the Port Victoria Naval Oil depot at Grain, as well as to the Thames Haven Oil Wharves on the Essex side of the Thames.[85] Lodge Hill, north-west of Hoo St Werburgh, was Britain's first purpose-built anti-aircraft gun site. It was formed of a diamond-shaped fenced enclosure with a circular concrete gun emplacement at either end of its major axis. Between them was a central magazine. At two of the angles were flanking concrete blockhouses, one of which had an attached barrack.[86]

The outbreak of war in August gave a stimulus to the development of air defence, continuing to be carried out in a partnership between the Admiralty and the War Office. This manifested itself in the mounting of guns in London, at Woolwich Arsenal as well as of further weapons in the Medway and Thames area. From time to time and for limited periods, monitors were also used in the Thames Estuary to provide anti-aircraft gun cover. In early 1915 the naval port of Dover also received anti-aircraft guns. At least initially these included 2 x 6-in. naval guns on extemporised very high angle mountings and one of the new purpose-designed 3-in. guns.[87]

Parallel with this was, from 1914/15, the first stage of the deployment of interceptor-fighters at what came to be a gradual spread of airfields and landing grounds. As well as the aircraft at such fields as Eastchurch, Manston, Throwley, Lympne and Walmer, there were sea planes with a patrol and interceptor role, for example at Grain in the Thames estuary, at Westgate and Dover.[88] Other airfields were added. The Naval Air Stations at Grain and Eastchurch, originating pre-war, had been a setting for important pioneering work in aviation and experimentation. In 1911 the first British launching of an aircraft from a ship had taken place from HMS *Africa* moored off Sheerness. During the war Eastchurch was a base for air bombing trials.[89]

As well as fixed-wing aircraft there were bases and mooring stations for airships at Kingsnorth, Godmersham, Capel le Ferne and Wittersham. Airships supported

a naval defence strategy by patrolling coastal waters to spot for submarines and sometimes bombed them.[90]

Considerable ingenuity was shown in inventing aircraft detection methods in the form of circular 'sound mirrors' which utilised acoustics to listen-in for enemy aircraft sound at long range, for example at an experimental installation at Binbury Manor in 1915.[91] Although limited in their geographical scope, this led on to the installation of combined experimental/operational mirrors at fixed sites at Joss Gap and Dover. These were supplemented by mobile acoustic detectors formed of metal horns rather like enlarged versions of personal ear trumpets. Ground observation to search the skies for intruders and reporting to help activate the air defences had hitherto been from any official establishment with a telephone, including forts, AA batteries and railway stations but communication links could be slow and uncertain. From 1916, when air defence became the sole responsibility of the War Office, ground observation became more organised and the reporting system was improved, including better liaison by telephone or wireless. There were also early-warning spotters on the Continent who would pass on a warning to Britain. In this year a new Height Finder Mk I was gradually introduced for the use of ground stations.[92]

The Admiralty continued to make significant contributions, from its expanding number of flying bases and aircraft spotting and gun defence from the use of warships in the Thames Estuary, where monitors were again deployed in 1916. In the same year the guns of the 3rd Battle Squadron based at Sheerness were added for a time, dramatically also enhancing the defences against a raid or invasion.[93] Ships of the Dover Patrol at the naval port of Dover were probably similarly used.

Although there was an early raid on Dover in December of 1914 (reputed to be the first on Britain),[94] the tempo of air raiding, whether by Zeppelins or aircraft, was more evident from 1915-16. In an example of cause and effect, interceptor aircraft came to be distributed more widely around London and the south-eastern counties in a greater number of airfields as well there being a greater deployment of anti-aircraft guns (**Fig. 20**). In a major strategic improvement, this led by July 1917 to the creation of the London Air Defence Area (LADA) which consisted of powerful radial concentric rings of guns, searchlights, balloon barrage aprons and fighter interceptor zones, from which a limb from the Medway and the Thames Estuary extended north to the River Blackwater. There were also outer air defence shields consisting of both anti-aircraft guns and fighter airfields running through the Swale area south from Faversham (where there was an important explosives industry) to Romney Marsh and, further to the east, along the coast between Margate and Folkestone.[95] By 1917 an observing instrument consisting of a flat wheel and a radial arm was introduced for ground observers. This established the bearing to the target and the angle of sky elevation which could then be telephoned through to an area sub-control to be marked on a map, with a call to LADA headquarters at Horseguards in London. From there the air defences could be activated and directed on to target. As part of the defence of Kent and of Britain, German Zeppelin and aircraft bases on the Continent were intermittently raided to diminish the enemy air threat at source.

