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SURVEY REPORT

PAUL PATTISON, ADAM MENUGE and ANDREW WILLIAMS

Photography by STEVE COLE & ALUN BULL

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THE WESTERN HEIGHTS, DOVER, KENT

REPORT NO 2

THE CITADEL

LAND-FRONT FORTRESS AND BARRACKS 1779-1950

ARCHAEOLOGICAL INVESTIGATION REPORT SERIES 5/2002
(REVISION OF 2004)

Report by: Paul Pattison, Adam Menuge & Andrew Williams
Survey by: Paul Pattison, Moraig Brown, Adam Menuge, Andrew Williams & Duncan Garrow
Drawings by: Paul Pattison, Moraig Brown, Adam Menuge, Allan Adams & Andrew Williams
Field photography by: Alun Bull & SteveCole

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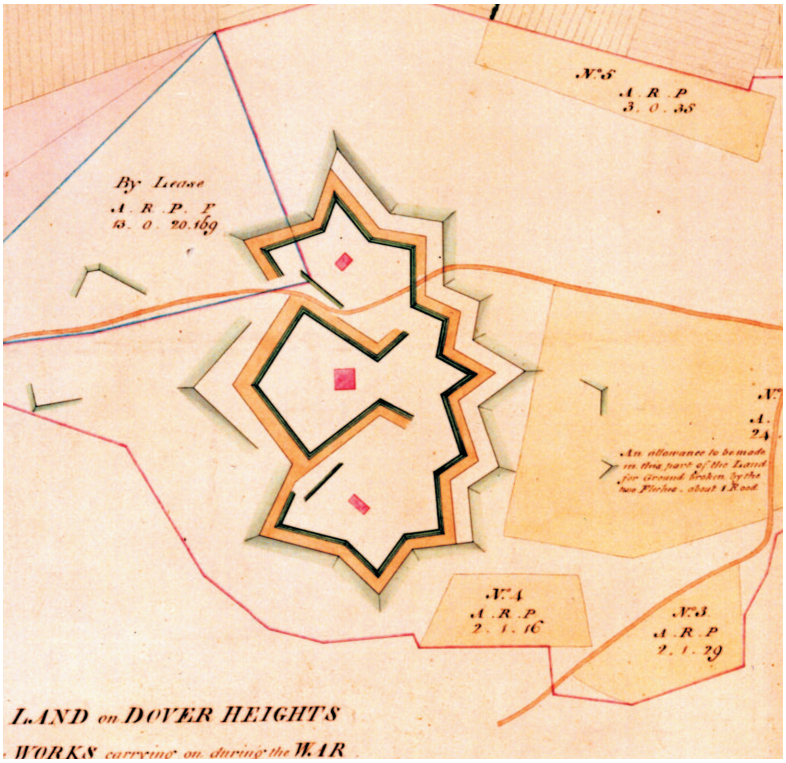
Cambridge Office: Brooklands, 24 Brooklands Avenue, Cambridge CB2 2BU
Tel: 01223 582700 ***Fax***: 01223 582708

Headquarters: National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon SN2 2GZ
Tel: 01793 414600 ***Fax***: 01793 414606 ***e-mail***: *customers@english-heritage.org.uk*
Internet: http://www.english-heritage.org.uk



The earliest phase of the Citadel; a bastioned fieldwork as shown by Lieutenant Hay in his survey of 1787 (extract of PRO: MPHH/1/248/6)

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ABBREVIATIONS USED IN THE TEXT

AA	Anti-aircraft
BL	Breech-loading
CO	Commanding Officer
CRE	Commanding Royal Engineer
HMPS	Her Majesty's Prison Service
IGF	Inspector General of Fortifications
NCO	Non-commissioned officer
QF	Quick-firing
RA	Royal Artillery
RE	Royal Engineers
RBL	Rifled breech-loader
RGA	Royal Garrison Artillery
RML	Rifled muzzle-loader
YOI	Young Offenders Institution

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GLOSSARY

Apron
A sloping concrete surface, forming the front face of a gun emplacement, designed to deflect in-coming shells over the top of the position.

Banquette
A low platform in the rear face of a rampart, with a low parapet to enable infantry to fire over it. Same as an infantry step

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

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

Battery
A work, either permanent or temporary, where artillery is mounted

Berm
A level space between the base of a rampart and the scarp face of a ditch, designed to absorb the weight and presure exerted on the latter by the former

Board of Ordnance
The government department responsible for supply of arms, ammunition and warlike supplies to the country's fighting forces on land and sea

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 from the rear of the barrel

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

Cartridge
An amount of gunpowder or other explosive made up into a measured charge, usually contained in a silk bag, which was placed in a gun behind the shell. Firing the gun ignited the cartridge and thereby propelled the shell out of the gun towards its target

Cartridge store
A chamber used to store powder that was already made up into cartridges

Cascable
A round or ring-shaped projection at the breech end of a gun, so shaped to anchor a rope

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

GLOSSARY (Continued)

Covered way
A continuous walkway, protected from enemy fire by an earthwork parapet

Counterguard
A defensive work with two faces forming a salient angle, usually placed in front of a bastion to cover and protect its flanks

Cordon
A continuous rounded projection situated at a change in angle on the face of a fortification, usually between the scarp revetment and the parapet

Counterscarp
The exterior slope or revetment of a ditch

Davit
A simple crane, usually an iron post, curved at the top and fitted with a pulley, for hoisting heavy ammunition from one level to another

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

En-barbette
A gun mounted to fire over the forward edge of its emplacement

Enfilade fire
Fire directed at a target by an attacking force from end to end, often along the face of a fortification

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

Fenestration
The arrangement of windows in the elevation of a building

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

Fixed ammunition
Ammunition in which the shell and cartridge are combined in a single casing

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

Glaçis
The external slope of a defensive work, carefully profiled to allow a clear fields of fire from the rampart and often massively reinforced with earth and other materials to absorb in-coming shell fire

GLOSSARY (Continued)

Gorge
The rear of a fortification

Guardhouse
In this particular 18th century context, a building fortified with thickened walls and loopholes for defence of a defined area. Normally, the guard house is found at the entrance to a military establishment, to check exit and entry of all personnel, and to confine those on a charge

Gun room
A casemate for an artillery piece or small arms; usually designed to fire into a ditch or along a flank

Haxo casemate
A casemate constructed on the *terreplein*, but open to the rear, providing gun crews with protection against enfilade fire

Holdfast
A metal plate fixed to the floor of an emplacement to firmly anchor a gun in position

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

Infantry step
See *banquette*

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

Lamp room
A chamber where lamps were cleaned, refitted and maintained

Lighting (or lamp) passage
A narrow passage adjacent to a magazine, containing recesses in the party wall to allow lamps to be placed for the illumination of the magazine

Loophole
A narrow opening in a wall for small arms fire. They are internally splayed to provide the defender with a wide arc of fire, and narrow externally to make it difficult for an enemy to fire in.

Machicolation
A projecting gallery, generally above an entrance, with openings for vertical defence of the foot of a wall

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

Militia
The main national reserve force of part-time soldiers

Mortar
A short but large calibre artillery piece designed to fire shells at high angles of elevation

Newel
A spiral stairway of circular plan

Oculus
A small hole or aperture

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

Position finder (PF)
An instrument by which a gun can be directed onto a target, even when moving: the two main types are position finder and depression range finder

Position finding cell (PFC)
A room on the flanks of a battery for housing the position finding equipment. There are at least two chambers – one for receiving and one for transmitting

Postern
A small, subsidiary gateway to a fortification, often concealed so that its use was not observed from outside. A postern could also function as a sally port

Piquet house
A small guard or sentry post

Quick-firing (QF)
A gun equipped with a quick-action breech mechanism, and using fixed ammunition, enabling a rapid rate of fire.

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

GLOSSARY (Continued)

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

Redan
An outwork to a fortification, with two faces formed into a salient angle, and an open gorge to the rear

Re-entrant
An angle formed in the line of a fortification to face inwards from the field

Revetment
Retaining wall of a rampart or the side of ditch

Rifle
An infantry weapon whose barrel is 'rifled' by continuous spiral grooves on the inside of the barrel. The grooves caused the bullet to spin in flight, thus ensuring greater speed and accuracy

Rifled muzzle-loader (RML)
A muzzle-loading gun is loaded from the front of the barrel and in this case the barrel is 'rifled'

Salient
An angle formed in the line of a fortification to project outward towards the field

Sally port
A small door or gate, often masked or concealed, through which defending troops can make a surprise 'sally' or counter-attack

Scarp (or escarp or curtain)
The inner slope or revetment of a ditch

Shell
The projectile fired from an artillery piece. Shells comprised a metal case filled with an explosive charge which exploded either on impact or after a set time had elapsed

Shell store
A chamber in which shells are stored

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

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

Small arms
Portable firearms, principally carbines, muskets, pistols and rifles

GLOSSARY (Continued)

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

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 a fortification

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

Trace
The overall plan of a fortification or battery

Traverse
An earth bank or wall, usually placed across the *terreplein* and thereby dividing it into sections, to confine or eliminate the effect upon defending troops of enfilade fire and bursting shells. A traverse could also be used to bombproof structures on the *terreplein*

Traversing slide or platform
A platform supporting an artillery piece which enabled it to be moved through a fixed arc. The slide enabled the gun carriage to move backward both to absorb the recoil on firing and to return to the loading position

Unclimbable fence
Usually found in the ditch of a work or defining its perimeter, an 8ft-high metal palisade with sharp spiked top to prevent it from being scaled

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 the Citadel, a key element in the extensive defences on the Western Heights in Dover (Fig 1).

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 2 in a series of ten to be produced on the Western Heights fortifications

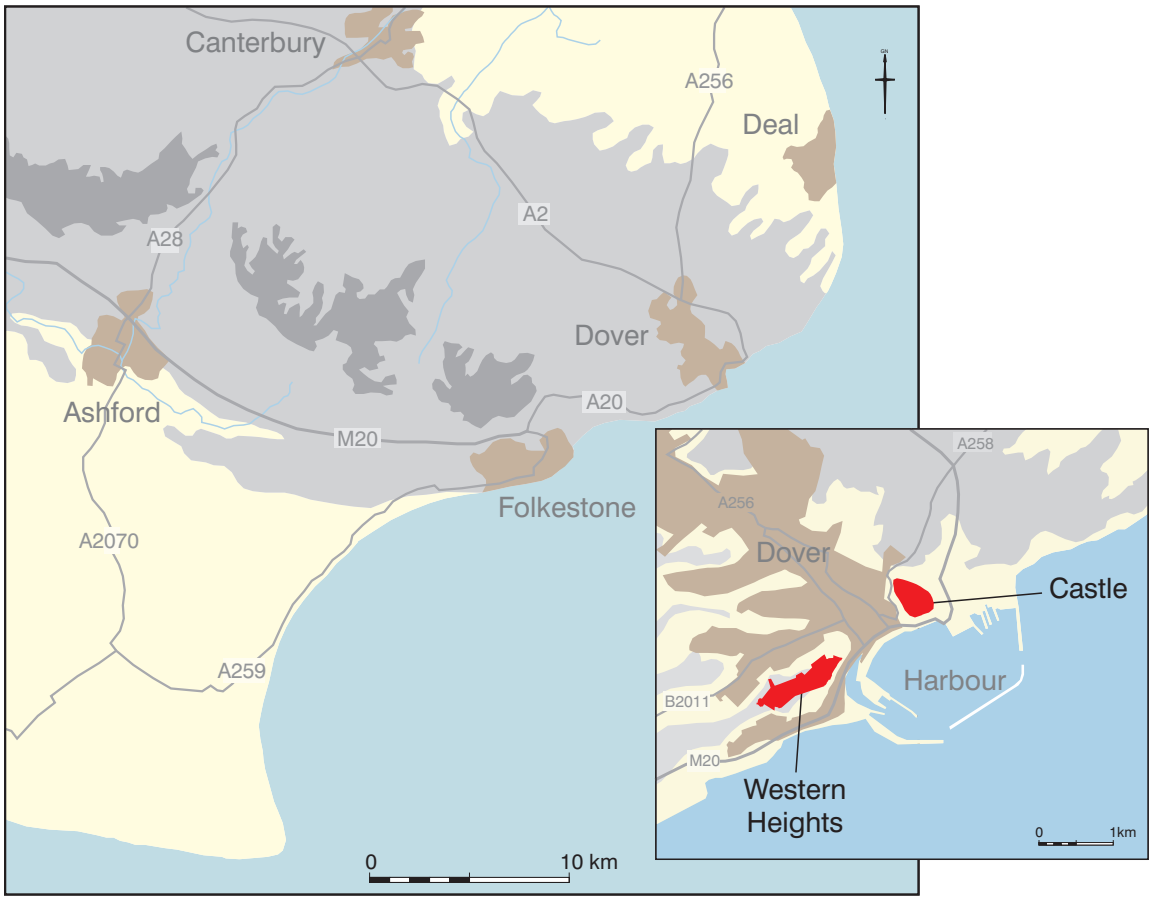

Figure 1
Dover Western Heights, location map (pale yellow = land below 50m OD; light grey = land 50-150m OD; dark grey = land over 150m OD; pale brown = urban areas)

The Citadel, an independent fort capable of its own defence, was also a key element in co-ordinated defences on the Western Heights. It spans the highest part of a long ridge that stretches westwards from Dover in the direction of Folkestone and affords panoramic views. It is situated in such a position as to prevent access along the ridge and to command the two roads from Folkestone in its lea, thereby preventing a flanking attack on the port and town (Fig 2).

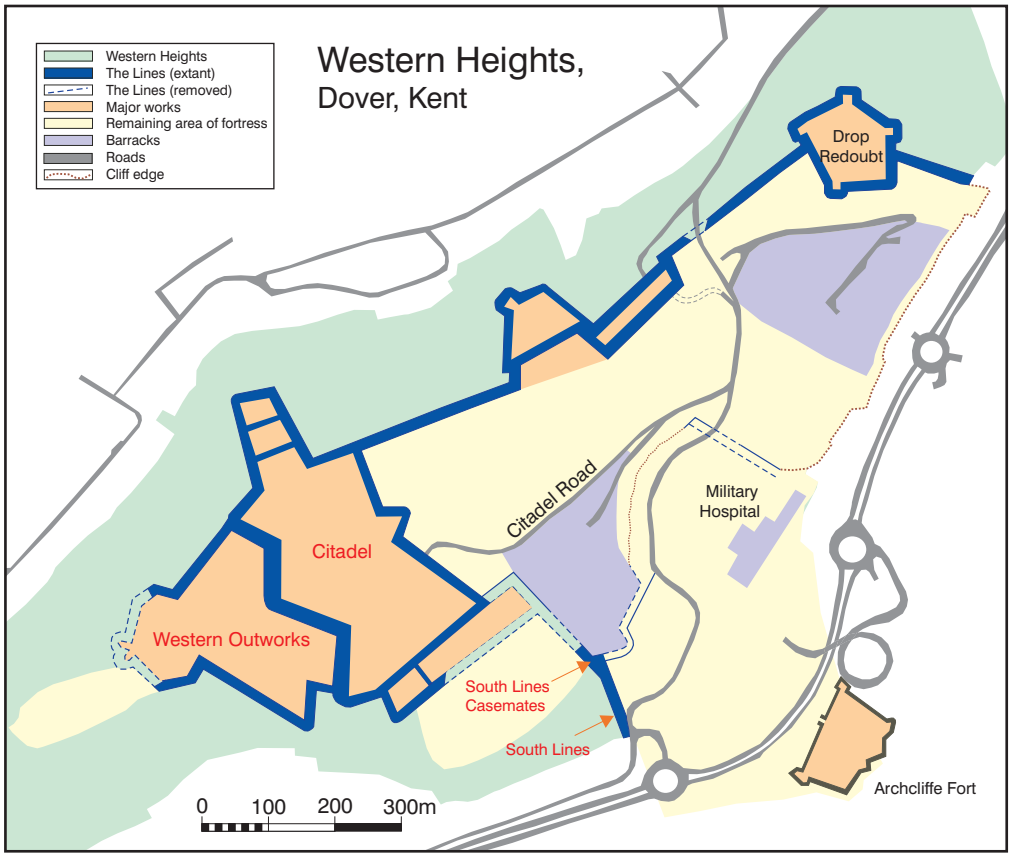

Figure 2
Plan of Dover Western Heights, showing the position of the Citadel and the Western Outworks

2. HISTORICAL BACKGROUND

THE ORIGINS OF THE CITADEL, 1779-96

The first defences recorded on the Western Heights were constructed with militia labour in 1779, during the American War, when the Board of Ordnance purchased a large area of the ridge (Akers 1886, 38). However, at this time only a small sum, £2100, is recorded as being spent on the Heights and three batteries guarding the harbour (North's, Townshend's and Amherst Batteries). The defences on the Heights could only have been temporary fieldworks, comprising small unrevetted earthworks for infantry and artillery, capable of temporary resistance against a land assault.

Nevertheless, this modest plan was soon transformed into an ambitious scheme for more substantial fortifications, combining both permanent and temporary elements. Their design, by the engineer officer Lieutenant Thomas Hyde Page, is revealed on a plan dated 1784 which shows a large bastioned fortification spanning the western end of the Heights, the earliest representation of the main work which was to become the Citadel Other minor works are shown along the ridge (Fig 3).

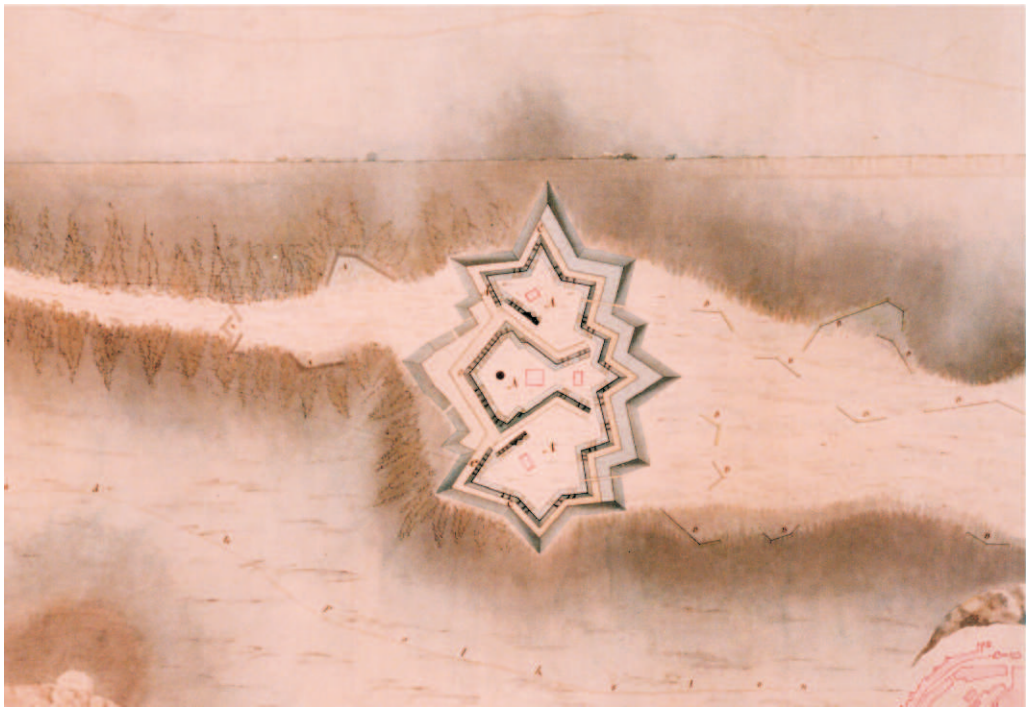

Figure 3
Lieutenant Page's design for the Citadel, dated 1784 (extract of PRO: MR/1/1345 © The Public Record Office)

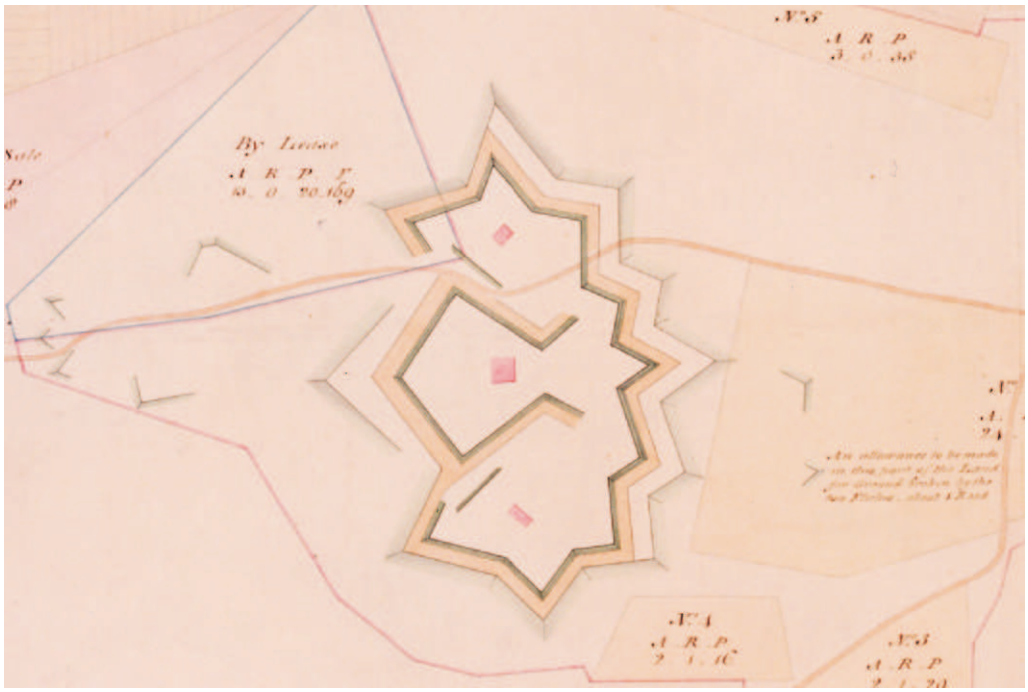

Figure 4
Lieutenant Hay's plan of the Citadel, dated 1787. The guardhouses are shown in pink (extract of PRO: MPHH/1/248/6 © The Public Record Office)

A start had been made on the south-west bastion of this work in 1782, by order of the Master General of the Ordnance, the Duke of Richmond. It is apparent that the *outline* of the whole trace was established by the end of the war in 1783 despite the fact that, in February 1782, the 1st Assistant Engineer in Dover, a Mr Bigges, was paying the labourers himself for want of money from the military authorities (Akers 1886, 39). On the inside of the work, three guardhouses were completed, each provided with loopholes for independent and mutual defence (PRO: WO/55/780). The state of the works becomes clear in 1787 when the Commanding Royal Engineer (CRE) at Dover wrote to the Master General noting that '*Lieutenant Hay reports that the Works are in a very unfinished state, nevertheless that he has traced their general outline and marked them on the survey*' (PRO: MPHH/1/248/2). Two copies of Lieutenant Hay's survey have survived, showing the plan of the '*Main Work*' with its three guardhouses, the whole taking up some 24 acres (Figs 4 and 5; PRO: MPHH/1/118; MPHH/1/248/6).

