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## The Fortification of the Firth of Forth 1880–1977

‘The most powerful naval fortress in the British Empire’

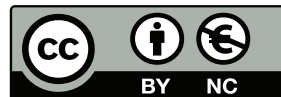
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Part I

‘IN TIME OF WAR . . .’

*In time of war a Fleet can only operate efficiently if [its] base . . . is defended in such a way as to provide security and thus confidence and rest.’<sup>1</sup>*



## Chapter 1

# THE FORTH

### 1.1 Introduction

To allow the unimpaired mobility of sea, land and air forces, defended bases were necessary at strategic points throughout the Empire. The purpose of coast defences was to allow such places to protect themselves until the main fleet could arrive – the ‘period before relief’ – against the ‘estimated scale of attack’ likely on a specific port, and also to deter sudden capture or raiding.<sup>2</sup> Our book sets out to tell the story of the ‘most powerful naval fortress ... in the British Empire’, as it was described in 1922, referring to its state in 1916, whose role as one of Britain’s most important 20th-century naval bases is gradually fading from popular memory.<sup>3</sup>

After the Napoleonic War the river was largely undefended until concerns about potential French and Russian aggression prompted the beginnings of the modern defence of the estuary in 1880, at Kinghorn and on Inchkeith. From that time, the strength of the defences grew through the last decade of the 19th and the first decade of the 20th centuries.

The importance of the Forth grew as the emphasis shifted from the defence of the vulnerable south coast against the French, to the possible threat from France’s ally, Russia, and then to an expansionist Germany. The Rosyth Naval Base was the response, and the protection of that asset from German raiding on the Forth became a key aim of the defences. The Germans, indeed, were planning for such raids in 1908 (Fig 1.1).<sup>4</sup>

In the years before 1914, the estuary was well defended, and in the first half of the First World War significant additions were made. When it was decided in early 1916 to move the Grand Fleet from the anchorage at Scapa Flow, the Forth was made impregnable.

Although the defences were scaled down between the wars, the estuary continued to be relatively strongly defended. The surface naval strategy of the Second World War was not focused on the North Sea, but on keeping German warships out of the Atlantic. Although Scapa Flow would again be the main fleet anchorage, the Forth was still of high strategic importance and was hurriedly rearmed in 1938–9, remaining at high alert into 1943. Some of the guns in place since before

the First World War continued to form part of the armament, but batteries of the most up-to-date guns were put in place to tackle motor torpedo boats. The defences were extended to encompass the important convoy mustering area in Largo Bay.

The coast defences were run down after the war and finally wound up in 1956, but the capacity to erect an anti-submarine barrier across the river was only finally abandoned in 1977.

An important feature of the Forth defences is that they closely reflected contemporary developments and controversies in defence. The defence of the southern naval bases was compromised in the earlier part of the period 1880–1956 by the presence of large-scale forts, only recently built at vast expense, but almost immediately outmoded. The nature of the narrative in the Forth is surprisingly different: it is a story of the construction of fortifications *de novo*, and generally speaking of relatively rapid rates of upgrading and reinforcement. Our intention is to relate what was built, upgraded, downgraded, abandoned, reoccupied or repurposed in the Forth to the wider political and military context so as to give meaning to what happened, rather than merely to document the development of disparate sites.

The strength of Coast Defence waxed and waned as two schools of defence strategy struggled for precedence: the ‘Blue Water’ school, for whom a large fleet was the answer to every question, and the ‘Bolt from the Blue’ school, which wanted to develop a larger standing Army for home defence and to act abroad. The fortunes of the defences between the wars also reflected the bitter controversy about the capacity of air power to replace ships and coast defences, and documented the shift from preparation for a theoretical war with France in the 1920s to the belated recognition of the renewed threat from Germany. From the beginning of the 20th century, aviation played an increasingly important role in warfare. While we touch on the role of aircraft, both friendly and enemy, in the story of the fortification of the Forth, the histories of air defence and of naval aviation are immense subjects, beyond the scope of our book.

The defences of the Forth have been described in a number of brief articles or in passing in books covering wider topics.

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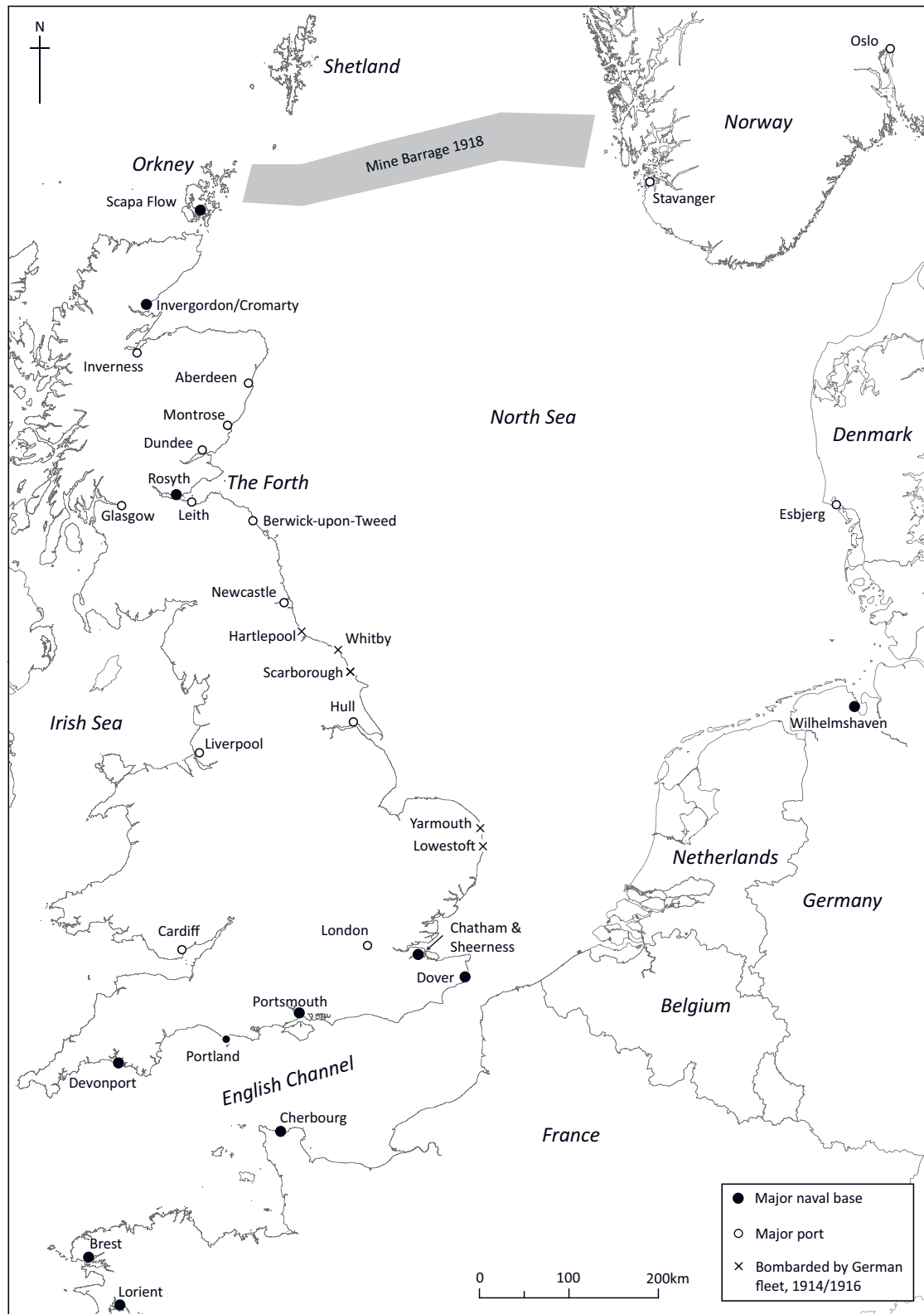