Although the earlier-mentioned Lodge Hill site may have been an intended template for other sites, war-time construction of anti-aircraft batteries tended to

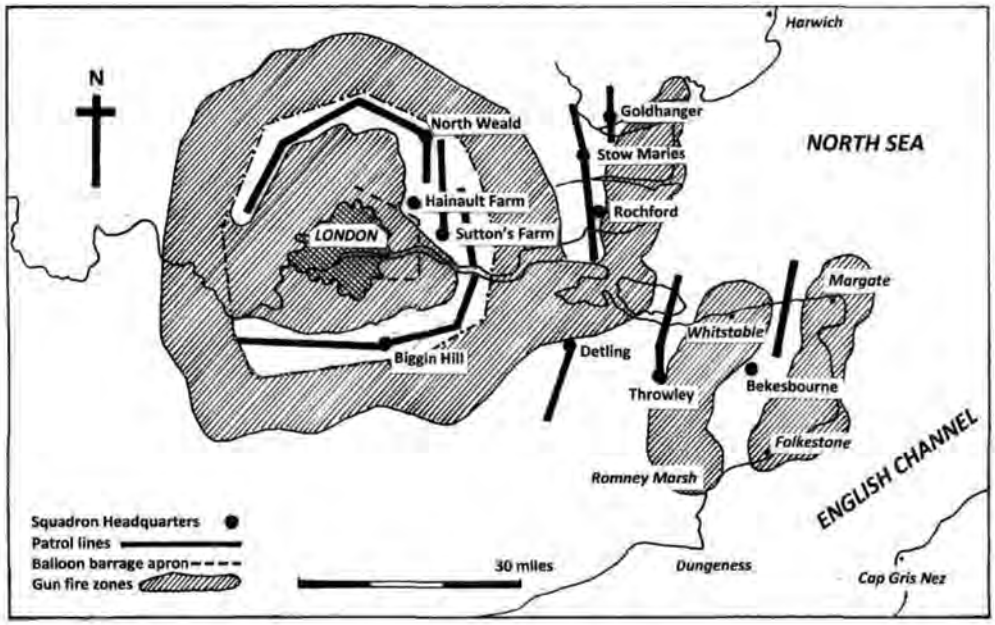

Fig. 20 Map of the air defences of London in 1918, based on a map in Derek Wood, *Attack Warning Red* (1992) (Victor Smith 2015).

be less elaborate, having a simple concrete base with holdfasts, with a magazine and a detachment hut adjacent.

According to considered strategic need, the infrastructure of Britain's air defence continued to grow, with a spread of gun batteries, searchlights and airfields in an interception line extending north from Essex. Kent eventually embraced 121 anti-aircraft sites (gun batteries, searchlights and places for ground observation) and around 40 airfields and landing grounds of varying sizes, importance and utilisation.[96] There was a concentration of guns at Folkestone which had suffered from heavy bombing in May 1917 and the beginnings of what appears to have been an intended grid of sites, including a sentinel line of searchlights, across the interior of the county.[97] Airfields originating or used in Kent during the war combined grass fields or concrete slipways where seaplanes were operated with temporary and semi-permanent buildings, whether hutting, accommodation for airfield services of various kinds, including motor transport, or hangars. An analysis of the anatomy of such airfields in the county is overdue.[98] Aircraft types and their distribution to airfields and landing grounds changed during the war and a full listing is not known but, from among them, were the BE2 and 12, the SE5, the Short 184, the AVRO 504 and the Fairey III. The standard patrol airship was the Submarine Scout, many of which were provided with wireless for communication.[99]