So it seems that work slowed but did not necessarily stop in 1783 and received greater impetus following resumption of hostilities with France in 1793. In 1795 there was barrack accommodation for 60 men - probably in the loopholed guardhouses built earlier (Akers 1886, 40). The modest sum of £4885 4s 4¾d had been spent on the Heights by 1796 and though we have no idea what this sum was spent on, it probably went towards Lieutenant Page's original scheme (Coad and Lewis 1982, 160).

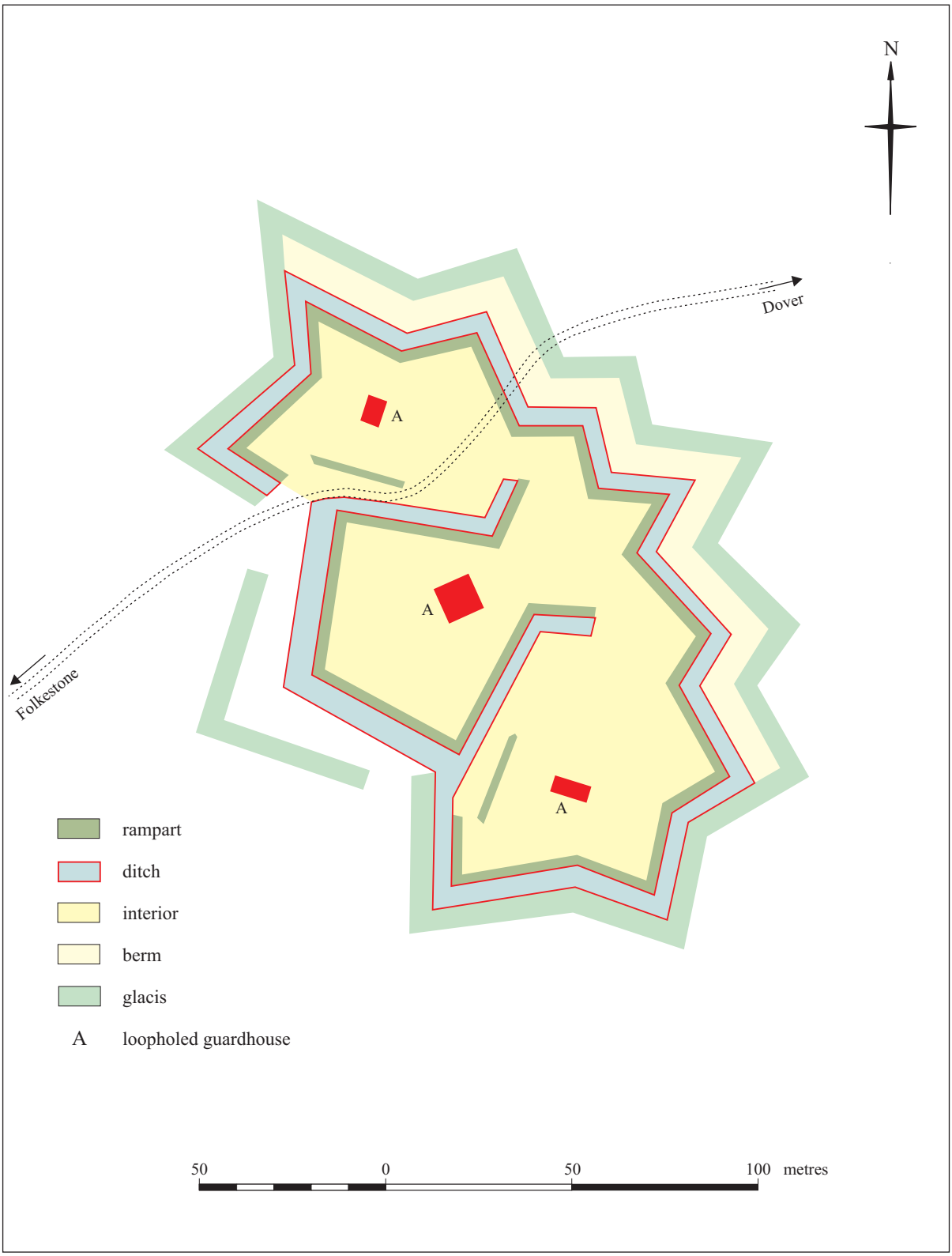

Figure 5
The Citadel in 1787, interpreted from Lieutenant Hay's plan (scale is approximate) (after PRO: MPHH/1/248/6)

RE-DESIGNED AND ALMOST COMPLETED, 1804-15

The impetus for resuming work on the Citadel in earnest - and the Western Heights defences as a whole - was the threat of a French invasion in the early years of the 19th century. By April 1804 revised plans were authorised by a senior Committee of Engineers comprising Lt Colonel Twiss (CRE Southern District), Generals Morse and d'Aubant. Work began under the general command of Twiss and local direction of the CRE Dover, Captain William Ford. The plan was to complete the '*east and west redoubts'* (the Drop Redoubt and the Citadel respectively) in much the same positions as envisaged by Page, but to link them by earthworks forming a complete entrenched camp on the Heights. Such a camp could house and protect a small field force to meet any enemy troop landings, and also provide offensive fire under siege conditions.

Some use was made of the existing earthworks, and progress was rapid, with 480 men employed. By the end of 1805, the earthwork rampart and ditch of the Citadel were established, temporary barracks for a garrison were erected to the east of the three original guardhouses and a well was sunk (Coad and Lewis 1982, 171). In 1806 a request to revet the scarps and counterscarps in brick was refused, unfortunately, as that winter saw part of the west scarp revetment slide into the ditch. Eventually, in September 1807, authority was given to revet the west, north and south fronts in brick and to provide the ditches with casemated flanking defences (*ibid*, 172; PRO; WO/55/778). This decision transformed the Citadel into a permanent fortification.

A working plan has attached to it a note dated December 1808 by Captain Ford, depicting progress as a whole, although comment is restricted to the earthwork defences of the western and southern fronts, including the *tenaille* and South Lines as far as the South Lines Casemates (PRO: MR/1/1429/10). It seems that their ramparts, ditches and counterscarps were substantially completed, although their brick revetments had hardly been started. However, work on the casemates, which combined artillery defence for the ditches with barracks accommodation, had begun, with those in the South Lines finished and ready '*for occupation in the spring'*, and a pair at the west end of the *tenaille* also complete (the Short Casemates). Nearby, the Long Casemates were in an advanced state but only two of four sets covering the whole west ditch had been completed. The remainder of the trace, on the north and east, is shown in outline and was clearly still an earthwork. The plan as a whole reveals that the line of the western face of the fortification, shaped into three salients, follows and probably re-uses the original work of the 1780s. The remainder was designed by Twiss and Ford and comprised, on the north, a projecting tiered bastion referred to initially as the Right Wing (later the North-West Bastion) and built to flank the north slope of the Heights as a whole. On the east, the gorge

comprised two salients with a central redan, while the south face had a double ditch with *tenaille* between (PRO: MR/1/1429/10).

By August 1809, the brick revetments along the west face were almost complete and preparations were being made for completing and revetting the gorge in 1810. This involved straightening the line of the trace south of the redan, removing a salient angle, and heightening the rampart (PRO: MPHH/1/228/2-3). At the redan, the re-entrant angles were to be defended by casemates under the counterscarp, shown on a working plan of October 1809 (MPHH/1/228/1). As it turned out, these were built to a similar design but behind the scarp of the redan, becoming known as the Gorge Casemates. These casemates, smaller than those built earlier on the south and west faces, were gun rooms which defended the ditch but were not intended as barracks accommodation. Others were built to a similar design under the east and west faces of the North-West Bastion (both sets were probably not quite complete by 1816). Like all the Napoleonic casemates in the Citadel, they have parabolic vaults and bombproof roofs, quite different from the segmental or semi-circular vaults in the works of the 1850s and 60s (see below).

Figure 6
The revised design taking shape; the Citadel in 1811 (extract of PRO: MPHH/1/506 © The Public Record Office)

One of the 1809 plans shows the original main entrance in the northern part of the gorge, close to where it had been on Lieutenant Hay's survey of 1787. It also depicts a proposed new entrance in the southern part of the gorge, where it was eventually placed; but not until the 1850s (MPHH/1/228/3; Coad and Lewis 1982, 174).

Progress is recorded on a plan of 1810, with the north part of the gorge scarp, the inner ditch of the tenaille scarp and the counterscarp revetted. By 1811 the revetments to scarp and counterscarp were virtually completed for the whole trace (Fig 6; PRO: MR/1/1349).

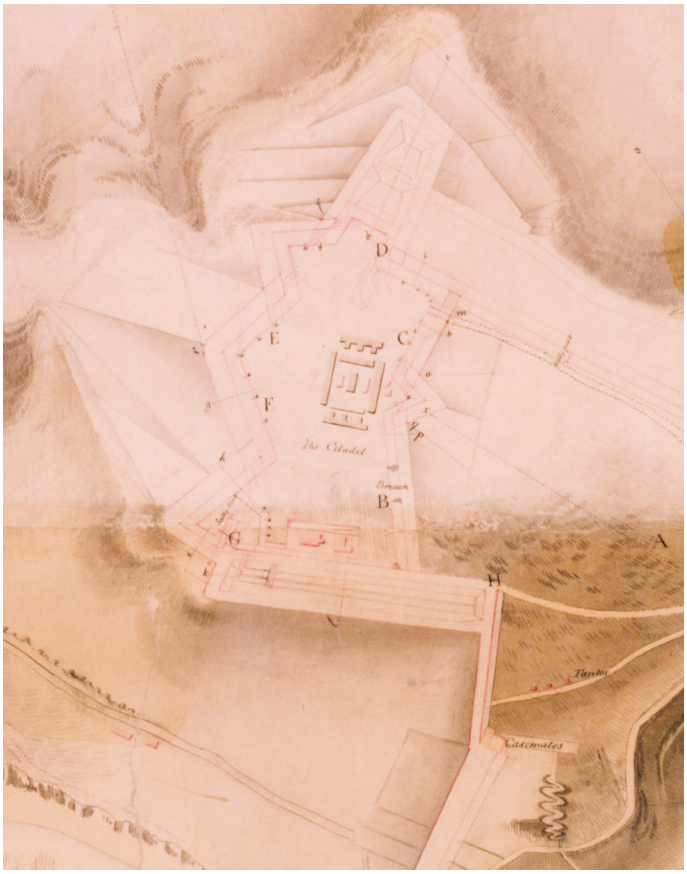

Figure 7
The Citadel in 1813 (extract of PRO: MR/1/1346 © The Public Record Office)

Work continued at a rapid pace until 1813, the last year of large expenditure on the Citadel, though smaller works continued until funding ceased in 1816 (Coad and Lewis 1982, 176-7). By this time, though the defences were in an advanced state, they were not finished. Completed buildings included some of the casemates, the brick guardhouses of the 1780s, temporary barracks built in 1804, a well house, and three structures of unknown function on the south (Figs 7 and 8).

CARE AND MAINTENANCE, 1815-53

After 1815, the whole Western Heights project ceased, with only the Drop Redoubt regarded as complete. Thereafter, the armament and garrison of the Citadel were withdrawn and by 1821 several Board of Ordnance buildings - those which were incomplete or no longer needed - had been pulled down and their materials auctioned or made use of in public projects. This included the temporary barracks, as there is a null return for 1830 (PRO: WO/55/2461; 2562). Nevertheless, the Board carried out basic maintenance and let the land around the Citadel to tenant graziers. Objections were raised to this practice in 1835, with shot and gun carriages still stored in the Citadel, probably in five expense magazines shown on the west side on a plan of 1830 in the lea of the rampart of the west face (Fig 9; PRO; WO/55/783; WO/55/2562). In 1852 an agricultural tenant was given permission to cut grass from the ditches and depasture sheep in the unfinished and unarmed Citadel (PRO: WO/55/785; 2931).

Figure 8 *Plan showing the Citadel in 1815 (after PRO: MR/1/1346)*

COMPLETION AND RE-ARMAMENT, 1853-5

With the appointment in 1846 of General Sir John Fox Burgoyne to the post of Inspector General of Fortifications (IGF), dissatisfaction over neglect of the nation's fortifications was gradually transformed into action. In 1847, a Colonel Tylden had submitted a report on the Dover defences in which the ridge just west of the unarmed Citadel was considered the most likely point for a land attack (Akers 1887, 62-3). Despite the report, the Citadel

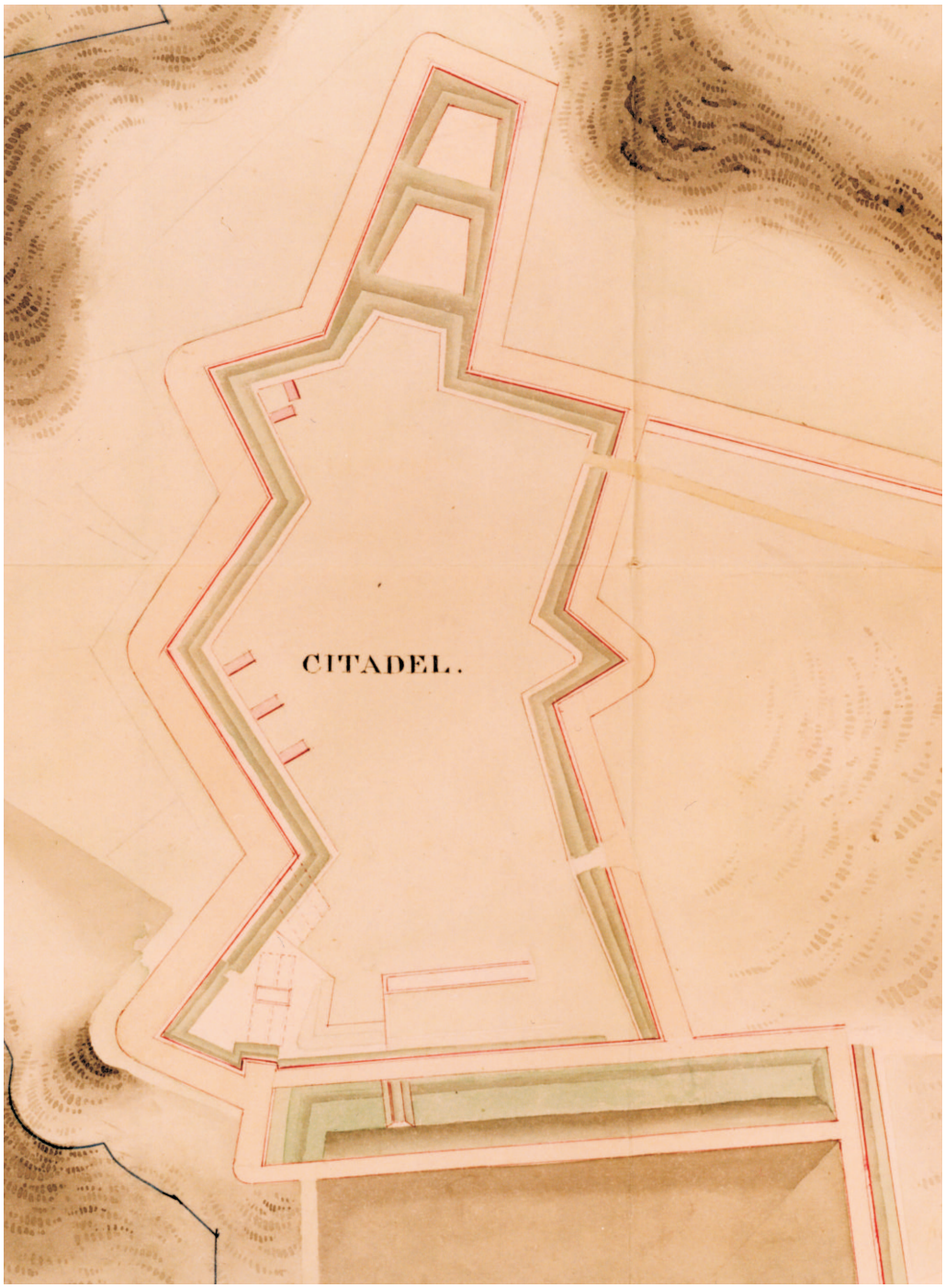

Figure 9
The Citadel in 1830; the five buildings in pink on the west side were expense magazines. The temporary barracks had been removed (extract of PRO: WO/55/2562/8 © The Public Record Office)

remained unarmed in 1851 (PRO: WO/55/785). Two years later, in March 1853, repairs to the tune of £11,704 were finally proposed for the Citadel. These included:

- the replacement of part of the existing bridge with a drawbridge;
- the completion of the scarp of the South Lines up to the counterscarp of the Citadel and its defence with new casemates for four guns;
- the fitting out of some existing casemates to accommodate 500 men and (temporarily) some officers;
- the renewal of fittings for traverses in the expense magazines (those shown on the plan of 1830);
- the closing of a breach in the rampart;
- the construction of a gallery of communication from the main work to casemates flanking the ditch of the lower wing (= North-West Bastion);
- repairs to the scarp and counterscarp revetments;
- the mounting of artillery in the casemates to defend the ditch;
- the mounting of curbs and pivots for 22 traversing gun platforms on the *terreplein*.

In June of the same year, the CRE Dover wrote to the IGF requesting issue of the guns, carriages and racers, comprising six 32-pdr, sixteen 18-pdr cannon and fifty 12-pdr carronades. The carronades were for the casemates whereas the cannon were for the *terreplein,* '*to be placed as nearly as possible to their old positions*' (PRO: WO/55/785).

MODERNISATION AND THE ROYAL COMMISSION, 1858-67

The works authorised in 1853, completed by 1855, were a catching-up exercise in that they brought the previously neglected Citadel into use as a defensible fort. However, the rapid advance of weapons technology was outstripping the ability of existing fortifications to withstand bombardment from a new generation of artillery. Burgoyne realised that a massive programme of modernisation was required to improve the nation's defences and wrote several key memoranda on the subject to 1856. In 1858, the new Assistant IGF, Major W D Jervois, wrote to the Secretary of State for War setting out specific proposals for remodelling of the Western Heights. For the Citadel the proposals included an advance work on the west side of the Citadel (the Western Outworks) to secure the ground that Col Tylden had judged vulnerable in 1847, and purpose-built Officers' Quarters. These proposals were accepted and were underway by the time the Royal Commission on the Defences of the United Kingdom reported in 1860, voting additional resources for the Western Heights. The new works, begun in 1858 or 1859,

Figure 10
The Citadel in 1871, after completion of the works recommended by the Royal Commission in 1860 (extract of PRO: WO/78/2755/12 © The Public Record Office)

were largely finished by 1867 and completed the Western Heights as a land front fortress. At the Citadel, the new features are shown on a plan dated 1871 (Figs 10 and 11):

- the Western Outworks with new casemated barracks;
- the Officers' Quarters;
- the Main Magazine;
- the Canteen;
- the Armourer's Shop;
- the Armoury;
- the Pump House;
- the Main (east) Gatehouse;
- a completely new *terreplein* with guns and modified original expense magazines;
- the completion of scarp and counterscarp casemates for the defence of the ditch.

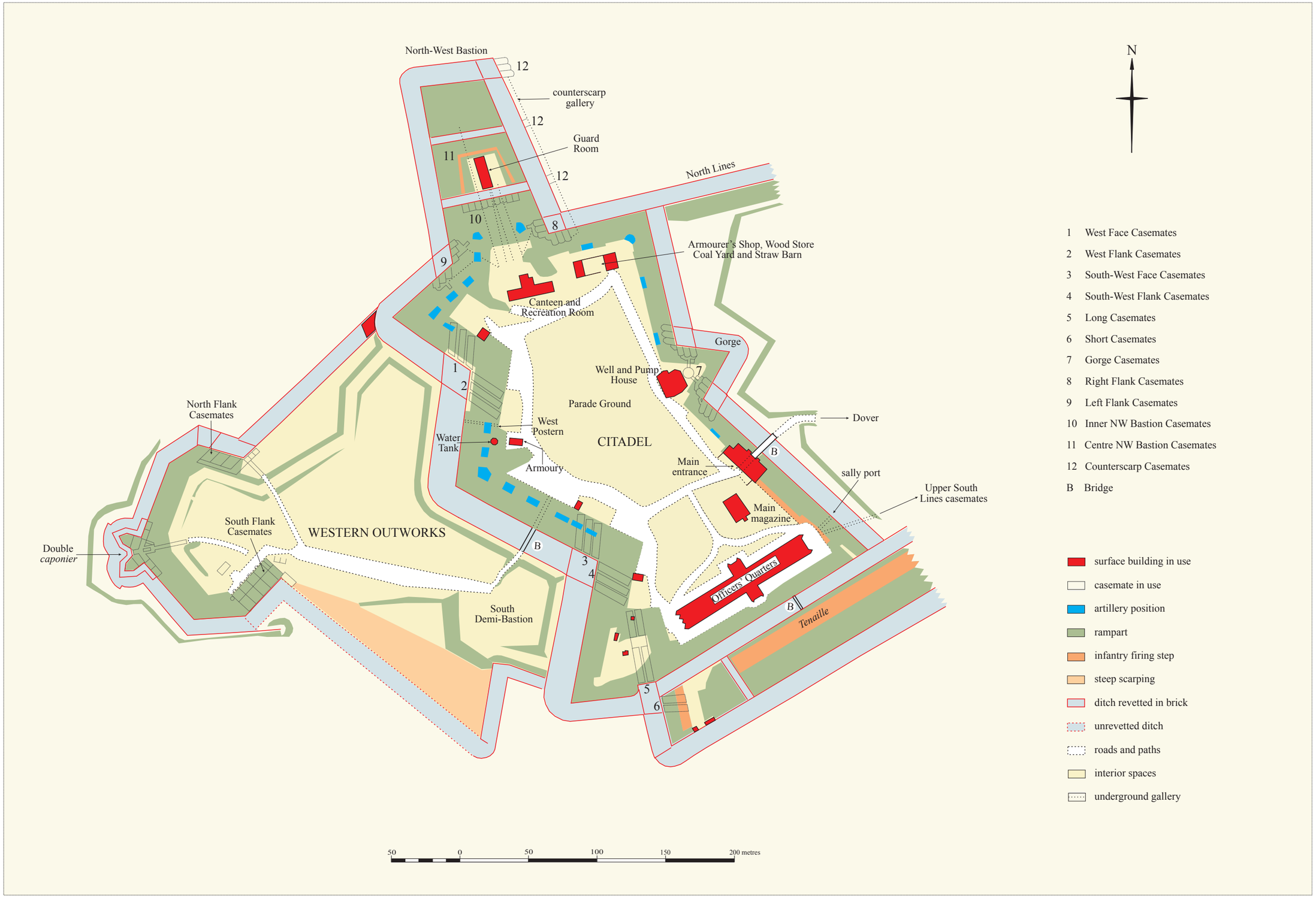

Figure 11 *Plan showing the Citadel in 1871 (North orientation is taken from the original document; after PRO: WO/78/2755/12)*

CHANGING RÔLES, 1870-90

By the time the new works at the Citadel were completed in 1867, new artillery was entering service. These guns had rifled barrels and were capable of firing projectiles over longer distances with greater accuracy and more devastating explosive charges. In December 1870, the Defence Committee agreed to the distribution of fifty RML guns among the nation's fortifications and in 1872 there were several in Dover, serving initially for defence of the harbour against ironclad warships equipped with comparable weapons. However, for defence of the land front older guns were retained and in 1876, the Citadel's armament comprised the guns installed following the works of 1853-5, ie eighteen 18-pdr carronades, twenty 12-pdr carronades and ten 8-inch mortars, the last added following the further remodelling of the 1860s. It was proposed to rationalise the carronades to guns of one calibre (PRO: WO/33/2775). The carronades were mounted in casemates to defend the ditch, with the mortars on the *terreplein* for defence of the land approaches, a task for which they alone were inadequate. The *terreplein* was clearly under-armed, an observation confirmed by a plan of 1871, which shows more gun emplacements there, particularly along the more vulnerable west and north faces, many equipped with traversing platforms and embrasures. It is likely that the guns for these positions had been withdrawn or, more likely, not installed (PRO: WO/78/2755/12).