Figure 1.1

The Forth in its strategic position in the North Sea basin. The map shows the location of major British, French and German naval bases operational in the first half of the 20th century, as well as other major ports and places mentioned in the text. The five English towns bombed by the German fleet in 1914 and 1916 are marked. The location of the US/British mine barrage between Orkney and Norway, completed in 1918, is also shown (© Gordon Barclay)

General Scott-Moncrieff first described the defences of the Forth up to the end of 1918 in an official report and in a popular article.<sup>5</sup> In more recent times, there was a flurry of activity in the 1980s, with Saunders' summary, Smith's account of the defences from 1880–1910 and Clark's of the 20th century.<sup>6</sup> Individual elements of the defences have been the subject of particular studies: one of us, RM, has published accounts of the Charles Hill and Kinraig batteries, and the wartime history of the May Island.<sup>7</sup> Pollard and Banks described the defences of Inchkeith, in the context of a report of excavations on selected parts of them.<sup>8</sup> The most recent is Stevenson's article, 'Some Defences of the Firth of Forth'.<sup>9</sup> The role of the Forth and its defences were also described by Lavery in his *Shield of Empire*.<sup>10</sup>

The modern coast defences of the UK and Ireland have been the subject of only one book, *The History of Coast Artillery in the British Isles* (1959), by Maurice-Jones, now very out of date.<sup>11</sup> Saunders, in 1989, summarised the history of artillery fortification in the British Isles.<sup>12</sup> Two detailed accounts have been written of the modern coast defence of England; the first (including Wales), by Hogg, some 40 years ago, and more recently, an unpublished manuscript report by Dobinson on the more limited subject of 20th-century 'coast artillery' in England and Wales, comprising an introductory text and a detailed inventory (relating to the period 1900–56).<sup>13</sup> Dobinson's volumes were part of a larger project to document 20th-century defence sites in Britain, and are complemented by gazetteers of the Scottish defence sites.<sup>14</sup>

While the Fort Record Books of the batteries and other contemporary military, naval and political records must be the basis of any accurate account, we have found that they can be internally inconsistent and can contradict each other as well as the accounts of people who served in the defences. We have also found that contemporary aerial photographs and mapping, as well as intensive fieldwork, can show omissions in the written records. We have found that the best result comes from combining not only a thorough study and comparison of the records, but also 'ground-truthing' what they say using other sources, fieldwork and oral history.

Our account is based on a thorough trawl of the archives, libraries and other sources listed in the acknowledgements section above, and on the close reading of the contents of hundreds of official files and the extraction of what we believed were relevant data. The most productive sources for the layout of the defences of the Forth, however, from the plans of individual gun sites at one end of the spectrum, to the overall structure of the defences of the estuary, were Royal Engineer plans, War Office maps and plans, aerial photographs and historical Ordnance Survey maps and Admiralty charts. Some 150 data layers were combined in a Geographical Information System run on the ArcMap platform, which allowed the complex history and layout of the defences and of individual sites to be laid out phase by phase. The overlaying of data of

different periods makes easy the detection of what has changed and what has not over time. The GIS outputs formed the basis of the maps of the Forth illustrating Chapters 5 and 7 and the maps of the more complex sites in Chapters 9 to 12. As we have written and revised our text we have continued to come upon further sources of information, in publications, archives and in individual collections. It is certain that more documents, photographs, maps and official and personal accounts remain to be found. Our account of the history of the Forth's defences cannot be definitive, but we believe it to be the most thorough and accurate yet attempted. Cross-references to the National Grid References and to the site numbers in the national heritage database 'Canmore' are given in the Annex.

Our coverage of the anti-aircraft defence of the Forth is limited both by space and by the focus of this book. In the First World War, the limited anti-aircraft defence of Forth was very closely tied in with the naval infrastructure, and we have provided some information on the development of this aspect of the defence. In the Second World War, the scale and scope of the air defence of the UK makes it a subject of study in its own right; for that period, we have described only the anti-aircraft defences supplied to the islands and the other coast batteries, not the wider anti-aircraft defence of southern Scotland.

### 1.2 The Forth Estuary

In 1916, the Royal Navy defined '*The Firth of Forth*' as 'All the waters bounded on the east by a straight line joining Elie Ness on the North and Fidra Lighthouse on the South, and extending westwards as far as the tide flows' – that is, just west of Stirling – an area over 500 sq km in extent; '*The Forth*' was defined as all the waters bounded on the east by a straight line, Kinghorn Ness–Inchkeith–Anthony Beacon, on the Lothian coast (c 116 sq km). '*The Port*', otherwise '*The Rosyth Dockyard*', was defined as lying between two lines: on the east, a line drawn true south through the south point of Carron Harbour (a tiny harbour just west of Burntisland, Fife); to the west, a line drawn true south through Carriden House (an area of water c 72 sq km) (Fig 1.2).<sup>15</sup>

For the purposes of our study, we define the Forth Estuary as the body of water west of a line drawn between Fife Ness and St Baldred's Boat, a rock on the coast near Tantallon Castle, dog-legged a little to the east to include the May Island, which played an important part in the defence.

Although the surface of this great body of water gives an impression of uniformity, it conceals a complex 'landscape' of deep channels and extensive shallows which determined the ways in which the estuary could be used and constrained the sorts of attacks that might be made. In all the maps of the estuary we have prepared, we have included bathymetric information (Fig 1.2).

To the north and south of the May Island and between the island and the Elie–Fidra line the water is, apart from

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Figure 1.2

The estuary, showing the formal boundaries of 'The Port', 'The Forth' and 'The Firth of Forth' as defined by the Admiralty. The green dashed line shows the line we have chosen to define our study area. The Forth is tidal to Stirling. The place-names in red are the sites of major naval and military installations in the first half of the 20th century. The red dots are significant naval ports and installations. The three aerodromes are the Royal Naval Air Stations operational from the First World War. The maximum extent of the rail network is shown. The depth of the water is given in fathoms and metres (© Gordon Barclay)

the coastal shallows, up to 60m deep. Nowhere are there obstructions in the channel that would hinder navigation of surface vessels, nor significantly hinder the free manoeuvring of a submerged submarine.