The growing effectiveness of air defence virtually eliminated daylight raids below 10,000 feet. More noticeable became raiding by aeroplanes such as the large Gotha introduced in 1917 and later the even larger Staaken having treble the bomb-load. This year saw devastating raids by heavy bombers on London and, within Kent, on

Folkestone and Chatham, all with considerable loss of life and many injuries. There were other fatalities during the war arising from raids whether by Zeppelins or bombers on Dover, Ramsgate, Margate, Shornecliffe Camp, Sheerness, Otterpool Camp, Broadstairs, Cheriton, Hythe, Gillingham, Deal, Walmer and Ashford, as well as raids without significant injury at Gravesend and other places.[100] As the war progressed, especially with the introduction of the incendiary bullet by the British, the Zeppelin became a decreasingly viable weapon. Home defence aircraft were also earmarked for surface attack in the event of an invasion, some 500 machines being assigned nationally for this purpose. Further enhancement of ground and air based defence was being considered in the expectation that the war might last for another year. Thoughts also began to be given to the shape of a hoped for powerful post-war air defence organisation.[101] Even though post-war financial retrenchment actually led as early as 1919/20 to the reduction of the most powerful air force in the world and of the British system of air defence to near vanishing point, LADA with its system of ground observation, reporting and coordination of defence was used as a frame of reference for post-war air defence planning.

The star survival from the anti-aircraft batteries in Kent is that at Lodge Hill. Although some guns were on mobile mountings it is likely that there are many remains of hard standings for fixed types, bases for magazines and detachment accommodation which could be discovered archaeologically. Anecdotal evidence of survival is starting to emerge, for example at Lower Halstow/Basser Hill. Survival of elements of airfields is represented, for example, at Eastchurch but there are other places. Striking cropmarks of the airship station at Capel le Ferne appear on aerial photographs.

Civil defence: though of a tentative nature, that which was rather later came to be called civil defence against air attack was introduced, consisting of the use of air raid sirens to warn of an approaching enemy, schemes to reduce or eliminate lighting in target areas to decrease their visibility to night raiders and the designation of cellars and other suitable places as shelters. In addition to the use of sirens, in some areas groups of volunteers were formed to warn the community of an impending air attack by the use of whistles and to give first aid if needed after a raid. Doctors were designated from whom medical assistance could be obtained. Existing chalk tunnels at Dover were extended and used as shelters, with other tunnels being used at Broadstairs, Ramsgate, Walmer, Deal and Chatham, as well as elsewhere. Civil defence tended to be concentrated in areas considered more likely to be targets, including Chatham, Sheerness and Dover. Where there was a service presence, there was an organisational liaison between military and civil authorities to ensure or at least assist unified arrangements. At Sheerness, however, there were difficulties in settling upon an appropriate air raid warning signal. The possibility and fear of attack from the air with poison gas was promoted by commercial interests who offered respirators for sale. In addition to instructions to civilians about what action to take in the event of an air raid there was also guidance concerning what to do should there be bombardment from the sea, for example on Thanet, at Deal and Walmer.[102] Tunnel shelters remain at Ramsgate, Dover and Broadstairs as well as perhaps elsewhere.

The Vulnerable Points Committee: spanning the range of facilities for land, sea and air defence, as well as the infrastructure of industrial and war production, the Vulnerable Points Committee was formed in July 1916 as a sub-committee of the Committee of Imperial Defence.[103] It listed and periodically revised a national compendium of Vulnerable Points, under 13 categories, of which Kent was plentifully provided:

Cable landing stations	Ammunition stores
Wireless telegraph stations	Explosive factories
Port War signal stations	Filling factories
Aircraft stations	Factories generally
Docks	Supply depots
Shipbuilding and repairing yards	Miscellaneous
Coal and oil stores	

These were grouped under a descending hierarchy from 'A' Points of First Importance, 'B' Points of Serious Importance to 'C' Points of Lesser Importance, each being analysed according to the nature of the expected attack, and whether provided with a military guard, anti-aircraft defences and protection against naval attack, whether situated in a town or an open space and the government department most interested. All were to be adequately guarded and, if required, provided with a perimeter fence. Forms of attack to which Kentish sites were expected to be subject were landing raids, air raids, sea bombardment and action by enemy agents and 'evil-disposed persons'.