This situation was rectified soon afterwards with the installation of rifled guns. In September 1887, there were eight 64-pdr RMLs on the *terreplein* along with eight of the old 8-inch mortars; the ditch casemates mounted twenty-five 24-pdr carronades; the counterguard (probably = the south-west salient or the south-west demi bastion on the *tenaille*) had another eight 24pdrs (not mounted); and the Double *Caponier* of the Western Outworks supported eight 18-pdr carronades (PRO: WO/33/2775).

At the same time, the ability of the large land fortresses to provide effective defence was being called into question; tactics were changing towards moveable armament and rapid deployment of mobile field forces. It is in this light that we should view the approval, also in the 1887 armament return, to reduce the Citadel's artillery complement by removing the old mortars, fifteen of the 24-pdr carronades (including the eight for the counterguard) while adding another 64-pdr RML and a 5-inch BL. Moreover, the Western Outworks was to lose all of its 18-pdr carronades and to have a moveable armament comprising one 4-inch RBL, two 40-pdr RBLs, two 6.6inch RML howitzers, two 3-pdr QFs and two machine guns (PRO: WO/33/2775).

However, these decisions were subject to some revision and in April 1892 there were still eighteen 24-pdr carronades mounted for defence of the Citadel ditch, only eight 64-pdr RMLs on the *terreplein* but the mortars had gone. The Western Outworks had no mounted artillery at all, probably because a moveable armament had been approved for the Western Heights as a whole, but four machine guns had been approved for its defence. Two more machine guns were approved for the main part of the Citadel, which was to lose nine of its 24-pdr carronades (PRO: WO/33/2775).

BARRACKS and MOBILISATION CENTRE, 1890-1954

Towards the end of the 19th century, the Citadel was no longer regarded as a land fortress. In 1902, approval was given to remove the nine obsolete 64-pdr RMLs; the carronades had already gone, leaving just six machine guns for local defence (PRO: WO/33/2775). This situation persisted in the 1907 defence scheme for Dover, by which time the Citadel was a large barracks and mobilisation centre (Fig 12). By the 1920s, many of the old casemates were no longer used to accommodate troops, although men were still housed in the North and South Casemates and the Double *Caponier* of the Western Outworks. New barrack huts and associated facilities had been built on the surface in the Western Outworks in 1890. Between 1911 and 1929, almost 900 men were accommodated in the Citadel and there had been a proliferation of support buildings providing a greater range of facilities and comfort (HMPS: 402581). As at the Grand Shaft Barracks and South Front Barracks nearby (Pattison and Williams 2001a & b), many of these buildings were in place by *c*1910 and included a Recreational Establishment Institute (1890s), a new Cook House (1911), a Mobilisation Store (by 1905), Warrant Officers Quarters (No 1 by 1890 and no 2 by 1892); Workshops and Stores, a Bread and Meat Store (proposed in 1888) and a Sergeants' Mess (1899). Alterations and additions to these buildings continued until and throughout the Second World War. The Army relinquished control to the Prison Commissioners in 1954.

Although the Citadel ceased to be an effective land fortress, it received an additional rôle which was to endure until after the Second World War: the defence of the seaway by coast artillery. By 1900, two batteries had been constructed inside defensible additions to the Citadel; Citadel Battery with its 9.2-inch BL guns and South Front Battery with its 6-inch BLs (Brown and Pattison 2001; PRO: WO/78/5102/5). In 1910, Citadel Battery had three 9.2-inch guns and two parapet-mounted machine guns with the War Quarters for the gun crews (the Kent RGA) situated in the Double *Caponier* of the Western Outworks (PRO: WO/33/488).

Citadel
1 Main entrance and Guard Room
2 Main magazine
3 Well and Pump House
4 Water tanks
5 Officers' Quarters
6 Regimental Institute (former Canteen)
7 Fire Engine House (former Straw Barn)
8 Coal Yard
9 Wood Store
10 Smith's Shop
11 Armourer's Shop
12 Medical Inspection Building (former Armoury)
13 Stables and Vehicle Shed (later Garages)
14 Workshop (former Mobilization Store)
15 Carpenters' Shop, Plumbers' Shop and Weapons Training Store (former Cook House)
16 Shoemaker's Shop (former Artillery Store)
17 Soldiers' Room
18 Bread and Meat Store
19 Warrant Officers' Quarters no 1
20 Warrant Officers' Quarters no 2
21 Sergeants' Mess Establishment
22 Shower Baths and Drying Rooms
23 Cook House and Dining Room
24 Company Office, Company Store and Sergeants' Bunk
25 Gorge Casemates
26 West Face and West Flank Casemates
27 South-West Face and South-West Flank Casemates
28 Long Casemates
29 Rifle ranges

Western Outworks
H1 Hut Barrack no 1
H2 Hut Barrack no 2
H3 Hut Barrack no 3
H4 Hut Barrack no 4
H5 Hut Barrack no 5
H6 Hut Barrack no 6
H3a Hut Barrack no 3a
H7 Cook House and Bath House
H8 Drill Shed (former Dining Room and Wash-up)
H9 Company Office & Stores (later Sergeant's Quarters)
H10 Caretaker's Quarters (for Citadel Battery)
H11 War Quarters for Citadel Battery (formerly Double *caponier*
H12 Sergeants' Bunks (formerly Officers' Quarters)

General
A Ablution building
B Bridge
L Latrines
W West Postern Gate
S Sally port

Figure 12 *Plan showing the Citadel c 1933 (North orientation is taken from the original document; after HMPS: 402582)*

In 1917, the Citadel housed one anti-aircraft gun - for local defence against German zeppelins and bombers - a 3-inch QF 20cwt (PRO: WO/33/828).

THE SECOND WORLD WAR 1939-45

During the war, the Citadel continued in use for a variety of purposes, not least providing focal facilities for the troops stationed on the Western Heights and manning coast and AA batteries. Some nine pillboxes and observation positions were established on the Citadel ramparts and light AA emplacements established in the Western Outworks (NMR 1945; PRO: WO/192/45). In 1939, a new camp of hutments was built just outside the east gate of the Citadel, to house the staff of a heavy AA battery (designated D7) situated a little further east (Fig 13). The battery and camp remained in use throughout the war and for a few years afterwards, as D7 was designated a 'nucleus site' for continuing AA defence (Dobinson 1996, 23-5).

Figure 13
The Citadel from the air in 1945. Important additions include the hutment camp, built in 1939 (top right) (106G/UK944/6090-1 ©MOD)

3. THE CITADEL: DESCRIPTION AND INTERPRETATION

SUMMARY (Fig 15)

The locational terms used in the following section eg West Face, South-West Flank, are derived from later 19th-century sources.

With the single exception of the *tenaille*, the Citadel trace is well preserved including the rampart, ditch, revetments and casemates, although there is very little visible detail of the defences on the *terreplein* (Fig 14). Surviving internal buildings include the Main Gatehouse, the magnificent Officers' Quarters, the Sergeants' Mess, the Regimental

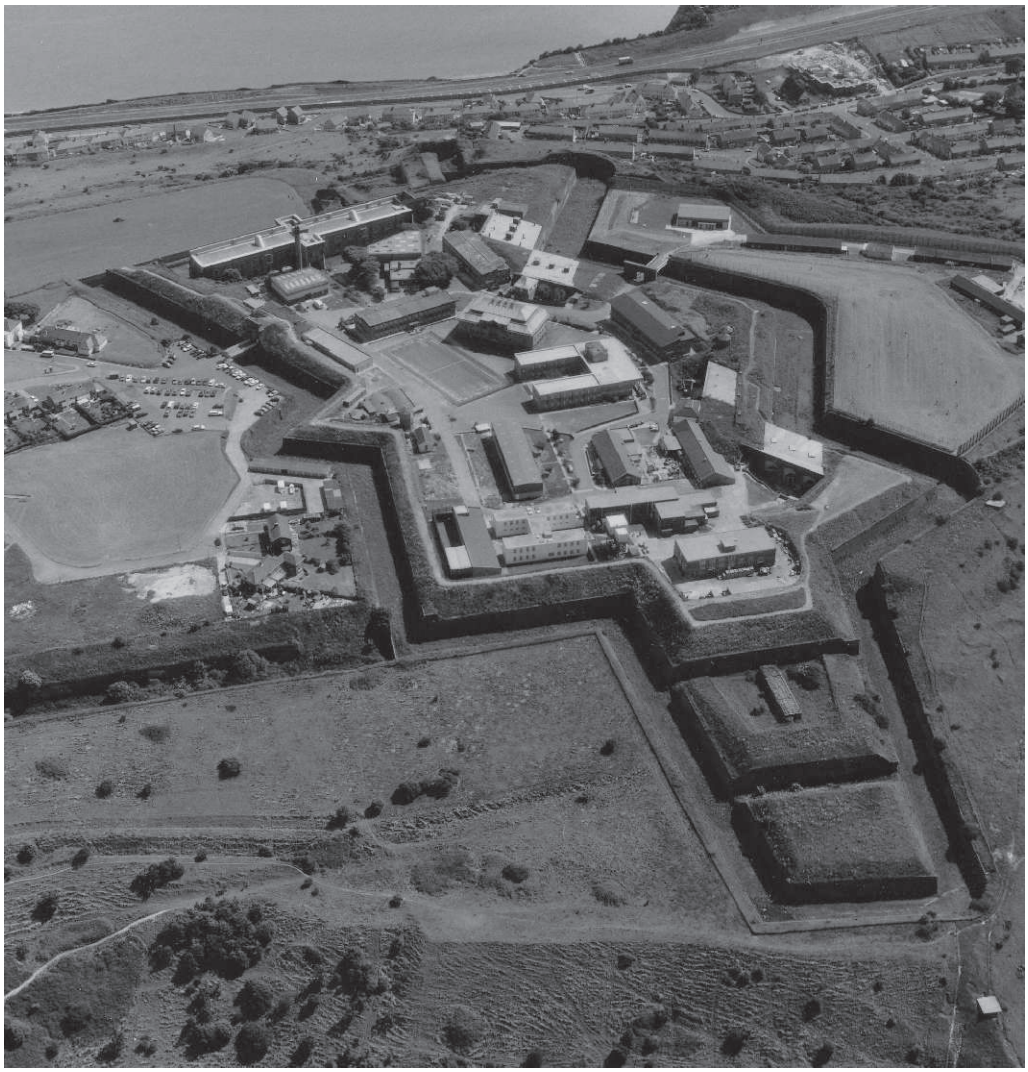

Figure 14
The Citadel from the air in 1994, clearly showing how the defences straddle the gently-domed top of the Heights. Many of the internal buildings have been erected by HMPS (NMR: 15115/57 © English Heritage)

Institute, the Canteen and Dining Room, the Welfare Clinic, the Engine and Boiler House and the Guard Room of the North-West Bastion. Many underground galleries that linked various parts of the complex are also extant but most are sealed for security reasons. HMPS buildings now occupy the major part of the former Parade Ground and other internal spaces.

THE DEFENCES (Fig 15)

The irregular trace of the Citadel sprawls across the gently domed top of the Heights, its longer axis aligned north-west to south-east (Fig 14). The zigzag western side owes its outline to the late 18th-century engineers but was remodelled in the early 19th, while the North-West Bastion, the *tenaille* on the south and the gorge on the east are purely a product of the early 19th-century. The North-West Bastion projects some way downhill along a natural spur in order to provide flanking fire east and west along the slope of the Heights, while the remains of the *tenaille* draw a hard straight line along the crest of the ridge on the south. The junctions of the Citadel ditch with the ditches of the North Lines and the South Lines are extant, although in the latter case this comprises only the scarp revetment.

There is now very little evidence of the fieldworks constructed during the American War, most having been incorporated into, concealed or destroyed by later works. One possible exception is a counterscarp bank for the western defences. An earth bank of low profile, it now lies within the Western Outworks and follows the Napoleonic trace closely, although it was probably modified both at that time and during the later part of the 19th century.

The rampart and *terreplein* (Fig 15)

The rampart, parapet and *terreplein* have been altered radically by HMPS. In general, the body of the rampart survives, along with most of the parapet wall, but nearly all details of the *terreplein* have been removed or buried. Nothing can be seen of the late 19th-century traversing gun emplacements, expense magazines, ready-use lockers etc, nor of the 20th-century pillboxes and other structures that are visible on Second World War photographs (NMR 1945; Fig 16). The rampart of the South-West Face north of the present west gate has been levelled to the height of the ditch revetment and details of the West Flank and Salient D are obscured by infilling.

The parapet comprises a battered wall, generally in yellow stock brick laid to English bond but there are sections of red brick forming the lower courses; it is likely the latter is

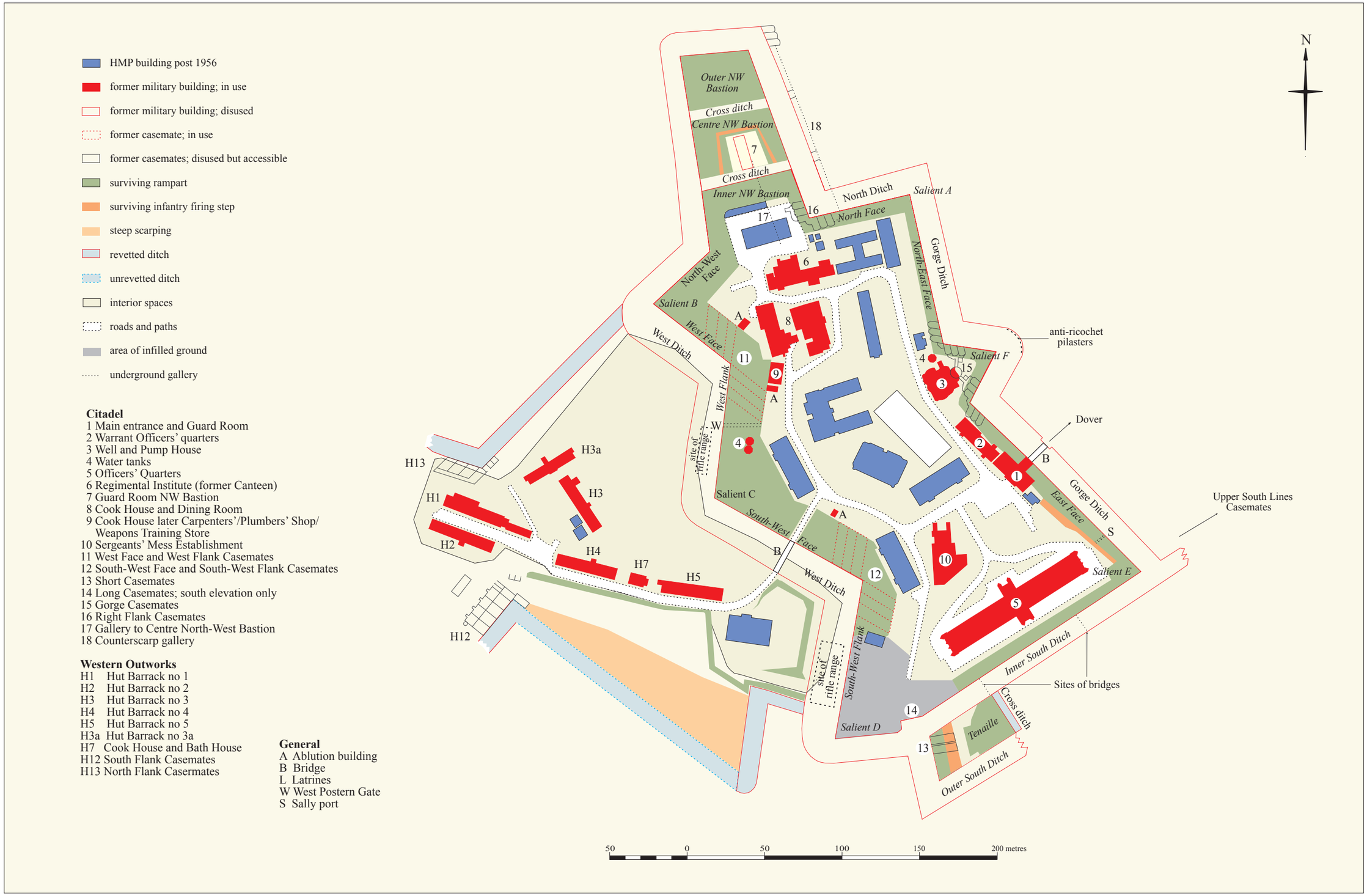

Figure 15 *Plan showing the Citadel c1998 (text in italics indicates the nomenclature of the fortress used from the later 19th century onwards)*

Figure 16
The terreplein *of the West Face, in 1959, showing (at lower left) the racer from a late 19th-century traversing gun platform and (at rop right) details of embrasures in the parapet. All of this detail is now lost or concealed (A5513/34 © Dover Museum)*

Napoleonic work while the former dates to the 1850s/60s. Although the parapet survives for much of the circuit, there has been much patching, repair and replacement by HMPS, including lengths of concrete block walling like that along the North-West Face.

In general, the parapet is around 1.8m (6ft) high, though short stretches reach 2.0m (6ft 7in), and one short stretch on the north face reaches 2.7m (8ft 10in). The southern part of the North-East Face incorporates an infantry step with a parapet 1.9m (6ft 3in) high, while most of the East Face also forms an infantry position (Fig 17). Elsewhere, all traces of gun emplacements, embrasures and ready-use lockers have been removed or concealed, with the single exception of a stone embrasure in the parapet of the North Face, its base 2.0m (6ft 7in) above the gun floor.

The Main Ditch (Fig 15)

The scarp and counterscarp revetments of the main ditch are virtually complete, built in stock brick, steeply battered and usually strengthened at the salient angles with large dressed stone quoins. The revetments have been repaired to a very good standard at various times, not least by HMPS, judging by damage recorded on photographs taken in 1959 (Fig 18). The general bond pattern is that of Flemish bond to between ½ and ¾ height, with English above but in a couple of locations the bond is all English or Flemish.

Despite this, it seems that the Napoleonic work is in Flemish bond while that of the 1850s/60s is in English bond and represents a deliberate heightening (Fig 18). The brickwork forming the top of the each revetment is formed into a drainage gulley.

Figure 17
Overgrown infantry banquette *and steps on the East Face, or south end of the gorge rampart (NMR: BB032736 © Crown copyright 1998)*

The revetments define a flat-bottomed ditch, on average 9.1m (29ft 10in) wide at base and around 6.5m (21ft 4in) high. The base is either level or cut to an even incline, depending upon the ground to be negotiated, and generally survives to its original depth, although there are some instances where minor infilling has occurred. The gorge ditch is cut at a higher level than the rest, leaving steep drops at its north and south ends which are also revetted down to the main ditch levels in the respective locations. The ditch was defended principally by artillery fire from carronades, with some small arms fire, from gun casemates positioned generally behind the scarp revetment in the re-entrant angles (see below). Only the North-West Bastion has gun casemates built behind the counterscarp revetment. The majority of these casemates originally had large embrasures for the carronades, formed in massive gritstone blocks, most of which are extant though blocked with brick or concrete. Each embrasure has an external aperture 1.21m (4ft) wide and 1.09m (3ft 7in) high, with a ceramic smoke vent above it. However,

Figure 18
North end of the western scarp revetment of the NW Bastion, in 1959, showing defective brickwork cut out prior to repair. Note the heightening marked by a junction between brickwork and chalk ashlar, probably representing the Napoleonic and 1860s construction phases respectively (A6207/4 © Dover Museum)

several casemates in the North-West Bastion were defended by small arms fire through narrow loopholes. Both embrasures and loops, carefully angled to cover all of the open ground along the bases of the main ditches, were protected from close attack by drop ditches which were sunk deeper than the main ditch levels. These are all infilled though in several cases the tops of their revetment walls break the surface.

The West Ditch (Fig 15)

The ditch junctions between the Citadel and the Western Outworks are blocked with concrete blockwork. However, the ditch of the Citadel is deeper than that of the Outworks such that, at the southern junction, the original brick revetment marking the change in level is extant. It contains a blocked doorway that provided access between the two ditches. This has a semi-circular arched head, 1.22m (4ft) wide and 1.57m (5ft 2in) high, with stone anchor blocks for securing the hinges of substantial double-leaf doors.

In the ditch base adjacent to the doorway, a cross-axial stone footing marks the southern end of a miniature rifle range, which was established in the early years of the 20th century.

North of the bridge at the present west gate, as far as Salient C, both revetments have been rebuilt in English bond incorporating ceramic drains. Low profiled scarps against the

Figure 19
The West Ditch, looking north, showing the West Postern (at right) and the windows of the casemates of the West Face and West Flank (NMR: BB032743 © Crown copyright 1998)

base of both revetments, 1.8m (5ft 11in) wide and 0.8-1.3m (2ft 7in-4ft 3in) high, continue around the salient. These are probably of the 1850s/60s and gave protection against the established siege technique of bombarding the base of a rampart to effect its collapse into a ramp that could be assaulted by infantry.

North of Salient C, a concrete floor in the ditch is from another miniature rifle range. The scarp revetment incorporates the West Postern, a small square-headed doorway constructed in a concrete repair to the revetment and approached up three steps defined by low flanking walls (Fig 19). Inside the doorway, a small section of an earlier semi-circular brick vault is visible, from a gallery that led under the rampart to the interior of the fort. Both entrance and gallery were probably inserted in the 1850s/60s and they are depicted on the 1871 Citadel plan, although the present form is modern (PRO: WO/78/2755/12). Originally, it was a sally port to the ditch and a stairway ascending the counterscarp into the Western Outworks; although the stair has gone, the scar of its two relieving arches remain. In the 20th century it provided a route to the rifle ranges.

The ditch around the North-West Bastion (Fig 15)

The revetments have large areas of patched repairs, most by HMPS. On the east, the counterscarp has two sections inserted into the Napoleonic brickwork, with very clear

Figure 20
Inserted walling in the counterscarp revetment of the NW Bastion with, just visible, blocked loopholes (NMR: BB032730 © Crown copyright 1998)

Figure 21
The eastern scarp revetment of the NW Bastion, showing the cross ditches and clear patching of the brickwork (NMR: BB03729 © Crown copyright 1998)

straight joints, as part of the 1850s/60s work (Fig 20). These are precisely opposite the cross ditches of the bastion and mark the position of gun casemates built behind the revetment. Each one incorporates six narrow loopholes and three smoke vents above them, all of which are now blocked (see below).

Only the southern cross ditch has large gritstone quoins at its junction with the main ditch, although the brickwork at the junctions of both cross ditches does not course through and was clearly subject to alterations contemporary with the gun casemates (Fig 21).