West of the Elie–Fidra line the channel, as defined by the 20m isobath (underwater contour), begins to narrow. South of Methil the 20m channel narrows to 10km wide; 3.9km further to the west, the depth across the whole estuary drops to less than 20m, although it increases again. From this point, shipping is split to north and south of the island of Inchkeith. To the north of the island the depth of the river increases to between 20m and 48m in the North Channel, which runs westward between Inchcolm and Inchmickery, where it is between 30m and 40m deep. The dangerous Blae Rocks lie just north of the channel.

To the south of Inchkeith, the South Channel, in modern times used by ships with a draught less than 10m, registers depths of 14–31m to a point north of Leith Docks, to the west of which it reduces to less than 10m. Continuing westwards, the South Channel leads into the 'dead end' of the shallows of the Drum Flat and Drum Sands; Drum Sands dry out at low tide, while Drum Flat has only 1m of water (above chart datum) over much of it. The South Channel has dangerous shallows and rocks close to both sides.

Between Inchcolm and the Forth Rail Bridge the water is between 16m and 23m deep. To the west of the bridge, on the Fife side, lay the important sheltered anchorage known as

St Margaret's Hope. After 1909 the northern, shallower part of the anchorage was largely occupied by the Rosyth Naval Base. The naval anchorage west of the bridge extended from the Hope, unencumbered by obstructions and at a minimum depth of 9.1m, 1,700m wide and 6,500m long to the Tancred Bank; the anchorage continued westwards to north and south of the Bank, towards the formal western boundary of 'The Port'. In 1914, 16 moorings for large ships were available.<sup>16</sup> By September 1918, there were, west of the bridge, 38 numbered moorings for capital ships and another 63 smaller moorings, mainly for destroyers.<sup>17</sup>

The defence of the Forth was made more difficult because the estuary itself was a major obstacle to the movement of land forces. Until 1885 (the opening of the railway bridge near Alloa), the lowest crossing of the Forth was the medieval bridge at Stirling. What could not be moved by rail relied on ferry crossings at Queen's Ferry (steam or motor-powered ferries in operation between 1821 and 1964) and between Granton and Burntisland (from 1850 to 1939 – until 1890, the ferries could carry whole railway trains). Work on the present Forth Bridge began in 1882 and it was completed in 1890. It is a major feature in the waterway, at the estuary's narrowing at Queensferry, and its planning and construction overlapped the first modern coast defences in the river. There was a constant fear that the bridge might be 'dropped' by enemy action, trapping the fleet upriver or, later, blocking access to and from the dockyard. The bridge had great strategic value, in



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allowing the rapid movement of large numbers of troops and quantities of equipment across the estuary and along the east coast. The strategic bottleneck was ameliorated in 1936 when the Kincardine road bridge was completed. Throughout most of our study period the coast defence installations, including those on the mainland, were linked by boat to each other and to HQ in Leith.

### 1.3 The naval infrastructure

The Forth contained the largest concentrations of naval installations in northern Britain. Some of these places have already had their history written; others deserve their own.

#### *Rosyth*

Approval was given in 1903 for the construction of the naval base and dockyard at Rosyth. Between 1905 and 1907 the major elements of the design were finalised and work began in 1909. The geology of the site was complex and on the outbreak of the First World War the dockyard was still at least two

years from completion, although the contractor had already got the programme 18 months ahead of target. The main basin was flooded on 16 September 1915. Dredging of the approach channel was completed on 25 March 1916.<sup>18</sup> The dockyard was the target of the first air raid on Scotland, by six German airships on the night of 2/3 April 1916, although none of them reached their target.<sup>19</sup>

The facilities comprised a basin 21.6ha in extent, over 2km of wharfage, and three graving docks. There were also extensive tidal facilities for docking. A major fuel storage facility, with a capacity of 250,000 gallons, was completed in 1919. The dockyard went into care and maintenance in 1925 but was reopened in 1938, as Britain rearmed to face a resurgent Germany. From 1 July 1926, Rosyth was the home of HM Boom Defence Training School.<sup>20</sup> During the Second World War, Rosyth played a vital role as a relatively 'bomb-free' repair yard; after 1940 there were no major air attacks on Rosyth and all five battleships commissioned during the war were fitted out at Rosyth, as were most of the aircraft carriers (Fig 1.3).<sup>21</sup> The naval base finally closed in 1994.