CONCLUSION AND COMMENT

Although the Kaiser did not invade, the Germans did come in the form of bombing of military targets and communities, the triggering of numerous bombing alerts and the display of air to air contests in the skies as well as naval incursions, attacks with sea mines around the coast resulting in losses of shipping and lives. Ordinary people were affected by the effects of 'total war', whether working in war industry or in the exertions of family members away fighting, dying and becoming injured, further touching daily lives. Added to this was the visibility of a vast troop movements and the camps of soldiers destined for the Western Front and other theatres, as well as the presence of home defence troops and of the defences themselves.

The possible debarkment points and the degree of probability of invasion drew differing assessment during the course of the war. As earlier remarked, in August-September 1914 the fear was that German forces might roll up the Channel Ports and present a risk of invasion, if there was to be one, across the English Channel from France with a landing in Kent or Sussex. The stabilisation of the Western Front negated that, leaving as more likely a descent on the East Coast of England and the Thames Estuary. The latter was considered by home defence planners to be more probable, given the facility it presented for a direct attack on London without a long trek from elsewhere. But the degree of likelihood of an invasion depended upon a range of 'what if' contingencies. One of these was fear of a serious military reverse and a retreat on the Western Front. This could have led to the abandonment

of the French ports to the Germans and to the short Channel crossing being used by them. Likewise at sea, and however improbably, a serious British defeat would have granted the German fleet the freedom to support an invasion. Worse still would have been a combination of the two. There was even a fear that in an act of desperate bravado, the Germans might have been willing to risk near-annihilation of their fleet to ensure getting their troops ashore. The reality, however, was that as had been predicted in earlier British planning assumptions, Germany's efforts were fully occupied coping with the demands of the Western Front, having set aside the idea of invasion in favour of submarine attacks to try to starve Britain into submission and surrender. The last time that British naval superiority was seriously challenged was at Jutland in 1916. Indeed, the real conditioning factor had been the British domination of the North Sea and the diminishing effect this had on the possible scope of action by the German fleet which would have been needed to support an invasion. However, British home defence planners did not have the advantage of hindsight about the course of the war and, understandably, continued throughout the conflict to develop and maintain measures as best they could against a number of possible contingencies.

Looking to the future, the war stimulated arguments for the cutting of the Channel Tunnel between Kent and France, it being noted by the British Channel Tunnel Committee that 'had the tunnel been in existence millions of tons of war shipping [for troop transit and supplies] would have been available for other purposes, freights would have been lower and food cheaper, while the transport of wounded would have been greatly facilitated.' A tunnel would have been a vulnerability as well as an advantage but could easily be cut from the British side if danger had threatened.[104]

The potential for further discovery and the possibilities for conservation and public display

Under the Defence of Swale Project greatest research effort into anti-invasion defences has so far concentrated upon those of Sheppey and the Chatham Land Front, including ground search by volunteers. There has also been important new information from the discovery of memoranda of the committees responsible for civil emergency measures across the county. Collectively, this work has started to put home defence during the Great War on the map. Indeed, the representation of home defence facilities, operational areas and vulnerable points using computerised mapping has demonstrated the potential of this powerful tool more broadly for helping to understand and illustrate the strategy and tactical measures in play during the war, a theme running through other possible avenues of research. Other useful sources are the reports of the committee set up at the end of the War to dispose of War Office land and buildings.[105]

This paper is a beginning and a curtain-raiser for many exciting new discoveries to be expected from investigation in the years ahead. This will build on the groundwork of the Defence of Swale Project, through further work that both investigates the Swale defences in more detail and examines their Kent-wide context as part of the wider British system of home defence. This will further improve our appreciation of Kent's defences during the Great War. Further research, survey

and investigation should provide a more complete knowledge of the surviving archaeology, above or below ground, and the possibilities for conservation and public display should emerge more clearly. Opportunities to use this heritage and the story of home defence in education and public interpretation are considerable and will be explored in more detail.