The North Ditch (Fig 15)

In the re-entrant angle between the North-West Bastion and the North Face, the east-facing scarp revetment has three rows of I-section steel girders inserted into the brickwork, originally projecting horizontally but now sawn off flush. These supported a heavy structure of which there is no further trace, probably of 20th-century date because it totally obscured the gun casemates behind the revetment.

Further east, there are traces of two blocked doorways in opposing positions in the revetments, now half-buried by made ground such that only 0.72m (2ft 4in) of the southern door and 0.82m (2ft 8in) of the northern one are visible. Both have segmental arched stone lintels; the southern doorway is 1.55m (5ft 1in) wide. It seems likely that these are of the Napoleonic phase, representing an incomplete route to the counterscarp gallery of the North-West Bastion.

Originally, the North Ditch was continuous with that of the North Lines, heading east across the Heights to North Centre Bastion, but the junction is blocked by HMPS concrete blockwork. The junction between the North Ditch and that of the gorge, the latter cut at a higher level, was formerly marked by a battered revetment. This has been removed except for a stub on the west, leaving only a steep scarp between the ditches.

The Gorge Ditch (Fig 15)

The counterscarp revetment is neatly rounded in the salient formed by the redan. Against it and spaced evenly are eleven substantial pilasters built with heavy gritstone blocks of triangular cross-section, extending upwards for ¾ of the revetment height. These structures are probably Napoleonic and functioned to prevent ricochets from the gorge casemates (Fig 22).

There is a blocked postern gate in the scarp revetment, 34m from the southern end of the ditch, which functioned as a sally port from an area close to the Officers' Quarters. It has a

semi-circular arch in gauged yellow brick typical of the 1850s/60s work. It is 1.22m (4ft) wide but only 1.07m (3ft 6in) of its height is visible, due to made ground.

Figure 22
Anti-ricochet pilasters against the counterscarp of the Gorge Ditch, from the west (NMR: BB032731 © Crown copyright 1998)

***The South Ditches and the* tenaille** (Fig 15)

The *tenaille* was a long rectangular 'island', between twin ditches, on which were concentrated defences to protect the entire south face of the Citadel. The ditches were badly damaged during construction of South Front Battery in the last years of the 19th century; the outer ditch was removed for three-quarters of the original length and the *tenaille* cut away to leave a new sloping profile on the south (Fig 23). Most of the inner ditch survives although its counterscarp revetment is generally reduced to half of the original height of 3.35m (11ft); at the south-western end it has been rebuilt by HMPS with concrete blockwork. The scarp revetment is complete and, in the ditch bottom and running along its base, there is another ditch averaging 4.8m (15ft 9in) wide and 1.0m (3ft 3in) deep, ending just before the Long Casemates.

The damage to the *tenaille* has left a neat section at the north-east end, exposing both chalk bedrock and construction details of the counterscarp revetment of the inner ditch. The revetment comprises an inner layer of chalk ashlar, some 2.0m (6ft 7in) thick,

Figure 23
The south face of the Citadel, from the east. The inner ditch of the tenaille*, now guarded by a modern gate, survives, while to the left, the* tenaille *itself has been cut away leaving a 45° slope; the outer ditch has gone (NMR: BB032737 © Crown copyright 1998)*

divided by brick string courses, keyed into which is an outer brick skin, some 0.4m (1ft 4in) thick.

At *terreplein* level, the greater part of the *tenaille* was formed into an earthwork, carefully profiled into a *banquette* for infantry defence of the steep slope of the Heights on the south. However, at the western end, a cross ditch separated part of it to form a demi-bastion which could be defended independently, at both *terreplein* level via *banquettes* facing south, east and west, and at ditch level, by gunrooms known as the Short Casemates (Fig 24; see below).

There were three points of access to the *tenaille*. The Napoleonic route was from a newel stair shaft inside the south-west part of the Citadel. The stair descended to an underground gallery which led to a sally-port on the *glaçis* and also, via a branch, underneath the Long Casemates to emerge inside the Short Casemates of the demi-bastion, from which steps also led up to the *terreplein*.

A second route, established during the 1850s/60s phase, came through the rampart south of the Officers' Quarters, in a short vaulted passage to a defensible gate in the scarp

Figure 24
Part of the demi-bastion at the west end of the tenaille. *Note the infantry* banquette *(centre) and pivot for a swing bridge (lower left) (NMR: BB043986 © Crown copyright 1998)*

revetment. The gate gave directly onto a bridge across the inner ditch to the longer part of the *tenaille*. Although the bridge has gone, the gate can still be seen, built into a canted elevation, with recessed double inward-opening reinforced doors, each with a vertical slit for observation and small arms fire, the whole capped by a round arched head of cream rubbed brick (Fig 25). There is a stone sill, chamfered down to the exterior at an angle of around 60°, suggesting that the bridge may at one time have incorporated a lifting section. The sill and brickwork below it are patched, probably following removal of the bridge structure, while a metal grip handle set in concrete is of relatively recent origin. Opposite the door in the counterscarp revetment, two small patches in the

Figure 25
Reinforced doors in the scarp revetment of the inner South Ditch, formerly leading onto a bridge to the tenaille *(NMR: BB032740 © Crown copyright 1998)*

brickwork, 0.9m (3ft) apart, may mark the anchor points for structural elements of the bridge.

A third route was formed by a swing bridge with its pivot on the demi-bastion, located in a setback on the counterscarp of the inner ditch immediately adjacent to the cross ditch. The bridge could be swung across the inner ditch to rest on the scarp revetment, although there is no trace, either on the ground or on any surviving plans, of a route from there through the rampart. The bridge is depicted for the first time on a plan of the Citadel made in 1911(HMPS: 402581).

At the east end of the *tenaille*, the blocked carronade embrasures to the Upper South Lines Casemates, which flanked the inner ditch of the *tenaille* and the South Lines, remain visible in the angle of the scarp revetment. There are two pairs of embasures for each flank, on two levels, each defined by large gritstone blocks; the lower level also has flanking small arms loops. All are clearly cut into the brickwork, which is consistent with the insertion of these casemates as part of the works of 1853-5 (see above). There is no access to the interior of the casemates.

The North-West Bastion (Fig 15)

This is a complex work of three tiers, descending northwards, which provided flank defence for the North Lines. Although defined by the main ditch of the Citadel, it is separated into three self-contained parts - Inner, Centre and Outer - by two cross ditches set at a higher level than the main ditch (Fig 26). The *terreplein* of each part overlooked and provided close defence for the one below, while the cross ditches were defended by small arms fire from casemates behind the scarp revetments and by flanking fire from similar casemates behind the east counterscarp revetment of the main ditch. The Inner North-West Bastion also had artillery positions for longer range defence.

From the Inner North-West Bastion, four vertical stair shafts descended to separate underground galleries that served all parts of the bastion and its casemates (see below).

The Inner North-West Bastion (Fig 15)

The rampart of the inner bastion is intact but nothing remains of the defensive arrangements, the *terreplein* having been extensively remodelled and built over.

The Centre North-West Bastion (Fig 15)

The centre part of the bastion was designed for infantry defence. The *terreplein* is formed into a profiled infantry *banquette* with a battered brick parapet on the north, east and west

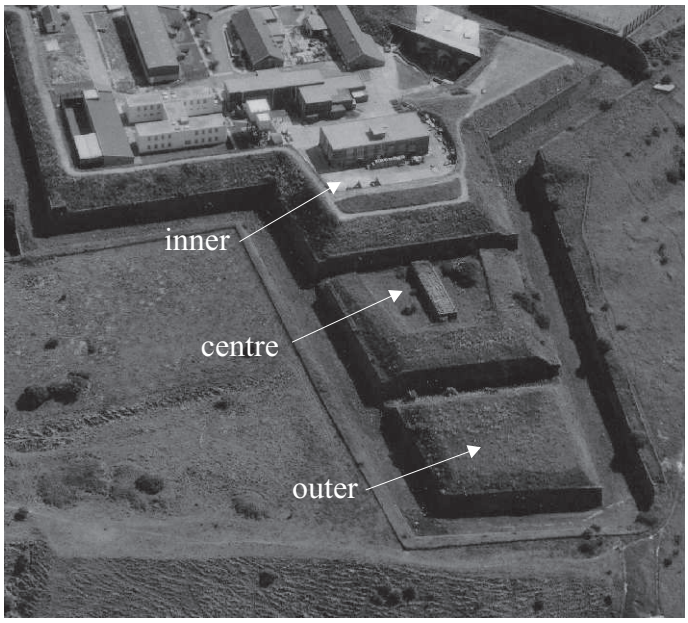

Figure 26
The North-West Bastion, seen from the air in 1994. The three parts of the work are clearly visible (north is at the bottom of the photograph)(extract of NMR: 15115/57 © Crown copyright)

faces, while the enclosed space contains a large surface-built bombproof infantry shelter, referred to as a '*Guard Room*' in the later 19th century (PRO: WO/78/2755/12; Figs 26-7).

This Guard Room is an improvement of the 1850s/60s, built to a very low profile on the long axis of the bastion. It is a long and narrow building of one storey, with a segmental-vaulted roof, built in pinkish brick laid to English bond. The walls are battered externally, with large gritstone quoins at the southern end and brick quoins at the other end that are carefully cut to intersecting angles. The long east and west walls are capped

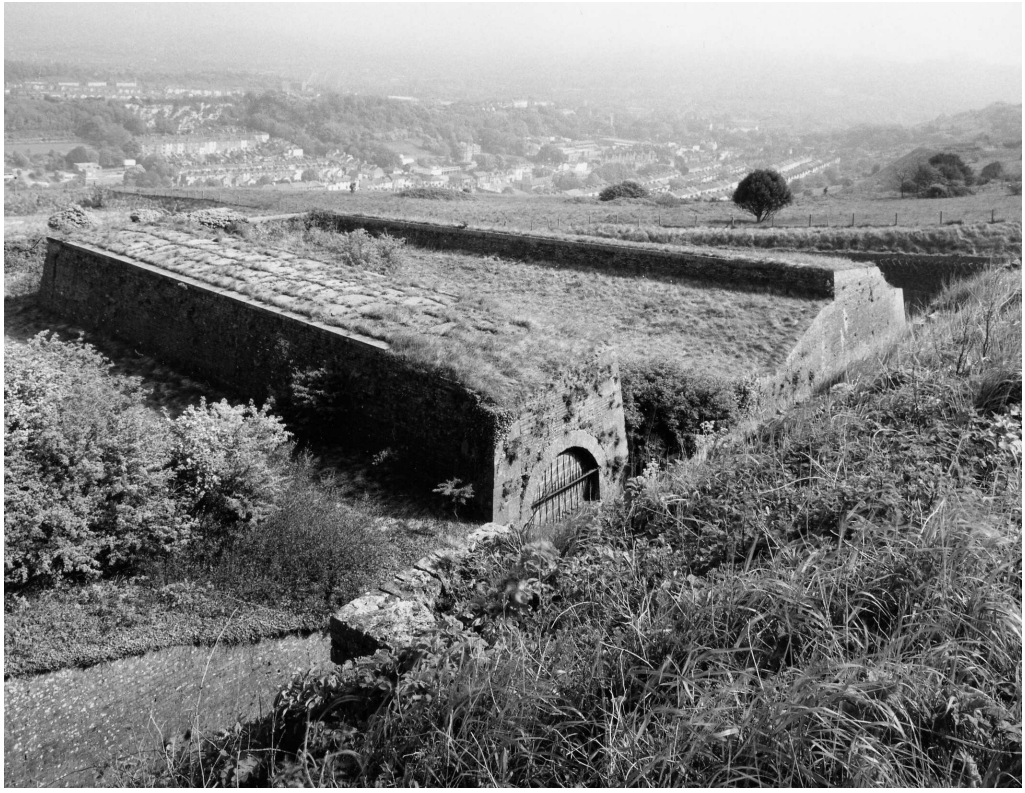

Figure 27
The long rectangular Guard Room on the Centre North-West Bastion, with the infantry banquette *beyond, from the south-west. The only window to the Guard Room is just visible (lower centre) (NMR: AA043948 © Crown copyright 1998)*

Figure 28
Centre North-West Bastion: the drawbridge entrance to the Guard Room, from the east (NMR: © Crown copyright 1998)

in sandstone. The vault is covered with concrete laid to very shallow pitches and covered with a layer of asphalt, the latter exposed due to removal of the earth bombproofing.

Access from the Citadel was via an underground gallery from the inner bastion (described below), which emerged at a doorway, bridged by a gritstone lintel and now blocked by yellow brick, in the north wall. The single room, 21.7m (71ft 2in) long, 3.08m (10ft 1in) wide and 2.79m (9ft 2in) to the crown of the vault, is paved with brick and was lit by a large window in the south wall, overlooking the cross ditch. The lower part of the window is inserted into the pre-existing brickwork of the ditch revetment. This window is infilled with concrete blockwork, but has a segmental arch two stretchers deep, and a sandstone sill. Externally, it appears that the sill may have been raised, as it rests on several courses of yellowish brick that end in straight joints with the surrounding brickwork. The window is protected by a grille of wrought-iron bars and spikes above and below an iron transom.

An unusual feature of the otherwise plain, unheated and sunken interior is the presence, in the northern half, of six opposed pairs of gritstone blocks, projecting at the height of the vault springing. Each has a shaped upper part and a flat soffit incorporating a mortice 6cm (2in) square and deep. They appear to relate to timber fixtures, now missing, along each side, perhaps a framework for beds, kit racks or weapons for troops manning the bastion in an emergency.

In such circumstances, exit onto the *terreplein* was via a second doorway at the southern end of the east wall, with a drawbridge placed over an external drop-pit (Fig 28). The

bridge enabled the building to be sealed off if the *terreplein* was taken by assault. Four steps rose through the doorway, which has a semicircular arch internally, rising in line with the stair, and a wider segmental arch externally. The latter has a rebate of one brick thickness into which the bridge closed on lifting. A shelving piece of gritstone between the bases of the jambs allowed for the lifting motion of the bridge, and was protected against rising damp by a course of Welsh slate. The bridge has been removed with the exception of the hinge pivot, which indicates that the bridge deck was of timber, carried on three iron bearers. The hinge is mounted in recesses bridged by gritstone lintels at the base of the entrance jambs. Inside the recesses the hinge was attached to weighted counterbalance arms running back through the wall thickness. The pits accommodating the arms are positioned low down on either side of the entrance, and were covered by iron plates on the inside face and inner jambs of the doorway, the latter plates flanged to allow the others to be bolted over them. The pits are bridged by gritstone cantilevers, bearing vertical tooling between horizontally tooled margins, the ends of which received only partial support from the triangular-section thickening of the flange. The bridge was lifted by ropes passing over two sets of pulley wheels, an arrangement paralleled at the North Centre Bastion and the Hospital Postern (Pattison, 2002a and b). The pulley wheels, one set visible externally and one internally, are in narrow slots with iron surrounds placed close to the springing points of the semicircular arch. When lowered, the bridge spanned a pit 5.12m (16ft 9in) wide, 2.42m (7ft 11in) across and at least 1.7m (5ft 7in) deep. On the opposite side, four stone steps ascend to the open ground behind the *terreplein*, the bottom step incorporating a 1.54m (5ft) wide notch for the end of the drawbridge.

The Outer North-West Bastion (Fig 15)

This is an earthwork without provision for its own defence but carefully profiled to allow fire over it from the Centre North-West Bastion.

THE CASEMATED DITCH DEFENCES (Fig 15)

These were all constructed, or at least started, during the Napoleonic phase. Some combined troop accommodation with artillery defence of the main ditch, while others were for defence only: these are differentiated below as casemated barracks and casemated gunrooms respectively. The nomenclature applied to these casemates varied through time and the proper names applied here came into general use in the later part of the C19th. Additionally, all of the casemates on the western side of the Citadel were given numbers following the work of 1853-5; these numbers are given in brackets.

The Casemated Barracks (Fig 15)

The Short Casemates (Figs 1, 29 & 29a)

These two casemated barracks, together with an adjacent casemated Cook House, are located in the demi-bastion at the western end of the *tenaille*. The barracks also served as gunrooms, positioned to flank the western part of the South Ditch beyond the *tenaille*. They were the first casemates to be completed in the Citadel, by December 1808 (PRO: MR/1/1429/10). The 1858 Interim Report on the Citadel noted that the barracks were empty but could accommodate 21 men in each room (PRO: WO/33/574). By 1897, the barracks formed a makeshift Sergeants' Mess, with an adjoining Mess Kitchen in the former Cook House (PRO: WO/78/2426/6). However, in 1899 the Mess moved into purpose-built accommodation within the Citadel and at this point, a proposal to re-appropriate the casemates as barracks for eighteen men apiece was briefly entertained, but quickly withdrawn (PRO: WO/78/2426/6). By 1911 the whole complex was disused, as it had been, in all probability, since 1899 (HMPS: 402581).

The two casemated barracks open off the west side of a sunken area, from which steps lead up to the *terreplein* , while a smaller casemated Cook House opens off the north end (Fig 29a). Two small buildings housing Ablutions and Latrines stood at the south end. The casemates were originally approached via an underground gallery, originating inside the main part of the Citadel (see above). This emerged at a doorway, now blocked, in the north wall of the northern casemated barrack, towards its eastern end.

The group is faced in grey stock brick laid in English bond, with the two barracks recessed obliquely beneath segmental arches of a more reddish brick. Their front walls have partially collapsed but sufficient remains to show that each followed a common pattern, with a central doorway flanked by windows and a further window, the segmental heads of which survive, over the doorway. The window heads were of gauged brick.

Each room was heated by three fireplaces, one on the common wall and two on the other; small sub-vaults provide headroom close to the fireplaces. A doorway in the common wall allowed communication between the two rooms and surviving dwarf brick walls indicate the former presence of suspended timber floors and hearthstones. Ventilation was provided by an *oculus* in the west wall and by a square aperture in the crown of the parabolic vault, above which a ceramic pipe rose through the bombproof layer. These appear to have been supplemented, probably in the 1850/60s, by two vents in the west wall, one on either side of the shutter recess. There is vestigial evidence for former kit-racks on the long walls.

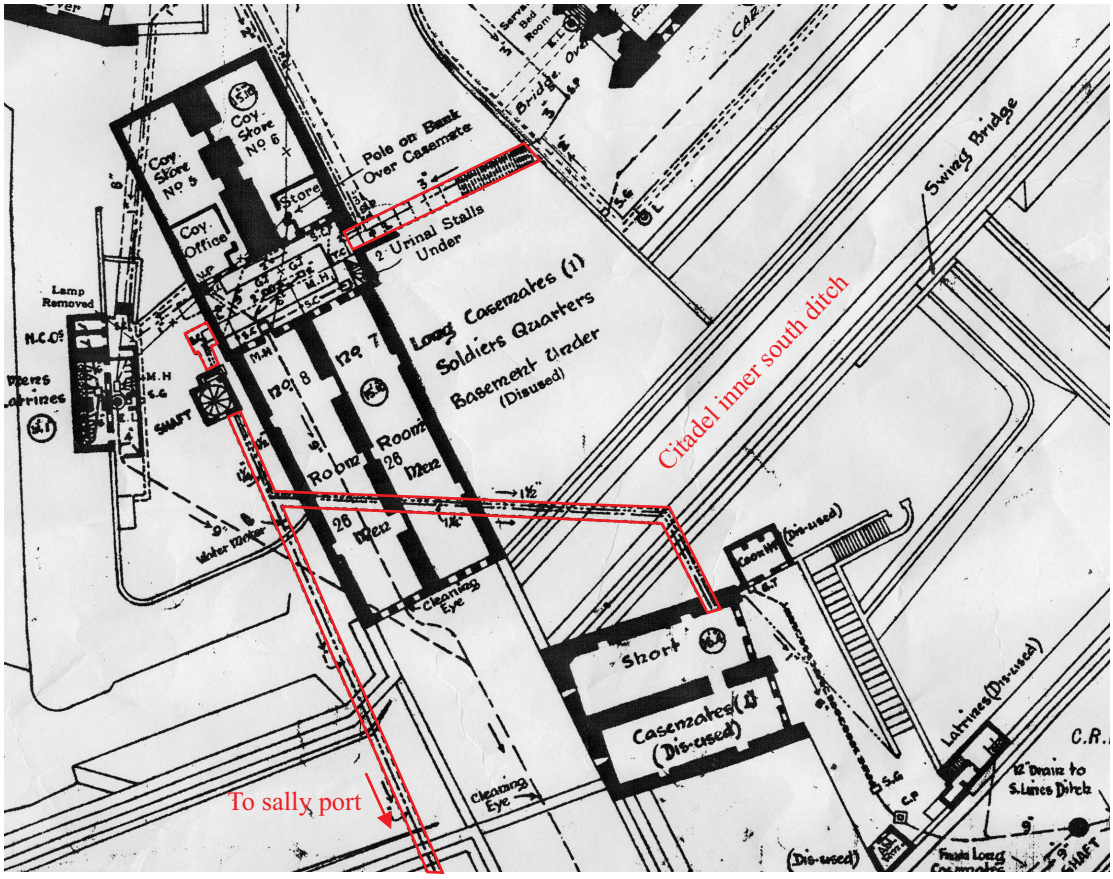

Figure 29
Extract of a general plan of the Citadel, showing the Short Casemates and the Long Casemates, original at 1:500 scale, printed in 1930 with annotations to 1947 (402582 © HMPS: Lines in red are underground galleries; together with text in red they are added by the authors for emphasis. North is at the top of the page)

Apparently unique to these casemates is the provision of what appear to be water points on their internal walls. These are narrow, segmental-arched recesses about 1.20m (4ft) high, rebated for a door, with the remains in some cases of a lead or non-ferrous pipe entering through the top of the recess. Such provision reflects the isolated position of the demi-bastion from the remainder of the Citadel and would have guaranteed a water supply for troops in both peacetime or during a prolonged defence.