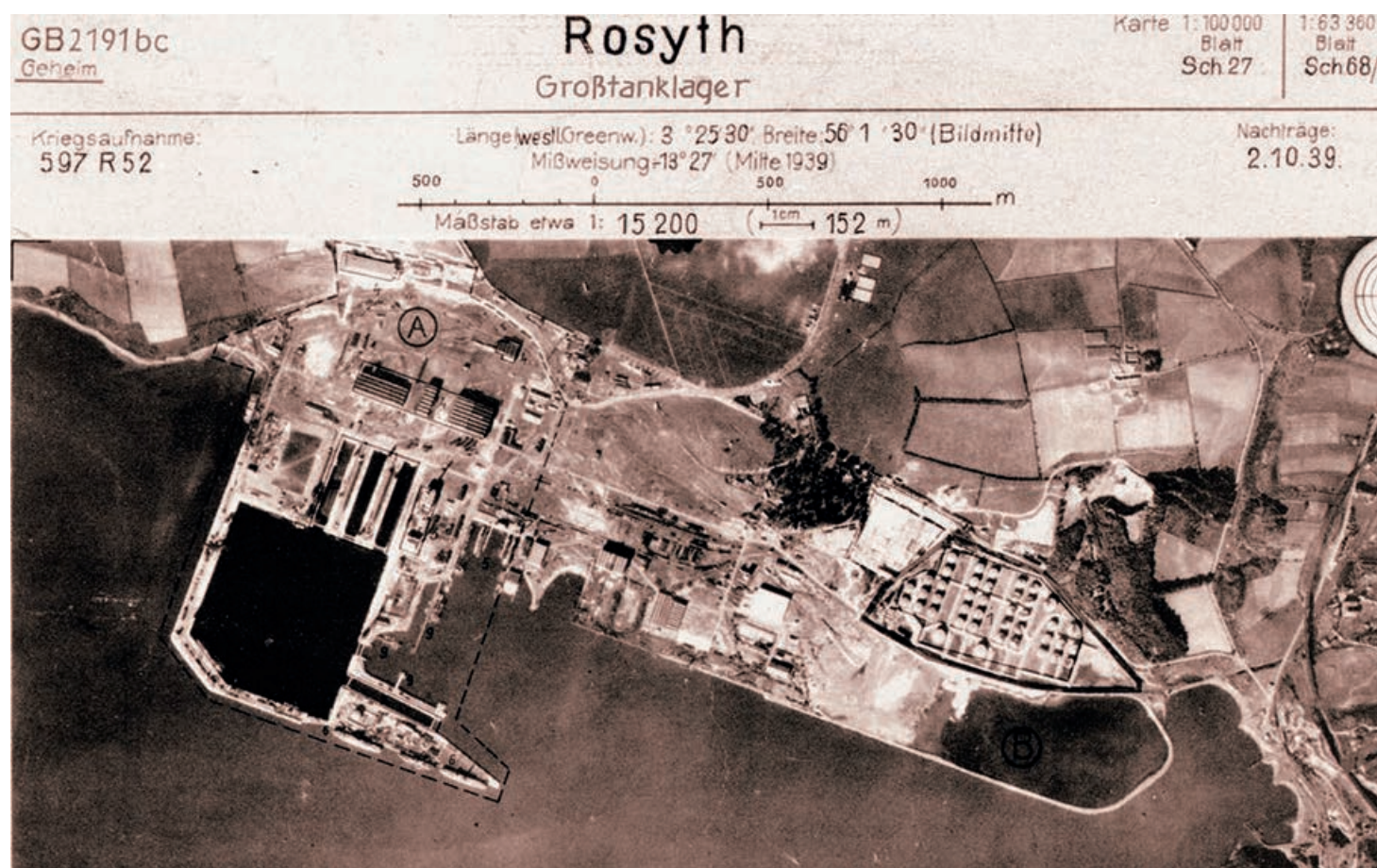


Figure 1.3

Rosyth Dockyard in October 1939. A detail from a German Air Force reconnaissance photograph (Nigel Clarke collection: [www.hitlersukpictures.co.uk](http://www.hitlersukpictures.co.uk))



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### *RNAD Crombie*

About 5km upriver from Rosyth, and on the same side of the estuary, Royal Naval Armaments Depot (RNAD) Crombie was established in 1916 to store ammunition for the Grand Fleet. A map detailing the landward defences of the depot dated 28 May 1916 shows the dozen principal buildings stretched out along the shore, with about 25 further smaller buildings and ‘military hutments’, presumably for the guards who manned the five blockhouses and patrolled the barbed wire boundary fence. The 1916 map also shows the location of the depot’s anti-aircraft defences. The risk of air attack later prompted the construction of underground magazines at a number of RNADs, and six of these, almost 40m long and over 10m wide, were built at Crombie, reached by curving tunnels in which railway tracks were laid.<sup>22</sup> There was, at this date, a single L-shaped pier stretching 750m out into the river. A second L-shaped pier, totalling 950m in length, was built after the Second World War. Crombie is still in operational use as a ‘Defence Munitions’ centre.

### *RNAD Bandedeath (Throsk)*

RNAD Bandedeath was established during the First World War on a terrace in a bend of the Forth, 26km west-north-west of Rosyth, and remained in use until 1978.<sup>23</sup> The camp’s extensive internal railway system served all the main storage and assembly sheds, and was linked to the nearby main line across the Forth, to Crombie and Rosyth. Ammunition for the fleet was also loaded onto small auxiliary vessels at a specially constructed pier for transport downriver, along the initially rather narrow, shallow and twisting channel.

The earliest part of the complex comprised 36 buildings in the ‘Magazine Area’ arranged in six lines across the northern part of the peninsula (Fig 1.4; Fig 1.5). Three of these buildings were surrounded, probably at a later date, by earthwork

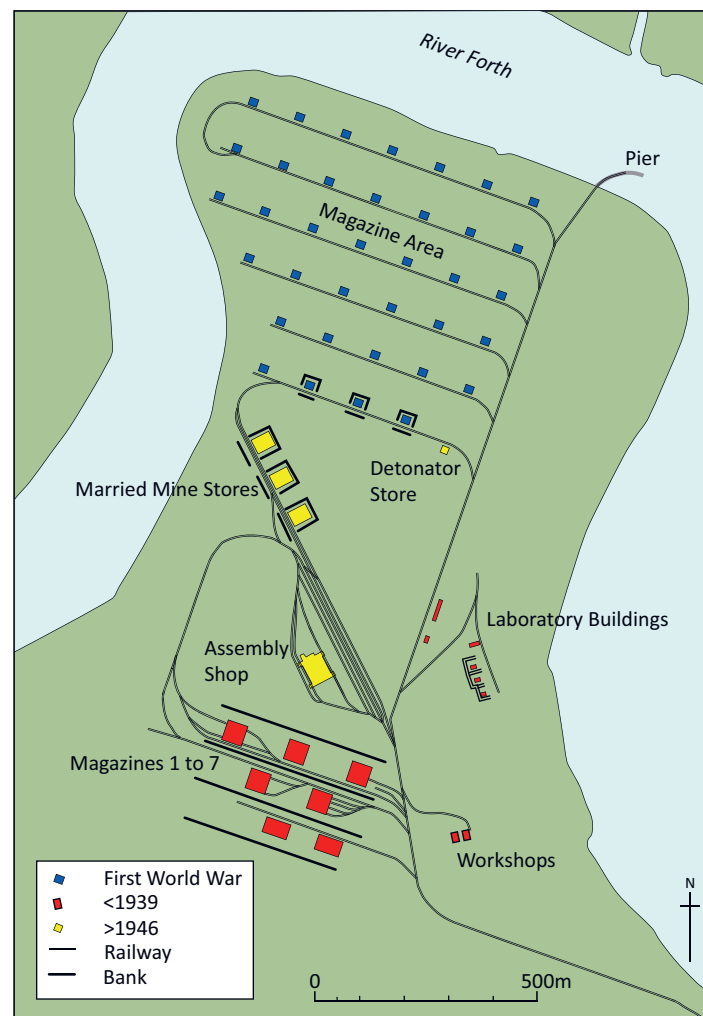


Figure 1.4

Royal Naval Armaments Depot, Bandedeath, in a loop of the River Forth, showing the main structures in place in 1960. The phasing of buildings has been worked out using aerial photographs taken during and after the Second World War. The rail network is shown in slightly simplified form and the limited number of internal roads is not shown (© Gordon Barclay)



Figure 1.5

First World War munitions storage magazines, RNAD Bandedeath, 2016. The small brick structure in the foreground has been identified as a pillbox, but we believe that it is more likely to be a refuge, in case of fire and possible explosion (© Gordon Barclay)

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Figure 1.6

Postcard of the destroyers in their pens at Port Edgar, 1920 (Valentine & Sons, via Frank Hay)

embankments, to deflect the blast from an explosion in any shed. Most of the buildings survive, albeit in a dilapidated condition. Near the southern boundary of the site is a group of seven more substantial buildings within earthwork embankments, labelled Magazines 1 to 7. A small group of 'Lab[oratory]' buildings was in place by 1939, to the east of the main complex. Further buildings beside the railway track were laboratories and a 'Cartridge Examination Room'. One medium-sized building was labelled as the 'Transfer & Shell Painting Room'.