Work on the naval defences could reveal illuminating points of detail about changes to, and enhancements of, shore base facilities during the war as well as about the use of mines and nets at sea and the operation of warships. There is scope for learning more about the work of Nore and Dover commands and, within this, the significance of the Dover Patrol requires special study. Much of the defensive arrangements adopted will be found to have been a response to new technologies and strategies of both the British and German navies. The integration of aircraft and airships with the operations of naval vessels was pioneering. Maritime wrecks are a rich illustration of the war at sea but are often unmapped or unrecognised. There may be a potential for encouraging volunteer divers to participate in investigation, with due sensitivity to the presence of war graves.

There are significant opportunities for learning more about the coastal anti-ship and anti-invasion defences on land, not only the forts and batteries at the more familiar defended localities of the Thames and Medway and at Dover but the less well-known war-emergency batteries elsewhere. Most of all there is the prospect of discovery arising from the extemporised fieldworks which proliferated and which, collectively, added up to many linear miles. There is a need to identify the extent of trenches intended for training and experimental purposes and to distinguish these from those having a defensive use. Both are significant with some cross-over of function. Full knowledge of them is challenged by an absence of abundant records but they can be revealed from the study of aerial photographs, occasionally mentions in official memoranda, sometimes dramatically from LIDAR survey and, from time to time, from folk memory and local histories as well as from field survey. The enhanced interest in the Great War can be capitalised upon and might bring to light material in family hands, including photographs, diaries and even official documents. In this context there needs to be a point of contact at which people can seek an explanation of what they hold and from which to make such information more generally available. As trailed by the pioneering work of Kent County Council for the fieldwork lines of Sheppey and the Chatham Land Front on the adjacent mainland, known lines might be better understood by archaeological excavation and detailed recording, where this is possible. The garland of field defences, outposts and check-points to the rear of Dover presents a major investigative opportunity as well as for discovering what it was like for people to live within the confines of such a place.

Study of existing contemporary mapping of the many anti-aircraft batteries across Kent to more precisely identify locations and functions could also open up the possibility of archaeological exposure to reveal and record their designs. The military airfields of the county have been studied but their use in Kent and the south-east during the Great War as well as their individual anatomy during that period would justify continuing work. Eastchurch, illustrating the birth of the RNAS, is especially significant and has considerable potential through the survival of structures and defences that relate not only to the Great War but also to its

earlier and subsequent use. The South-East has a particular significance for the national response to the new air threat and much has yet to be understood. An in-depth review of ground and sky-based air defence operations over the course of the conflict, together with mapping its evolution, would be welcome and useful. The surviving air activity reports for Nore Command are, for example, a rich source of information. A project by the National Trust to re-expose the sound mirrors at Fan Bay at Dover is a good example of how the effort of volunteers, supported by funds to employ contractors, can be effective and is perhaps an indication of what can be achieved more generally across the spectrum of Great War remains.

The port operations of the Thames, the Medway, Richborough, Dover and Folkestone in sustaining the war effort with supplies and manpower would merit a special study, especially if contextualised with the work of other ports in Britain. Richborough in particular, demands a study project to understand and explain its vital role in the second half of the war, to discover more fully its anatomy and how its elements functioned as well as to establish what now remains.

An important and less-exploited area, rich in the prospects for advancing knowledge, is the social impact of measures taken for defence, as well as of the collecting, accommodating and transit of troops in and through the county. Themes could also include restrictions on personal movement, secrecy and suspicion of enemy agents, requisition of land and property, economic effects of defence and the presence of troops and changes to the landscape. Likewise the effects on the lives of people and communities of air raids, as well as the measures for civil defence. Also meriting further study is the range of implications for populations in the event of an invasion, as set out in a raft of contingency planning by the county's Local Emergency Committees.

There are comparisons to be drawn with the anti-invasion measures during the wars with France from 1778 until 1815. These also included provision of stop lines between the coast and London and elements of a scorched earth policy to be implemented in the face of an advancing invader.

The role of war industry in the county is a further area for investigation. There may also be possibilities for additional research into the politico-strategic context of defence planning which gave rise to the totality of the measures adopted for naval, military and air defence, including what more can be discovered of German intentions in relation to invasion.