The western quarter of each barrack formed a fighting area for troops operating a carronade. An embrasure with a gritstone surround, including a low sill, is placed centrally below a relieving arch in each west wall, facing the ditch. The openings, now blocked in brick, have rounded corners on the inside and broaden towards the ditch to provide an adequate field of fire. Limewash scars on the wall indicate the presence, formerly, of a shutter which could be lowered to close the embrasure when not in use. The wall is recessed very slightly in line with these scars. A recess in the vault directly above the embrasure suggests the mounting point for a pulley system to raise and lower the shutter. The gun position was provided with a solid brick floor, extending three-quarters of the way across the room and merging on one side with one of the hearth

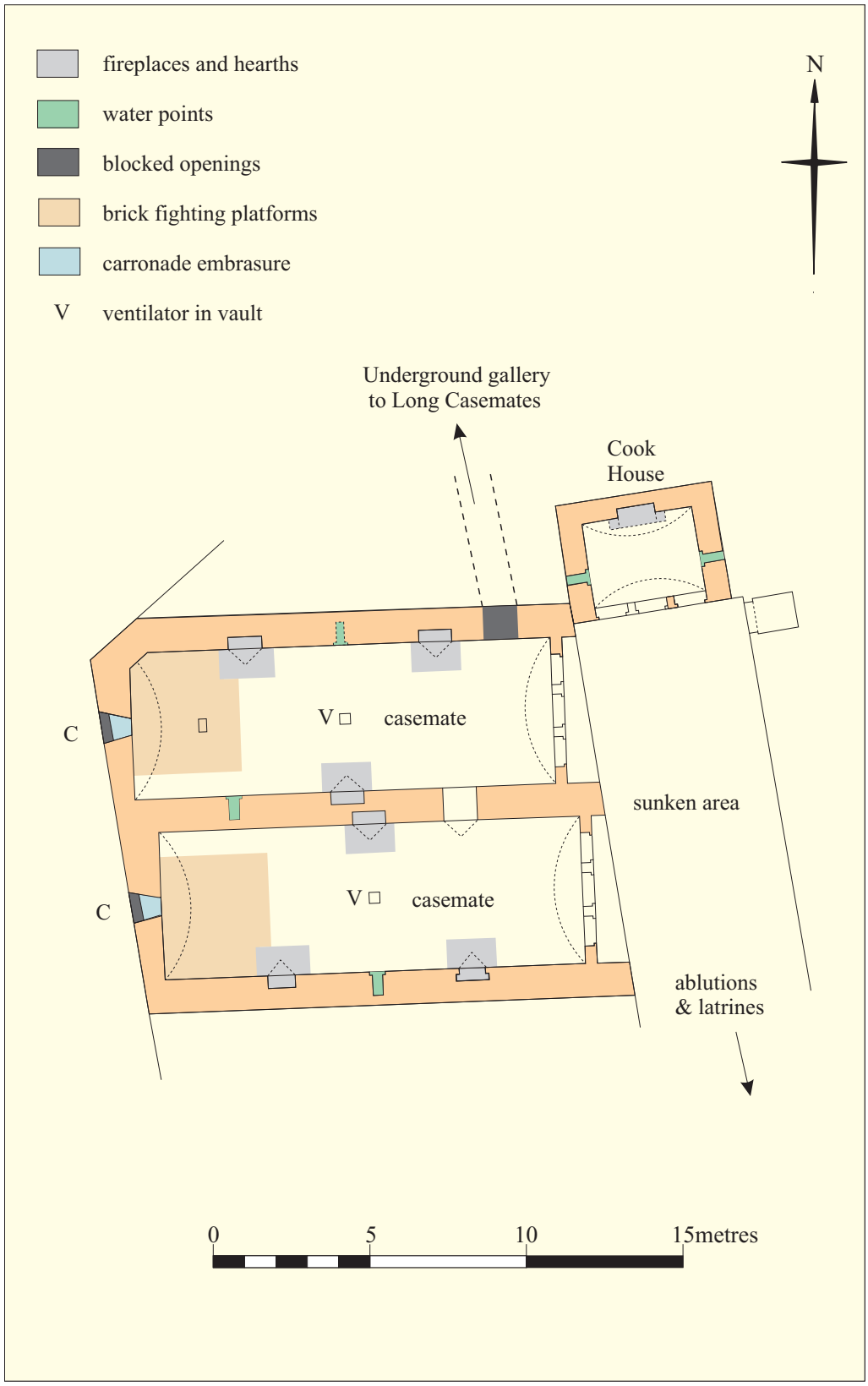

Fig 29a
Plan of the Short Casemates

bases. This would have reduced the risk of fire resulting from action, and may be an original feature, though in the centre of the northern platform there is an aperture with a wrought-iron surround similar to those employed on the vents inserted in the west wall.

The Cook House is a smaller casemate with its south elevation fenestrated as two storeys, the openings having segmental arches and stone sills. In common with the Long Casemates (see below), the upper windows are blind with the exception of the lower part of the central one, where there is a recessed segmental-headed window lighting the upper part of the vault. This window was positioned above the semicircular-headed entrance, which was flanked by two windows. On the opposite wall there was a large brick fireplace, fragments of which survive. Arched recesses, probably also water points, are present in the east and west walls, with that in the east wall containing a copper pipe through which water still drips. In the north-east corner there are the remains of stone flags with a drain hole and indications in the brickwork suggesting the position of a sink.

The ablutions and latrines shown on the south side of the sunken area in 1897 and 1911 have been demolished but traces of their foundations can be discerned in an overgrown area (PRO: WO/78/2426/6; HMPS: 402581).

The Long Casemates (nos 1-8) (Figs 15 & 30)

The area of these Napoleonic casemated barracks, in the south-western part of the Citadel, has been filled with debris and the entrances blocked, leaving only the southern elevation of the southern pair visible. The interiors are not accessible.

The group consists of two pairs of two-storeyed casemates, situated to the north and south of what was originally a deeply sunken area serving as a light well. Each level was numbered clockwise on plan, beginning at the north-west corner of the lower level. The southern pair were designed to defend the ditch at the south-west end of the *tenaille*, and were described as '*not finished'* in 1808 (PRO: MR/1/1429/10). At that time the northern pair, which are considerably shorter with a thicker spine wall, had been excavated and were described as Cooking Casemates, though later evidence suggests more varied use (see below).

One original point of access was from the east via a brick-lined gallery, now entered through a replacement revetment wall built in the 1850s/60s, to the south-west of the Officers' Mess. The gallery was described as *'excavated and now revetting*' in

December 1808 (PRO: MR/1/1429/10). The entrance has a semicircular-arched head in fine yellow rubbed brick and was closed by double outward-opening doors hung on pintle hinges set in stone anchor blocks. However, it was subsequently partially infilled for a smaller door with a wooden frame and a flat head. Inside the door, steps descend to the gallery, which is 1.82m (6ft) wide and faced in English bond, though blocked by soil and brick debris after only a few metres.

A second access route approached from the west via a vertical stair shaft and gallery, continuing under the South Ditch to a sally port, with a branch to the Short Casemates. A third came from the north via another stair shaft descending from the sunken area outside the South-West Flank Casemates (see below) and along a gallery which joined the east gallery. The galleries from the east and north entered the Long Casemates on a first-floor landing that extended around three sides of its sunken area, with a stair descending to the lower level at the eastern end. The gallery from the west entered the area at ground level.

The south-east elevation of the southern casemate pair can be viewed from the South Ditch of the Citadel (Fig 30). It has certain points in common with the much smaller south elevation of the Short Casemates Cook House (see above) with which it is nearly

Figure 30
The Long Casemates; south elevation forming the scarp revetment of the inner South Ditch (NMR: 032741 © Crown copyright 1998)

contemporary. It is fenestrated with tall, narrow, segmental-arched openings on three levels, arranged in triplets, with stone sills. The highest level is blind with the exception of the lower part of the central opening of each triplet, which each have a recessed segmental head. These smaller windows light the upper part of the upper vaulted rooms. The other windows are comparatively large, and it is unclear how embrasures may have been contrived within them to limit the exposure of soldiers under attack. All the windows have been blocked, in two phases, the main central windows lighting the upper level being the last to be infilled. The elevation also contains several metal ventilators.

Proposal drawings for new work, dated 21st May 1853, reveal some of the internal arrangements (HMPS: 402517; 402518). These show that the basement rooms in the two northern casemates had timber ceilings, the beams of which rested on corbels. The upper rooms had vaulted ceilings, the height of which accounts for the third tier of fenestration on the south elevation (Fig 30). Each of the southern casemates appears from the plan to have been heated by three fireplaces, though this contradicts a statement by the Barrack and Hospital Improvement Commission in 1858, that they had '*only one fireplace each*'. They accommodated 34 or 35 men apiece (including the occupant of a Sergeant's Bunk, partitioned off in one corner of at least one room), compared with 23 in the upper rooms of the northern casemates. The new work proposed in 1853 may have included subdividing the upper level of the northern casemates, which appear to have been turned into stores.

The 1858 report complained that '*The ablutions room is very dark ... as is the cookhouse*' (PRO: WO/33/587; 589; 591). In 1897 these rooms were located in the basement of the northern casemate pair, the Cook House on the west and the Ablutions on the east, an arrangement that dates from the 1850s at least, and possibly from the outset to judge by the 1853 drawing (PRO: WO/78/2426/6). The latter shows what appears to be a cooking range against the north wall of the Cook House and a series of sinks arranged in stalls all around the Ablutions Room.

In 1897, the rooms over the Cook House and Ablutions were barracks for seventeen men apiece, in spite of the Commission's insistence, forty years previously, that '*The casemates that do not have windows at both ends should not be used for quarters*'. They were condemned in October 1898 but were still occupied in March 1901 due to the demand for accommodation (PRO:WO/78/2426/6).

In 1897, all four rooms in the southern casemates were used as barracks, the upper pair for 31 men each and the lower pair for 28 men each. By 1911, the upper rooms of the southern casemates still accommodated 31 men each, while the lower rooms formed a

basement; the upper rooms of the northern casemates had been converted to stores, each one partitioned to provide a small room at the southern end which formed a Signal Store and a Lecture Room respectively (HMPS: 402581). In 1929 the entire lower level was disused with the exception of the Ablutions Room; on the upper level the two southern rooms each housed 26 men. The northern rooms were still designated as Company Stores, the small partitioned rooms within them forming a separate Store (east) and a Company Office (west) (HMPS: 402582).

The West Face Casemates (Figs 15 & 31)

In each of the two re-entrant angles on the western part of the Citadel trace, a group of six Napoleonic casemates provided both ditch defence and barracks, to a common design quite different from the Long Casemates. From the mid-19th century and probably from the Napoleonic period, these were referred to as the Left Wing and Right Wing Casemates (HMPS: 402486). In 1858, they were called collectively the West Face Casemates (PRO: WO/33/587; 589; 591). A fuller terminology, adopted below, was used in armament returns of 1887 and 1892 (PRO: WO/33/2775).

Each group comprised two sets of three casemates, with short passages for communication between the sets: one group was formed by the West Flank and West Face Casemates (also referred to as nos 15-20), the other by the South-West Flank and South-West Face Casemates (also referred to as nos 9-14). Each set of three also had its own sunken area to the rear, at one end of which there was a small Ablutions building, and a Cook House overlooking the sunken area on the edge of the Parade Ground.

The West Face and the South-West Face Casemates were described as '*covered in*' (i.e. excavated, revetted and vaulted) in 1808, when work had yet to begin on their partners, the West Flank and South-West Flank Casemates (PRO: MR/1/1429/10). A partial plan of the South-West Flank and South-West Face Casemates survives, dated 1812 (PRO: MR/1/1429/5). Although it is lacking in detail, being primarily to illustrate the geometry of the re-entrant and the carronade ports, that it shows those on the South-West Flank and South-West Face is suggested by the nature of the '*Communication between the Casemates*' - the communicating passage - which is contrived differently in those of the West Flank and West Face. However, in most respects the drawing is probably intended to be applicable to both groups of casemates. The internal dimensions of one casemate are given as 65ft (19.8m) long and 18ft (5.49m) wide, with ditch walls varying from 3-6ft (0.91-1.83m) in thickness (PRO: MR/1/1429/5). As built, this width was adhered to but the length was increased to over 77ft 6in (23.62m) in all except those on the West Face, which were 67ft 5in (20.55m) long (PRO: WO/78/2426/6).

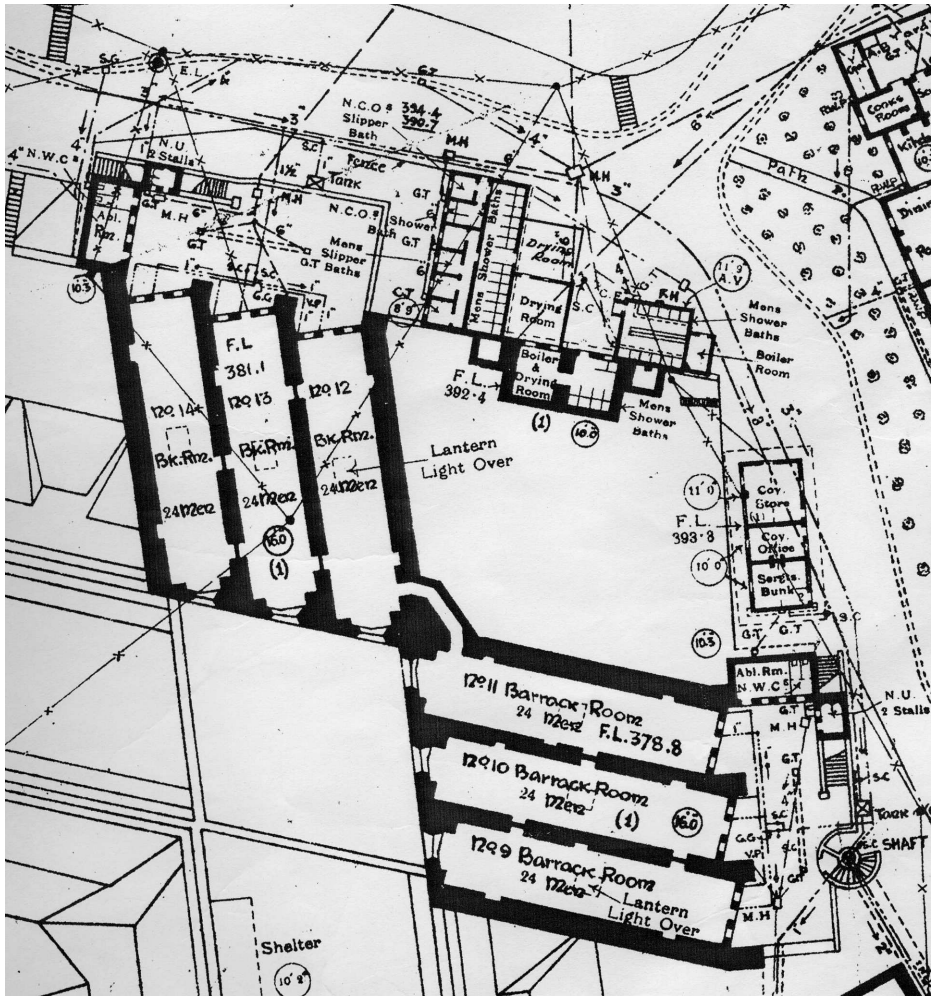

Figure 31
Extract of a general plan of the Citadel, showing the South-West Flank and South-West Face Casemates, at 1:500 scale, printed in 1930 with annotations to 1947 (402582 © HMPS)

The rear elevations of the casemates are faced in yellowish grey stock bricks, laid in Flemish bond. They have been subject to considerable and varying alterations. The original form, best preserved in the western casemate of the South-West Face and the central casemate of the West Face, is shown in elevation on two drawings of those on the South-West Flank, dated 1853 and 1854 (Figs 32-3; HMPS: 402486; 402639). It consisted of a central fan-lit entrance flanked by segmental-arched windows. Above the entrance was another window, rising to the crown of the parabolic vault, an arrangement paralleled at the roughly contemporary Soldiers' Quarters at the Drop Redoubt, but the flanking windows, giving a fully glazed *tympanum*, are later (Brown *et al* 2001). The vault is recessed and set at an angle within a tall arcade of segmental arches. The brickwork of the arcade is structurally distinct from the English bond brickwork to either side but whether this indicates insertion in earlier walling, or merely the separate but broadly contemporary construction of revetment walls and building walls, is unclear.

Figure 32
The rear elevation of the South-West Flank Casemates , from the south-east. Note the recessed façade of each casemate and the parabolic vaults. The sunken area incorporates an ablutions building with lean-to roof (right) (NMR: BB032719 © Crown copyright 1998)

Figure 33
The rear elevation of the West Face Casemates. The central casemate retains much of its original appearance with central fan-lit entrance and flanking windows. Above the entrance another window rises to the crown of the parabolic vault (NMR: AA043936 © Crown copyright 1998)

The ditch elevations were originally pierced only by a single carronade port in each casemate. These have been obliterated by later windows, but are depicted on the 1812 and 1853 drawings (PRO: MR/1/1429/5; HMPS: 402486). The latter also indicates that the gun occupied a reinforced portion of floor extending rearwards almost as far as the first fireplace.

Each casemate consists of a single large room with a parabolic brick vault. By 1853, and perhaps originally, a sergeant's bunk occupied one corner at the rear. All the fireplaces have been blocked, but sub-vaults indicate the former positions of two fireplaces on one wall and one on the other, the stacks rising clear of the bombproof layer above the vaults.

To the rear, the external areas are deeply sunken below the level of the Parade Ground and form small yards reached by long flights of brick steps. At one end of each there is an Ablutions building of yellow brick, which in all cases has also been extensively altered: each has openings with flat arches of gauged brick set in lime putty, with a roof laid with Welsh slate forming a lean-to against one revetment of the sunken area. The building serving the West Flank Casemates retains its original openings, which have sandstone sills and sash windows. The one adjoining the West Face Casemates, on the other hand, has a scar on the wall behind, perhaps relating to what appears to be a louvre shown on the cross-section through this building on the 1853 drawing (HMPS: 402486). Latrines may have been provided in the smaller building under the stair that rises to the Parade Ground.

Each group of six casemates was provided with a two-bay casemated Cook House, opening off the Parade Ground between the sets of three. These were still used thus in 1897, each flanked by two small stores (PRO: WO/78/2426/6). One Cook House survives to the rear of the 1911 Cook House that replaced them, but it was not investigated.

In 1858 three casemates, presumably a single group and possibly those of the West Face, which were slightly smaller, were in use as married quarters, the interiors divided by partitions. They housed just eight men each. Of the remainder, five held 35 men, three had 31 and one had 34 (PRO: WO/33/587; 589; 591).

There are a number of variations in the later development of both casemate groups. At the south end of the sunken area serving the West Flank Casemates, a doorway opens onto a gallery which emerges in the ditch at the West Postern. At the south end of the area belonging to the South-West Flank Casemates, another gallery leads to Latrines set into the *talus* of the rampart. These were built according to a proposal of 1854, and were

originally for the use of NCOs (HMPS: 402639). The semicircular-arched doorway leading from the area survives, reduced in size for a modern opening.

By the end of the 19th century the casemates were considered obsolete for defensive purposes but were retained as barracks. It is probably about this time that they were altered to provide better lighting and ventilation for the men - one example perhaps the full glazing of the tympanums facing the area in the South-West Flank, the West Flank and the West Face. Similarly, a large window was inserted to the ditch elevation of each casemate, replacing the original embrasures, and probably indicated schematically on the 1897 Citadel plan (PRO: WO/78/2426/6). These windows are wide, with segmental arches formed of three rows of headers, and widely-splayed reveals. The jambs have generally pinkish brick, in contrast to the yellow elsewhere, and the sills are rendered. The windows are not centred on the line of the ceramic pipe vents (one per casemate) which are set above them. The 1897 plan records a complement of 28 men in each casemate of the South-West Flank and South-West Face, 30 in the similarly proportioned West Flank and 26 in the shorter rooms of the West Face. The NCOs Latrines had been extended, the extension probably serving the NCOs and the remainder for other ranks.

By 1911, the accommodation was reduced to 28 men in each casemate of the South-West Flank and South-West Face, 30 in each of those of the West Flank and 26 in each of those of the West Face; both Cook Houses remained (HMPS: 402581). In 1929, the complements had been further reduced to 24, 25 and 22 respectively. One Cook House was subsumed in the 1911 Cook House (see below), while the other was converted to a Boiler and Drying Room in one bay and showers in the other (HMPS: 402582).

In 1913, the profiled bombproof layer above the casemates was substantially reduced in height and each of the vaults was pierced to take a lantern light (HMPS 402650; 402651; 402652). These were built of concrete, with steel sashes to all four sides (paired on the longer sides) and in the roof a '*Luxfer pavement light*'- a cast-iron grid set with thick, opaque glass (Fig 34). Today, several conform to the 1913 design and retain their pavement lights, though most of the windows, which in at least one case were timber fixed lights, have been blocked.

Small flat-roofed sanitary blocks added to several of the casemates are not apparent on the latest plan revisions, dated 1947, and therefore probably post-date military occupation (HMPS: 402582). On the West Face they were added to the north and south casemates, covering the original entrances. From this point the entrance to the central casemate served all three, via internal doorways. On the West Flank the north and central

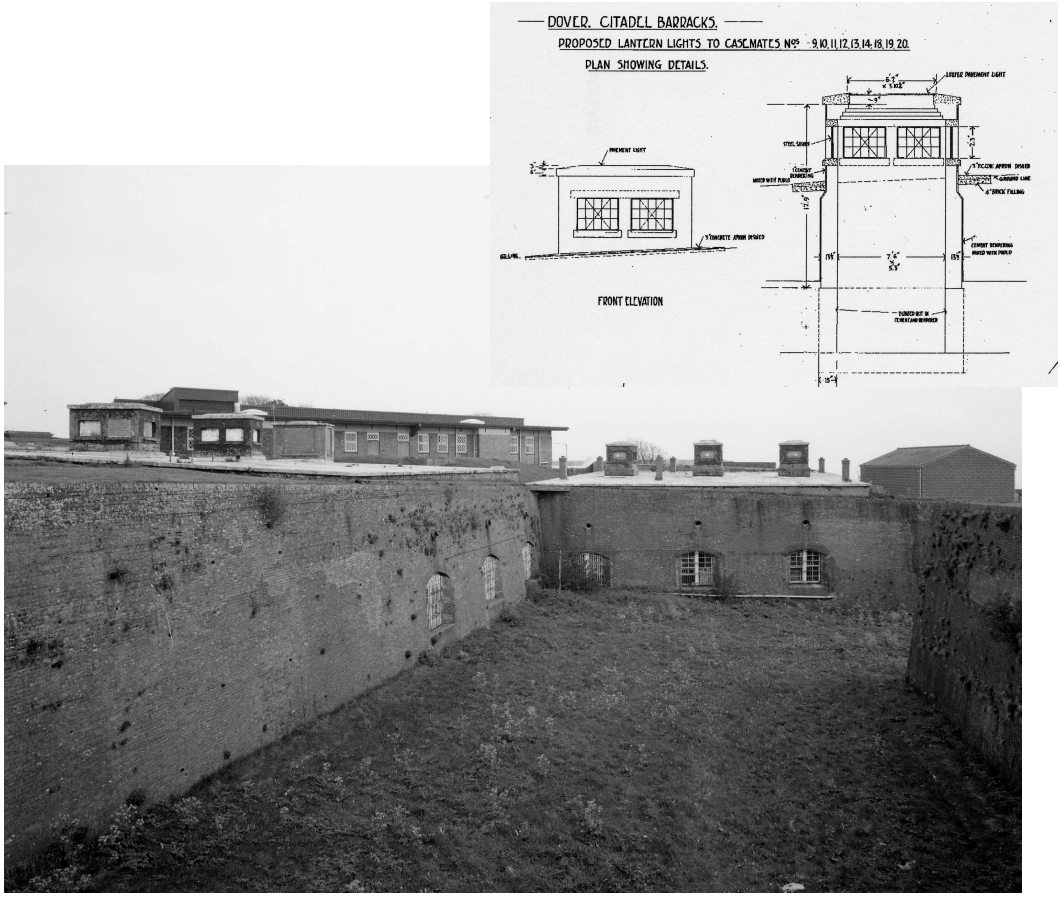

Figure 34
The South-West Face Casemates and the South-West Flank casemates, from the NW, showing the windows at ditch level (inserted into the former embrasures) and the lantern lights placed on the roof around 1913. The drawing shows the lanterns as proposed in 1913 (photo NMR: AA043990 © Crown copyright 1998, drawing 402652 © HMPS)

casemates had latrines added covering the entrances; the south casemate had a latrine covering the south window, later extended to cover the original entrance, at which point the north window was converted into a doorway.

