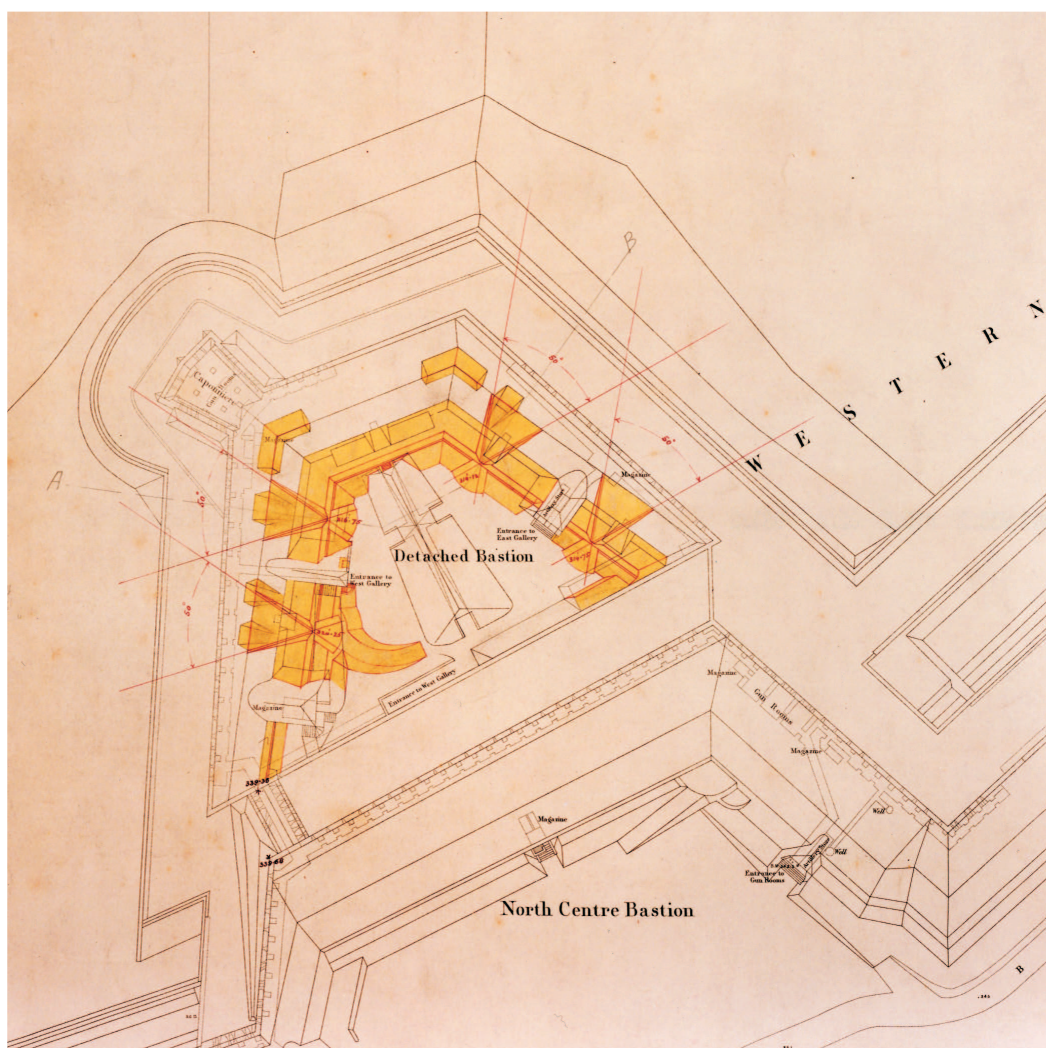


# THE WESTERN HEIGHTS DOVER, KENT

ISSN 1478-7008

## Report No 7: North Centre and Detached Bastions: 19th-century fortifications



SURVEY REPORT

PAUL PATTISON

Photography by STEVE COLE & ALUN BULL



ENGLISH HERITAGE

ARCHAEOLOGICAL INVESTIGATION SERIES 28/2001





ENGLISH HERITAGE

**THE WESTERN HEIGHTS,  
DOVER, KENT**

REPORT NO 7

**NORTH CENTRE AND DETACHED BASTIONS**

19TH-CENTURY INFANTRY AND ARTILLERY FORTIFICATIONS

ARCHAEOLOGICAL INVESTIGATION REPORT SERIES 28/2001

**NMR No: 1353402**

**NGR: TR 3110 4083**

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*North Centre and Detached  
Bastions from the air in 1994,  
showing the prominent northward  
projection (the right of the photo)  
in order to flank the slope of  
Western Heights (©NMR: TR  
3140/10, 30th June 1994)*



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## ABBREVIATIONS USED IN THE TEXT

<b>BL</b>	Breech-loading
<b>BLC</b>	Breech-loading converted (from another calibre)
<b>CRE</b>	Commanding Royal Engineer
<b>RA</b>	Royal Artillery
<b>RE</b>	Royal Engineers
<b>RBL</b>	Rifled breech-loader
<b>RML</b>	Rifled muzzle-loader
<b>SB</b>	Smooth bore



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## GLOSSARY

### **Artillery store (or RA store)**

A subsidiary building in a fortification, storing equipment for the operation and maintenance of artillery pieces

### ***Barbette***

A protective breastwork or forward edge of an emplacement, over which guns fire

### **Bastion**

Part of a fortification which projects from the main work to provide flanking fire for its defence

### **Blocked-up platform**

A form of traversing platform raised up so that an artillery piece could fire over a parapet rather than through an embrasure

### **Bombproof**

A thick covering of earth and other material over a vaulted room (barrack, store, magazine etc), providing protection against in-coming fire

### **Breech-loader (BL)**

A gun which is loaded at the rear of the barrel

### ***Caponier***

A protected position running across or projecting into a ditch; usually with embrasures and loopholes to provide flanking fire along the ditch.

### **Carronade**

A short heavy cannon, with a large bore, for close range defence

### **Cartridge store**

A chamber used to store powder that was already made up into cartridges. Cartridges were cylindrical bags or cases containing the explosive propellant for the shell

### **Casemate**

A bombproof vaulted chamber used for a variety of purposes, including artillery or small arms positions, storage of ammunition and to provide troop accommodation

### **Counter-scarp**

The exterior slope or revetment of a ditch

### **Drawbridge**

A bridge which was hinged at one end only so that the other could be raised, usually by chains or strong ropes

### **Embrasure**

An opening in a parapet or wall through which a gun - usually an artillery piece - could be fired



## GLOSSARY (Continued)

### **Flanking fire**

Artillery or small arms fire coming from a flanking position eg in a bastion or *caponier* to sweep the face of a fortification

### **Escalade**

The storming of a fortification using siege ladders

### **Expense magazine**

A small magazine in which ammunition was stored for immediate use in part of a fortification

### **Exterior slope**

The outer slope of a rampart, laid at a steeper angle than the superior slope, between 60° and 45°, so that enemy shot will bury itself on impact

### **Fieldwork**

A temporary or semi-permanent fortification, usually an unrevetted earthwork, constructed during a field campaign or to meet an emergency need

### **Garrison Carriage**

A simple carriage used for artillery pieces, comprising a wooden or metal frame with four small wheels. The gun could not be easily traversed and tended to be fired as the target came to bear.

### **Glacis**

The external slope of a defensive work, carefully profiled and often massively reinforced with earth and other materials to absorb in-coming shell fire

### **Gorge**

The rear of a fortification

### **Howitzer**

An artillery piece shorter and lighter than its equivalent conventional smooth bore calibre, specialising in firing shells at high angles

### **Gunroom**

An enclosed chamber for an artillery piece; usually to fire along a ditch or flank

### **Lamp recess**

An alcove or small tunnel in a wall into which a lamp is placed to illuminate a windowless chamber, often a magazine. A pane of glass set into a brass frame across the recess prevents sparks from entering the chamber

### **Loophole**

A narrow opening in a wall through which small arms could be fired. They are generally internally splayed to provide the defender with a maximum arc of fire, and narrow externally to make it difficult for an enemy to fire in

### **Magazine**

A place for the storage of gunpowder. Generally applied to any ammunition storage, the term more particularly refers to the place where gunpowder was kept loose in barrels or cases (often called a main magazine). See also *cartridge store* and *shell store*





## **GLOSSARY (Continued)**

### **Murder hole**

A small hole, slot or loop in a fortification, looking down on an enemy and through which weapons could be discharged or projectiles dropped

### **Musket**

A light smooth-bored infantry weapon

### **Musketry gallery**

A series of chambers with loopholes allowing small arms fire

### **Overbank carriage**

A carriage which enabled an artillery piece to fire over a high parapet, greater than 5ft 6in (1.68m)

### **Parapet**

A low wall or earthen breastwork protecting the front or forward edge of a rampart

### **Pivot**

The point about which an artillery piece is traversed

### **Racer**

A curved steel track set into the gunfloor. The wheels of a traversing platform engaged with the racer to ensure smooth movement of the gun about a pre-determined arc of fire

### **Rampart**

The main defence of a fortification, comprising an often massive and carefully profiled earthwork, on or behind which a large part of the garrison and its weaponry are situated

### **Revetment**

Retaining wall of a rampart or the side of ditch

### **Rifled breech-loader (RBL)**

A gun loaded at the front of the barrel, which has grooves cut into its inside surface (= rifling). These enabled the shell to spin, thus ensuring greater speed and accuracy

### **Rifled muzzle-loader (RML)**

A gun loaded at the front of the barrel, which is rifled as in the RBL

### **Scarp (or escarp or curtain)**

The inner slope or revetment of a ditch

### **Shell**

The projectile fired from an artillery piece, with explodes on impact or after a given period of time

### **Shell recess**

A small reinforced locker on or near the gun floor, for storing a few shells for ready-use

### **Shell store**

A chamber, often bombproofed in a sunken or underground position, in which shells are stored



## GLOSSARY (Continued)

### **Shifting lobby**

A room next to a magazine or cartridge store in which men change into and out of magazine working clothes. This was to prevent metal on their ordinary clothing from sparking and thus igniting the gunpowder. Access to the magazine was generally prevented by a waist-high barrier between it and the shifting lobby

### **Side arms store**

A room for storing the equipment required to load and fire an artillery piece eg sponge, rammer etc

### **Slide**

A form of gun carriage which allowed the gun to recoil smoothly (by sliding backwards) on its mounting. It also facilitated reloading. Slides were normally mounted on traversing platforms

### **Slit trench**

A small rectilinear trench, with spoil along the forward edge, forming a temporary defensible position for infantry

### **Smoke vent**

A hole in a casemate wall or vault which enabled the noxious fumes to disperse after firing a gun

### **Superior slope**

The upper surface of a rampart or *glacis* which has a gradual slope so that the defenders could see their enemy

### ***Talus***

The rear slope of a rampart

### ***Tenaille***

A low-lying defensive work sited in a ditch between bastions, designed to protect the main face of the fortification

### ***Terreplein***

A level surface on a rampart, behind the parapet, providing a platform for guns

### **Traverse**

An earth bank, usually placed across the *terreplein*, to protect troops from flanking fire and bursting shells. A traverse could also be used to bombproof structures on the *terreplein*

### **Traversing platform**

A mounting for an artillery piece, with small wheels which enabled it to be moved through a fixed arc on curved rails or racers.



## 1. INTRODUCTION

*Between April and July 1998 the Royal Commission on the Historical Monuments of England (RCHME) carried out survey and analysis of the earthworks, buildings and structures of North Centre Bastion and Detached Bastion, both 19<sup>th</sup>-century elements of the extensive defences on the Western Heights in Dover.*

*The survey formed part of the Western Heights Project, which was undertaken at the request of Kent County Council as part of an Interreg II programme relating to historic fortifications in Kent, Nord-Pas de Calais and West Flanders. The programme was co-ordinated for several partners in Kent by Kent County Council and funding for Western Heights was shared between the RCHME and the European Union. The field investigations were the responsibility of staff of the RCHME Field Office in Cambridge.*

*This report is no 7 in a series of ten to be produced on the Western Heights fortifications.*

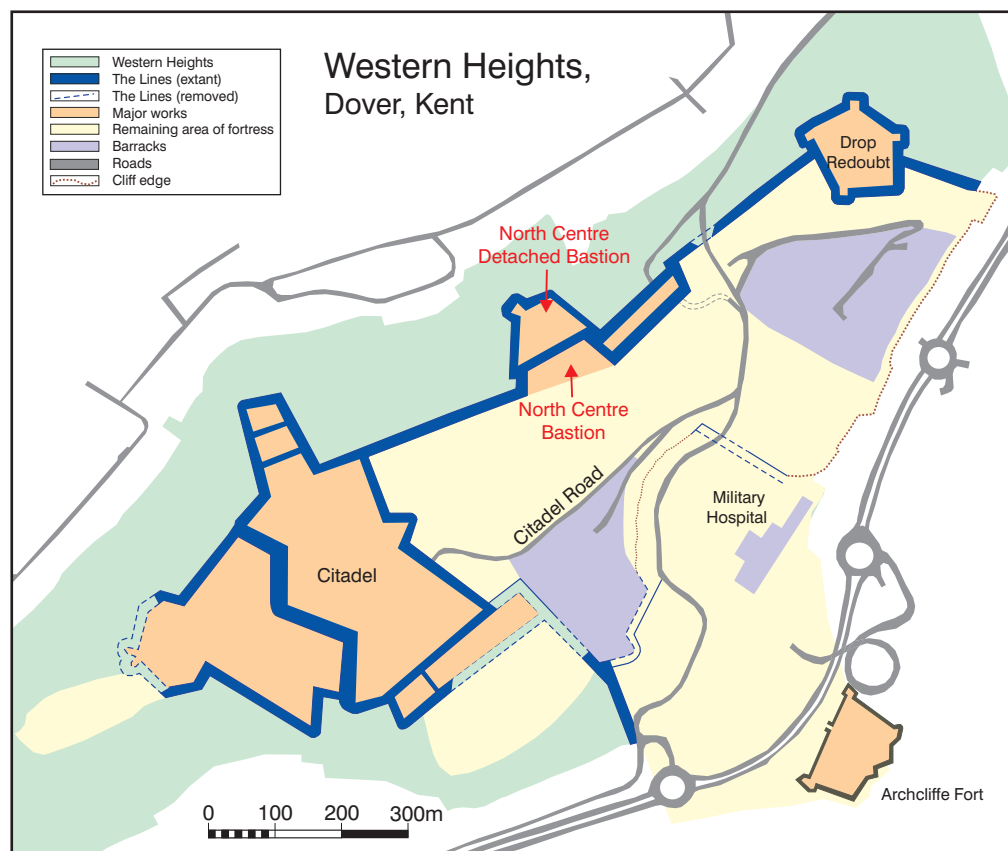




North Centre and Detached Bastions formed an important element of the Western Heights defences, protecting part of the land front to the north-west of the port of Dover (Figs 1 and 2). They were built into the linear defences of the Heights and provided a platform for artillery and infantry to defend the northern approaches to the town and the road from Folkestone in the valley below. Both bastions also had intricate measures for their own defence and were designed to operate independently if the need arose.

North Centre Bastion was begun as part of the Napoleonic works in 1804 but left unfinished at the end of hostilities in 1815. The completion of the work as North Centre and Detached Bastions took place between 1858 and 1867 as part of a wider scheme for the Dover defences as a whole. Both bastions supported some artillery until around 1900, after which their use for any purpose was intermittent; small scale re-occupation for local defence probably occurred in both the First and Second World Wars.

Today, the bastions are derelict and partially vandalised, overgrown and not easily accessible. The original entrances have all been removed.



**Figure 2**  
*Plan of Dover Western Heights, showing the position of North Centre and Detached Bastions*



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## 2. HISTORICAL BACKGROUND

### AN UNFINISHED BASTION, 1804-15

The first hint of North Centre Bastion occurs in a scheme of December 1803, for all of the Western Heights, drawn up by the resident RE officer, Captain William Ford, in the light of increasing anxiety over the possibility of a French invasion. He proposed a '*tower of communication under the protection of which troops might form*' (an artillery work also providing shelter for infantry) flanking the northern slope of the Heights between the Citadel and the Drop Redoubt (Coad and Lewis 1982, 161). By April 1804 revised plans made by a senior Committee of Engineers - Lt Colonel Twiss, Generals Morse and d'Aubant - called it '*North Centre Bastion*'. Work began in the same year for a bastion to support six 24-pdr carronades, two on the east and west flanks respectively and one in each salient angle with the northern face (ibid, 163; 166-9). By 1805 the earthworks were almost complete although it remained unfinished in 1810 when Twiss proposed revetment (ibid, 172, 174). It remained so in 1813, when an estimate was put forward for completion of all the works on Western Heights, and again at the end of the war in 1815 (ibid, 177). After 1815 it remained in an unfinished condition, without guns or garrison.

The extent and nature of the Napoleonic construction is shown on several plans, dating to 1810, 1811 and 1830 (Fig 3; PRO: MR/1/1349; MPH/1/506; WO/55/2562). The plan of the bastion, which projected from the linear defences (the North Lines) along a short natural spur, resembled a triangle with a truncated tip, with longer east and west flanks tapering to a shorter northern face. Its purpose was defence of the land front, particularly to provide flanking fire along the north slope of the Heights. In form it was an unrevetted earthwork which had incorporated an earlier linear fieldwork, dating probably from the American War of the 1770s and 80s, which was aligned east to west along the north face of the Heights, outside and parallel to the later North Lines (Pattison 2001). The huge ditch and rampart of the bastion were constructed across this older work, producing two tiers of defence, each of which could be defended independently. The outer bastion was closed off from the inner by the modified rampart and ditch of the earlier linear work and connected to it by what appears to be an underground gallery. The inner bastion contained two traverses, projecting inwards at right angles from the west flank, while the gorge incorporated a dog leg such that the entrance could be flanked from inside the Heights.