Further structures were built between 1946 and 1960: three large sheds ('Married Mine Store' numbers 1 to 3) surrounded by earthen banks; and the largest building on the site, the 'Assembly Shop', presumably also for mines. Substantial parts of the complex survive, many buildings now being in commercial use.

### **Port Edgar**

The first pier at Port Edgar was built in 1810. By the end of the century, the two large enclosing breakwaters had been built. After initial enquiries in 1911, the harbour was bought by the Admiralty in 1916 and commissioned in 1917 as HMS *Columbine*, a base for torpedo boat destroyers (Fig 1.6). A naval hospital at Butlaw, just to

the south-west of the harbour, was in operation from at least 1905 (Fig 1.7). The naval hospital closed in 1938 but was reopened in the Port Edgar barracks in 1939. In that year, Port Edgar was recommissioned as a naval training establishment, and in 1943 became HMS *Hopetoun*, a combined operations training base. After 1945, the harbour was the base for the minesweepers employed in removing wartime mines from the east coast and, in 1960, became the Navy's only minesweeping training establishment. It closed in 1975.

### **Methil and Largo Bay**

Methil Docks was one of the more important commercial ports on the Forth. Between 1883 and 1912 three large modern docks were constructed, mainly to ship coal from the Fife collieries, with a length of quay totalling over 2.5km. By the beginning of the First World War, it was Scotland's largest coal port.

Discussions were set in train in 1924 about the provision and defence of a convoy anchorage off Methil, in Largo Bay. It was to be the main east coast assembly port for convoys from the Thames and from east and west coast ports. The assembly point had to be capable of accommodating between 120 and 130 vessels, of which about 70 would be large ocean-going

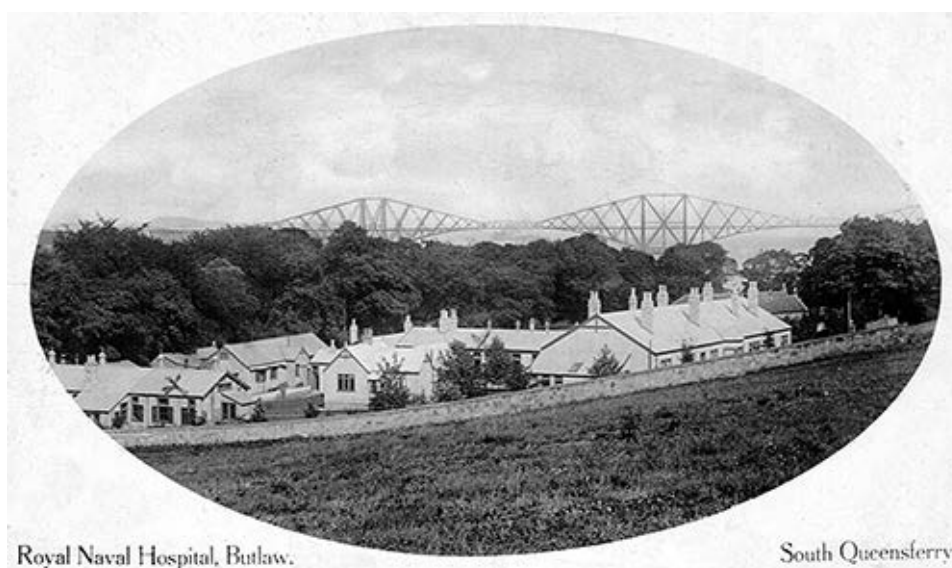


Figure 1.7

Postcard of the naval hospital at Butlaw, near Port Edgar, c 1914 (J Wilson, South Queensferry, 'Forth Series')



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vessels. An area of sea of *c* 10 sq km was needed. Largo Bay was chosen (despite concerns about the difficulty and expense of making it secure from attack by sea) not only because of its capacity, but its accessibility by rail; its location allowed the reduction of transit times for cargoes travelling via the north of Scotland, and reasonable protection from the weather. The Largo Bay convoy mustering area was used intensively during the Second World War.<sup>24</sup> At different times during the war, convoys operated to and from the Thames (Southend), Bergen (until the fall of Norway), Loch Ewe, Belfast, the Clyde and the Tyne.<sup>25</sup>

### Grangemouth

Grangemouth, now Scotland's largest container port, has been one of Scotland's most important ports for over a century. In 1790, the small village became the eastern terminal of the

Forth and Clyde Canal and direct access to Glasgow along the canal led to swift expansion. Cargoes from Europe were landed, while coal and manufactured goods from the interior were loaded for export. Between 1843 and 1906, major expansion of the dock system was undertaken, the last, the Grange Dock, doubling the previous wharfage. By the latter date, the industrial development of the town had also begun.

In August 1914, Grangemouth Docks was turned over wholly to military use and closed to merchant vessels altogether on 11 December. While Aberdeen became the main railhead for the fleet in Scapa Flow in January 1915, Grangemouth was the main coaling port for the fleet; a Dreadnought class battleship could use up to 30,000 tons of coal a month. The first consignment of an eventual 2,306,000 tons arrived on 10 August 1914 for onward shipment by sea. The port was also used for the storage of vast quantities of flour and other victuals.<sup>26</sup>