HMPS has used the casemates for many purposes, mainly concerned with craft training.

The Casemated Gunrooms (Fig 15)

As the casemated barracks approached completion, from *c*1810 further casemated positions were begun, to cover the ditches on the north and east sides of the Citadel. These gunrooms, not intended for permanent occupation, were shorter and, being built back-to-earth in the rear, did not benefit from the through ventilation enjoyed by accommodation casemates with an external open area. They were left in varying stages of completion in 1816 but were finished and augmented between 1853-5 when, in addition to structures demonstrably planned during the Napoleonic War, further gunrooms were provided - in this case for small arms fire, not artillery.

The Gorge Casemates (Figs 15 & 35)

The design of these casemates evolved from a proposal drawing of 1809 showing a group of six casemates built under the counterscarp revetment of the gorge ditch, facing

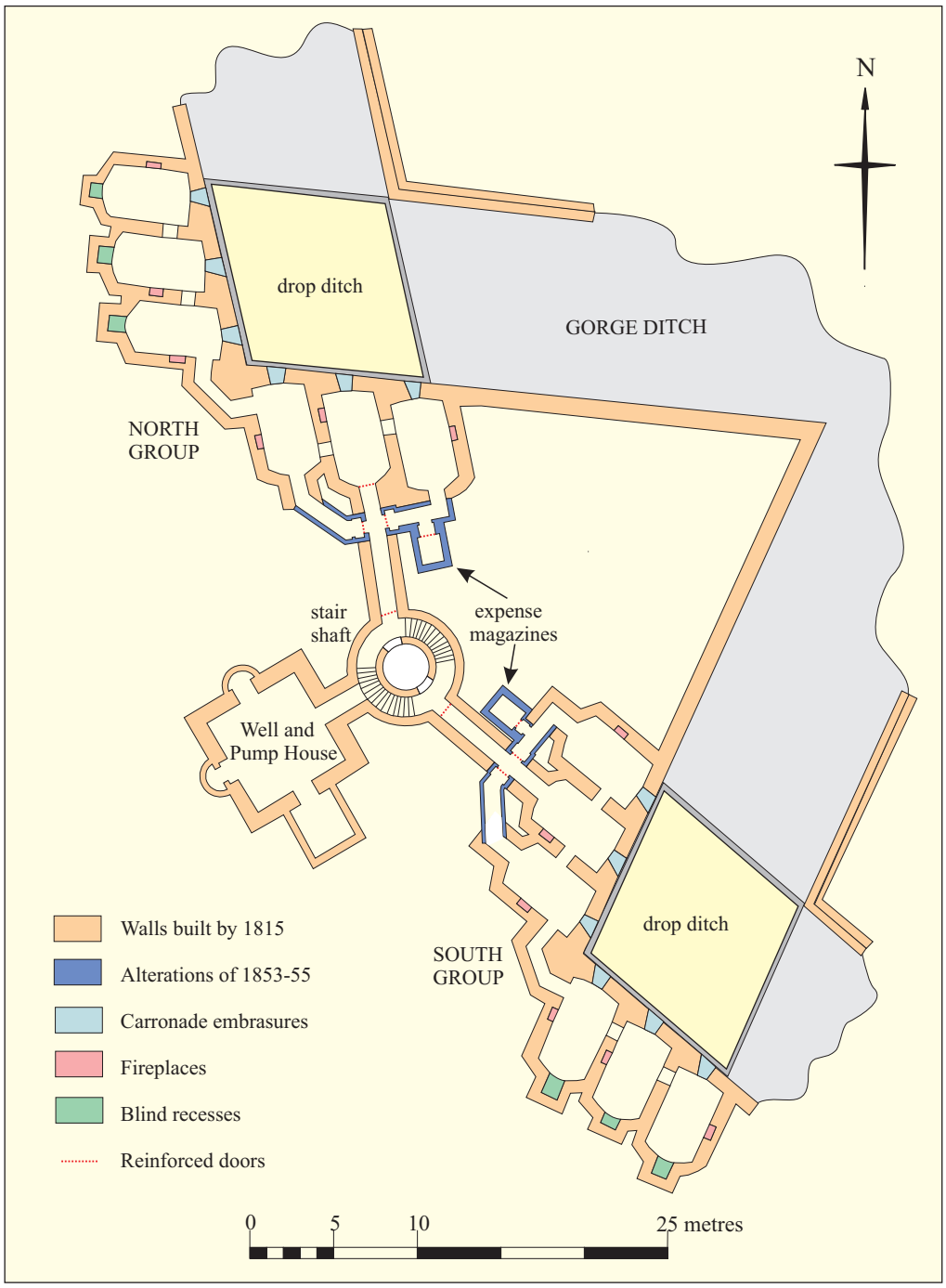

Figure 35
The Gorge Casemates in 1855 (after HMPS: 402516)

westwards towards the central redan (PRO: MPHH/1/228/1). This proposal was rejected in favour of another, in which the design of the casemates themselves was retained, but two groups of six were positioned instead under the scarp wall at the re-entrants of the redan. This scheme provided similar protection for the faces of the redan, while additionally giving flanking fire along the main lengths of the gorge ditch. Revetting the gorge ditch had commenced by 1810 and was substantially finished in 1811, by which time the casemates were probably well advanced (PRO: MR/1/1349; MPHH/1/506). However, it would appear that while the main gunrooms, and some connecting galleries, were finished, or all but finished, when work ceased in 1816, the supporting expense magazines and many of the galleries were not begun. Indeed, a plan dated 1855 suggests that the expense magazines and the short galleries linking them to individual casemates were not added until then (HMPS: 402516).

The Gorge Casemates comprise two groups of six gunrooms (here called the north and south groups), each group being further arranged in two sets of three. The inner set of each group covered the main lengths of the gorge ditch, while each outer set flanked the redan. They are reached from the *terreplein* by two stairs, descending in a single shaft to independent galleries serving the north and south groups respectively. Within each group, a short gallery connected each set of three. Construction of the whole complex is in brick with stone dressings.

The stair shaft is driven down through chalk bedrock and lined with brick. Within it, two independent stairs descend around a circular shaft, from which they were lit by borrowed lights. The brickwork is in Flemish bond and the stairs are of gritstone. Unlike the triple stair of the Grand Shaft, these stairs served different destinations, with one (of 39 steps) leading directly to the north group while the other (of 37 steps) served the south group and the Well House (later the Boiler and Pump Houses). Originally, like the Grand Shaft, the top of the shaft was left open and unprotected, with the stairs descending between the stone-coped walls of the shaft and light-well before passing into the galleries via brick segmental-arched doorways (see Pattison amd Williams 2001a).

The bottom of the shaft contains two doorways for each staircase. The first, opposite the foot of the each stair, is blocked but formerly led into the light-well for maintenance and also provided a direct route between the north and south groups without having to ascend to the surface first. It would also have allowed the occupants of both casemate groups to use one staircase if the other became blocked by enemy action. The second doorway from each staircase opened onto a gallery serving one of the two casemate groups. Both

galleries have segmental vaults closed by two sets of doors on pintle hinges: one set opened into the shaft and closed against a rebate in a stone lintel; the other set opened into tie-back recesses in the gallery. No doors survive. The provision of two sets of doors is a defensive measure, serving to delay an enemy who had taken possession of either the casemates or the *terreplein*. The galleries from the stair lead directly to the central casemate of the inner set in each group (Fig 36). Openings in the spine walls, without doors, allowed free movement between casemates. The two sets of each group of six are linked by a further gallery, opening off the long walls of the adjacent end casemates in each set. Again, provision was made for double doors that opened into tie-back recesses in the gallery. These galleries are lower than those around the stair shaft and are faced in English bond; the vault is semicircular, and there are heavy stone arched lintels at both ends. The constructional differences between these and the galleries radiating from the stair shaft may suggest phased work.

In each casemate there is a fireplace in the centre of one long wall and a carronade embrasure in the centre of the canted ditch wall (Figs 37-8). The lintel, sill and jambs of the embrasures are of gritstone, with the jambs splayed outwards at various angles depending on the arc of fire required. The embrasure could be closed by an internal shutter running in vertical guide rails from floor to vault on each side of the embrasure. Only the scars left by the removal of the rails, and a slot in the vault to accommodate the top of the raised shutter, now remain. Ventilation was via a ceramic pipe above the embrasure and there is evidence in several casemates that these could be regulated by a sliding iron shutter in a wooden frame. The floors are paved with brick.

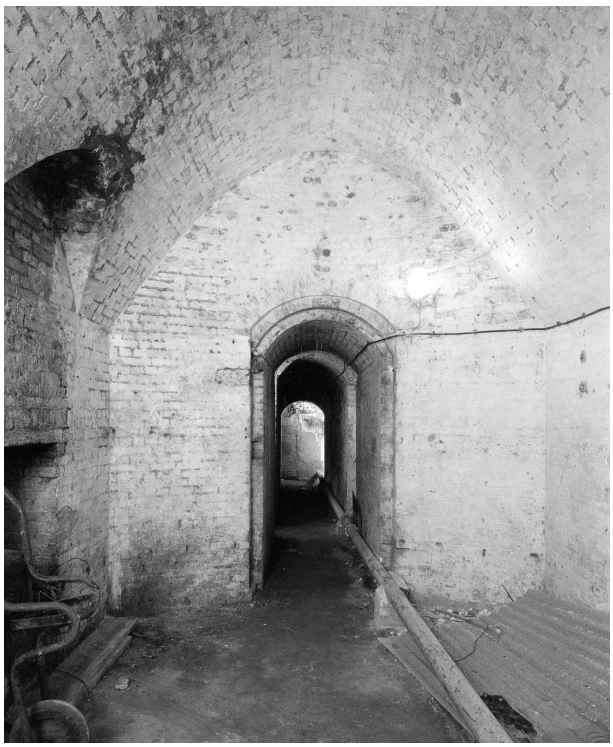

Figure 36
The Gorge Casemates; view through the central SE gunroom along the passage to the stair shaft (NMR: AA043934 © Crown copyright 1998)

The rear wall is concave in plan and built mainly in headers. In the two inner sets of casemates (closest to the stairs) a semicircular-arched doorway, rebated for a pair of

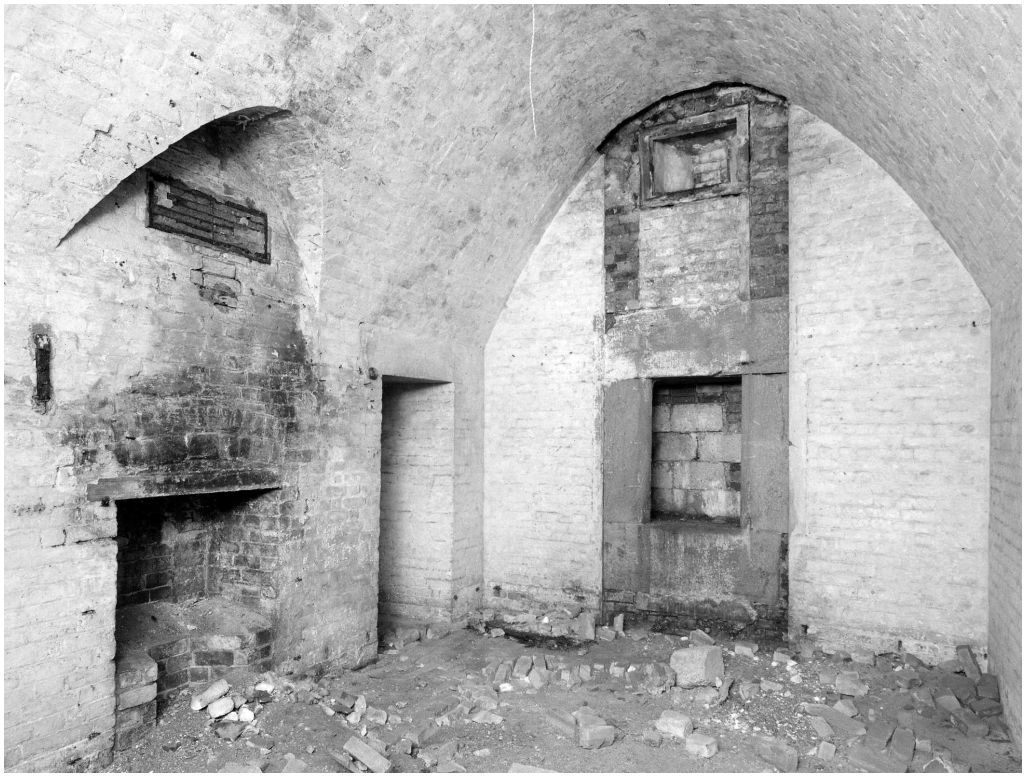

Figure 37
The Gorge Casemates; southern group, central casemate of the outer set, showing the blocked carronade embrasure and scar from the vertical sliding shutter in the ditch wall (at right), entrance (just left of centre) and fireplace (at left)(NMR: AA044007 © Crown copyright 1998)

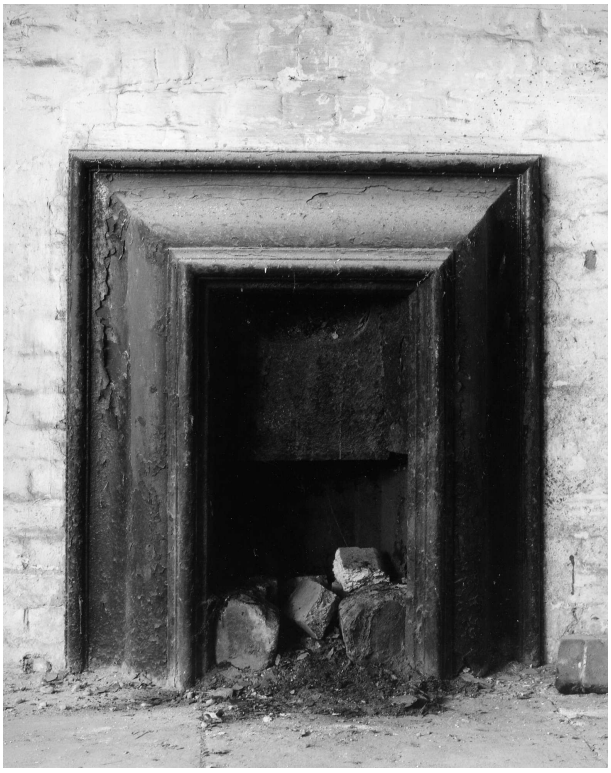

Figure 38
The Gorge Casemates; detail of cast iron fire surround (NMR: AA044009 © Crown copyright 1998)

inward-opening pintle-hung doors, occupies the centre of this wall, forming the principal entrance from the galleries. In the outer sets of three there is an opening in the same position but it gives onto a blind recess. There are two possible explanations for this variation. One is that it was intended to link all the casemates by galleries extending to the rear of each set of three, off which an expense magazine opened. This was subsequently adopted for the two inner sets. In this interpretation the recesses are built as the doorways to galleries as yet unbuilt. Another

Possibility is that the recesses formed stores for small quantities of powder, but this seems to be contradicted by the variation in the depth of the recesses.

The plan of 1855 enables an interpretation of the works carried out in the gorge casemates between 1853 and 1855 (Fig 35). The plan appears to be of the casemates as they existed by 1816, to which new details have been added in another and firmer hand. These include the addition of rear galleries, on the lines described above, to serve both inner sets of casemates, but not the outer sets. Each was associated with a single expense magazine serving all six casemates in one group. The rear galleries branch off those linking the casemates to the stair shaft, extending at right-angles in both directions. Block-bonded joints in the brickwork on the shaft side of the junction point to their later origin. In one direction the new gallery makes two angled turns to reach one end casemate. In the other the gallery continues in a straight line past the doorway to the expense magazine, then makes a right-angled turn into the casemate at the other end.

Access to the new galleries was controlled at the gallery leading from the stair by double-leaf doors, which opened inwards into tie-back recesses. Similar doors opened into the casemates at the various points of access. Surviving doors are pintle-hung and comprise an iron plate sandwiched between diagonal boarding on the outer face and vertical boarding on the casemate face, the components bonded together with iron studs standing proud of the boarding (Fig 39). A large iron pivoted locking-bar is provided on the casemate side, enabling troops to hold off an attacker who had gained the interior of the Citadel. In reality, the position of such defenders was hopeless unless a relief force was available, though re-taking the

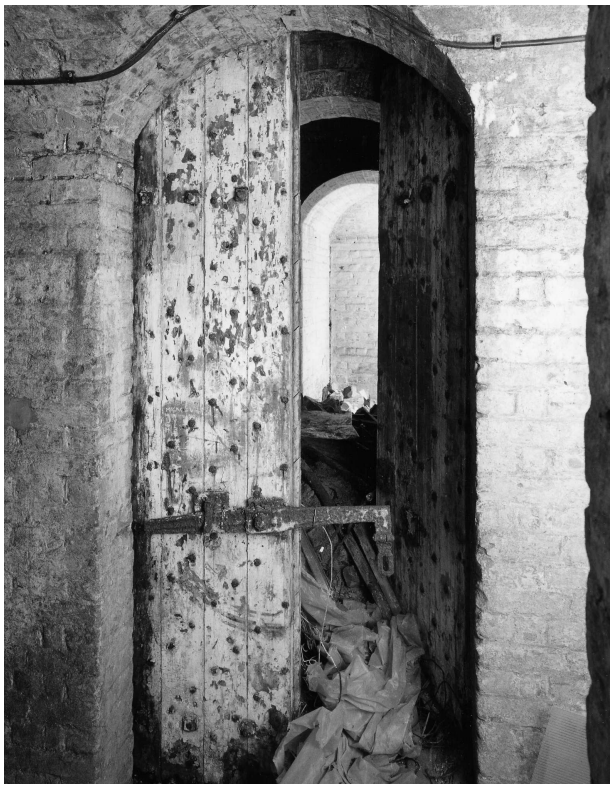

Figure 39
Gorge Casemates; detail of reinforced door, showing iron locking bar (NMR: AA043935 © Crown copyright 1998)

Main Gatehouse would have been easier if the Gorge Casemates were still in friendly hands.

The doorway opening off the new gallery to the expense magazine has a flat stone lintel, and the remains of a timber doorframe. The door leads to a short lobby with a roof of slate slabs. On each side of this lobby, two openings, rebated for a mesh grille, allow air into the cavity of a double brick skin around the magazine. The magazine is a barrel-vaulted chamber in which the rear wall contains ventilation slots and wooden plates either for the mounting of shelves or for a timber lining. Brick dwarf walls indicate the former existence of a suspended timber floor with further ventilation slots below.

In 1877 the two expense magazines were still in commission, each with a capacity of 36 barrels of gunpowder, implying that carronades were in position (PRO: WO/78/2755/1-2). However, by 1887, the guns had been withdrawn and were not replaced (PRO: WO/33/2775). In 1911, the inner sets of each group were in use as Company Stores; the rest were disused as, in all probability, they had been since the 1880s (HMPS: 402581). This is reflected in the condition of the outer sets where there is no evidence for adaptation to a new rôle, while, in contrast, those nearest the stair have the remains of suspended wooden floors and remains of, or scars from, shelf brackets. They also have hearthstones, flue-pipe openings, mountings for stoves, and, in some cases, one or both jambs of the embrasure removed to accommodate a window. This evidence suggests use as barracks, presumably prior to 1897 when they do not appear on the Citadel accommodation plan. This can only have been temporary as they were not designed for permanent occupation (PRO: WO/78/2426/6).

During the Second World War, the inner set of the northern casemates were adapted to provide a generator room, perhaps providing a back-up to the main Engine and Boiler Room of the Pump House, or serving the heavy AA battery just east of the Citadel. The central casemate contains the concrete base for a generator, with the date 1940 inscribed on it, and associated switch gear. The western casemate also contains switch gear, while the expense magazine was adapted to contain the diesel tank for the generator, with the supply pipe running back along the passages.

The North-West Bastion Casemates (Fig 40)

Four stair shafts descended from the Inner North-West Bastion to underground galleries. These independent shafts and galleries provided access to several groups of casemated

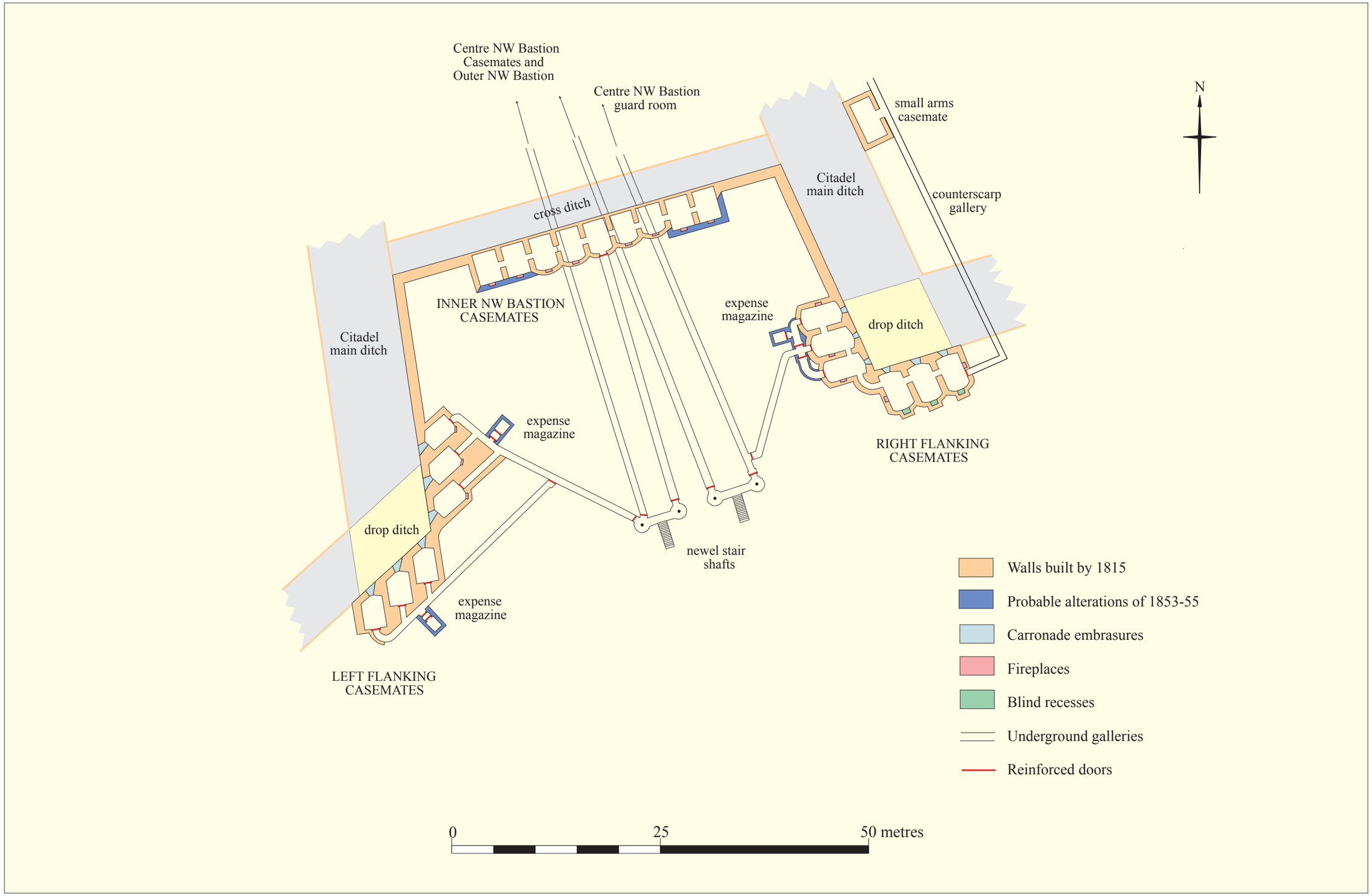

Figure 40 *Plan showing the Inner NW Bastion Casemates, Right Flanking Casemates and Left Flanking Casemates. Note that the fourth (eastern) expense magazine and gallery connecting the casemates to it, is illegible on the original plan (after HMPS 402513 and 402594)*

gunrooms that defended the ditches of the bastion. The building of independent galleries meant that an attacking force could not take the whole bastion if one part was captured. One gallery served the Inner North-West Bastion Casemates, a second led to the Centre North-West Bastion Casemates, a third communicated with the Left Flanking Casemates, while the fourth served the Right Flanking Casemates, the Counterscarp Gallery and Casemates, as well as the Guard Room of the Centre North-West Bastion.