**Figure 3**  
*Plan of North Centre Bastion, showing the principal features in 1810. Text in black, excluding Roman numerals, is added by the author (extract of MR1/1349 © The Public Record Office)*

### COMPLETION AND MODERNISATION, c 1858-67

Plans for completing and modernising the defences of the Western Heights were being made in the later 1850s by Captain Edmund Frederick du Cane, under the general command and supervision of the Assistant Inspector General of Fortifications, Major William Drummond Jervois. Plans were well advanced in 1858 when Jervois recorded:

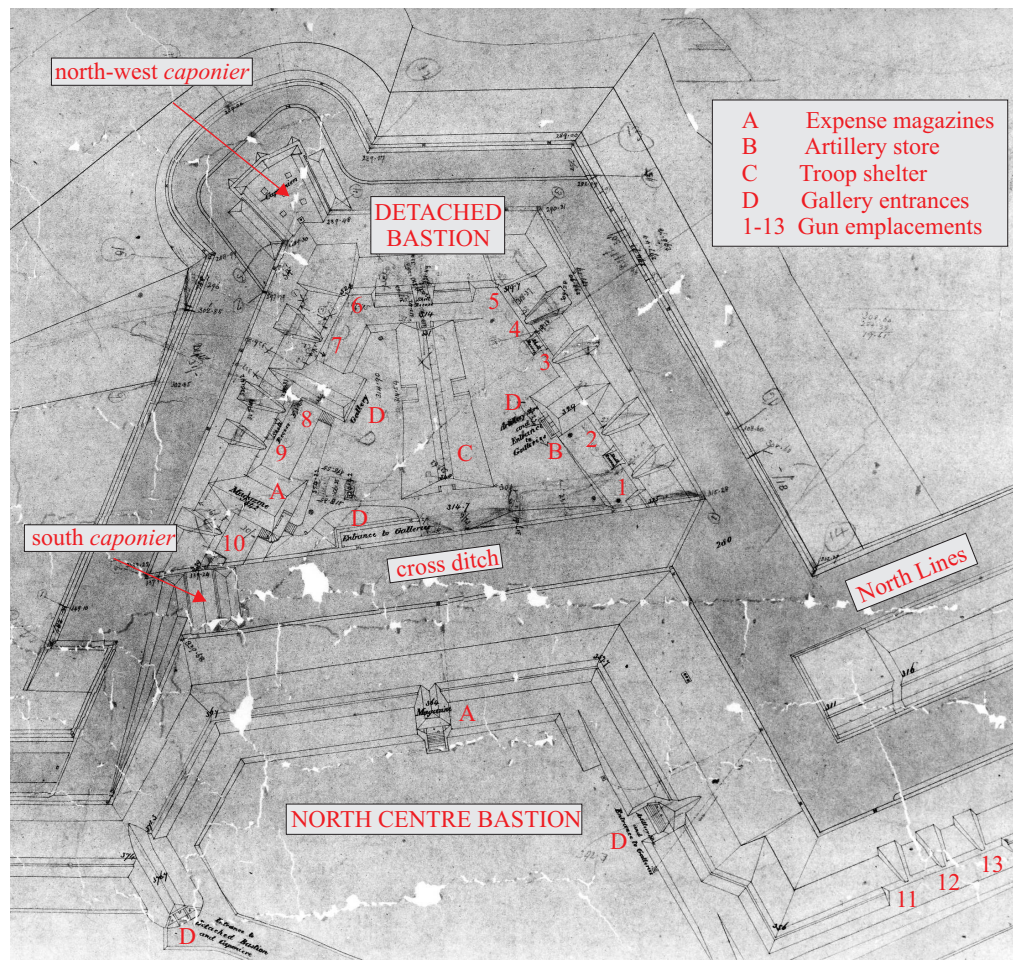
*‘13th August 1858; Drove into Croydon and went over the project for completing defences of Dover with Captain Du Cane who came from London for the purpose, who has been preparing the project – also went over the report thereon and made some additions and alterations’*

*‘18<sup>th</sup> August; Went into the project with Sir John Burgoyne (Inspector General of Fortifications)’* (Hughes 1980).



The modernisation programme for the Heights as a whole was given government approval in 1860, following the report of the Royal Commission on the Defences of the United Kingdom. However, some work had certainly started earlier, in 1859 at the nearby Drop Redoubt (Brown *et al* 2001). North Centre and Detached Bastions were in an advanced state of construction in 1862, when alterations were proposed to its southern *caponier*, and in January 1863 when major repairs were proposed to remedy structural failure of the fabric along much of the east flank of North Centre Bastion (NMR: WD/2307; 2312). Further repairs were made to the collapsing east face of Detached Bastion after 1867 (Burrige 1991, 39-40).

Captain Du Cane's work is embodied on a plan which, though not precisely dated, is of the 1860s; the only significant subsequent changes were made on the *terreplein* (Fig 4; NMR: WD/2517). His new fortifications, which took much up the same ground as the older works, comprised two distinct elements built to a more powerful and coherent



**Figure 4**  
North Centre and Detached Bastions, from a plan made in the 1860s. Text in red is added by the author (extract of WD/2517 © English Heritage)



design. The southern element was called North Centre Bastion (or Inner Bastion) and the northern element, Detached Bastion. Both were protected by huge ditches with brick revetments, behind which were casemated musketry galleries and gunrooms for their defence. Rising above the ditches, massive earth ramparts housed infantry positions, artillery emplacements and entrances, protected by traverses, leading to the musketry galleries and gunrooms. North Centre and Detached Bastions were linked only through the south *caponier* which spanned the base of the cross ditch between them. A larger, more powerful *caponier* at the north-west angle defended sections of the ditch of Detached Bastion.

Construction of both bastions involved the same method. Deep cuttings were made into the chalk bedrock of the hillside, leaving vertical faces, against which were built strong revetment walls on both the scarp and counterscarp faces. Behind the scarp revetment were the vaulted gunrooms and musketry galleries whose loopholes and embrasures commanded every inch of the ditches. Over the galleries and gunrooms, vaulted voids were made to bear the immense weight of the sloping face of the chalk and earth ramparts that were raised above.

As completed, **North Centre Bastion** was a three-sided work designed with a dual purpose. The longer north face overlooked and covered Detached Bastion against assault, while the only slightly shorter east flank and the short west flank provided flanking fire along the North Lines, westward towards the Citadel and eastward to the North Entrance with its bridges and gunrooms. Defence rested principally with infantry, situated in the musketry galleries to cover the ditches, and in open positions behind a parapet on the *terreplein*, covering Detached Bastion and its counterscarp. However, three gunrooms on the east flank had embrasures for carronades covering the ditch of the North Lines to North Entrance and there were also three other embrasures for artillery pieces (Fig 4, labelled 11-13) on the rampart of the North Lines. The latter covered the east flank of Detached Bastion and were added after 1867 when structural problems caused the closure of its east gallery (see below).

The *terreplein*, reached via three ramps on the east and west flanks, had a high infantry parapet interrupted in three places by traverses projecting inwards from the rampart. These covered the entrances to a sunken magazine in the centre of the north face, an artillery store and the east galleries on the east flank and the principal entrance to all galleries and Detached Bastion on the west flank (Fig 4). In 1881, the magazine had a capacity of 144 barrels of powder (NMR: WD/2411A).





Du Cane's **Detached Bastion** was also for the defence of the land front on the north slope of the Heights, but in this case by artillery. Its prominent northwards projection ensured that it could flank all of the ground to east and west that was not covered by guns in the Citadel and the Drop Redoubt (frontispiece). However, like North Centre Bastion, it was provided with casemated galleries, gunrooms and *caponiers* for its own defence.

The rampart was provided with embrasures for ten artillery pieces; four on both the east and west flanks and one each in the north-east and north-west salient angles (Fig 4, labelled 1-10). The intended gun complement is unknown but it may have been a combination of conventional smooth bore (SB) cannon and the new rifled guns that were entering service in the early 1860s. The guns on the flanks were probably to be mounted on garrison carriages as the embrasures were close together and had narrow arcs of fire, with those in the salients on traversing platforms. The rampart protected an expense magazine, an artillery store and entrances leading to the three musketry galleries behind the scarp revetments. The galleries also connected to *caponiers*, one for musketry defence of the cross ditch and another, at the north-west angle of the bastion, incorporating both musket loops and embrasures for carronades.

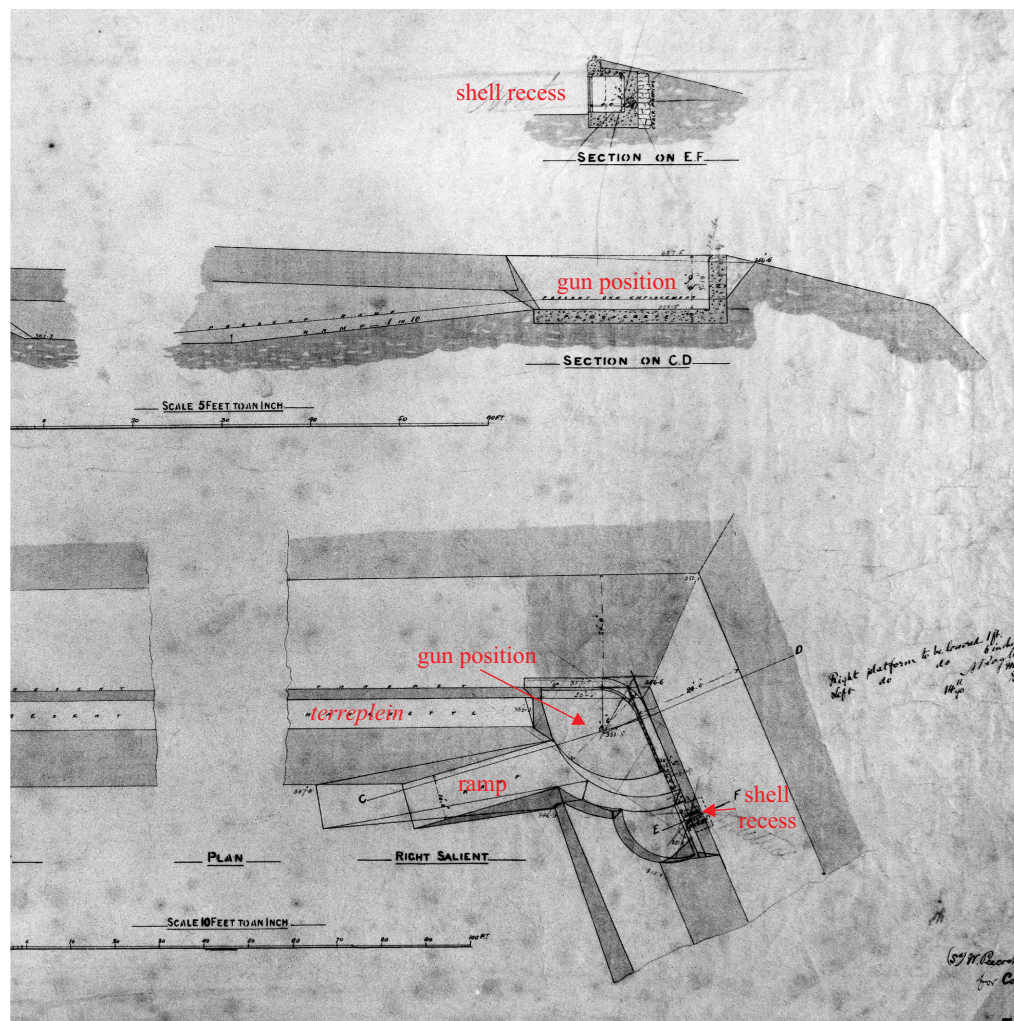
#### **REVISION AND ALTERATION, c 1875-1895**

It is uncertain what gun complement was mounted on completion of the works of the 1860s because, by 1887, only the ditches were defended by artillery; two 18-pdr carronades in the gunrooms of North Centre Bastion and three 24-pdr carronades in the north-west *caponier* of Detached Bastion. Shortly afterwards, following recommendations made by an RA and RE Works Committee in 1886, the 18-pdrs were replaced by the heavier 24-pdrs. These carronades were still in place in 1892 when it was recommended that they be reduced to one in North Centre Bastion and two in Detached Bastion (PRO: WO/33/2775). By 1902, all had been withdrawn (PRO: WO/33/254).

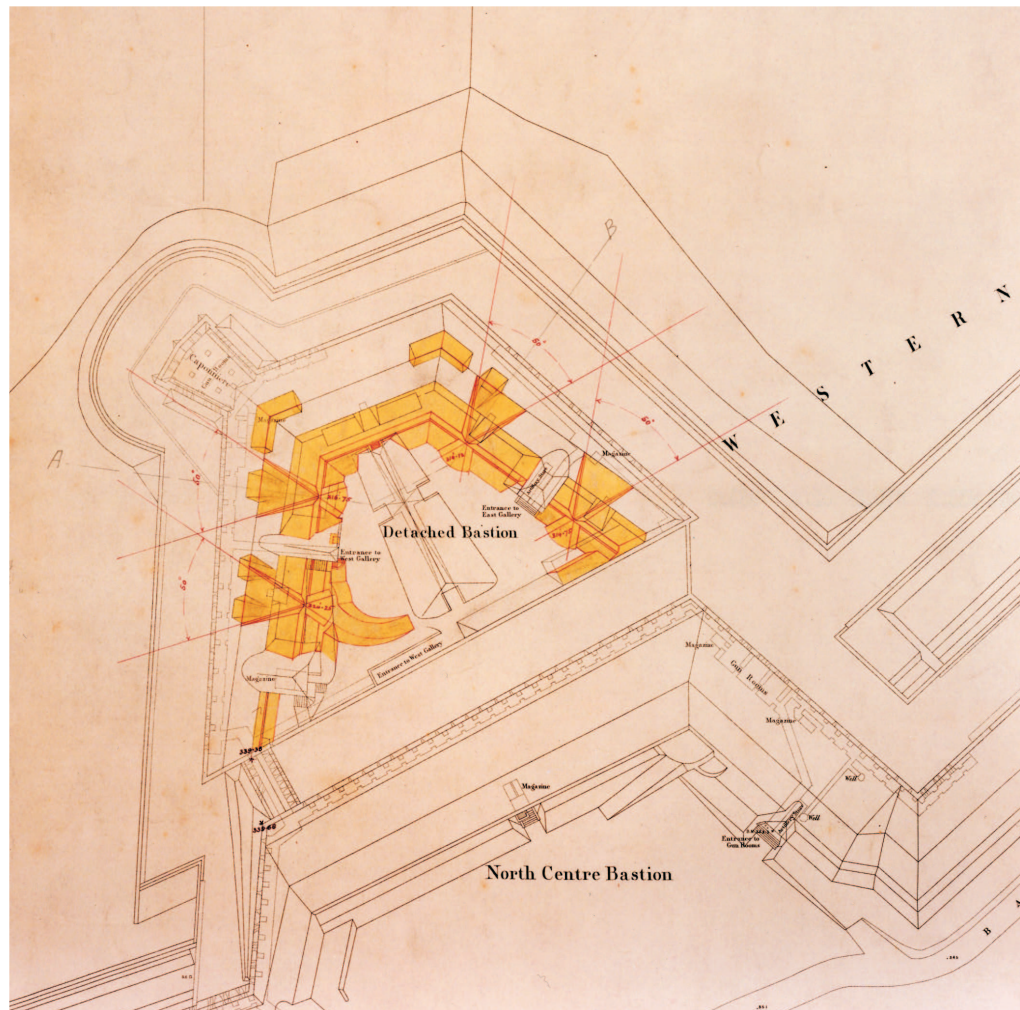
The *terrepleins* of both bastions were unarmed in 1887 although the Committee of 1886 recommended that four 7-inch RBLs should be mounted on Detached Bastion and that two 40-pdr RBLs be kept ready to mount in the salients of North Centre Bastion (PRO: WO/33/2775). Subsequently, alterations *were* made to facilitate this armament but documentary sources indicate that the guns for Detached Bastion were never installed and those for North Centre Bastion probably subsumed under the moveable armament allocated for the Western Heights as a whole. These guns were kept at a central location for emergency deployment.



However, on the *terreplein* of North Centre Bastion, the three artillery positions (nos 11-13 on Fig 4) covering the east flank of Detached Bastion had been removed before 1881 and a single emplacement added to the north-east salient (NMR: WD/2300). This new emplacement was approached up a long ramp and may have been intended for a moveable artillery piece, possibly a 40-pdr RBL. It was altered in 1890, when a similar position was established in the other salient, at which time both had concrete gun floors and vertical *barbettes* to support the 40-pdr RBLs recommended in 1886; overbank carriages were required to fire over the high infantry parapet, which nevertheless was given embrasures. Ready-use shell recesses were made in the rampart for each emplacement. Despite these alterations, no artillery was allocated to the bastion in the armament return of 1892, although in 1900, each salient could nominally support two 40-pdrs (Fig 5; NMR: WD/2309; 2310; PRO: WO/33/2775).