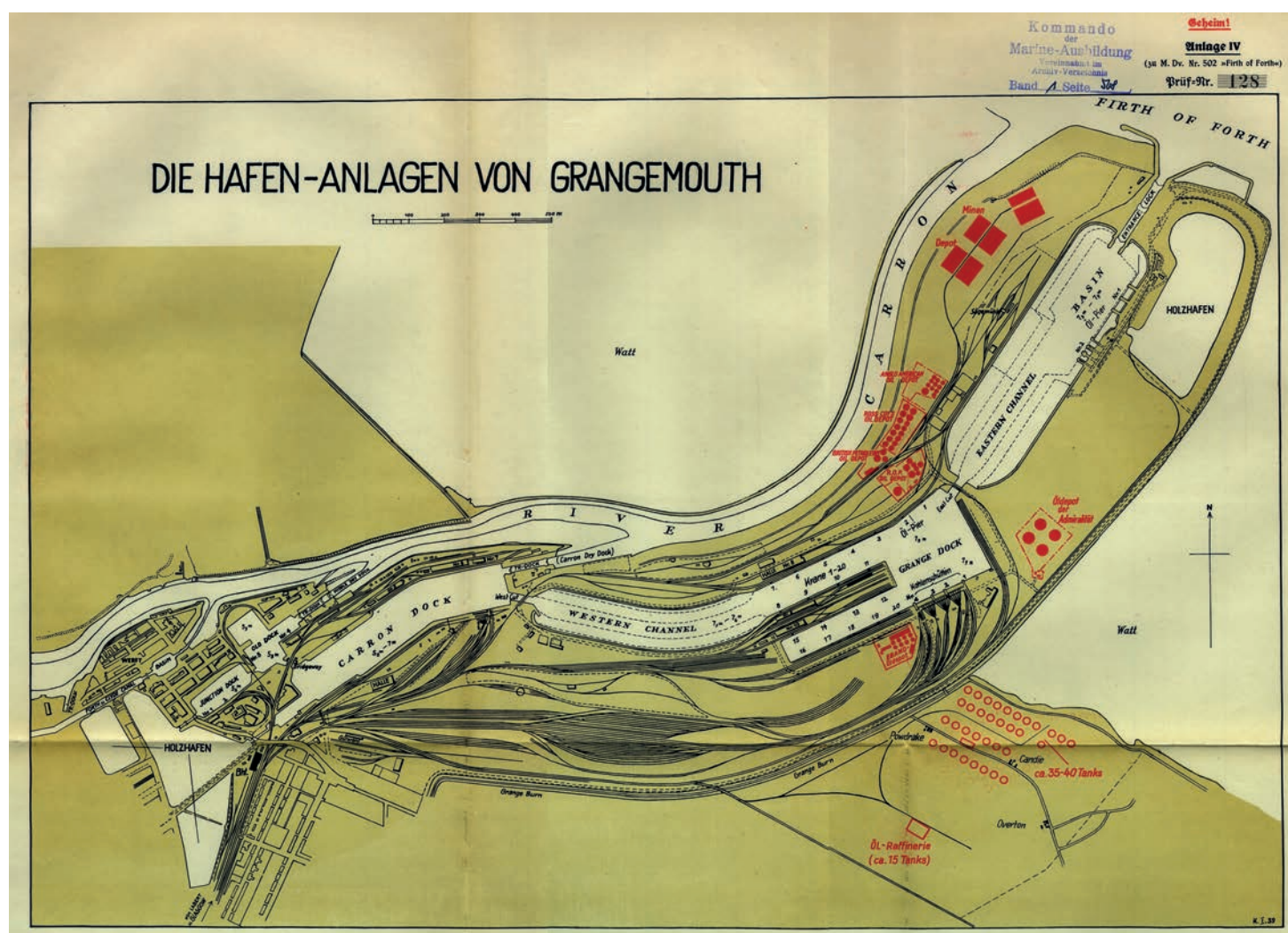


Figure 1.8

The harbour at Grangemouth, its mine depot and oil storage tanks, as mapped by German naval intelligence in March 1939 (Oberkommando der Kriegsmarine, via A Liebold)

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The large-scale shipment of naval ammunition and mines to and then out of Grangemouth began in March 1915 and in January 1916 Grangemouth became a Royal Naval Mine Depot, with workshops set up for the assembly and storage of mines. It is estimated that 60,000 mines passed through Grangemouth during the war.<sup>27</sup> In 1918, a Royal Naval minelaying squadron was established at Grangemouth, which took part in the laying of the great mine barrier between Orkney and Norway to close the northern entrance to the North Sea to German U-boats (Fig 1.1). Training was also provided there for US Navy personnel engaged in this work.<sup>28</sup>

As the British fleet converted from coal to fuel oil for propulsion, Grangemouth was also the port from which supplies of fuel oil were despatched. Oil arrived from the USA at the port of Bowling on the Clyde and was transported in specially converted barges along the canal to storage in Grangemouth, for shipment to the fleet. About 137,514 tons of oil were moved in this way. To increase the supply of oil, in 1918 an 8-inch diameter oil pipeline was laid along the towpath of the canal from Bowling to Grangemouth. Although only completed days before the war ended, it conveyed 220,000 tons of oil in the five months in which it was used.<sup>29</sup>

During the Second World War Grangemouth continued to be an important port and the mine depot became a Royal Naval Armaments Depot administered from Crombie. There was also an important victualling depot. The shipyards of the port were active in new-build, fitting out, repair work, fitting ASDIC instruments and arming 'Defensively Equipped Merchant Ships'.<sup>30</sup>

### **Granton**

Granton Harbour was built between 1836 and 1863 as a commercial and fishing port and, after 1850, a ferry terminal. The harbour was a naval base from August 1914 to July 1919, at first as a base for trawlers and other small vessels engaged in patrol work, minesweeping and the maintenance of the permanent and temporary anti-submarine booms and nets to protect the fleet. From 1915, it also became a base for the fitting out and operation of 'Q' Ships, merchantmen and trawlers fitted with hidden weapons designed to lure in and then attack German submarines.<sup>31</sup>

The main naval hospital in Scotland in the First World War was also attached to the Granton base. The Royal Naval Hospital Granton occupied the buildings of the Leith Public Health Hospital (built 1894–96), which was taken over by the Navy in October 1916. Cases from all over Scotland were treated here, including injured men from the naval divisions serving on the Western Front.<sup>32</sup>

In the Second World War, Granton was once again a base for minesweeping and patrol vessels.

### **Burrtisland**

During the First World War, Burrtisland harbour was largely used for work by the Government. Of the two docks, one was for the most part devoted to the vessels of the boom defence, their maintenance, coal supply, stores and repairs. The other dock was used to ship coal out to the fleet. During 1918, almost half a million tons of coal were shipped, of which 215,593 tons were high-quality Welsh steaming coal.<sup>33</sup>

### **Royal naval and other air stations**

This book is not concerned with the wider defence of Scotland in both wars, nor the development of military and naval aviation in Scotland, and the air defence of the country is a study in itself, but air stations were an important part of the naval infrastructure in the Forth. From before the First World War, the Royal Navy was interesting itself in the role of flying machines, both fixed-wing and balloons, in naval warfare. By 1914, the Royal Naval Air Service (RNAS) had 39 land plane and 52 seaplane bases in the UK. In the Forth, seaplane bases had been established at Port Laing (Carlingnose) by October 1912, Rosyth, Leven (temporarily in the summer of 1913), Granton and Hawkcraig (near Aberdour). Most seaplanes were used for reconnaissance.<sup>34</sup>

During the First World War, substantial naval air stations were built at Donibristle and Leuchars (a Torpedo Training Station). Turnhouse, by 1918, was a Fleet Aeroplane Depot. Kite balloons, observation balloons towed behind warships, were stationed at Rosyth and Methil. East Fortune was the main RNAS base in south-east Scotland, and housed not only a major rigid airship station, but also fixed-wing aircraft.<sup>35</sup>

Donibristle, after a period in care and maintenance after the First World War, was active again by 1928; it remained operational until the 1950s. In the Second World War, Crail was a major RNAS aerodrome, and the estuary, of course, was defended by fighter and bomber units deployed at the many RAF stations.<sup>36</sup>

### **Castlandhill**

The history of the Royal Naval wireless communication centre at Castlandhill is sketchy. In 1908, a Low Power Station had either recently been built or was planned, as it was to be added to the existing list of such stations.<sup>37</sup> It was presumably this station that was reported as 'to be installed' in the *New Zealand Evening Post* on 20 March 1909, to provide a direct link with the Admiralty in London, the fleet at sea and the new naval base. A mast 160ft (48.7m) in height and consisting of three lengths of Oregon pine was to be erected. By May 1915, the station had been upgraded to a High Powered Shore Station.<sup>38</sup> The complex was heavily defended in the First World War, being integrated with the defence of the Forth Bridge



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and the Carlingnose/Coastguard battery complex (Fig 9.26). Although it came out of naval use in 2006, three original First World War pillboxes survive on the site.