Although the shafts are sealed, HMPS provided temporary access to the easternmost shaft. It is 2.34m (7ft 8in) in diameter with a central stone newel (Fig 41). The galleries leading from it are lined with brick in English bond, usually whitewashed, with paved brick or plain chalk floors. There are groined intersections to the segmental brick vaults and where stairs are necessary, they are formed in gritstone. Between each casemate or group of casemates there is a set of double-leaf doors, opening into tie-back recesses, that were intended to delay the progress of an enemy in possession of part of the bastion. Where they survive, as at the entrance to the gallery from the Counterscarp Casemates, they are strongly built, counter-boarded, with the casemate face armoured with 3mm iron plate. Each leaf incorporates a small loophole and each pair could be secured using a heavy, centrally pivoting iron strap. At intervals of seven to eight metres there are splayed lamp recesses in the gallery walls. These always have stone lintels and, in the gallery leading northwards from the Right Flanking Casemates, they have stone sills as well. Where the gallery slopes the lamp recess is also inclined.

Figure 41
Inner NW Bastion; base of a newel stair shaft linking to a gallery leading to Centre and Outer NW Bastions (NMR: AA043964 © Crown copyright 1998)

The first set of doors is placed at the base of the easternmost shaft after which the gallery extends northwards for about 47.6m (156ft 2in) before veering slightly east of north for a further 22.6m (74ft 2in) (Fig 40). It then turns northwards again for 6.1m (20ft), rising six steps to a quarter-landing, then a further 4.5m (14ft 9in) and seventeen steps westwards

(passing a small rock-cut opening on the north side) to emerge on the Centre North-West Bastion. This changes in alignment are marked by ragged joints in the brickwork, suggesting later modification, perhaps when the Guard Room was built.

Near the base of the shaft, a branch gallery opens to the east, at right-angles some 2.5-3.6m (8ft 2in-11ft 10in) north of the doors. After a single-leaf door, it immediately makes an angled turn north-eastwards, continuing for 16m (52ft 6in). With a curve to the east for 1.6m (5ft 3in), the gallery joins the magazine gallery of the Right Flanking Casemates. From these casemates, the Counterscarp Gallery extends eastwards.

The Inner North-West Bastion Casemates (Fig 40)

This row of casemated gunrooms, for small arms fire, is situated behind the scarp wall of the cross-ditch. Although not currently accessible, a mid 19th-century plan provides details (HMPS: 402513). The gallery opened onto the central casemate, from which doorways in the party walls gave access to another nine. These are contiguous and of two different forms; the central five have concave rear walls, a feature of most Napoleonic gun casemates on the Western Heights, and parabolic vaults. Additionally, the casemates are shown increasing gradually in depth from east to west. The remaining four casemates, which flank the central five in two groups of two, differ in having straight rear walls and one appears to be drawn over an earlier representation of a curved wall. This difference in form suggests two distinct phases of construction and may indicate that an original five casemates were expanded to nine as part of the works of 1853-5. If so, the later examples probably have segmental vaults.

In other respects the two types of casemate are similar; each has six splayed small arms loops in the scarp wall, divided equally by a short central projection or baffle. The communicating doorways are arranged *en enfilade*, a poor arrangement defensively, but one that reflects the fact these casemates, with their very small loops to the ditch, were practically impregnable except from the rear. On each rear wall except the central one, where the gallery enters, a central recess is probably a fireplace, as eight brick-built chimney stacks are visible on aerial photographs dating to 1945, protruding from the rampart (NMR: 106G/UK/944/6090-1).

The Right and Left Flanking Casemates (Fig 40)

These casemates, similar in design to those of the gorge, are constructed in the re-entrant angles where the ditches of the North-West Bastion met those of the Citadel proper; in each angle there was a group of six casemates arranged in two sets of three.

Both groups are absent from surveys of the Western Heights produced as late as 1811, but they were sufficiently far advanced (either in planning or in execution) to appear on a survey of 1813 (PRO: MR/1/1346). However, on this plan they are depicted like the casemated barracks on the west side of the Citadel, a form that they did not eventually take. It is likely, therefore, that they were among the last works to commence, to a different design than originally intended, and when funding ran out in 1816 were more or less incomplete.

An undated plan, stylistically similar to that of the Gorge Casemates drawn in 1855, refers to them as the '*Casemates at the North-West Face*'. It indicates that the western group of six was broadly similar to the eastern group, though enjoying different access arrangements (Fig 40; HMPS: 402513). Armament returns of 1887 and 1892 call them the '*Right and Left Flanking Galleries*'. In 1887 there were eleven 24-pdr carronades in these casemates, divided six in the Right Flanking Casemates and five in the Left - though a reduction to four in each group had been approved. This was effected by 1892, when a further reduction to two per group had been given approval (PRO: WO/33/2775). By 1902, all armament was withdrawn (PRO: WO/33/254).

The Right Flanking Casemates, comprising two sets of three, have sufficient variations within and between the two sets to suggest phased construction. All have the characteristic angled inner face to the ditch wall, and the concave segmental rear wall. The floors are flagged, except in the passages, which are paved with brick. The parabolic vaults incorporate a series of sub-vaults, chiefly for fireplaces, at which the groins are formed by angled cuts to the bricks. The walls are faced internally in Flemish bond and the carronade embrasures (all blocked) have gritstone surrounds, with rounded corners on the inside face. In the eastern set the two outer casemates have iron shutters fixed in place, but these are missing in the western set: in all cases the boxing for the shutter pulleys and counterweights has been removed. The surviving shutters incorporate two small arms loopholes for use (and observation) when the embrasure was closed (Fig 42). Above the embrasure there is a pipe vent, but unlike the casemated barracks, there are no vents in the crown of the vault. On one long wall of each casemate there is a fireplace, capped by a segmental brick arch on wrought-iron centring, below a gritstone lintel acting as a relieving arch.

The rebated, segmental-headed doorways in the centre of each rear wall, giving onto the gallery communicating with the expense magazine, were originally designed for a single-leaf door, for which hinge pintles were set in stone anchor blocks on one jamb

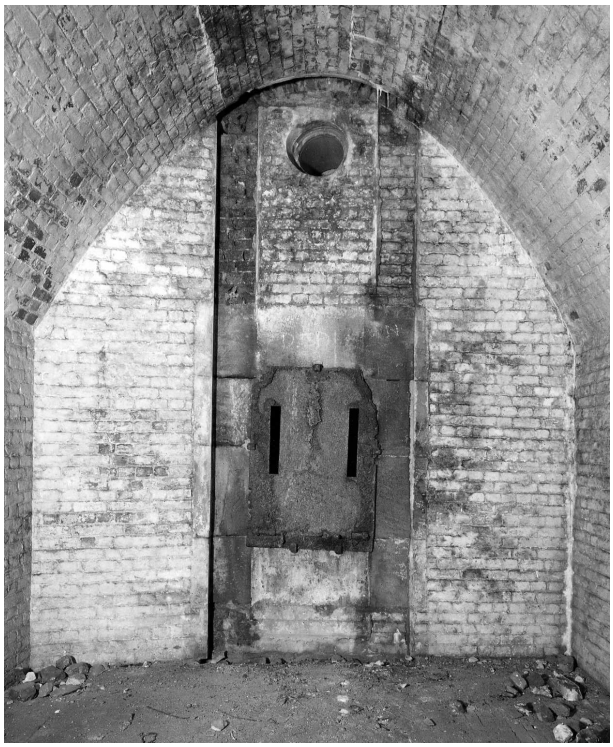

Figure 42
Inner NW Bastion; a gunroom in the Right Flanking Casemates. Detail of the ditch wall showing the scars from the original sliding shutter and its replacement, a small fixed steel shutter perforated with loops for small arms fire (NMR: AA043967 © Crown copyright 1998)

only. Subsequently a second set of pintles was driven into the opposite jamb and the present double-leaf doors were hung (Fig 43). This alteration seems to be contemporary with the construction of the gallery, suggesting that this followed the initial construction of the casemates. The doors are counterboarded with lapped and beaded boards, studded with nails and sandwiching 3mm iron sheets. The exception is in the central casemate of the western set, where double leaves have been attached to a single iron plate and therefore hung on one side only. By contrast, the doorways giving direct communication from one casemate to the next were left without a door (they are not rebated) and have segmental-arched heads formed from three joggled gritstone blocks.

A short gallery describing an irregular quadrant links the two sets of casemates, rising by three steps from east to west. At the west end this has a joggled segmental arch in gritstone, but at the other end there is a segmental brick arch awkwardly cutting into the springing of the casemate vault – perhaps another indication of phased construction.

Longer galleries, with quadrant turns at either end, link all three casemates in each set to the expense magazine. In the western set this is complicated by the junction with the gallery approaching from the stair shaft. This joins the magazine gallery directly opposite the entrance to the central casemate. A degree of security is afforded by a lobby there, contained to north and south by double-leaf doors opening into tie-back recesses.

The entrances to the expense magazines are off-centre in order to minimise the risk of a spark entering from one of the casemates. A small lobby opened off the gallery beneath a rectangular stone lintel. In the sides of the lobby were chamfered apertures, cut from a single piece of gritstone and incorporating a narrow rebate for a perforated screen (now

Figure 43
Inner NW Bastion; Right Flanking Casemates. Reinforced doors giving access from the casemates to the expense magazine corridor (NMR: AA043971 © Crown copyright 1998)

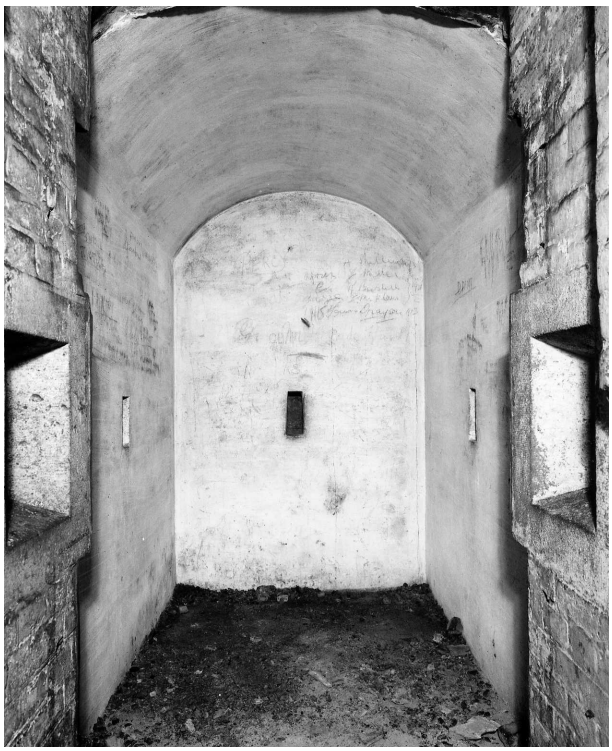

Figure 44
Inner NW Bastion; Right Flanking Casemates. Interior of an expense magazine, showing stone ventilators flanking the entrance and ventilation slots in the walls (NMR: AA043968 © Crown copyright 1998)

removed). These ventilated the magazine via a cavity in the double brick skin and also provided ventilation under the floor; the apertures inside the magazine are plain (Fig 44). The door was hung in the rebate on the inside face of the magazine. The magazine was rendered internally and had a suspended timber floor. The eastern magazine has a sign reading '*25 Expence Magazine*' next to the entrance.

It is likely that the undated plan of the casemates records work of the 1850s bringing to completion what was left unfinished in 1816 (HMPS: 402513). The expense magazines and the gallery linking them with the casemates appear to be drawn as additions to existing fabric, together with the accompanying double-leaf doors, and this seems generally consistent with the evidence for alteration, and for variations in flooring material. It is similar to what occurred at the same time in the Gorge Casemates.

At some time, the ventilation of the magazines was improved by the insertion of a new ventilation duct extending from

the gallery to one side of the magazine. At each end, tiers of glazed air bricks are set in the wall. These have a pattern of perforations associated elsewhere with work of the 1860s. Of the same or later date are several metal lamp brackets. Many of these are positioned above the fireplaces or to one side of the communicating doorways in the casemates, but they are also found in the Counterscarp Gallery Casemates (see below).

The rendered walls of the magazines attracted a considerable quantity of graffiti, some dating from the First World War and many from the 1930s (e.g. 'CPL EDMUND | ROYAL SCOTS | 15/3/34')

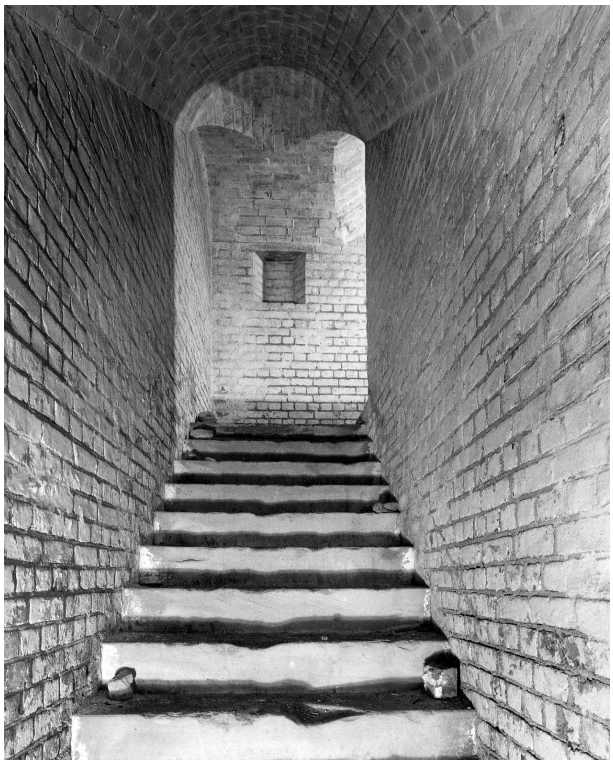

Figure 45
South end of the counterscarp gallery, showing steps up towards the Right Flanking Casemates in the Inner NW Bastion. Note the small lamp recess in the wall of the quarter landing (NMR: AA043977 © Crown copyright 1998)

The Left Flanking Casemates, also two sets of three, were inaccessible. The undated plan indicates that there were differences. First, the gallery from the stair shaft divided to give independent access to each set, thereby removing the need for separate magazine galleries. Second, there was no other means of communication within and between the casemates of each set. Third, the rear walls are straight, and not segmental on plan. Finally, in the eastern set only, fireplaces were positioned in one of the rear corners of each casemate, not in the long wall as elsewhere.

The Counterscarp Gallery and Casemates (Fig 46)

This gallery and its casemates, situated behind the east counterscarp of the North-West Bastion, formed part of the Napoleonic design, but construction did not take place until 1853-55 (PRO: WO/55/785). From the Right Flanking Casemates, a gallery descends twelve steps eastwards to a quarter-landing, then thirteen steps northwards to a 17.15m (56ft 3in) level section leading beneath the North Ditch (Fig 45). Off the east side, a ventilation shaft opens. The gallery then rises over a distance of about 21m (68ft 11in) to

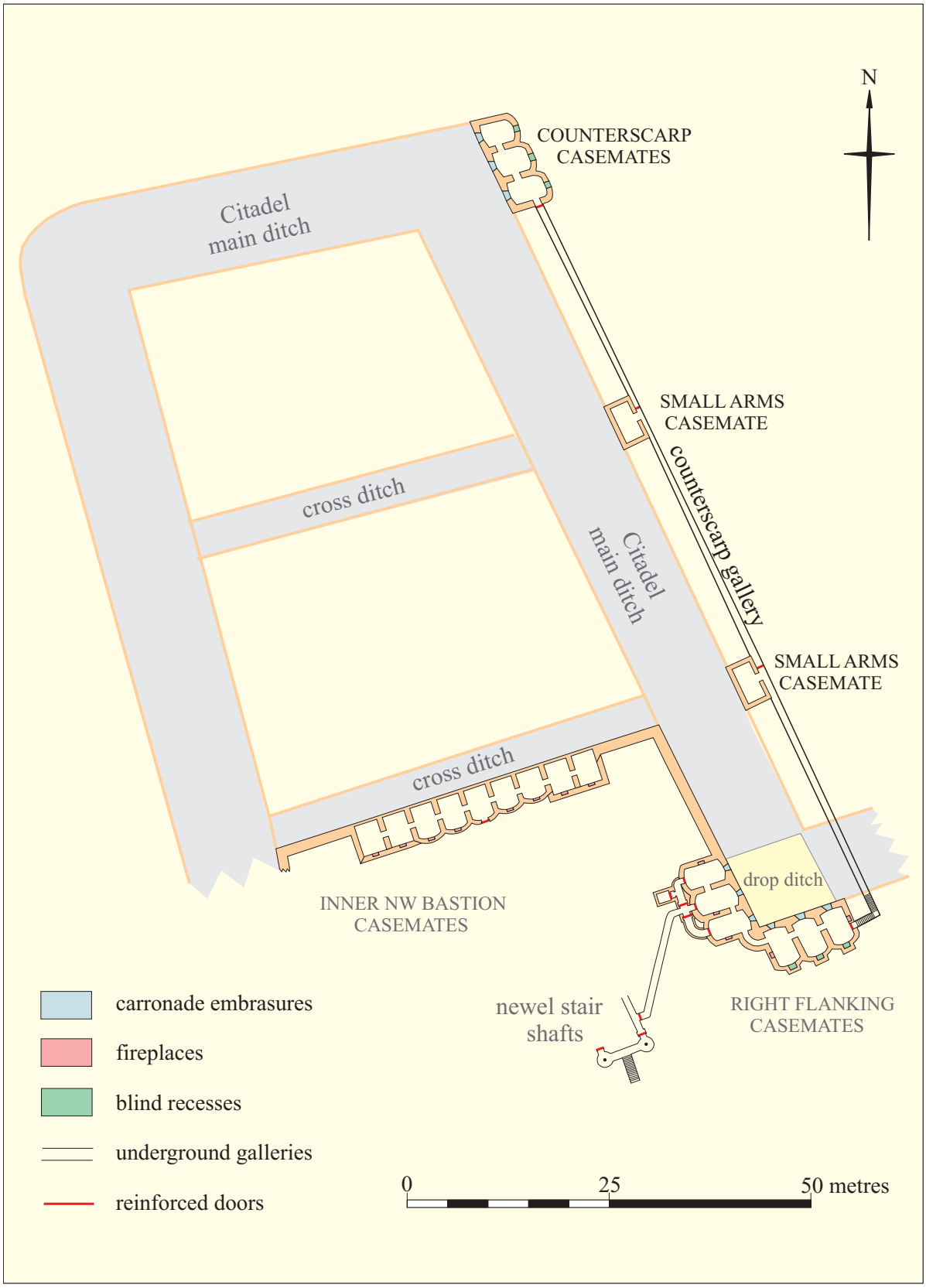

Figure 46
Plan showing the counterscarp gallery of the NW Bastion (after HMPS: 402513 and 402594; scale is approximate)

a short level section off which the southern casemated gunroom opens to the west. Then begins a long shallow descent - some 80m (*c*262 ft) in all - interrupted by a short level section at the second and identical casemated gunroom and incorporating slight westward shifts in alignment before terminating at the Counterscarp Casemates.

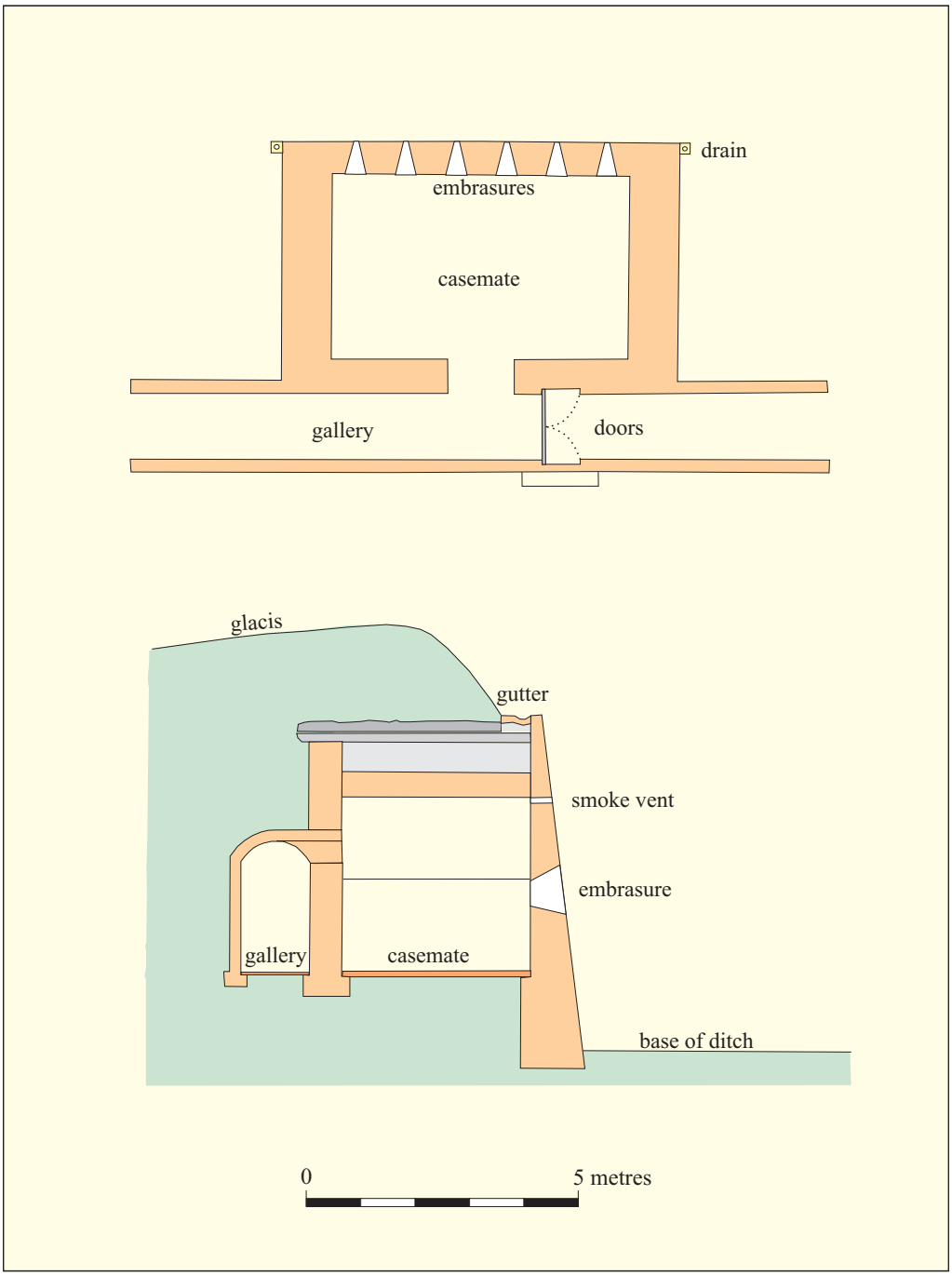

Figure 47
Plan (at top) and section of a casemated gunroom for small arms, built behind the counterscarp of the NW Bastion (after HMPS: 402509)

The two casemated gunrooms provided flanking fire with small arms along the cross ditches of the North-West Bastion. Their construction required the removal of lengths of the Napoleonic counterscarp revetment and the inserted walling is clearly demarcated by straight joints on the ditch face. It respects the batter of the revetment externally, but rises vertically inside, giving a tapered cross-section. Each casemate, which opened off the counterscarp gallery through an arched doorway (the doors were not fitted), is a rectangular chamber with a flagged floor and an axial segmental brick vault (Fig 47). Above the vault there were layers of concrete capped by asphalt. The ditch face contains six regularly spaced, splayed loopholes, now blocked, but without the baffles found in the cross-ditch casemates (Fig 48). Externally they have small stone lintels and sills, as have three smoke vents above them (also blocked). Internally the loopholes have massive gritstone lintels and sills. In cross-section they are splayed sharply towards the exterior to maximise the vertical field of fire. The smoke vents, which also have gritstone lintels internally, appear to incorporate baffles and do not utilise ceramic pipes as elsewhere. There are no fireplaces.