**Figure 5**  
North Centre Bastion,  
one of two gun  
emplacements for  
40-pdr RBL guns  
established on the  
terreplein in 1890, this  
one in the north-east  
salient. Text in red is  
added by the author  
(extract of WD/2309 ©  
English Heritage)



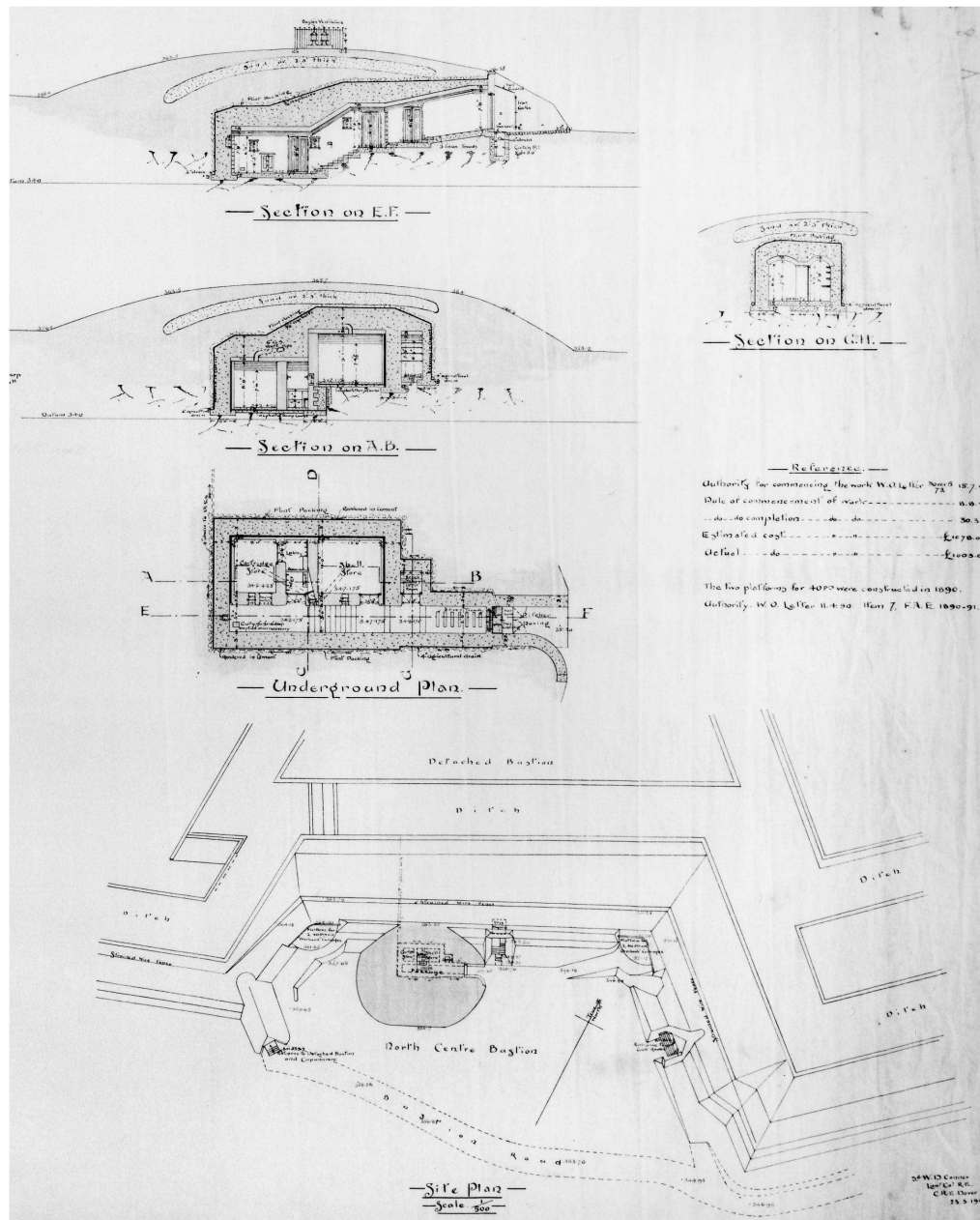
**Figure 6**  
*Detached Bastion; a plan of 1890 showing the proposed alterations to the terreplein (in yellow), to receive four 7-inch RBL guns. The work did take place (extract of NMR: WD/2300 © English Heritage)*

The alterations to the *terreplein* of Detached Bastion are shown on a drawing dated 1889, over a base plan of 1881, from which it is apparent that the rampart had been altered previously- ie between 1867 and 1881. This had resulted in the infilling of four of the 1860s embrasures; one on the west face and three on the east. The 1889 drawing shows four emplacements for 7-inch RBLs, recommended by the 1886 Committee, to be mounted on blocked-up platforms but a slightly later plan is for 'L' pattern traversing slide carriages which required embrasures (Fig 6; NMR: WD/2301; 2300). The latter was adopted and the emplacements built with concrete *barbettes* and gunfloors incorporating racers for the traversing platforms. The rampart was thickened on the inside, the old embrasures infilled and new ones made. The expense magazine, artillery store and entrances to the galleries remained in the same locations, with some re-design and new ready-use shell recesses were built adjacent to the emplacements. In 1892 the RBLs were approved but not mounted and there is no evidence that they ever were; by 1902 Detached Bastion had no armament at all (PRO: WO/33/2775; WO/33/254).



## DECLINE AND PERIODIC USE, c 1895-1945

In reality, the improvements of the early 1890s were temporary, given that, by c 1875, the effectiveness of the Western Heights as a defensible fortress was questionable - as were static defences everywhere in the face of increasingly powerful modern artillery. The years to 1900 saw a relative decline in fixed defences on the *land front* in contrast to the boom years after 1860, and a new generation of breech-loading artillery came to be concentrated in smaller less visible batteries for *coast defence* against naval bombardment. For the land front, military planners proposed defence by a field army of



**Figure 7**  
North Centre Bastion;  
record drawings of the  
shell and cartridge  
store for moveable  
armament, constructed  
in 1898 (extract of  
NMR: WD/2310 ©  
English Heritage)

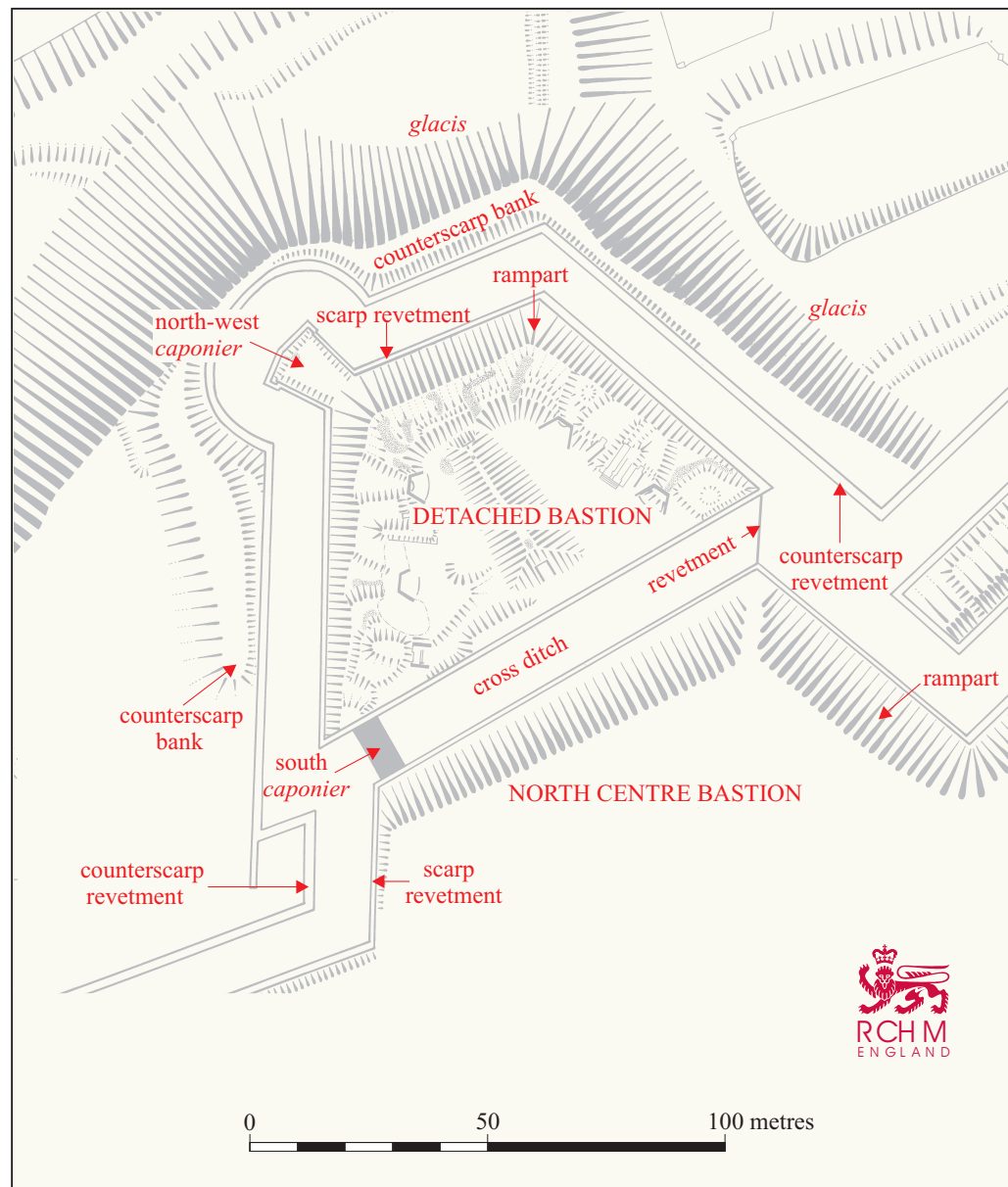


regulars and reservists which could be mobilised quickly to meet an invasion threat, wherever it came. They were to construct low-cost temporary field defences to fight specific actions, retiring if necessary and making new ones to a predetermined plan. The artillery required for these tactics was moveable and in 1898-9, in accordance with the policy, a shell and cartridge store for mobile armament was built under a large oval bombproof mound behind the rampart on North Centre Bastion (Fig 7; NMR: WD/2310). This was to serve artillery capable of rapid deployment to meet a threat anywhere in the vicinity of Dover.

By 1907, a 30-yards rifle range had been established in the southern ditch of the North Lines, immediately east of the east face of North Centre Bastion. The butt for the range was built hard up against the face of the bastion, preventing or impeding potential small arms fire from part of the east gallery. Although the range could have been quickly removed in an emergency, its construction is an indication that defence of the bastion from the galleries was no longer regarded as a serious possibility (NMR: WD/2364).

The further use of both bastions is uncertain, except to say that no guns were mounted in 1902 or 1907, although two machine guns were assigned to '*Western Heights generally*'. Nor do they figure specifically in the Dover Defence Scheme of 1910. In this scheme, the land front was to be defended in part by mobile artillery comprising a combination of light and heavy pieces - twelve 15-pdr BLCs and four 6-inch BL howitzers respectively (PRO: WO/33/254; WO/78/5102/5; WO/33/488). These guns would have been supplied with ammunition at several magazines maintained across the Heights, including the shell and cartridge store built on North Centre Bastion in 1898-9.

However, the archaeological survey revealed some evidence of later use, notably on the rampart of Detached Bastion where there are the earthwork remains of numerous slit trenches and weapons pits, including what appear to be machine gun emplacements. Coupled with evidence in the galleries of both bastions for electric lighting, the insertion of a doorway through the wall of the north-west *caponier*, other minor alterations and military *graffiti*, and a bridge between the bastions, it is likely that there were one or more temporary phases of light and emergency use, possibly during the First and Second World Wars (see Description section below).



**Figure 8**  
*North Centre and Detached Bastions; RCHME plan of the earthworks (original at 1:1000 scale)*



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### 3. DESCRIPTION and INTERPRETATION

In this section, words and letters **in bold** are shown on the figure given **at the beginning** of that particular section. Other figure references of note are given in the body of the text.

#### **NORTH CENTRE BASTION**

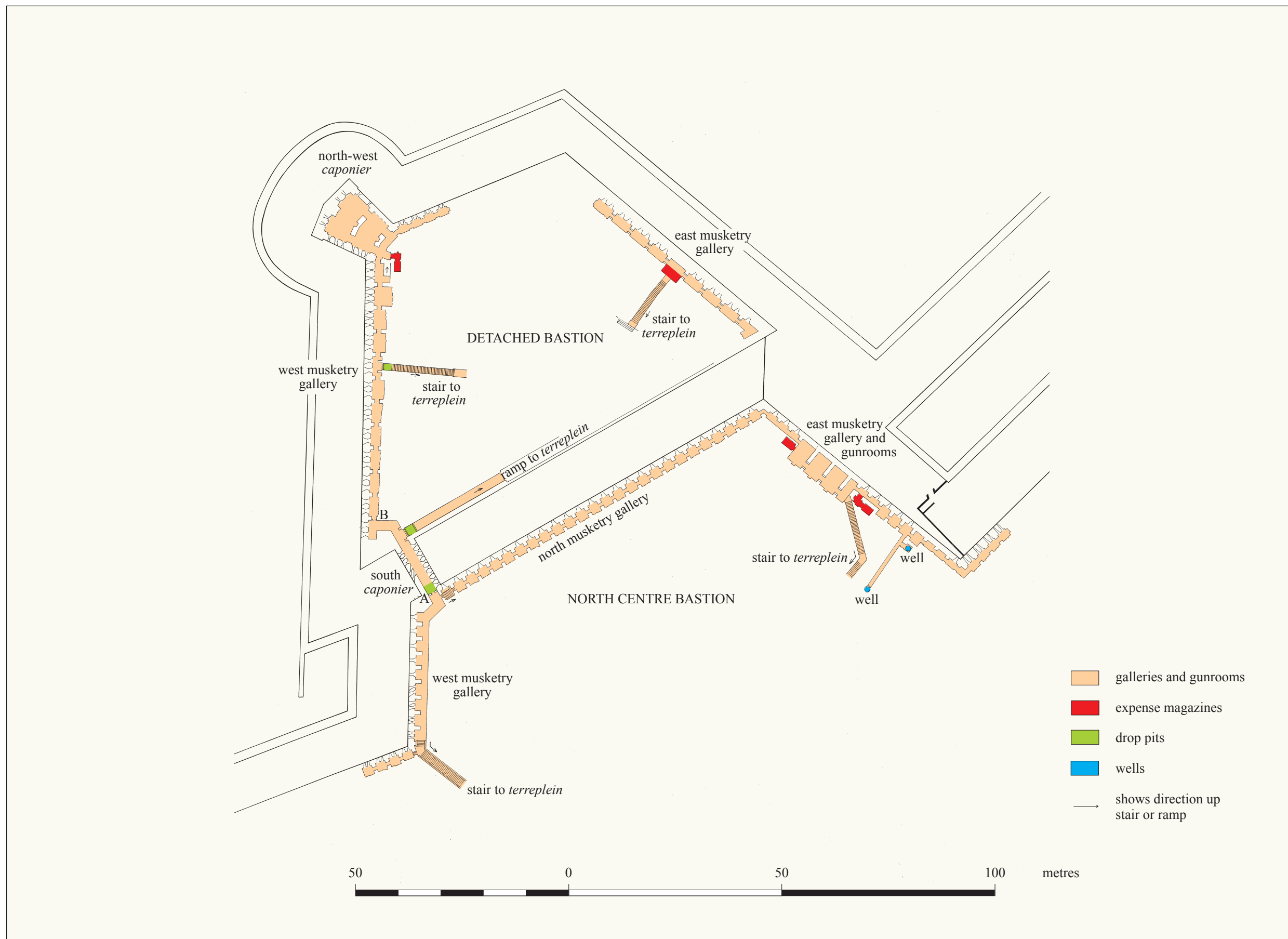
##### **THE RAMPART, *TERREPLEIN* AND SCARP REVETMENT** (Fig 8)

Very little remains above ground, except part of the exterior slope of the **rampart** above the scarp revetment. The parapet, *talus* and *terreplein* have been levelled and the entrances to the underground galleries and magazine truncated and sealed.

The ditches and revetments are intact, though the former are choked with trees, scrub and undergrowth and the latter heavily overgrown with creeping foliage which has obscured much detail of the loopholes and embrasures. The vertical **scarp revetment** is built in stock brick laid to English bond and where visible, the loopholes from the casemated galleries are built to a stepped exterior profile, with shallow segmental relieving arches. The ditch is 12.0 to 12.4m (39ft 4in to 40ft 7in) wide and the revetment 12.2m (40ft) high, except the north face, which is 10.4m (34ft 1in) high.

##### **THE CASEMATED MUSKETRY GALLERIES AND GUNROOMS** (Fig 8a)

Behind the scarp revetments there are three long galleries incorporating casemated rooms for both musketry and carronades, all for the defence of the ditch. These are constructed mainly in brick laid to English bond, usually with axial semi-circular vaults of stretchers, invariably whitewashed. Most of the casemates are small rectangular bays for musketry with loopholes in one face, except in the east gallery, where there are also three larger gunrooms with carronade embrasures. Each casemate has at least one small square smoke vent, situated in the front wall at the apex with the vault. The floors are usually concreted, although stone flags occur in the gunrooms, while brick and stone are used for steps. Stone is used also for load-bearing, notably for lintels to doorways (gritstone) where there are structural elements above. The musket loops are mainly brick, stepped and splayed in profile and plan, the splay varying according to the ground covered in the ditches. The apertures can be either horizontal or vertical, the former utilised to cover straight sections of ditch, the latter to cover the angled faces of the revetments. Most loops have a shallow segmental arched head with a relieving arch of two or three header courses. Cut sandstone is used for the lintels of the horizontal loops.