### *War Signal Stations in the Forth*

Signalling stations were the first line of the naval defence, from which trained observers would alert the Port War Signal Station (PWSS: see below) of the approach of friendly, neutral or enemy shipping. They were first established in the Forth during the Revolutionary and Napoleonic Wars.<sup>39</sup> Signalling methods used by the Navy and Army developed through the 19th and 20th centuries and by the 1870s wired telegraph lines on which messages could be sent using Morse Code were established on land to complement flags, lamps, mechanical telegraph or semaphore and beacons. When wireless telegraphy was developed in 1905, it revolutionised naval communication, at first using Morse Code and, later, voice radio. It was, however, necessary to retain some means of visual signalling, including flag and lamp semaphore, for use during times when radio silence was required.

Each naval base or defended port had a Port War Signal Station manned by naval or Coastguard<sup>40</sup> personnel. Its main function was the identification of shipping approaching or within sight of the port. The Extended Defence Officer, the naval officer who controlled the 'floating' defences (at various times, the booms, controlled minefields, and active and passive anti-submarine defences) was stationed at Inchkeith.<sup>41</sup> The (Naval) PWSS was responsible for passing information about the movement of friendly shipping, or the possibility of enemy activity, to the (Royal Artillery) 'Selected Military Officer'.<sup>42</sup>

PWSS were often supported by a network of satellite War Signal Stations (WSS), to which they were linked by telephone. During the First World War, there were three PWSS in the Forth, on Inchkeith and Inchcolm and at Carlingnose, adjacent to the Fire Commands for the three lines of defence, which had authority to challenge any warship approaching their line and, if need be, to alert the coast artillery to open fire.<sup>43</sup>

The Firth of Forth Defence Scheme of 1900 listed War Signal Stations at St Abb's Head, Dunbar and North Berwick. Stations were also listed for Fife Ness and Elie, but these were within the Tay defences at that time.<sup>44</sup> The 1909 revision of the Defence Scheme recorded that the PWSS for the Forth Defences was at Inchkeith and that all information received there was to be communicated to the Fire Commander on the island by telephone. By that date, the two WSS at Fife Ness and Elie were within the Forth Defences.

During the 'Precautionary Period', when there was an imminent threat of war, the PWSS at Inchkeith and the naval wireless communication centre at Castlandhill were to

be protected by the garrisons at Inchkeith and Carlingnose respectively. On mobilisation, along with the War Signal Stations at North Berwick, St Abb's Head, Elie and Fife Ness, they were each to be guarded by small parties from Territorial infantry units.<sup>45</sup>

In May 1913, only Inchkeith PWSS and a Naval Challenge Station at Carlingnose Battery were recorded.<sup>46</sup>

A Board of Trade list, revised in manuscript to 1917, included Elie (WSS), May Island (WSS), Anstruther, Fife Ness (WSS & W/T), Inchkeith (WSS, PWSS & W/T), Inchcolm (WSS & PWSS), North Queensferry (PWSS), Rosyth (Castlandhill) (W/T), North Berwick, Fidra, Dunbar, Cockburnspath and St Abb's Head (WSS & commercial work for Lloyds).<sup>47</sup>

By April 1926, St Abb's Head was the only WSS listed for south-east Scotland, all others having been stood down after the end of the First World War.<sup>48</sup> During the Second World War, the PWSS building on Inchkeith was enlarged and reused (Fig 11.30) and appears to have been supported by a WSS at Kinghorn (Fig 11.80), although we have found no information about the latter establishment. A WSS was again established on the May Island, along with a subsidiary lookout at Gin Head (Canty Bay). Naval signalling was also carried out by Royal Marine personnel from the Battery Observation Post at Kinraig Battery as part of the Examination Service. The approaches to Rosyth Dockyard appear to have been controlled by a WSS at Battery Hill, North Queensferry, although once more we have found information difficult to come by.<sup>49</sup>

Below, we provide more information on selected WSS sites.

### *Seacliff*

In October 1912, a state-of-the-art signalling station was erected in the vicinity of Seacliff Old Tower. The building, which was of stone with black plaster dressing, consisted of a large sleeping room on the ground floor fitted with bunks and a watch-room on the first floor. The roof was of reinforced concrete with a stone parapet and was equipped with a semaphore. Only the base of the tower survives. In 1917, HMS *Seacliff* was the landfall site of the easternmost line of hydrophones laid across the seabed at the entrance to the Firth of Forth to detect U-boats. HMS *Seacliff* was also used as a training establishment in the art of navigation.

### *Canty Bay*

Early in 1940 the Admiralty requisitioned land and buildings at Canty Bay, previously used as a Scout camping facility, for the purposes of coast defence.<sup>50</sup> The camp became known as HMS *Canty Bay* or RN Station Canty Bay and was initially run by Lieutenant Braid, RN. A power-house was built on the braes above the camp. The Navy set up a watch-keeping facility at Canty Bay which was probably at the summit of



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Gin Head, which forms the eastern boundary of the bay. This establishment came under the direct control of May Island, although very little is known about it. It supported the May Island WSS, covering the channel between Bass Rock and the Lothian coast. By November 1945, the land and buildings had been de-requisitioned.