The possibilities that exist for conservation and public display are varied, including the interpretation of defence sites used during the conflict and the permanent exposure or reconstruction of a sample of the epic field work systems.

Moreover, the nature of the evidence for the defences of the Great War lends itself to public participation, for example in mapping what was built or made and what now survives. This could include opportunities for involvement in the earlier-suggested archaeological examination of back-filled trenches and of anti-aircraft batteries but there are other possibilities. Collectively, the results of this further work could have an important and enduring educational value at all levels.

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ENDNOTES

1 An overview of Kent's First World War Defences is provided by Victor Smith and David Killingray in *An Historical Atlas of Kent*, 2004, pp. 140-41. H. Basford and K.H. McIntosh, 2008, *Gazetteer of East Kent in the Great War, 1914-1918*, East Kent branch, Western Front Association.

2 H.R. Moon, 1968, 'The Invasion of the United Kingdom', PH.D. thesis, University of London.

3 *Ibid.*; Victor T.C. Smith, 1985, 'Chatham and London: the changing face of English land fortification, 1879-1918', *Post Medieval Archaeology*, 19, 105-49.

4 TNA WO33/48, A138.

5 H.R. Moon, *op. cit.* (see note 2).

6 TNA CAB38/13/27.

7 Andrew Saunders, 1989, *Fortress Britain*, Liphook, 190-1.

8 TNA CAB/2/1/69; see also CAB38/2/5 and CAB38/2/9.

9 Navy Records Society, 1993, *British Naval Documents 1204-1960*, 742-52.

10 Victor T.C. Smith, *op. cit.* (see note 3), 2, 142; TNA CAB3/2/1/44a.

11 H.R. Moon, *op. cit.* (see note 2), 427, 665.

12 D. Capper, 1963, *Moat Defensive*, London, 194 *et seq.*

13 H.R. Moon, *op. cit.* (see note 2), 526.

14 As provided for in TNA WO33/671, 'The Eastern Coast Defence Scheme – Thames and Medway – Part 1 (HQ), revised to February 1914'; and TNA 33/602, 'Defence Scheme – South Eastern Defended Ports – Dover, revised to August 1912'.

15 Sir Julian S. Corbett, 1920, *History of the Great War – Naval Operations*, I, London.

16 D. Capper, *op. cit.* (see note 12); TNA ADM151/81.

17 Admiral Sir Reginald Bacon, 1919, *The Dover Patrol 1915-1917*, New York.

18 P. MacDougall, 1981, *The Chatham Dockyard Story*, Chatham, 138.

19 TNA ADM82/137; WO33/771.

20 Annotated map in Fred T. Jane, 1906, *Fighting Ships 1906-7*, London, 31.

21 Admiral Sir Reginald Bacon, *op. cit.* (see note 17), 53-7.

22 *Ibid.*

[23] John Goodwin, 1985, *The Military Defence of West Sussex*, Midhurst, 77-83.

[24] Admiral Sir Reginald Bacon, *op. cit.* (see note 17), xi, xiii, xiv *et seq.*

[25] *Ibid.*, xiii.

[26] *Ibid.*, vii.

[27] TNA 33/671. A recollection of the 1887 incident was given in the *Daily Telegraph* for 31 August 1910.

[28] K.W. Maurice-Jones, 1959, *History of Coast Artillery in the British Army*, Woolwich, 182.

[29] TNA WO33/671.

[30] TNA ADM151/83, 'Summary of situation in regard to measures to be adopted to deny the enemy the use of certain ports', 31 December 1914.

[31] TNA WO33/874, WO192/222 (Fort Record Book for Fletcher Battery); C. Dobinson, 1996, 'Twentieth Century Fortifications in England, I.1., Coast Artillery 1900-1956', CBA, 148.

[32] TNA 33/602.

[33] *Ibid.*; TNA CAB3/3, memorandum 'Coast Defences of the United Kingdom', May 1914.

[34] David Burridge, 2001, *The Fixed defences of Dover in the 20th century*, Dover, 7.

[35] TNA 33/602.

[36] TNA 33/706; TNA 33/828.