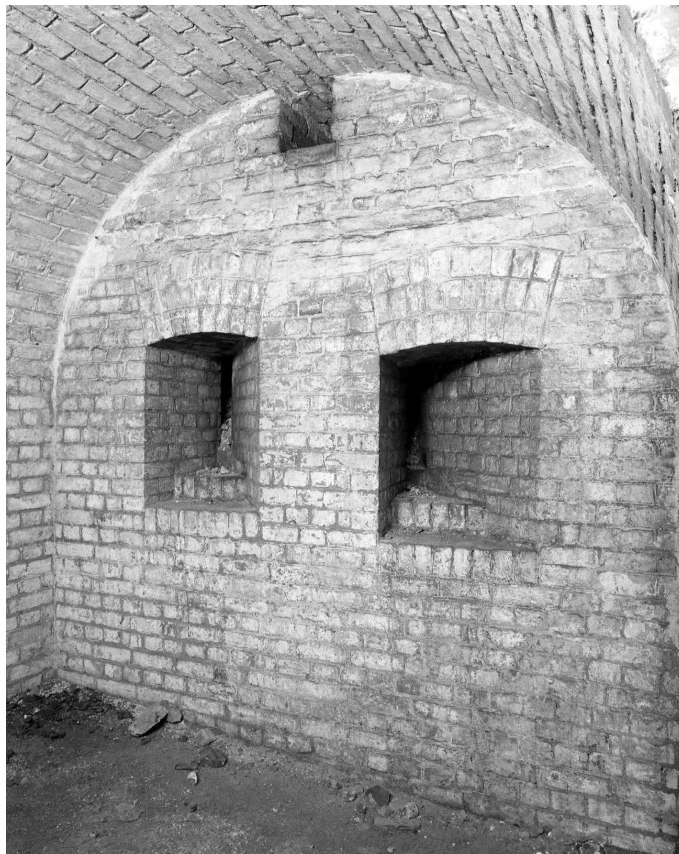
**Figure 8a**  
North Centre and Detached Bastions; RCHME survey plan of the musketry galleries and gunrooms (original at 1:1000 scale)





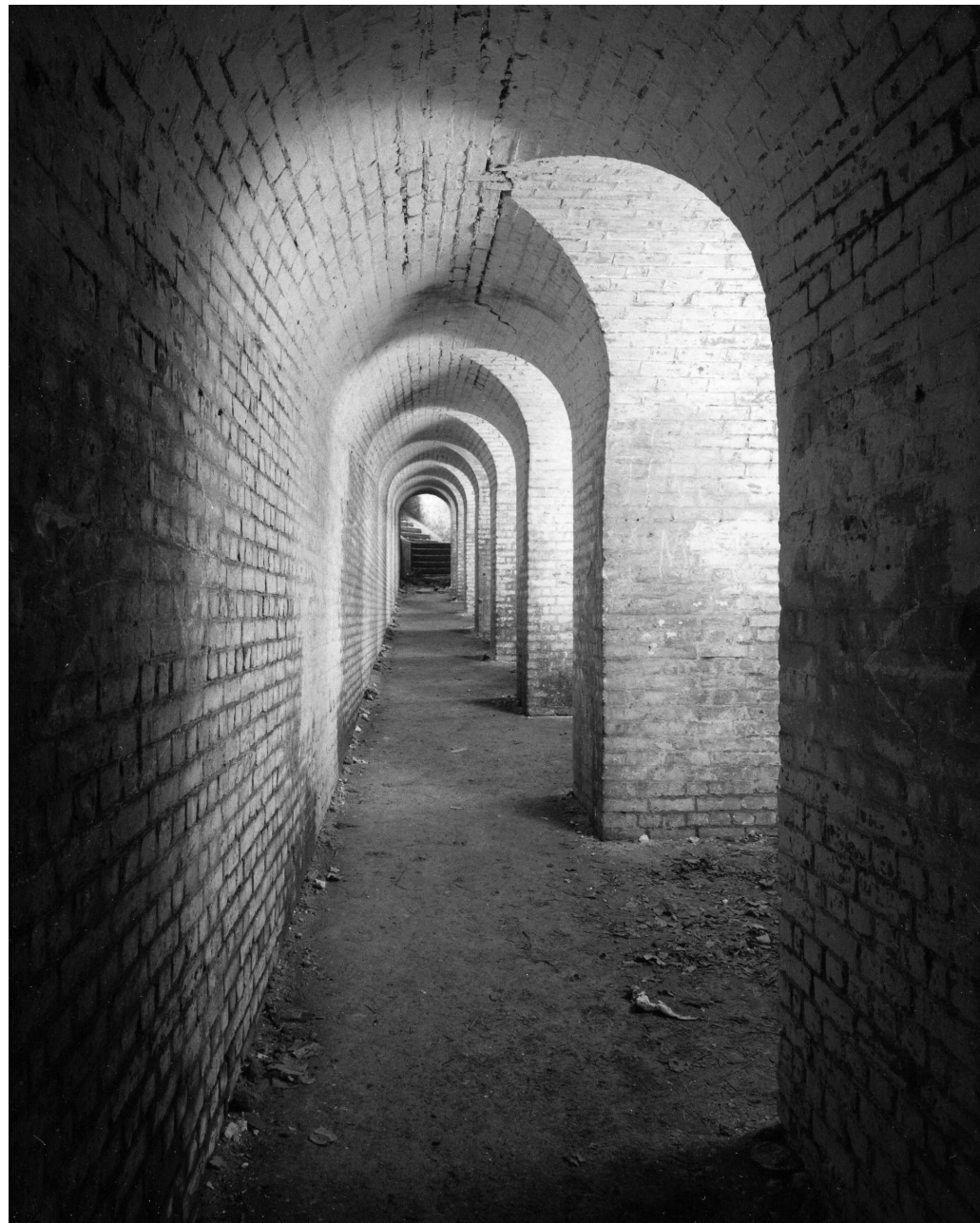
### The west musketry gallery

This was approached down a moderately steep stairway from the *terreplein* but the entrance is sealed. The brick steps have stone treads, with low stone wheeling platforms on the flanks to facilitate hauling of artillery and supplies. The side walls at the head of the stair show no traces of the iron rings through which the hauling ropes passed. At the base of the stair there is a small landing, from which two shorter flights lead west and north respectively. The west flight of three narrow steps leads down into the short western portion of the gallery, comprising four musketry casemates connected by central rectangular openings in the party walls, each with a large rectangular gritstone lintel. The first casemate is slightly smaller because its rear wall is finished, whereas in the remaining three there is unrevetted chalk rock. The front walls are prominently battered and contain two vertical musket loops each, splayed to cover the west ditch northwards to the cross ditch and south *caponier*; the angle of splay becoming more acute westwards (Fig 9).



**Figure 9**  
*North Centre Bastion;  
photo of the face wall of  
a casemate in the  
shorter western portion  
of the west gallery,  
showing two musket  
loopholes with angled  
splays and a smoke vent  
over (NMR: AA008610  
© Crown Copyright  
1998)*

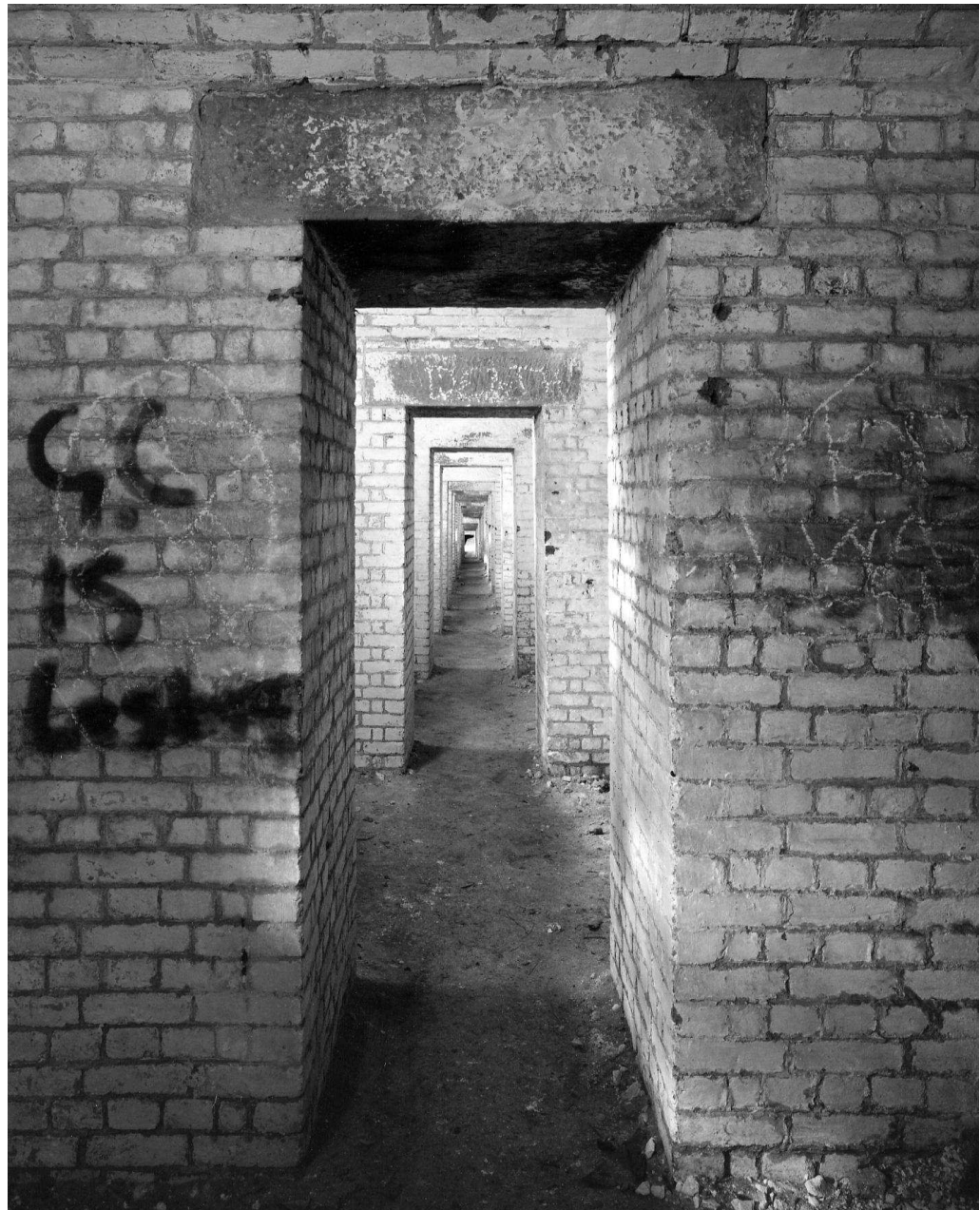
The north flight of five steps has wheeling platforms and descends to the longer section of the west gallery. This has a continuous axial vault along the rear of nine casemates, their individual vaults groined into that of the gallery at 90° (Fig 10). The northern five casemates have single horizontal musket loops that look straight out into the ditch, the remaining four each have a pair of vertical loopholes angled to sweep the ditch of the North Lines as it runs west towards the Citadel.



**Figure 10**  
*North Centre Bastion;  
photo of the main  
section of the west  
musketry gallery,  
looking west. The  
musketry positions are  
in the bays along the  
right of the picture and  
the steps to the  
terreplein at the far end  
(NMR: AA008609 ©  
Crown Copyright 1998)*

### **The north musketry gallery**

At its east end, the west musketry gallery divides. One branch leads into Detached Bastion through the south *caponier* (see below); the other connects directly with the north musketry gallery. There, twelve brick steps lead up through the first of 26 casemates, which also contains a single horizontal musket loop flanking the east face of the *caponier*. The gallery proceeds through the centre of the party walls to each casemate, via



**Figure 11**  
*North Centre Bastion;*  
*photo looking east*  
*along the north*  
*musketry gallery,*  
*showing the flat-headed*  
*doorways between the*  
*casemates (NMR:*  
*AA008612 © Crown*  
*Copyright 1998)*

flat-headed openings capped by large gritstone lintels like those in the western section of the west musketry gallery (Fig 11). Each casemate has an unfaced rear wall of chalk rock and a single horizontal musket loop in the front wall, looking straight into the cross ditch.

### **The east musketry gallery and gunrooms**

The east end of the north musketry gallery leads, via a sharp angled turn, directly into the east musketry gallery and gunrooms. This is a complex construction incorporating, in

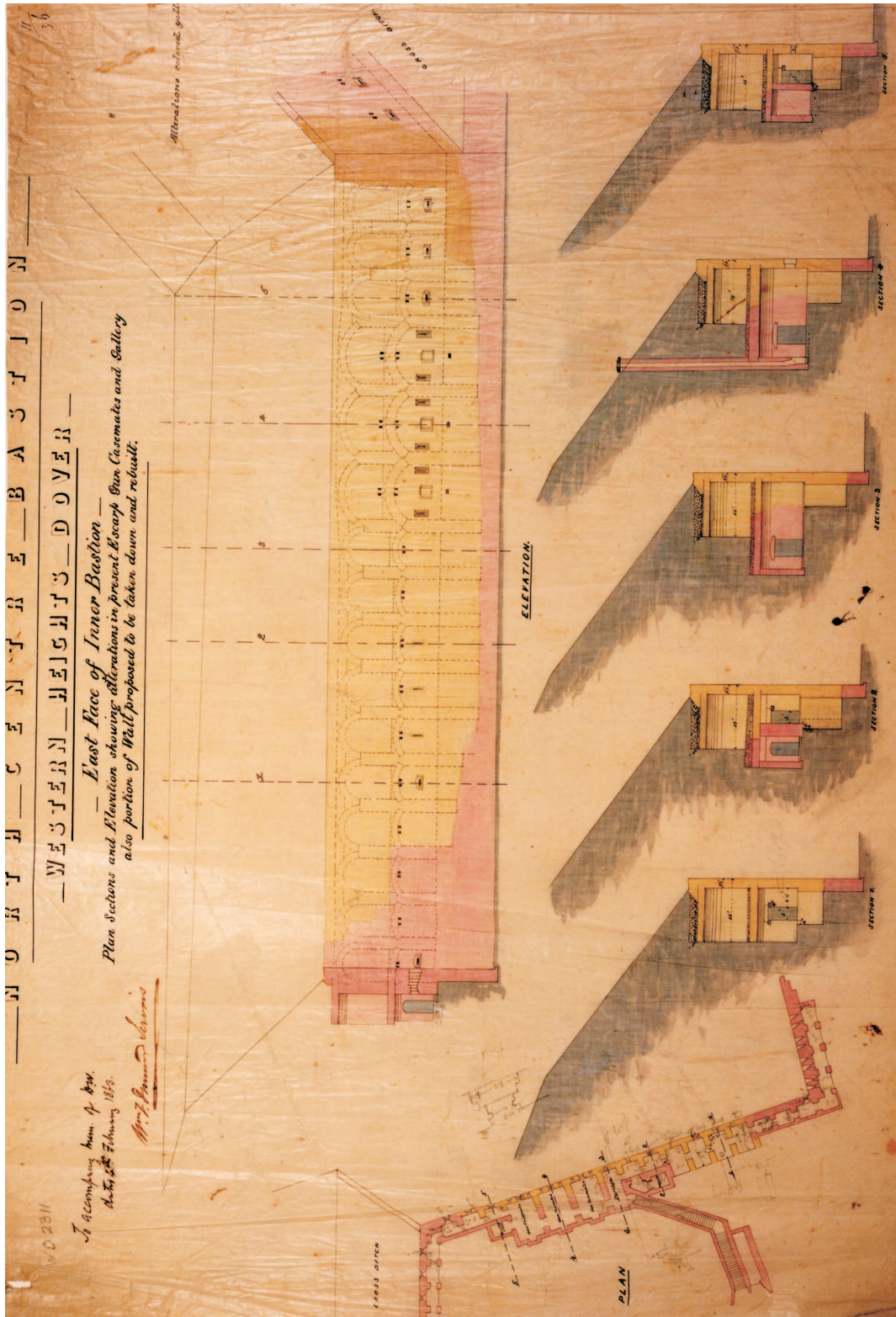


**Figure 12**  
*North Centre Bastion;*  
*photo of one of three*  
*gunrooms in the east*  
*gallery, showing the*  
*central carronade*  
*embrasure flanked by*  
*musket loops and smoke*  
*vents in the vault*  
(NMR: BB 029684 ©  
Crown Copyright 1998)

sequence southward, three musketry casemates, an expense magazine, three gun rooms for carronades, a single musketry casemate with steps up to the *terreplein*, another expense magazine, five musketry casemates, a well passage and nine musketry casemates. This complexity reflects the important role in covering the ditches and bridges on each side of the *tenaille* protecting the North Entrance to the Heights, as well as the east ditch of the bastion itself. It is also this face of the bastion which experienced structural failure leading to the repairs of 1863, involving the rebuilding of some  $\frac{3}{4}$  of the scarp revetment and parts of the casemates behind it (Fig 13; NMR: WD/2311; 2312)

Initially, the gallery runs along the rear of three casemates, each having a single horizontal musket loop looking straight into the east ditch. Only the first casemate is entirely of the original phase, the second and third are partial rebuilds of 1863. The gallery passes through flat-headed openings in the party walls, capped by gritstone lintels which have shallow-arched upper surfaces and relieving arches of three header courses.