### *Bass Rock*

The Admiralty established a WSS in a look-out hut on the summit of the Bass Rock during the First World War. It seems that the Coastguard signallers were billeted in a short row of apartments, possibly built for the men constructing the lighthouse, in 1900–2, against the interior curtain wall of the castle ruins. The look-out hut survived until at least 1924.<sup>51</sup> Telephone cables were laid to provide intercommunication between the Bass, Seacliff and North Berwick WSS, but these were removed after the war, along with the men. The Rock was not reoccupied during the Second World War.<sup>52</sup>

### *North Berwick*

There had been a signal station on the summit of North Berwick Law during the Napoleonic War.<sup>53</sup> A WSS for North Berwick was planned under the Forth Defence Scheme, in 1900, and the Admiralty applied to the North Berwick Town Council for a site for it.<sup>54</sup> It may be that the WSS was co-located with the look-out post at the summit of North Berwick Law.<sup>55</sup>

### *Fidra*

Fidra was listed as a Coastguard Station in 1911 and 1917. It was a small affair which operated mainly as a look-out post during the first half of the First World War. It was probably no more than a small hut located at the highest point of the island a short distance east of the lighthouse. In August 1914, workmen laid communication cables between the look-out post and mainland. The island's importance grew in 1916 when anti-submarine obstructions were laid across part of the estuary, on the line from Fidra to Elie, and a hydrophone listening station was proposed for the island. The existing look-out post was upgraded to a properly equipped War Signal Station for the remainder of the war. To reduce costs and to economise on manpower, the Admiralty decided to exchange Fidra's Coastguard personnel with Seacliff War Signal Station a few miles further east on the Lothian coast. Seacliff had proved to be of little value for signalling purposes, but had a larger complement of coastguards than Fidra. To accommodate the increased manpower on Fidra, the Northern Lighthouse Board agreed to evacuate the island's two lightkeepers and make their dwellings available to the Admiralty. The Hydrophone Shore Station was closed in December 1918. Fidra was not occupied during the Second

World War, although the name was applied to the 6-inch gun battery on the adjacent mainland.

### *Elie Ness*

Under the Defence Scheme for Scottish Defended Ports in 1900, Elie was planned at that time to have a WSS, as part of the Tay Defences. By 1909, Elie was included in the Forth defences.<sup>56</sup> During the First World War, a WSS and wireless hut were erected near the small lighthouse at Elie Ness and manned by coastguards, with satellite stations at Anstruther and a WSS on the May Island. The Elie station was under the command of a Naval Chief Petty Officer. A photograph depicting the crew of 'Elie Radio Signal Station' in 1914 shows one officer, six coastguards and one civilian. Elie Ness was, for a short time in the summer of 1915, provided with a hydrophone listening station. It was re-established in December 1916 and, with Fidra Hydrophone Station, became operational in February 1917. It was apparently located in a separate listening and observation hut manned by a Lieutenant, RNVR, one Sub-Lieutenant and six Chief Petty Officer operators. The Hydrophone Shore Station was closed in December 1918. The WSS may have continued in operation until 1923, as it was the parent station for May Island which apparently closed at about that time. Elie Ness was not reoccupied during the Second World War.

## Notes

- 1 ADM 116/4113.
- 2 CAB 2/4. A 'raid' was defined as 'a secondary operation of war, by means of which an enemy seeks to deal a blow at our naval or military power, or to influence in his favour operations taking place in a main theatre of war elsewhere', with objectives which include damaging, destroying or capturing fixed defences, like those in the Forth; destroying magazines stores and factories; creating panic such as to prevent an expeditionary force being sent overseas; to destroy wireless and telegraph cable installations (this is the 1911 definition, in the 'Memorandum on the Principles Governing the Defence of the United Kingdom' WO 33/515).
- 3 Scott-Moncrieff 1922, 497–500; 515–28.
- 4 Kennedy 1974: 65.
- 5 WO 32/5528; Scott-Moncrieff 1922.
- 6 Saunders 1984; Smith 1985; Clark 1986.
- 7 Heddle and Morris 1997; Morris 2004; Morris and Ramage 2009.
- 8 Pollard and Banks 2008.
- 9 Stevenson 2014.
- 10 Lavery 2007: 231–3.
- 11 Maurice-Jones 1959.
- 12 Saunders 1989: 40.
- 13 Hogg 1974: 13; Dobinson 2000: the status of Dobinson's document is unclear. It has no ISBN and copies are not lodged in the copyright libraries, nor could we find a source for a digital download.
- 14 Redfern 1998.
- 15 WO 192/101.

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- 16 ADM 137/994.
- 17 ADM 137/1647.
- 18 Hunter 2005: 77.
- 19 Cole and Cheesman 1984: 122. Robinson 1971: 137.
- 20 ADM 244/2.
- 21 Lavery 2007: 318.
- 22 WO 78/4937.
- 23 For the entire life of the site, the Ordnance Survey maintained the cartographic fiction that the site was still agricultural land. Aerial photographs were taken of the site in 1939 (by the German air-force: NCAP-000-000-153-184 *St Ninians, Stirlingshire, Scotland [Bandeath]*. National Collection of Aerial Photography, Historic Environment Scotland), by the RAF in 1941 (NCAP-000-000-161-023 1941 *Throsk House, St Ninians, Stirlingshire, Scotland [Bandeath]*), 1942 (NCAP-000-000-161-115 1942 *South Cockspow, St Ninians, Stirlingshire, Scotland [Bandeath]*) and 1946 (NCAP-000-000-114-638 1946 *Bandeath Industrial Estate, St Ninians, Stirlingshire, Scotland*). There is also a set of three detailed Ordnance Survey 1:2,500 maps printed in February 1960 for the Admiralty by the Ordnance Survey (Stirlingshire Archives).
- 24 ADM 116/2493.
- 25 Downie ND; Hague 2000.
- 26 Pratt 1921: 542, 546. Bailey ND.
- 27 Pratt 1921: 547–8.
- 28 Fullinwider 1920: 102.
- 29 Pratt 1921: 548.
- 30 Bailey 2013: *passim*.
- 31 Girvin and Cosens 1919: 21, 3, 38–44, 58–62, 71.
- 32 Whelan 1918: 184–92.
- 33 *The Scotsman*, 6 January 1919.
- 34 Fife 2007: 73.
- 35 Delve 2010: 281.
- 36 Delve 2010: 102.
- 37 Anonymous 1908.
- 38 Kent 1993: 47.
- 39 Morris and Barclay 2017.
- 40 The organisation was, into the 20th century, known as the Coast Guard. From 1850 to 1923, it was administered by the Admiralty and operated as a sort of naval reserve.
- 41 WO 33/491.
- 42 Maurice-Jones 1959: 184
- 43 WO 33/491.
- 44 WO 33/173.
- 45 WO 33/491.
- 46 WO 78/5179.
- 47 Department of Transport correspondence with RM, 28 December 1990. There are some anomalies in this list. By 1917, Fidra was operating as a War Signal Station (WSS) and a WSS that had by then been established on Bass Rock was not included.
- 48 CAB 13/3.
- 49 Morris 2004: 41; Morris and Ramage 2009: 39, 41.
- 50 Evans 1950. The site is at NGR NT 5859 8521.
- 51 Morris et al 2007: 23.
- 52 Morris and Bruce 2006: 75.
- 53 Morris and Barclay 2017.
- 54 *Hansard* 13 Dec 1906, Vol 167; WO 33/173.
- 55 WO 33/491; Seaton ND.
- 56 WO 33/173; WO 33/491.