[37] H.R. Moon, *op. cit.* (see note 2), 588.

[38] TNA WO33/742, 'Report of a conference to consider the possibilities of attack on the United Kingdom', 1916.

[39] H.R. Moon, *op. cit.* (see note 2), 517.

[40] TNA WO33/694, Memorandum 'Home Defence Central Force Scheme', August 1914, WO792, report 'Distribution of Southern Army (Home Defences)', July 1916.

[41] TNA WO153/425, maps 2, 3 and 10.

[42] *Ibid.*, map 5.

[43] TNA 33/1776, 'General Scheme for the Employment and reinforcement of troops in the event of raid or invasion', August 1916; Edwin A. Pratt, 1921, British Railways and the Great War, London.

[44] I.F.W. Beckett, 1985, *A Nation in Arms: a social study of the British Army in the First World War*, Manchester, 15-16.

[45] Photographs of the field defences constructed during the war, in 'The Sheppey Section of the Thames and Medway Garrison, with details of some of the various works and different types adopted, 22 April 1919' in the collection of the Royal Engineers Library and Museum and a collection of maps and plans of the defences, countersigned 1919 in TNA WO78/4431 as well as other plans in WO33/4403 and 4427.

[46] *Pers. Comm.* Alan Anstee, 2014.

[47] TNA WO78/4431.

[48] Announced and regulated in 'Special Announcement – defence of the Realm – Isle of Sheppey Special Military Area, dated 21 August 1916; transcript supplied by David Hughes.

[49] Several maps and plans in TNA WO78/4400 and 4402.

[50] TNA WO153/425.

[51] The defence scheme was set out in TNA WO33/602 and recorded in maps contained in TNA WO78/4424. The generality of schemes for other fortresses is referred to in TNA WO32/5528.

[52] David Burridge, *op. cit.* (see note 34), 8-10.

[53] H.R. Moon, *op. cit.* (see note 2), 490.

[54] Memoranda in Kent History and Library Centre, C/A2/6/19.

[55] TNA ADM151/83 (see note 30); and from scrutiny of aerial photographs by Alan Anstee and Chris Blair-Myers.

[56] TNA WO106/6188, 'Handbook for the London Defence Positions (Provisional)', War Office, 1903.

[57] Richard Morris, 2009, *The Diaries and Letters of Lieutenant General Sir Francis Lloyd, 1853-1926*, Barnsley, 99.

[58] Memoranda in TNA WO32/9966 and 9967.

[59] TNA ADM137/967.

[60] See note and images by Andrew Mayfield in this volume, pp. 304-06.

[61] TNA 33/1776 (see note 43); TNA WO33/877.

[62] 'General views of the main Defensive Position on the Chatham Land Front, which was organised for defence during the war', 22nd April 1919 in the collection of the Royal Engineers Library and Museum and a collection of maps and plans countersigned 1919 in TNA WO78/4431.

[63] Alan R. Anstee, forthcoming, 'The Artillery of the Great War anti-invasion defences of the Swale area of Kent', *Journal of the Ordnance Society*, 23, 55-79.

[64] The trenches and barbed wire were mapped in TNA WO78/4424 and images of the shelters are contained in the photographic collection described in note 45.

[65] Victor T.C. Smith and Peter Seary, 2012, 'Kent's 20th-century military and civil defences. Part 3 – Canterbury', *Archaeologia Cantiana*, cxxxii, 157.

[66] TNA WO33/771, 'Note by the General Staff on Home Defence', 23 April 1916; TNA 33/745, 'Emergency Scheme C, reinforcement of Central Force South of the River Thames', 1916 and TNA WO33/788.

[67] TNA WO33/788.

[68] TNA CAB3/3, Memorandum, 'Troops required for Home Defence', 15 January 1918.

[69] *Ibid.*; TNA WO153/425 (see note 41), maps 6 and 7.

[70] *Ibid.*; see also Anstee, *op. cit.*, at note 63.

[71] Memoranda in Kent History and Library Centre, C/A2/8/1.

[72] TNA CAB21/14.

[73] Information from Ben Found, extracted by him from Canadian War Diaries for formations in Kent.