Next is a suite of three large identical gunrooms with stone flag floors (Fig 12). The doorways, towards the rear of the party walls, have flat heads. They have been reduced in



**Figure 13**  
North Centre Bastion; east flank in 1863 (yellow tint shows extent of rebuilding required following structural failure in 1862 (NMR:  
WD/2312 © English Heritage)

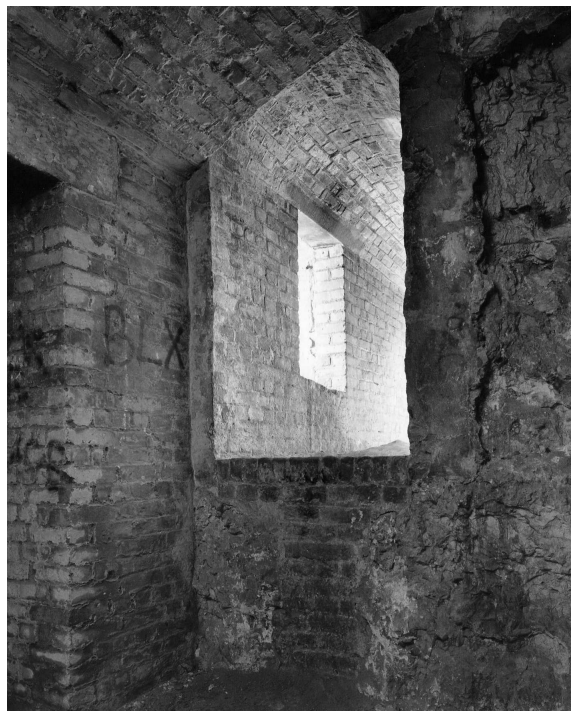


width by brick piers; the straight joints are obvious. These piers support large gritstone lintels, with arched upper surfaces and brick relieving arches over, and may be repairs of 1863. Each gunroom contains one carronade embrasure flanked by two musket loops in the front wall, all blocked. Each embrasure has a semi-circular arched head and a sandstone sill situated in the lower half of a rectangular panel, recessed one brick thickness. The panel itself also has a sandstone sill and lintel and formerly contained a wooden mounting which enabled the gun to be elevated and depressed. Each vault contains a ferrous ring for handling the heavy gun. There are two smoke vents to each casemate, one in the usual place in the front wall and a second, larger one defined by sandstone slabs, in the vault itself. One of the musket loops retains evidence of an iron fitting, comprising a small iron drum rotating in a vertical iron plate, itself anchored into the sandstone loop. The drum has a central circular hole through which the gun muzzle was inserted; the drum traversed by gentle pressure applied with the muzzle, to create an arc of fire in the ditch outside. Basic facilities in each gunroom comprise a ferrous bracket for a wall lamp and, in the rear wall, a fireplace with an iron lintel and a shutter vent over, and a stone lintel above it in the top of the vault. A stove flue, narrowing of the fireplaces and fittings for electric lighting are alterations probably of the 20<sup>th</sup> century.

A small expense magazine, unaffected by the alterations of 1863, is located adjacent to the northern gunroom. It is a simple rectangular brick chamber with a cross-axial semi-circular vault and cavity walls, entered originally through a doorway with a semi-circular arched head for doors with pintle hinges held in stone anchor blocks. This was truncated and replaced by the flat head of a later wooden doorframe. The magazine wall is ventilated into the cavity through missing headers, though there are no visible airbricks for the exit.

Continuing southwards, the large gunrooms give directly onto a musketry casemate with a single horizontal musket loop in the front wall and, from the south-western corner, a flight of steps ascends a moderate incline in a vaulted passage towards the *terreplein*. After 37 steps there is a half landing and a 45° turn, followed by 12 further treads before the gallery is blocked. The stairs are in brick with stone treads and are flanked by wheeling platforms, though once more there are no iron hauling rings on the half landing.

The gallery continues into a suite of nine musketry casemates of which only the last three are original. The other six are rebuilds of 1863, replacing *seven* originals. Moreover, four of the replacements are larger than the originals, being cut back further into the bedrock. The first two were rebuilt to the original small size, the gallery running through the rear of



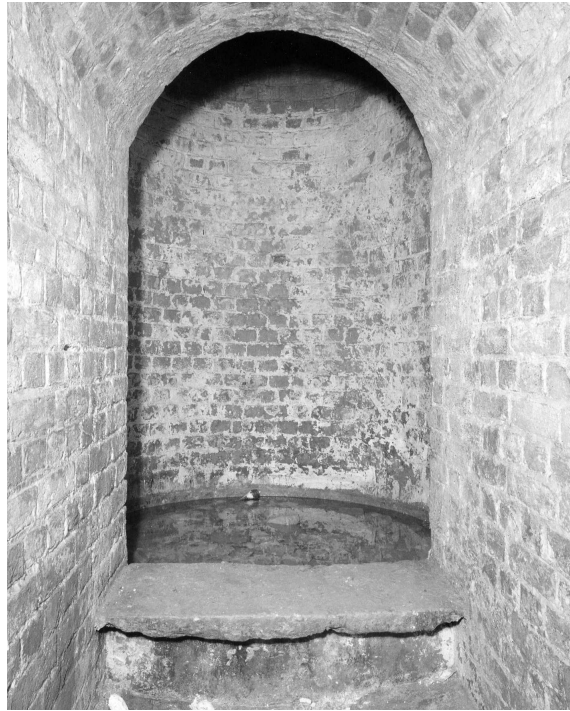
**Figure 14**  
*North Centre Bastion;*  
*photo in the east*  
*gallery showing the*  
*entrance to the well*  
*passage at the rear of a*  
*musketry casemate*  
*(NMR: AA008614 ©*  
*Crown Copyright 1998)*

the party walls through flat-headed openings with heavy gritstone lintels, and have single vertical loops in the front walls; the rear wall of the first casemate also has an entrance into another expense magazine. This was not affected by the repairs of 1863 and comprises an outer shifting lobby and an inner magazine, both with cross-axial vaults and shallow segmental arched entrances. The lobby entrance has an original keystone but the stone anchor blocks for the door hinges are partly obscured by the thick secondary render which extends throughout the lobby and magazine. The entrance is flanked

by earthenware airbricks to the cavity wall; those to the left are original stretchers while one to the right, of double stretcher size, is inserted and stamped 'STANLEY BROS NUNEATON PATENT'. Its north-west wall is angled and contains a lamp recess and a coat rack. The entrance to the magazine, in the south wall of the lobby, had outward-opening doors. The magazine, like the lobby, has dwarf dwarf walls for a raised plank floor and is vented to the cavity through missing stretchers and by three square holes, crudely cut through the wall on the gallery side. The render on the walls runs over numerous wooden plugs, formerly securing an original timber lining or a framework for shelves.

The gallery proceeds into the next four casemates, passing through the middle of their party walls via flat-headed openings with heavy stone lintels. There is a single musket loop in the front wall of the first three; the first two vertical, the third horizontal, while the fourth casemate is blind. The rear walls are unfinished chalk bedrock, except in the third casemate, which incorporates the entrance to a well passage.

The entrance to the well passage is raised 1.0m (3ft 3in) off the gallery floor (Fig 14). It has a semi-circular vault and is cut horizontally for 15.9m (52ft 1in) into chalk bedrock, ending in the circular chamber of **no 1**. The chamber rises to the surface as a brick column



**Figure 15**  
*North Centre Bastion;  
photo of well no 1, at  
the west end of the well  
passage (NMR:  
AA008616 © Crown  
Copyright 1998)*

8.5m (27ft 10in) above the water level, terminating in a corbelled roof with a small vent (Fig 15). The well is filled with rubble but clear water seeps through. There is a stone step of 0.30m (1ft) from the lip of the well to the passage, which is gently dished and slopes gradually eastward to the gallery, just before which there is a small metal grill for overflow drainage.

Just inside the well passage, in its south wall, is a square-headed opening with a sandstone lintel, giving onto a second, shorter vaulted passage, whose floor is set

0.5m (1ft 7in) higher than the floor of the main one. This passage leads to a second circular well, **no 2**, contained in a square chamber. Setbacks in the brickwork and scars on the wall suggest two doors, one at the mouth of the passage and one just before the well chamber. The floor slopes gradually northward back to the main well passage, with drainage effected by another small metal grille set in the floor.

The southern three casemates, of the smaller size, are original constructions, unaffected by the repairs of 1863. The gallery runs along their rear faces through flat-headed openings in the party walls that are capped by rectangular gritstone lintels. The casemates have the usual axial vaults and smoke vents but only the southern one has a musket loop, of the horizontal type.

A small lobby enables an eastward right-angled turn into four more musketry casemates at the blind end of the gallery, which passes through the centre of their party walls via semi-circular arches of four header courses. The rear walls are unfinished chalk bedrock, while each front wall has two vertical loops looking directly along and covering the whole east ditch. The western two loops are blocked by external steel shutters associated with the rifle range of the early 20th century (NMR: WD/2364).





## DETACHED BASTION (Fig 8)

Detached Bastion has a trapezoidal plan, with a ditch defining the defensible 'island' of the bastion (Fig 16). The ditch is generally 12.0m (40ft) wide, except on the east, where it was reduced to only 9.0m (29ft 6in) in the rebuilding of 1867. Its line is usually straight except on the north-west where it adopts a prominent arc around the north-west *caponier*. The ditch revetments are obscured by vegetation but there is a clear difference between the **scarp revetment** and that of the **counterscarp**. The former, in stock brick laid to English bond, is vertical except on the east, where it is battered; drainage gulleys are built into the capping course. In contrast, the **counterscarp revetment** utilises split and faced flintwork, with periodic string courses in red brick (three courses to each string course). This probably reflects a delay, if only a short one, in the completion of the counterscarp revetment, and also an economy in using flint nodules won locally during digging of the ditches. Moreover, along the west side, the counterscarp is an unrevetted chalk face except for the top 2-3m, which is in flint.

The **cross ditch**, also 12.0m wide, has a change of level down to the North Lines at its eastern end. The change is marked by an angled brick **revetment**, in English bond, some 2.92m high (9ft 6in). This served as an obstacle to an attacker, who, having negotiated it, would have been faced by the south *caponier* at the other end of the ditch. Numerous chunks of concrete debris and several large wrought iron joists lie abandoned towards the east end of the ditch. These cannot have been moved very far and possibly represent the remains of a bridge linking the two bastions. As there is nothing visible on aerial photographs dating 1941-45, the putative bridge is earlier, possibly First World War (NMR: HLA/373/906 and 106G/UK610/6329).

For the most part, construction of the bastion ditch involved cutting down into chalk bedrock. However, on the north and east, the redeposition of spoil over the natural slope to produce a *glacis* has served as much to create the counterscarp face of the ditch as has excavation of the chalk. The *glacis* is truly enormous, between 7m (23ft) high on the north and 10.5m (34ft 6in) on the east, to absorb the impact of incoming bombardment, and its slope very steep to render infantry assault arduous (Fig 16). There is a low **counterscarp bank** between the lip of the counterscarp and the *glacis*, slighter on the east and north sides, at 0.6m (2ft) high and larger on the west side, where it broadens to 19m (62ft 4in) wide and 1.4m (4ft 6in) high. This probably served as further protection for the ditch revetments.



**Figure 16**  
*North Centre and  
Detached Bastions,  
from the air in 1978  
(NMR: TR3040/4/147  
© Crown Copyright)*

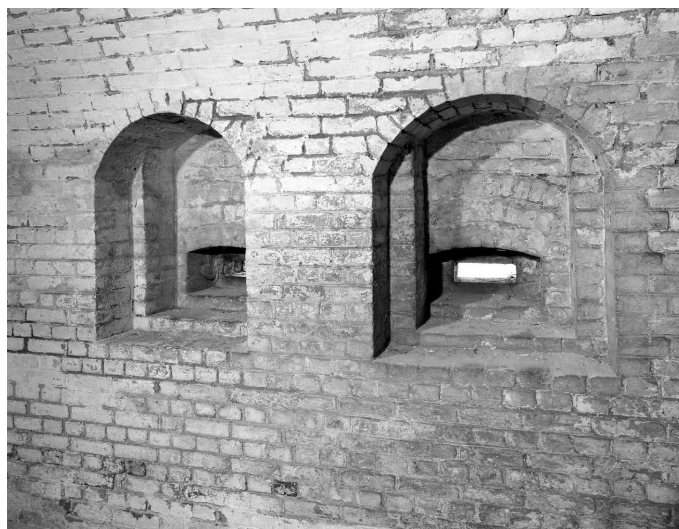


**Figure 17**  
*Detached Bastion;  
photo of the south  
caponier, east face  
exterior, showing  
horizontal musket  
loopholes (NMR:  
AA008604 © Crown  
Copyright 1998)*



### The south *caponier*

This *caponier* linked the bastions and gave flanking fire for the cross ditch (Fig 17). It is a plain passage with brick walls, 1.4m thick, and a semi-circular vault. Both sides have musket loops, above which a stone cordon at the top of the external walls gives onto a roof pitched at a very shallow angle. Enemy access to the loops was prevented by drop ditches and strained wire fences on both sides. The eastern drop ditch is some 2.5m (8ft 2in) wide and 0.7m (2ft 3½in) deep, the western one 3.5m (11ft 6in) wide and 1.40m (4ft 6in) deep. Several ferrous fence supports lie abandoned in the ditch bottoms.



**Figure 18**  
*Detached Bastion;*  
*photo of the south*  
*caponier, east face*  
*interior, showing*  
*horizontal musket*  
*loopholes (NMR:*  
*AA008607 © Crown*  
*Copyright 1998)*

Inside, the southern entrance was protected by a rectangular drop pit and drawbridge, which in an emergency would close the *caponier* and prevent entry from Detached Bastion. At some time, the bridge was removed, the pit infilled and a brick wall (Fig 8a, A) built across the *caponier* on the south lip of the drop pit.

This wall, in English bond, has a central doorway with a flat head, concrete lintel and a wooden frame. The fill of the pit has been disturbed, revealing sandstone coping on the northern edge and two corbels in the sides, to support the bridge when down. The heavy ferrous hinge at the base of the bridge is *in situ*, extending into counterweight chambers in the side walls. These continue south of the inserted wall, with sandstone lintels rebated for a frame, where the bridge counterweights and counterbalance arm connect with the hinge. Ferrous tiebacks, set in stone blocks in the side walls, secured the ropes for lifting or dropping the bridge.

The east wall of the *caponier* is original and has eight horizontal musket loops, which look straight along the cross ditch between the two bastions; the southern two could be used only with the drawbridge down. The loops have sandstone sills and lintels and internally, they have stepped sides and bases, with segmental arched heads (Figs 18-19a; NMR: WD/2307). Five in the west wall form the alterations proposed in 1862, of which the three northern examples are identical to those on the east wall. The other two are