[74] H.R. Moon, *op. cit.* (see note 2), 629.

[75] V. Smith and P. Seary, *op. cit.* (see note 65), 158; TNA WO153/425 (see note 41), maps 8 and 9.

[76] Synthesised from schedules in 'The Lands and Buildings Reconstruction Committee, reports of 1 January 1918 and 31 January 1919.

[77] As illustrated in *Bygone Kent*, 2014, 35/5, 4-5.

[78] See note 73.

[79] TNA CAB38/28/46 and CAB3/3, 'Instructions to Local Authorities in the event of belligerent operations in the United Kingdom', 9 November 1914.

[80] These measures were described in the memoranda of Kent's Local Emergency Committee during the Great War in the collection of the Kent History and Library Centre, for example, C/A2/6/10 (Faversham), C/A2/6/7 (Deal and Walmer), C/A2/6/8 (Dover), C/A2/6/19 (Ramsgate and Isle of Thanet), C/A2/12 (Folkestone), C/A2/6/25 (Sheerness) and C/A2/6/26 (Sittingbourne), together with the memoranda of the overarching Central Organising Committee, C/A/02/05/01-8.

[81] C. Dobinson, 1996, 'Twentieth Century Fortification in England, 1.5, Anti-aircraft Artillery, 1914-46', CBA, 11-21.

[82] *Ibid.*; TNA CAB/3, Memorandum, 'Coast Defences of the United Kingdom', 7 May 1914.

[83] TNA ADM151/82, memorandum of 22 October 1913.

[84] Reproduced in the Kent History Forum website.

[85] C. Dobinson, *op. cit.* (see note 81).

[86] Victor Smith, 2014, Barbed Wire Island: Sheppey and the Defended Ports of the Thames and Medway during the First World War', *FORT*, 42, 166.

[87] C. Dobinson, *op. cit.* (see note 81).

[88] Ken Delve, 2005, *The Military Airfields of Britain – Southern England*, Ramsbury, various entries.

[89] *Ibid.*, 82-9 and 262; Victor Smith, *op. cit.* (see note 86).

[90] Ken Delve, *op. cit.* (see note 88), 251 *et seq*.

[91] Richard N. Scarth, 1999, *Echoes from the Sky*, Hythe, numerous entries.

[92] C. Dobinson, *op. cit.* (see note 81). A description of the height finder is given in TNA WO33/775.

[93] TNA ADM151/84, Admiral Sturdee, 'Work carried out in Nore Command during the war', 20 December 1918.

[94] David Burridge, *op. cit.* (see note 34).

[95] Mapped and described in Derek Wood, 1992, *Attack Warning Red,* Portsmouth, 12-16.

[96] These figures have been synthesised from the schedules referred to in note 76.

[97] Derek Wood, *op. cit.* (see note 95).

[98] C. Dobinson, *op. cit.* (see note 81).

[99] TNA ADM151/82; Ken Delve, *op. cit.* (see note 88).

[100] Martin Easdown with Thomas Genth, *A Glint in the Sky*, Barnsley, 2004.

[101] H.R. Moon, *op. cit.* (see note 2), 386, 416 and 502; TNA CAB3/3 (see note 68); for the general situation and for the Thames and Medway area, see the memoranda of 1918 and 1919 in TNA ADM151/84.

[102] Samples of the measures for civil defence may be found in the memoranda of Kent's Local Emergency Committees listed in note 85, the papers of Nore Command for the war years (TNA ADM151/81, 82, 83 and 84) and in the minutes of councils in Swale District in the collection of the Kent History and Library Centre: Faversham Borough (Fa/AM1/5 and 6), Milton Rural District (RD/Mi/AM1/2 and 3), Queenborough Borough (Q6/AM1/10 and 11, Sheerness Urban District (UD/Sh/AM1/19 and 20) and Sheppey Rural District (RD/Sh/AM1/4).

[103] TNA CAB3/3, reports of April 1917 and April 1918.

[104] TNA CAB3/3, 'Memorandum on the Channel Tunnel', December 1916 and December 1919.

[105] See note 76.