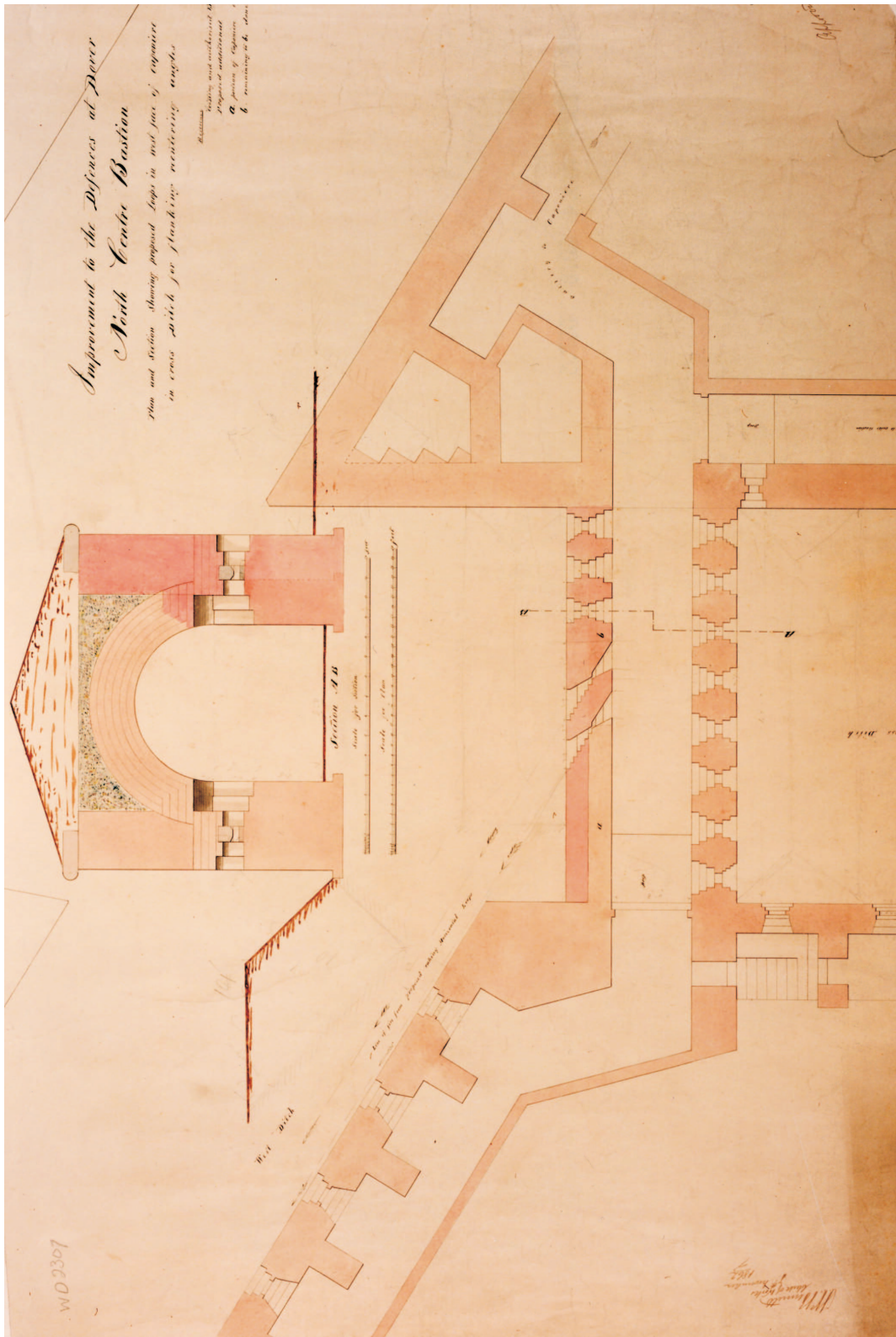


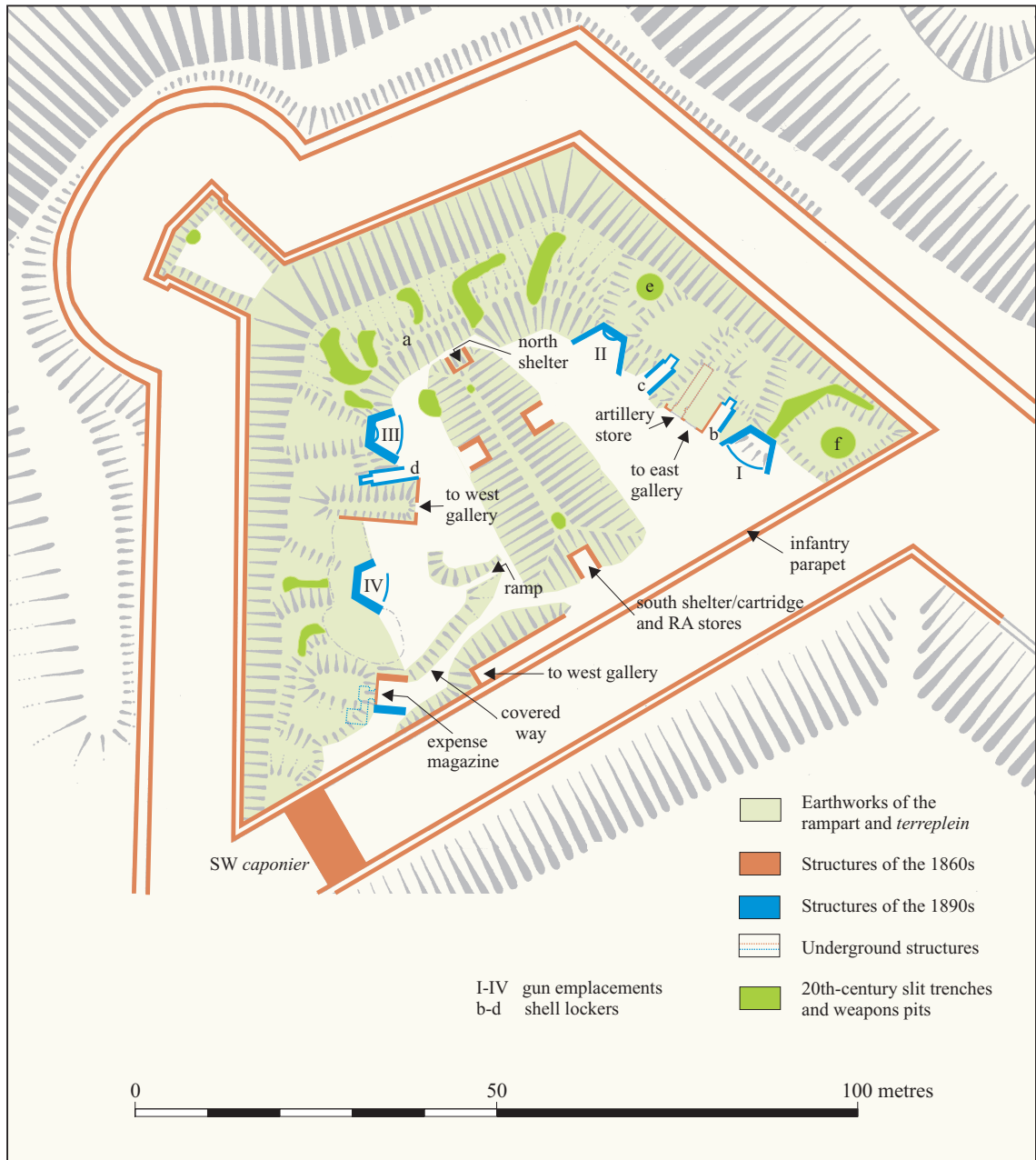
Figure 19  
Detached Bastion; a plan of 1862 showing proposed alterations to the south caponier (NMR: WD/2307 © English Heritage)



**Figure 19a**  
*Detached Bastion; the interior of the south caponier, looking south; at left is the entrance to a ramp leading up to the terreplein (NMR: BB 029680 © English Heritage 2001)*



vertical loops, acutely splayed to enfilade the whole west ditch of North Centre Bastion. Externally, the embrasures are finished with shallow segmental relieving arches of three header courses.





### THE TERREPLEIN (Fig 20)

A substantial rampart rises from above the scarp revetment, composed of redeposited soil and chalk carefully scarped into a steep even slope to absorb incoming fire. Beyond the crown of the rampart, which is pierced by gun embrasures and disturbed by later slit trenches, lies the *terreplein* where the greater part of the artillery was to be mounted. The *terreplein* level is so choked by long coarse grass and scrub that much detail is obscured, particularly along the west face. However, the broad **rampart** extends around the north, east and west faces, with an **infantry parapet** closing off the **gorge** above the cross ditch. The *terreplein* supports four **gun emplacements**, each with a ready-use **shell recess**, while an **expense magazine** and an **artillery store** are contained in bombproof traverses. The interior space is largely taken up by a large bombproof **troop shelter** and there are also three **entrances** leading to the musketry galleries in the bastion below.

The majority of the buildings are Captain Du Cane's work of the early 1860s, though all were modified in the 1890s, and are constructed in stock brick laid to English bond. Their entrances invariably have semi-circular arched heads of three or four orders and were closed by double outward-opening doors mounted on ferrous pintle hinges plugged into stone anchor blocks. They have keystones with bolt housings and could be secured in an open position on ferrous tie backs, once more held in stone anchor blocks in the flank walls. Interiors are usually whitewashed.

However, the present arrangement of the *terreplein* dates to the 1890s, for the reception of four 7-inch RBL guns. Captain Du Cane's *terreplein* of the 1860s had emplacements for ten guns, firing through embrasures in the rampart, and was interrupted by traverses over the magazine, artillery store and gallery entrances (Fig 4). The 1890s alterations concealed this original arrangement by thickening of the rampart on the inside and infilling of the original embrasures, although the traverses were retained in a shortened form. The *talus* stands between 2.0m and 2.35m in height while the superior slope is gradual before the exterior slope falls steeply to the **scarp** of the ditch. A clear break in the superior slope on the north face, **a**, probably marks the division between the original and thickened ramparts, such that it is possible that the original gun floors and embrasures are intact. An earthwork **ramp** up to the *terreplein* on the west side is also of the 1890s.

There are four identical **gun emplacements** let into the *talus*, **nos I to IV**. Each emplacement is made in concrete with a vertical front wall forming a *barbette* 1.35m (4ft 5in) high and 0.6m (2ft) thick, with flank walls ramped down and splaying to the rear, and a level gun floor (Fig 21). The floors each incorporate two steel racer arcs for guns



**Figure 21**  
*Detached Bastion;*  
*photo of the east*  
*terreplein, showing*  
*emplacement no II (at*  
*left), for 7-inch RBL*  
*gun, c 1890, together*  
*with its shell recess*  
*(centre) and the*  
*entrances to the*  
*artillery store and east*  
*gallery (NMR: BB*  
*029679) © English*

mounted on traversing platforms with ‘C’ pivots, enabling a theoretical 70° arc of fire. However, the unrevetted earthwork embrasures for all the guns are cut through the superior slope of the rampart with splays to enable only 50° arcs. Nevertheless, the arcs cross and maximum depression comes to bear precisely on the lip of the counterscarp revetment, leaving no dead ground beyond. These alignments correspond exactly to the proposal drawings of 1889 for the 7-inch RBL guns (Fig 4; NMR: WD/2301).

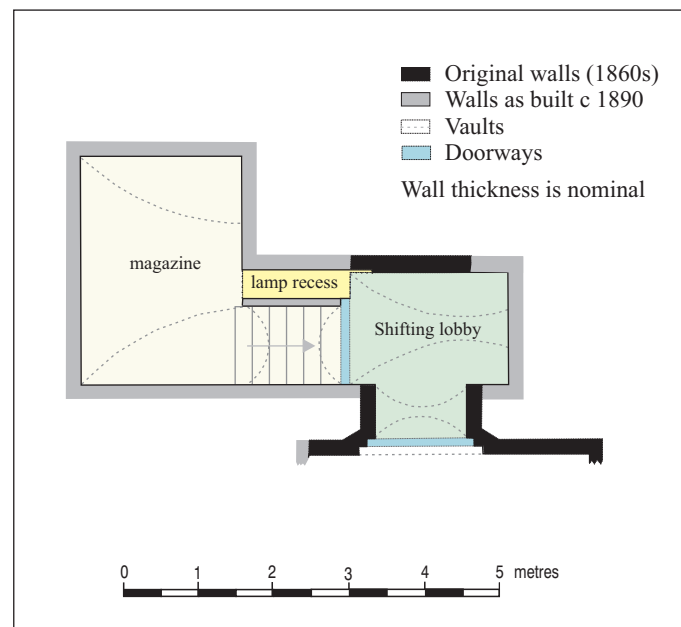
Four ready-use **shell recesss** served the RBL positions (Fig 21). Three are accessible, **bold**, one on each side of the artillery store on the east face, and one on the north side of the central entrance to the west gallery. The fourth, south of the same entrance, is hidden by vegetation. All are in the locations proposed in 1889 and follow a common design, let into the *talus* for protection, at the end of short passages with concrete side walls (where not built against an existing structure) that are ramped down to the rear (NMR: WD/2301). Each recess, of stock brick, is 1.25m (4ft 1in) square in plan, with a semi-circular vault under a flat roof. They were secured by single doors that opened outward, supported on ferrous pintle hinges held in stone anchor blocks; the rebates for the wooden doorframes survive.





### The expense magazine (Fig 22)

The expense magazine is approached along a short **covered way** (Fig 20) from the troop shelter. The structure was radically altered during the 1890s but retains some work of the early 1860s. The original arrangement is shown on a plan of 1882, when it was designated Western Heights Magazine No 13. It comprised two rooms, a shifting lobby and a magazine built in series straight back from the entrance, the whole covered by a bombproof traverse (NMR: WD/2411a). In the 1890s, the original magazine was sealed and replaced by a new sunken magazine, offset to the south and reached from the original shifting lobby, duly modified. The traverse remains largely unaltered.



**Figure 22**  
*Detached Bastion;  
RCHME plan of the  
expense magazine*

The entrance, approached up three steps, is set into a vertical brick façade with flank walls steeply ramped to the profile of the traverse. The north flank wall and the entrance façade are mainly original, the latter with the usual doorway, except for a column of red ceramic airbricks (stamped “STANLEY BROS NUNEATON PATENT”) east of the entrance, which date to

the 1890s for ventilation of the shifting lobby cavity wall. The south flank wall of mass concrete is of the same date, from which issues at head height, a large ceramic ventilator pipe (0.29m/11½in diameter) set horizontally within a rectangular recess. The recess has remains of a hinged metal frame from a door or grille to the vent.

The shifting lobby represents only half of the original, having been truncated on the north. Its axial vault is mainly a rebuild of red headers though part of the stock brick original survives just inside the entrance. Most of the west wall is also original but the north-west corner (except part of a relieving arch of three header courses over the door to the old magazine) and north walls are concrete rebuilds of the 1890s. Plinths for a raised timber floor survive along the east and west walls. Detail includes a scar from a coat rack



on the east wall and in the south-west corner, an inserted lamp recess, with a stone lintel, partly chased into the west wall. The recess, 0.54 m (1ft 9in) high and 0.38m (1ft 3in) wide, extends right through into the 1890s magazine, a wall thickness of 1.43m (4ft 8in), and is vented through airbricks into the cavity wall.

The entrance to the 1890s magazine, in the south wall of the looby, has a rebated wooden frame, painted green, with a segmental arched head cut into the lobby brickwork. There were double outward-opening doors onto a passage vaulted in red stretchers, descending six concrete steps to the magazine.

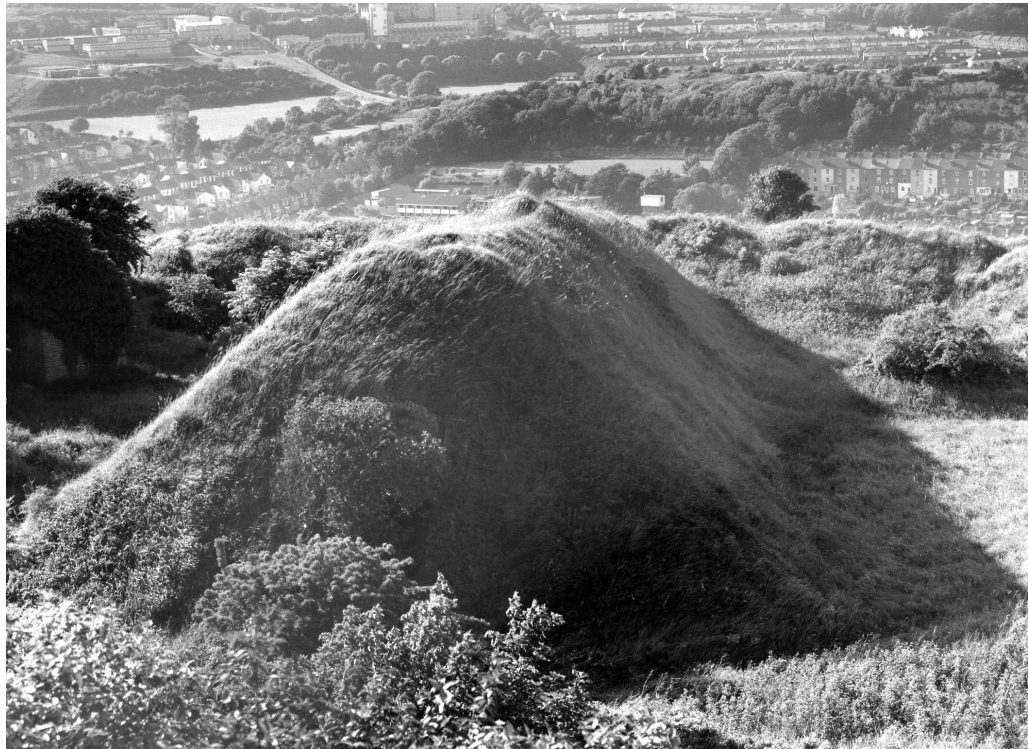
The magazine is cavity-walled, the inner skin in English bond, but the gaps to the cavity have been filled by brown salt-glazed bricks stamped 'C Jennings, Poole Dorset Patent'. Most of the north wall is rendered and there are metal brackets on the north and west walls. There is a brick half vault, the higher end to the north.

#### **The bombproof shelter (later shell store and RA store) (Fig 24)**

This building originally formed a bombproof shelter for the gun detachments in the bastion of the early 1860s. It has a cruciform plan with a semi-circular vault of stretchers, covered by a huge earth mound of inverted V profile, 37.5m (123ft) long, a maximum of 18.5m (60ft 7in) wide and up to 6.1m (20ft) high (Fig 23). All of the entrances lacked doors to enable rapid deployment to and from the guns; the long arms formed the two shelters while the shorter arms formed a through passage. In the 1890s, the south shelter was converted into a **shell store** and an **RA store**, both with doors, for the 7-inch RBLs, the northern shelter was blocked at the north end, while the through passage remained unaltered. The covering mound was extended slightly at the north end.

The original form of all four entrances is preserved only in the through passage, comprising vertical façades recessed into the body of the mound, in short cuttings with flank walls ramped down to the mound profile. The entrances have single-order semi-circular arches. At the centre of the passage there is a cruciform vault picked out in lighter, sandy-coloured bricks.

The **north** and **south shelters** are of unequal length and originally opened directly onto the cross passage. The north shelter is featureless apart from the 1890s blocking of pebbly mass concrete at the north end, where it originally opened onto the *terreplein*. Externally, the extension of the mound has all but concealed the original ramped brick flanking walls.



**Figure 23**  
*Detached Bastion;*  
*photo of the troop*  
*shelter, from the south*  
*(NMR: AA008624 ©*  
*Crown Copyright 1998)*

The 1890s conversion of the south shelter involved the insertion of new brick walls at the north and south ends, both with doors, and a brick partition dividing it into two chambers, an RA store on the north and a shell store to the south (NMR: WD/2301). The entrance to the RA store from the cross passage is formed by a well-built brick wall, in English bond, carefully coursed into the original work and finished with queen closers. A central doorway has a very shallow segmental-arched head, relieved by two header courses, and a concrete sill raised 0.23m (9in) above the through passage. The doorway is flanked by single rectangular holes, from which the airbricks have been broken out, while the wooden frame was held in an internal rebate and the door opened inwards. The floor is concrete, the interior featureless apart from the brick partition wall forming its south end; this is 0.25m (10in) thick and contains a lamp recess placed centrally for illuminating both stores, flanked by pairs of ventilators. The lamp recess retains the scar of a moulding for a glass pane and was vented by a ferrous pipe into the shell store. The ventilators have slate lintels and ferrous fixings for louvres which also opened on the shell store side.

The entrance to the shell store is at the south end, recessed into the mound with original flank walls of the 1860s, ramped down to the mound profile. The entrance elevation has a semi-circular arched head, also original, below which the arch is infilled down to a lower, segmental arched entrance for the 1890s shell store. The infill contains a single red ceramic ventilator stamped with 'STANLEY BROS NUNEATON PATENT' - identical

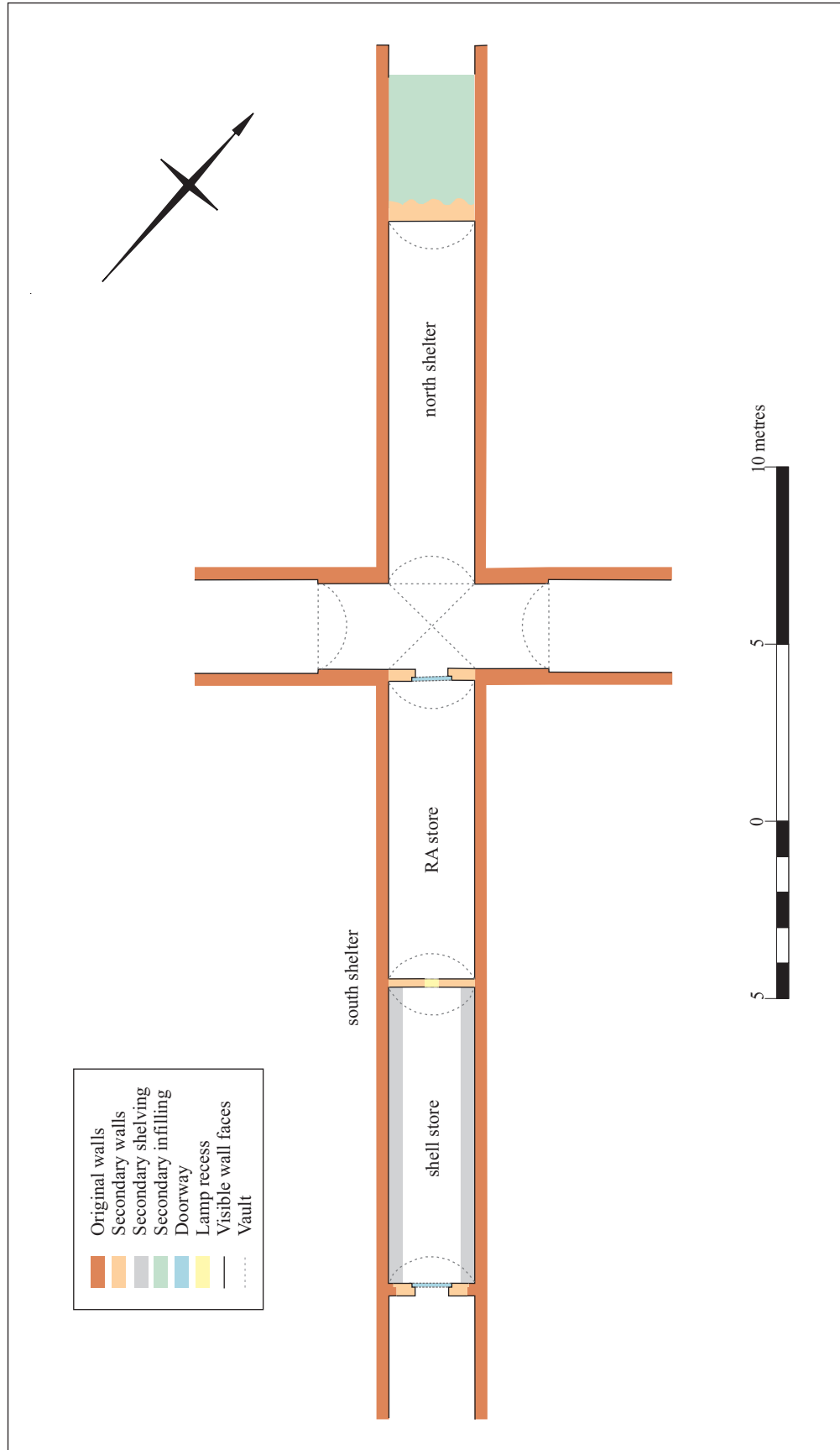


Figure 24: Detached Bastion; RCHME plan of the troop shelter, showing its partial conversion into a shell store and RA store c 1890



to one in the expense magazine. The 1890s entrance elevation, 0.37m (1ft 2½in) thick, is rebated internally for a flat-headed wooden doorframe flanked by small windows. Inside, the shell store is rendered and whitewashed around the positions of timbers that formerly supported two shelves along the length of the side walls, leaving a central corridor. The lower shelf was larger at 0.40m (1ft 3½in) wide and 0.065m (2½in) thick, positioned 0.77m (2ft 6in) off the floor as a rack for shells; the upper shelf was 0.23m (9in) wide and 0.025m (1in) thick, placed 1.33m (4ft 4in) above the floor for storing smaller items. The floor level is substantially higher than the adjacent RA store but its original form is obscured by earth. The partition wall to the RA store contains a large U-shaped ferrous fitting high above the lamp recess.

### **The artillery store**

This is an 1860s building which may have been converted in the 1890s, perhaps to a Side Arms Store (when part of the bombproof shelter became the RA store). The entrance, contained in a vertical recessed elevation shared with the entrance to the east gallery, is reached down four brick steps and protected by steeply ramped flank walls. Originally, an earthen traverse covered the store and the gallery entrance but this was shortened on the north during the changes of the 1890s and subsequently much material has been removed, leaving a flat top surface. The semi-circular vaulted chamber is reached through the usual entrance with evidence for doors of the outward-opening pattern. The interior is long at 6.4m (21ft) and narrow at 1.8m (6ft); earth and debris has been heaped into the eastern half. Four ferrous brackets, on the south wall at a height of c1.7m (5ft 6in), may have supported a shelf c 0.21m (8¼in) wide, or perhaps a rack for the side arms. The east wall is rendered externally and has been crudely breached to make a small hole, perhaps a crude embrasure looking along a corresponding trench in the rampart outside, and perhaps an infantry position of the 20<sup>th</sup> century (see slit trenches, below).

### **The entrances to the west musketry gallery**

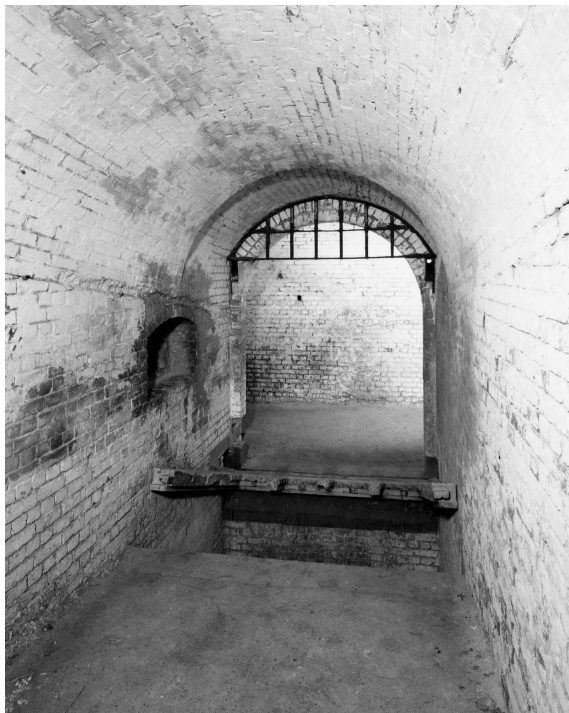
There are two entrances to the west gallery. The southern one lies against the gorge wall and is approached down a shallow ramp in an open cutting with vertical brick revetments; the north revetment is bombproofed by an earthwork against it. The entrance has the usual arch and door detail (Fig 25), giving onto a vaulted passage with a stone floor, ramped down for 27m (88ft 6in). The final 2.27m (7ft 6in) is taken up with an identical drop pit and drawbridge to that closing the south *caponier* from North Centre Bastion (Fig 26). In this example, the pit and bridge survive, the former 1.5m (5ft) deep, in brick with stone coping rebated for the bridge. The covering of the bridge has been stripped but its framework is *in situ*, comprising timber of heavy scantling strapped together with iron



**Figure 25**  
*Detached Bastion;*  
*photo of the southern*  
*entrance to the west*  
*musketry gallery from*  
*the terreplein, showing*  
*the typical entrance*  
*arch and, centre right,*  
*a pintle hinge for the*  
*door, in its stone*  
*anchor block (NMR:*  
*AA008628 © Crown*  
*Copyright 1998)*

bands secured with strong bolts. Large iron hasp hinges at the base of the bridge pass into cavities in the flank walls of the passage, with stone lintels, and there attach to counterbalance arms. These arms extend along the cavities and emerge in brick counterweight recesses in the side walls and floor of the west musketry gallery. These are rebated for covers and the wall sections have stone lintels. Each counterbalance arm is of wrought iron, passing through eight rectangular weights, 0.24m by 0.10m each (9½in by 4in) and secured at the end with a metal

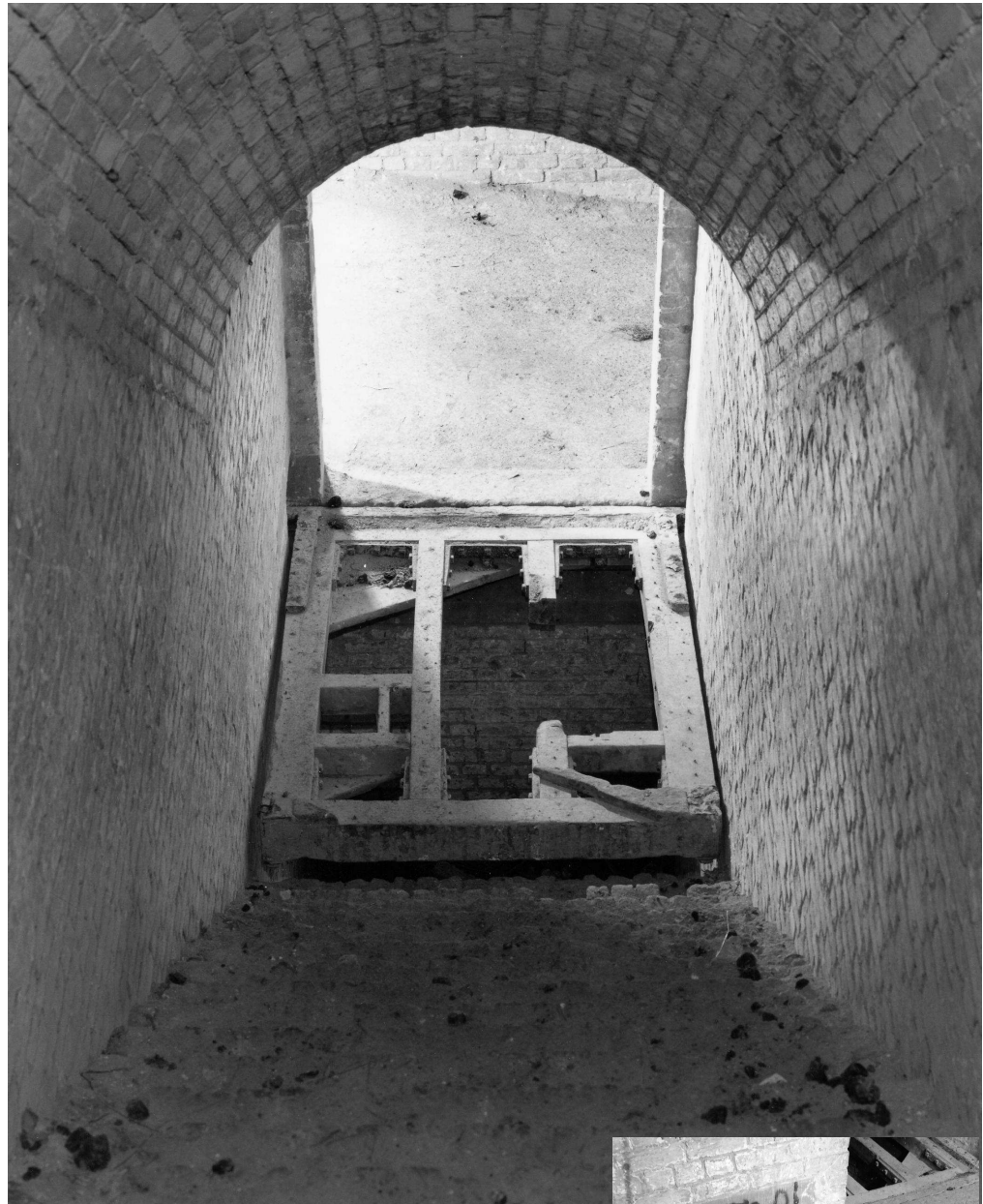
wedge through a hole in the arm. The entrance is of the usual form, the drawbridge ropes passing through iron pulleys set in stone blocks at the springing of the arch and secured on ferrous tiebacks halfway down the arch in the gallery. The gap between the square head of the bridge and the vault is taken up by an iron grille.



**Figure 26**  
*Detached Bastion::*  
*photo of the drop pit*  
*and lifting bridge at the*  
*end of the southern*  
*entrance to the west*  
*musketry gallery from*  
*the terreplein (NMR:*  
*AA008629 © Crown*  
*Copyright 1998)*

The northern entrance to the west gallery is also contained in a bombproof traverse on the *terreplein*; it has the usual details but the passage descends *very* steeply on brick steps, ending in a brick pit and drawbridge of identical form and detail; except each counterbalance arm has only four weights (Figs 27 and 28).

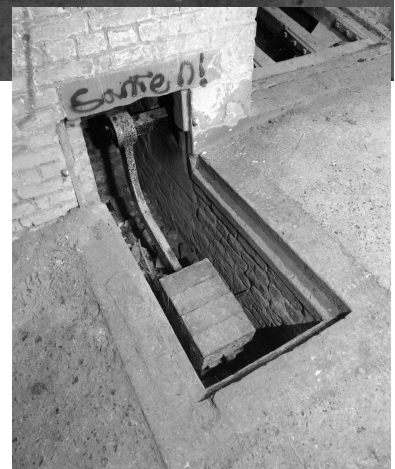
These bridges enabled troops to seal the west gallery if the *terreplein* was taken by escalade. If so, the ditches



**Figure 28**  
*Detached Bastion; photo of the drawbridge guarding the northern entrance to the west musketry gallery, at the base of the passage from the terreplein (NMR: AA008632 © Crown Copyright*

could be defended from the gallery, with the enemy confined to the *terreplein* and exposed to fire from North Centre Bastion and the North Lines.

**Figure 27**  
*Detached Bastion; photo of the counterweights for the drawbridge guarding the southern entrance to the west musketry gallery from the terreplein (NMR: AA008633 © Crown Copyright 1998)*





### **The entrance to the east musketry gallery**

This adjoins the artillery store in the same façade, approached down common steps. The entrance and vaulted passage are of the usual form, descending steeply via brick steps to the gallery. A slight but curious change of angle occurs just over halfway down, the passage deflecting slightly south, possibly the result of structural movement (see below).

### **Slit trenches and weapons pits (Fig 20)**

There are several straight and L-shaped slit trenches dug into the rampart, without regard for the pre-existing gun emplacements. Though somewhat eroded, they average 1.7m in width and 0.8m in depth. On the east flank, two flat-bottomed circular depressions, **e** and **f**, 2.85m and 3.5m in diameter respectively and 0.45m deep, command a view of the North Lines up to North Entrance and may be successive machine-gun emplacements. All may be of either First or Second World War date.

## **THE CASEMATED MUSKETRY GALLERIES AND GUNROOMS (Fig 8a)**

### **The east musketry gallery**

The passage from the *terreplein* descends to a rectangular lobby, the southern part of which was an expense magazine in 1881, though no evidence of this remains (NMR: WD/2300b). Two loops in its east wall are thoroughly blocked, the brickwork coursing in. From the lobby, the gallery leads through four casemates to both north and south of the lobby. The casemates are mainly of brick laid to English bond, with axial vaults of stretchers. The rear walls are of chalk ashlar (though the northern one is unfinished), a detail seen at no other place in these bastions. The gallery lies along the rear of the casemates, passing through square-headed openings in the party walls capped by large gritstone lintels that appear to be cut by semi-circular brick relieving arches. The arches are themselves cut by the line of the vaults. Each casemate has the usual smoke vent and two horizontal musket loops, except the southern casemate, which has only one; all loops have sandstone lintels.

To the north, the gallery does not cover all of the east ditch, ending short in a blocked semi-circular arch; perhaps more casemates lie beyond. In addition, the southern four casemates have significant cracking to the walls and vaults, repaired with a hard dark grey mortar, revealing similar structural problems to those experienced in the east gallery of North Centre Bastion in 1863 (see above). The extent of this problem is revealed by substantial ferrous tie straps, extending horizontally across and on each side of the openings between casemates, in an attempt to stop slippage of the entire gallery into the





east ditch . The straps are secured in brick repair patches cut into the brickwork of the east walls and the chalk ashlar of the west walls, in the latter case looking misleadingly like blocked doorways. In 1867, in order to arrest movement of the gallery, an additional battered wall was built against the exterior of the vertical scarp revetment, thus sealing the loopholes and rendering them useless. From this time, the gallery was not used for its intended purpose and this is the reason for the three artillery emplacements on the North Lines just east of North Centre Bastion, so that the east ditch of Detached Bastion could be covered (Burridge 1991, 39-40). Further evidence for closing of the east gallery occurs in the southern casemate, where there is a sharp turn to the west, as if signalling the intention to extend the gallery along the gorge face. It ends abruptly in another semi-circular arch blocked in brickwork.

### The west musketry gallery (lower floor)

The entrance to Detached Bastion was through the south *caponier* from North Centre Bastion, proceeding through a dog-legged passage into the west gallery. The gallery passes into the first of 12 casemates through an inserted red-brick wall with flat-headed doorframe (Fig 8a, **B**) and concrete lintel, identical to the one at the entrance to the south *caponier* (see above). Thereafter, the gallery extends along the west face of the bastion

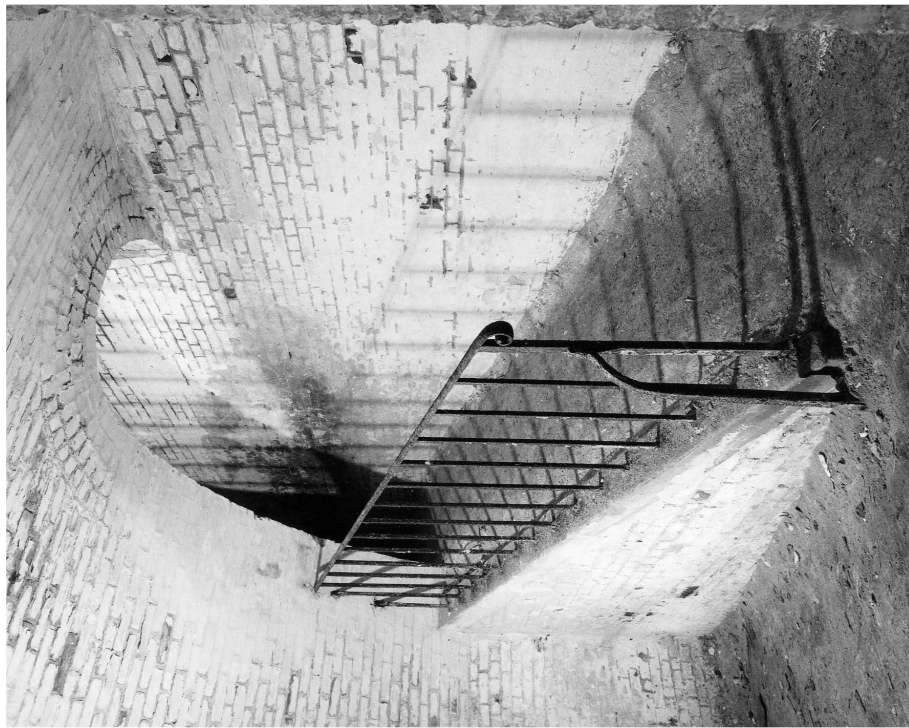
down a moderate incline, through semi-circular arches in the centre of the party walls. Only the top casemate has a rear wall finished in brick; the others have bare chalk on which are several relief carvings of faces and figures, of unknown date (Fig 29). The first nine casemates have two horizontal loops each, looking straight out into the west ditch, while the last three casemates have three vertical loops each. The eighth casemate gives access to the *terreplein* and the last one to the first floors of the north-west *caponier* and west gallery via a ramp, guarded by a wrought iron handrail in a stone base (Fig 30).



**Figure 29**  
*Detached Bastion:*  
photo of a head cut in  
relief into the chalk  
rear wall of a casemate  
in the west musketry  
gallery (NMR:  
AA008641 © Crown  
Copyright 2001



**Figure 31:** Detached Bastion; photo of the entrance to the west musketry gallery upper floor, viewed from the rear of the north-west caponier, showing elaborate brick vaulting (NMR: AA008636 © Crown Copyright 1998)



**Figure 30:** Detached Bastion; photo of the ramp between the lower and upper floors of the west musketry gallery (NMR AA008635 © Crown Copyright 1998)

The west musketry gallery (upper floor)



The ramp leads up to a landing at first floor level, serving both the north-west *caponier* and the west musketry gallery. The latter is reached through a semi-circular arched opening up a flight of seven brick steps (Fig 31). The gallery ascends a moderate slope through semi-circular arched openings in the centres of the party walls of three casemates. Each casemate, with the usual form and details, has three vertical musket loopholes angled to cover the curved section of ditch flanking the north-west *caponier*.

### **The north-west *caponier***

This two-storey *caponier* projects from the north-west angle of the bastion and thereby provided enfilade fire for the north and west ditches from embrasures and loopholes in its flank walls (Fig 32). The vertical walls are continuous with and rise to the full height of the scarp revetment, in stock brick laid to English bond, and there are brick gutters behind the capping course. The flank walls splay outward from the body of the bastion and were themselves protected by enfilade fire from the west and north musketry galleries. The north, or face wall of the *caponier* is finished as a very shallow outward chevron and is loopholed to protect the curved section of the ditch.

The ground floor of the face wall is finished in two broad, shallow segmental arches. The external section of wall beneath these arches is battered back into the body of the *caponier*, creating shallow vaults which may have been pierced by murder holes in the



**Figure 32**  
*Detached Bastion;  
external view of the NW  
caponier, from the west,  
showing musket loops  
and carronade  
embrasures (NMR:  
AA008621 © Crown  
Copyright 1998)*



form of narrow slots, but these are blocked internally by concrete beams at first floor level. At each corner of the face wall are triangular-shaped buttresses with sandstone capping courses; a similar smaller buttress is placed between the arches. The shape of the buttresses prevented the corners, and the area between the arches, becoming 'blind spots' which could be used as lodgements by an attacker. In all respects, this design is identical to the *caponiers* constructed at the same time at the Drop Redoubt (Brown *et al* 2001).

The roof is bombproofed by means of a flat-topped steeply-scarped earthwork of chalk and soil, pierced only by the truncated brick columns of the chimney stacks and ventilators from the casemates below.

Inside, the base of the west gallery leads into the rear of the *caponier* through a semi-circular arch and forms a passage linking to the north musketry gallery. The passage also has two semi-circular arched openings leading through its north wall into the main body of the *caponier* and a doorway into an expense magazine from its south wall.

The main body of the *caponier* is composed of two semicircular-vaulted, two-storey casemates constructed with the vaulting running at right angles to the flank walls (Fig 33). The two vaults meet at a heavy spine wall pierced at the outer ends by semicircular, two-storey arches allowing access between the casemates, matching identical arches through the wall from the rear passage. There are two circular, brick-built ventilators at the crown of each vault and one fireplace per casemate, situated in the north face of the spine wall and rear passage wall respectively.

The ground floor is stone flagged. The first floor has wide galleried walkways, formed of slate slabs, running from a landing over the rear passage through the arched openings and along the flank walls, through the second pair of arches between the casemates and then along the north wall. The slate slabs are carried on wrought-iron 'I' section beams anchored into the walls and provided with cast handrail stanchions. Additional support is provided by vertical rods extending from the handrails to the vaults. The central part of each casemate is open from ground level to vault.

The walls are pierced by embrasures and loopholes on both floors. The lower floor has three carronade embrasures in the flank walls, two on the west (one per casemate) and one on the east (north casemate), all of which have a vertical musket loop to each side. Additionally, there are four vertical musket loops in the east wall of the south casemate



**Figure 33**  
*Detached Bastion:*  
*photo showing the*  
*interior of the NW*  
*caponier, from the west*  
*(NMR: BB 029681 ©*  
*English Heritage 2001)*

and and four horizontal loops in the north face wall. The first floor has sixteen vertical loops on each flank, eight per casemate, and four horizontal loops in the north face wall.

The carronade embrasures are the same as those in the gunrooms of the east gallery in North Centre Bastion (Fig 34). Here, they are open and show similar splays and stepping to the musket loops, with variation according to the ground covered. Moreover, it is clear that the internal stone sills and lintels were purely for the support of the gun carriages, the



**Figure 34**  
*Detached Bastion; a carronade embrasure and mounting in the west flank wall of the north-west caponier (NMR: BB 029682 © English Heritage 2001)*

constructure of the embrasure being otherwise entirely brick, passing through the walls with flat bases and shallow-arched heads.

The embrasure in the east flank wall has been adapted to form a doorway, the brickwork crudely broken out below the original level. This mirrors a similar occurrence in the *caponiers* at the Drop Redoubt which for the short period *c* 1893 -9 were in use to provide troop accommodation (Brown *et al* 2001). There is no documentary record of such a use here but it remains a possibility.

The *caponier's* expense magazine is of the usual type, divided into an outer shifting lobby and an inner magazine, both of cavity wall construction with cross-axial vaults. It is situated to the rear, cut from the natural chalk for additional protection against enemy fire. The entrance to the lobby, flanked by five original stretcher airbricks from the cavity, is through a shallow-segmental arch, rebated internally for double inward-opening doors formerly held on pintle hinges secured in stone anchor blocks and secured by a bolt-housing in the vault. There is a lamp recess in the north wall, with traces of its frame, slate-lined with a small vent pipe in the upper surface. The magazine doorway has a shallow segmental arched head and is rebated for double outward-opening doors. The magazine is rendered and whitewashed, with missing stretchers ventilating to the cavity. Ledges along the side walls supported a suspended timber floor.

### **The north musketry gallery**

This is contained on two floors reached from the north-west *caponier* (Fig 35). The lower floor has four casemates of the usual type and details, with two vertical loops in each. The gallery proceeds through the centre of the party walls but the roofs are formed by the flat slate floors of the upper level. The upper level, reached directly from the first floor of the *caponier*, has a flat floor of slate slabs and four casemates with semi-circular vaults. All other details are identical to the lower floor.



**Figure 35**  
*Detached Bastion;  
musket loopholes of the  
north musketry gallery,  
seen from the north  
ditch of the bastion  
(NMR: BB 029678 ©  
English Heritage 2001)*



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## 5. SURVEY AND RESEARCH METHODS

The archaeological survey was carried out by Paul Pattison, Moraig Brown, Duncan Garrow and Andrew Williams. Control points and some hard detail were supplied using a Wild TC1610 Electronic Theodolite with integral EDM. Data was captured on a Wild GRM 10 Rec Module and plotted via computer using Key Terra-Firma software on a Designjet 750C plotter. Further details were surveyed on site using measuring tapes and conventional graphical methods.

All photography is by Steven Cole and Alun Bull: finished drawings are the work of Moraig Brown and Paul Pattison.

This report has been researched and written by Paul Pattison.

The site archive and a copy of this report have been deposited in the archive of English Heritage at the National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ (NMR HOB UID 1353402).

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## 6. ACKNOWLEDGEMENTS

The author wishes to thank the following for their help in this project:

John Iverson and the staff of Dover Museum

Paul Johnson of the Public Record Office.





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##### a) Plans

WD/2300 *Detached Bastion. General Plan of the Work, shewing in Yellow, proposed re-construction of Parapet for the reception of four 7" RBL Guns on Blocked-up Platforms*. War Department 1:500 Revision Sheet LXVIII.14.16 (1881) with proposals dated 1889.

WD/2300b *Dover Western Heights. Plan Shewing Occupation*. War Department 1:500 Revision Sheet LXVIII.14.16 (1881), signed 1893.



- WD/2301 *Dover. N.C. Detached Bastion. Proposed re-construction of Parapet for the reception of 4 7" RBL Guns on Slides L. Dated 1889.*
- WD/2302 *Sections Through Parapets, North Centre Detached Bastion.*
- WD/2303 *Sections through North Centre Detached Bastion.*
- WD/2304 *Detached Bastion Plan of the terreplein.*
- WD/2307 *Improvement to the Defences at Dover. North Centre Bastion. Plan and Section shewing proposed Loops in west face of caponiere in cross Ditch for flanking re-entering angles. Dated September 1862, approved November 1862.*
- WD/2309 *Dover. Western Heights. North Centre Bastion. Proposed Platforms for 40-pdrs on "Overbank Carriages". Dated September 1890. Approved September 1890.*
- WD/2310 *Dover. Western Heights. North Centre Bastion. Record Plan of New Shell & Cartridge Stores for Moveable Armament. Dated 1900.*
- WD/2311 *Western Heights. Dover. North Centre Bastion. East Face of Inner Bastion. Plan, Sections and Elevation showing alterations in present Scarp Gun Casemates and Gallery, also portion of Wall proposed to be taken down and rebuilt. Dated February 1863.*
- WD/2312 *North Centre Bastion. Western Heights Dover. East Face of Inner Bastion. Plan, Sections and Elevation showing fractures in present Scarp Gun Rooms and Gallery also portion of a Wall proposed to be taken down and rebuilt.*
- WD/2364 *Dover Western Heights. North Entrance Ditch. Record Plan of 30yds Rifle Range. Dated 30th June 1907.*
- WD/2411A *Dover Western Heights. Plans and Elevations of Magazines and Cartridge Stores. Dated 1882.*
- WD/2517 *Dover Defences. Western Heights. North Centre Bastion – General Plan. Undated but certainly of the 1860s.*

**b) Aerial Photographs**

HLA/373/906, 11th December 1941

106G/UK610/6363, 5th August 1945



**Public Record Office, Kew**

MR/1/1349 *Plan of the Fortifications and Ground In and About Dover Surveyed and in part Delineated by E B Metcalf, Royal Military Surveyor and Draftsman, dated 1810*

MPHH/1/506 *Plan Shewing the Appropriation of the Ordnance Lands on the Western Heights, Dover 1811*

WO/33/488 *Dover Defence Scheme*; bound foolscap volume revised to February 1910

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WO/55/2562 *Dover 1833*; bound foolscap book of engineer papers, reports and plans.  
Includes *plan no 8*, dated 1830, showing the whole of the Western Heights fortifications

WO/78/2755 *List of Powder Magazines, Stores etc on Western Heights, Dover.* Dated 1877

WO/78/5102/5 Plans showing arcs of fire of all coast artillery and defence electric light beams covering Dover harbour and approaches, with an armament table



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## 7. LIST OF PHOTOGRAPHS TAKEN DURING THE SURVEY

- AA008604 Exterior. *Caponier* between North Centre and Detached Bastions from the south-east (B&W)
- AA008605 Interior. North Centre Bastion; inserted doorway to *caponier* looking towards Detached Bastion (B&W)
- AA008606 Interior. Angled embrasures in the west face of the *caponier* between North Centre and Detached Bastions (B&W)
- AA008607 Interior. Embrasures in the east face of the *caponier* between North Centre and Detached Bastions (B&W)
- AA008608 Interior. Embrasures in the east face of the *caponier* between North Centre and Detached Bastions (B&W)
- AA008609 Interior. Detached Bastion; the west gallery looking towards the steps at the south-west end (B&W)
- AA008610 Interior. Detached Bastion; detail of musketry loopholes at the south-west end of the west gallery (B&W)
- AA008611 Interior. Detached Bastion; detail of musketry casemates and loopholes at the south-west end of the west gallery (B&W)
- AA008612 Interior. North Centre Bastion; the north gallery from the west (B&W)
- AA008613 Interior. North Centre Bastion; the gunrooms of the east gallery; detail of entrance in the party wall (B&W)
- AA008614 Interior. North Centre Bastion; entrance to the well tunnel from the east gallery (B&W)
- AA008615 Interior. North Centre Bastion; well chamber no 1 off the east gallery (B&W)
- AA008616 Interior. North Centre Bastion; well chamber no 2 off the east gallery (B&W)
- AA008617 Exterior. Detached Bastion; bombproof troop shelter from the east (B&W)
- AA008618 Exterior. Detached Bastion; bombproof troop shelter from the south-east (B&W)
- AA008619 Exterior. The earthworks of Detached Bastion from the north-west (Colour)
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- AA008621 Exterior. Detached Bastion; *caponier* from the west (B&W)
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- AA008623 Exterior. Detached Bastion; top of *caponier* from the south (B&W)



- AA008624 Exterior. Detached Bastion; bombproof troop shelter from the south-east (B&W)
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- AA008626 Exterior. Detached Bastion; entrance to the west gallery. View from the top of the bombproof shelter on the *terreplein* (B&W)
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- AA008628 Exterior. Detached Bastion; ramped passage leading from the *terreplein* to the west gallery (B&W)
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- AA008630 Exterior. Detached Bastion; east face of the *terreplein* showing a gun emplacement and entrances to a shell recess, the artillery store and the east gallery (B&W)
- AA008631 Interior. Detached Bastion; view up the stepped passage leading from the *terreplein* to the west gallery (B&W)
- AA008632 Interior. Detached Bastion; drawbridge at the base of the stairway passage leading from the *terreplein* to the west gallery (B&W)
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- AA008636 Interior. Detached Bastion; detail of steps leading to the upper level of the west musketry gallery (B&W)
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- AA008638 Interior. Detached Bastion; *caponier* from the east (B&W)
- AA008639 Interior. Detached Bastion; chalk-cut figure in the west musketry gallery (B&W)
- AA008640 Interior. Detached Bastion; chalk-cut head in the west musketry gallery (B&W)
- AA008641 Interior. Detached Bastion; chalk-cut head in the west musketry gallery (B&W)
- AA008642 Interior. Detached Bastion; chalk-cut head in the west musketry gallery (B&W)
- AA008643 Interior. Detached Bastion; chalk-cut head in the west musketry gallery (B&W)
- AA008644 interior. Detached Bastion; chalk-cut head in the west musketry gallery (B&W)



- BB029678 Exterior. Detached Bastion; the north musketry gallery, showing stepped musket loopholes, from the north (Colour)
- BB029679 Exterior. Detached Bastion; the east *terreplein*, showing 7-inch RBL emplacement (left), shell recess (centre) and entrances to artillery store and gallery (right) (Colour)
- BB029680 Interior. Detached Bastion; the south *caponier*, looking south (Colour)
- BB029681 Interior. Detached Bastion; north-west *caponier*, from the west (Colour)
- BB029682 Interior. Detached Bastion; north-west *caponier*, detail of carronade port in west flank wall (Colour)
- BB029683 Interior. North Centre Bastion; east gallery gun rooms, detail of musket loophole (Colour)
- BB029684 Interior. North Centre Bastion; east gallery, one of three identical gun rooms, showing carronade port and musket loops (Colour)



NATIONAL  
MONUMENTS  
RECORD

The National Monuments Record contains all the information in this report - and more: original photographs, plans old and new, the results of all English Heritage and RCHME field surveys, indexes of archaeological sites and historical buildings, and complete coverage of England in air photographs.



ENGLISH HERITAGE

The Royal Commission on the Historical Monuments of England (now part of English Heritage) gathers information on England's heritage and provides it through the National Monuments Record

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