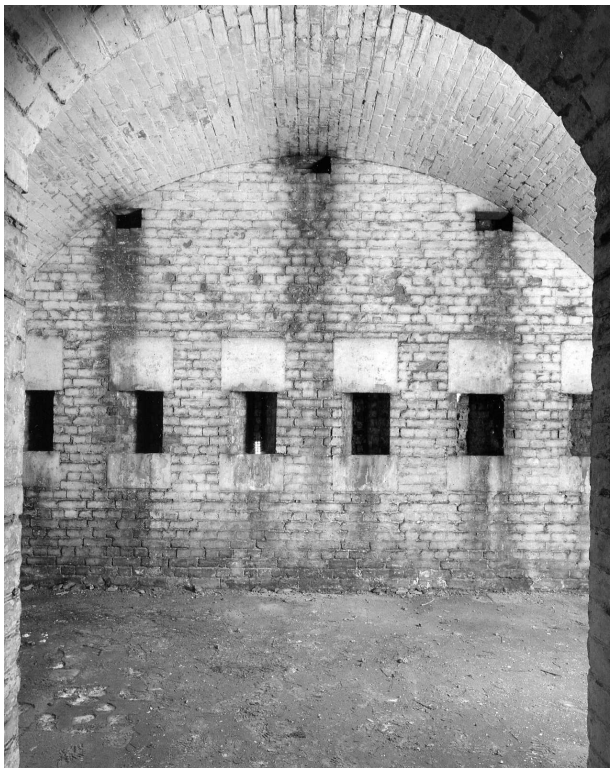

Figure 48
The NW Bastion Counterscarp Gallery; detail of casemated gunroom, showing six loopholes for small arms and three smoke vents above (NMR: AA043980 © Crown copyright 1998)

At the end of the gallery, three Counterscarp Casemates each contained a 24pdr carronade in 1887: only two remained in 1892, when a reduction to one had been approved (PRO: WO/33/2775). Despite being armed, the casemates were not completed, as revealed in each rear wall where a doorway opens blindly onto the natural chalk face in place of the communicating passages and expense magazine that were undoubtedly intended.

Otherwise, they are similar in form to the Right Flanking Casemates with slight differences as follows. The floors are of brick throughout and all three casemates retain their iron shutters, fixed in place, but as elsewhere the boxing for the counterweights has been removed. The rear walls have the same concave profile but the central doorways,

which have segmental heads, have more pronounced rebates and were to have single-leaf doors. The communicating doorways between the casemates differ in having rectangular stone lintels. Only the southern casemate incorporates a fireplace.

The Centre North-West Bastion Casemates

As in the Inner North-West Bastion, the casemated gunrooms which provided small arms fire from behind the cross ditch scarp revetment are longer accessible. No plan of them is available but the presence of seven chimney stacks on the rampart indicates that there were eight casemates, assuming the one where the gallery entered was unheated as in the group on the Inner North-West Bastion. The ruined stacks remain visible and are brick-built with a stone capping and twin elliptical flues. The loops in the ditch wall are blocked.

Figure 49 *Plan showing the Citadel c1998, with all remaining buildings (text in italics indicates the nomenclature of the fortress used from the later 19th century onwards)*

THE INTERNAL BUILDINGS (Fig 49)

The Napoleonic Temporary Barracks

Temporary hutment camps were a quick and inexpensive way of housing large numbers of soldiers while more permanent quarters were planned and built, and they were frequently resorted to during the Napoleonic Wars (Douet 1998, 82-3). Those in the Citadel were erected in 1805, according to a drawing prepared in 1817 (Fig 50; PRO: MPH/1/506). This drawing shows that the buildings occupied a central location and were of timber construction with the exception of the kitchens, which were of brick. An annotation records that '*The buildings are cover'd with Countess Slating*'. The core of the complex was formed by five Soldiers' Quarters, two of eight bays and three of four bays, which formed two interlinked courtyards. Each bay formed a barrack room intended for twenty men '*in double Births*', i.e. sleeping two to a bed, with heating from a fireplace set back-to-back with that of the next room. Placed within each courtyard was a Cooking Kitchen, the easterly one attached to a Canteen Yard and Cellar. No internal details are shown.

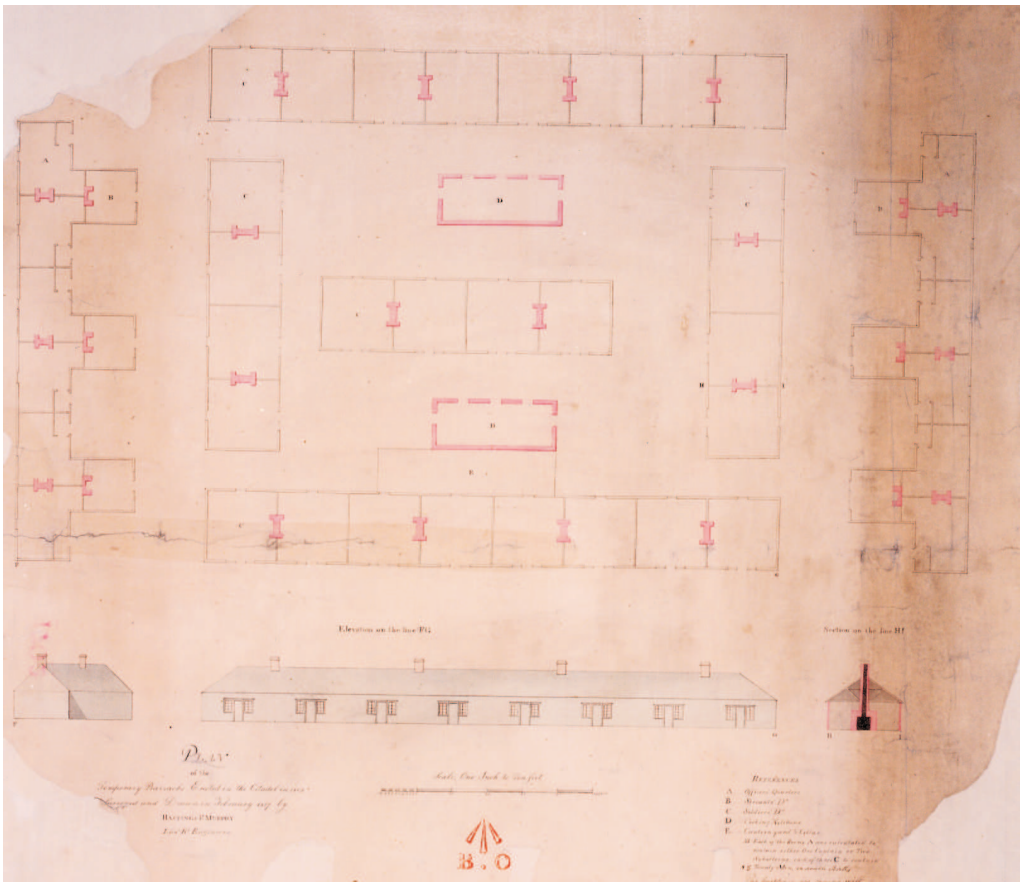

Figure 50
Plan of the Napoleonic Temporary Barracks in the Citadel, dated 1817. The large reectangular arrangement comprised the soldiers barracks and cooking kitchens, with separate officers' blocks on the east and west sides (north is at the top)(extract of MPH/1/506 © The Public Record Office)

North and south of the Soldiers' Quarters, and facing away from them, were two Officers' Quarters. Each consisted of six rooms for officers, with three rooms for their servants occupying the greater part of three rear ranges. The officers' rooms, designed for '*either One Captain or Two Subalterns*', each incorporated a lobby inside the entrance, which had the effect of screening one end of the room. At the opposite end, the room turned into the rear range for a short distance. Both spaces might facilitate the informal segregation of sleeping or eating space. North-west and south-west of the main complex, two small blocks may have contained Latrines.

Although the necessity for temporary barracks would have diminished as the casemates became available for occupation, their retention might suggest that the casemates were not all finished. There may also have been a need to retain them as long as war continued. With the advent of peace in 1815 the Citadel garrison was withdrawn, and the temporary buildings were dismantled, probably before 1821 and certainly by 1830 (PRO: WO/55/2461; 2562).

The Main Entrance and Guard Room (Fig 49)

The present Main Entrance replaced an earlier one which passed through the gorge rampart further to the north (it had been built during the American War and is shown on Lt Hay's plan of 1787 (Fig 4; PRO: MPHH/1/248/6)). A proposal plan, dated October 1809, shows the old entrance and a new one close to the present Main Entrance; both are simple revetted passages reached via bridges over the gorge ditch (PRO: MPHH/1/228/3). That work on this new entrance was started and abandoned before the end of the Napoleonic Wars is suggested by the labelling of a '*breach*' on a plan of 1813, and confirmed by a clear break in both rampart and ditch on another of 1830 (Fig 7; PRO: MR/1/1346; WO/55/2562/8). It was presumably this breach that was made good in works approved in March 1853 (PRO: WO/55/785). In 1858, a report describes a decaying timber hut as the guard house at the entrance to the Citadel, presumably the original entrance as shown in 1787 and still indicated as a bridge spanning the ditch on a survey of 1851 (PRO: WO/33/587; WO/55/2931).

As visible today, the Main Entrance was begun in the late 1850s on or close to the site of the earlier breach. It is depicted on the 1871 plan of the Citadel (PRO: WO/78/2755/12). A more complex drawing, though undated, is probably an original record drawing with subsequent additions (HMPS: 402550). It is a casemated and bombproof structure, built of yellowish grey stock brick in English bond, providing the only vehicular entrance to the Citadel. Set into the gorge rampart, it was originally approached across the gorge

Figure 51
The Citadel; Main Entrance and Guard Room casemates, viewed from the Parade Ground (NMR: AA043941 © Crown copyright 1998)

ditch on a bridge with a lifting span that closed against an outer gateway. This outer opening was protected by a pair of strong doors, which gave onto a vaulted tunnel through the rampart. The tunnel leads to an inner gateway with a second pair of doors. A gatehouse rose over the outer section of the tunnel, its east elevation carried up from the ditch scarp revetment, while from the inner, wider section of the tunnel, doorways in the north-west and south-east walls led into flanking casemates which together formed the Guard Room. These were built in the body of the rampart but presented an elaborate south-west elevation, incorporating the inner gateway, facing onto the Parade Ground (Fig 51).

The building has an irregular four-bay plan, of which a single bay forms the tunnel through the rampart to the outer gateway. The four-bay south-west elevation was originally flanked by westward projecting revetment walls, of which the northern example survives (Fig 51). The three southern bays form a symmetrical grouping, within which the narrower central bay, through which the tunnel passes, projects slightly and rises above the other two. The north-western bay is set apart by its lower eaves level, and does not extend as far back into the rampart. All four bays are articulated by large Gault brick semicircular arches of three chamfered orders. With the exception of the tall bay containing the tunnel these incorporate large semicircular-headed windows. In the bays flanking the tunnel these had two round-headed lights each, beneath an overall round head, in a style reminiscent of plate tracery, as on the Guard Room at North Entrance (Brown and Williams 2001). In the lower north-western bay the window took the form of a lunette; the sill has been dropped subsequently to match the others. All the fenestration has been renewed with modern casements. The whole elevation was crowned by an

elaborate brick eaves cornice, incorporating false brackets, machicolation and a cogged course, topped by a low parapet of bricks laid on end. On the tallest bay the upper courses of brick project beneath the cornice in the manner of a frieze. Below these there is a painted surround for a former circular feature, probably a clock.

The lifting bridge has been replaced by a fixed span since 1947, but some evidence survives for both its form and for the lifting mechanism. The record drawing shows that the bridge was carried by two pairs of columns, probably of cast iron, the masonry bases for which remain in the ditch bottom (HMPS: 402550). It also shows cross-bracing, presumably of wrought iron, between each pair of columns. The timber deck had iron balustrades. The south-western section, approximately one-quarter of the total span, could be raised by ropes or chains to close against the entrance in a rebate in the elevation. These and other details resemble those for the bridge at the South Entrance to the Western Heights, for which more detailed drawings, dated 1876, survive (Brown and Williams 2001, 35; NMR: WD/2316).

Large rectangular sandstone blocks set on either side of the roadway at the outer gateway appear to be mounting blocks for the bridge pivot. Rectangular iron slots placed on either side of the arched entrance contain pulley wheels for the lifting ropes or chains to pass over. Similar slots are found in the north-east faces of two small vaulted chambers opening off either side of the tunnel. These chambers, which are rebated for former doors, have been floored over, obscuring the pits for the counterpoise weights.

Figure 52
The Citadel; external elevation of the Main Entrance, from a photo taken in 1959 (© Dover Museum, ref A.5513/48)

The north-east elevation rises sheer from the ditch scarp revetment (Fig 52). Noticeably plainer than the entrances to the other gatehouses on the Western Heights - the North and South Entrances - it consists of a Gault brick segmental-arched opening of three plain orders, surmounted by an eaves cornice and a parapet with battered ends

reminiscent of the pylon form. Recessed within this arch is a narrower semicircular arch supporting the outer doors.

Off the tunnel opened the chambers containing the counterpoise weights. Where it meets the wider south-western portion of the bay, the vault rises and incorporates sub-vaulted recesses on either side, in order to accommodate the swings of the large, inward-opening double-leaf doors, giving traffic an unobstructed passage. Beyond the outer gateway the tunnel broadens to form a large, semicircular-vaulted chamber, capable of being used, as today, as the holding and inspection area for road traffic entering the Citadel. A second pair of doors closed the western end of the gateway, but these have been replaced by modern metal gates.

The inner gateway is flanked by segmental-vaulted casemates, two to the north-west and one to the south-east (Fig 51). These have been extensively modified internally, but incorporated a Guard Room, an Officers' Guard Room and Cells. The Guard Room occupied the casemate immediately to the north-west. It was entered directly from the gateway, which it also overlooked through a hatch. It was heated by a fireplace in the north-west wall, through which another led to the adjacent casemate. The stack rises through the bombproof layer. The north-westernmost casemate consisted of a two-cell Lock-up opening south-westwards off a passage which was lit by a small window set high in the north-east wall.

Two doorways led from the inner gateway into the south-eastern casemate, one into the Detention Room in the better-lit south-western half, and the other into a passage, from which three further cells, smaller than the others, opened to the north-east. Here the passage was lit from a light well off the south-east end, supplemented by borrowed light from the Detention Room. The door off the gateway is stoutly built with close boarding set with studs. The Detention Room, in which numbers of men might be kept, had a WC opening into a shallow projection on the south-west front, next to the window. This projection survives in what appears to be an altered form. The wall dividing the Detention Room from the passage incorporates recesses placed back-to-back, probably for stoves. This wall has been removed since 1947 to create a single room (HMPS 402582).

Backing onto the revetments which flanked the south-west elevation, and partially obscuring the outer arches, were two small flat-roofed blocks of different sizes (HMPS

402550; shown as additions to the original drawings). The smaller north-western block housed two WCs, while the south-eastern block served as Ablutions. The fact that they masked the arcading of the main elevation to different degrees suggests that they were later additions. They have been demolished since 1947 (HMPS 402582).

In 1911 the Officers' Guard Room was in use as a Serjeant's Bunk but by 1929 it was redesignated a Detention Room (Ordinary) and the Cells were termed Detention Rooms (Single) (HMPS: 402581; 402582). Under this system, the single rooms were probably reserved for more serious offenders, sentenced by the commanding officer to a few days' punishment, while the Ordinary Detention Room was for minor offenders such as those returning drunk to barracks.

The Main Magazine (Fig 49)

It is likely that the main magazine of the Napoleonic Citadel was intended to be on the recessed site later occupied by the Officers' Quarters, protected in the lea of the southern defences. A large building there, shown on contemporary plans, could have been a magazine, though no record of its function has been found (Figs 6-7; PRO: MR/1/1349; MPHH/1/506).

The need for a main magazine re-emerged with the completion and re-arming of the Citadel between 1853 and 1855, though there is no record of its construction then. However, it *was* present by 1859 when it was called the *'New Magazine'*, freestanding in a rectangular cutting, excavated in the moderate slope on the southern fringe of the Parade Ground, and lined by a vertical blast wall such that it only just projected above ground level. A lighting passage around the magazine was linked to a ramped passage along the north-east side leading up to ground level. A separate shifting room - a simple rectangular room with one entrance and a semi-circular vault - was built underground at the foot of the ramp.

The magazine was a strong structure with thick walls, particularly along the shorter north-west and south-east end walls (Fig 53). It had a flattish roof with a very slight pitch. The entrance lay in the south-east end, through a small rectangular porch into the first of two identical magazine chambers, the second entered through a doorway in the party wall aligned with the porch. Both chambers had cross-axial semi-circular vaults, the gap between these and the roof being taken up with bombproof material, probably sand. Each magazine contained wooden racks for the storage of gunpowder barrels and was lit by

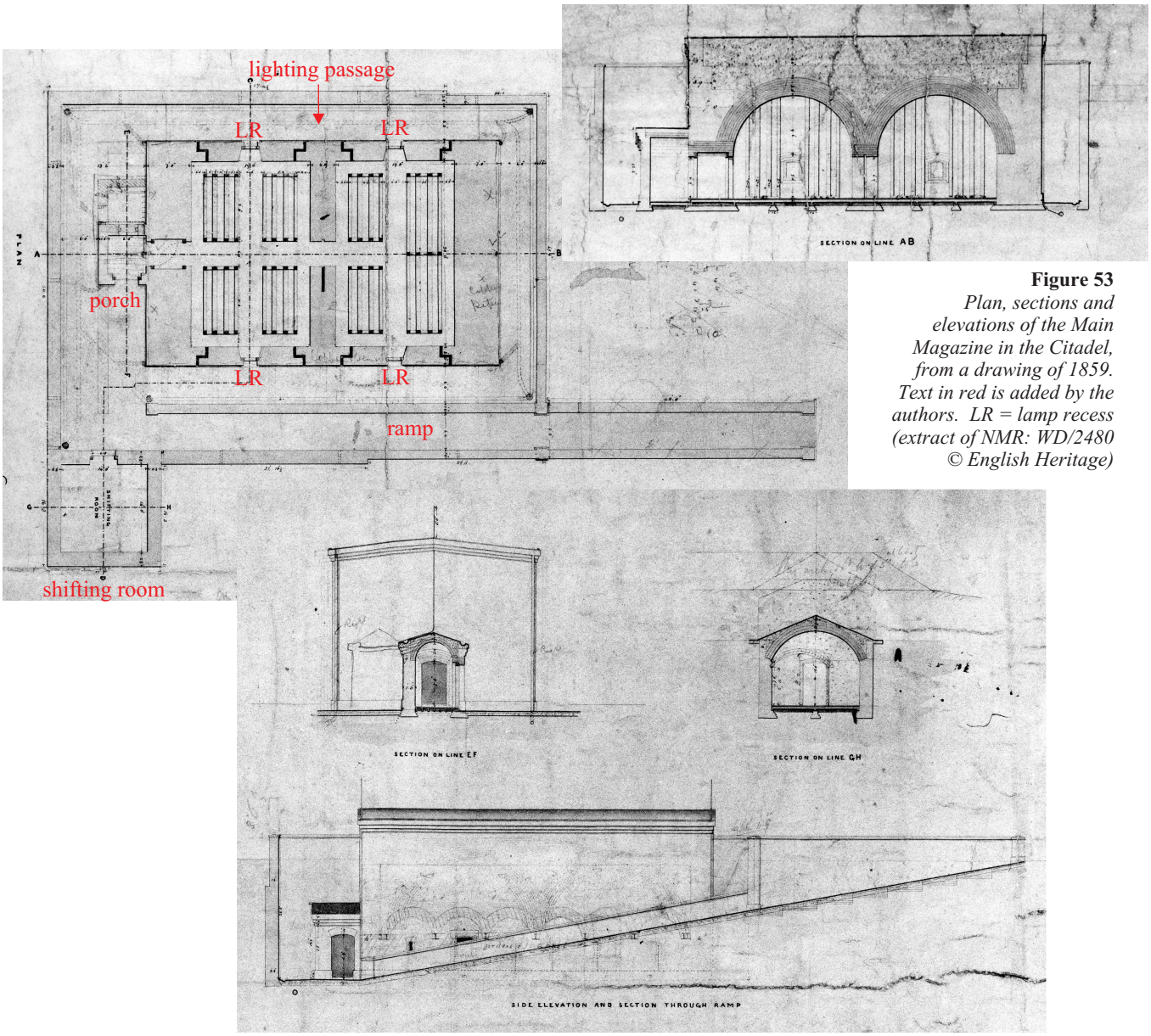

Figure 53
Plan, sections and elevations of the Main Magazine in the Citadel, from a drawing of 1859. Text in red is added by the authors. LR = lamp recess (extract of NMR: WD/2480 © English Heritage)

lamps set in two recesses accessible only from the lighting passage outside (NMR: WD/2480).

By June 1860, alterations had been made to the ramped approach by the closure of its northern end and its diversion by a right-angled turn into a new ramped section alongside the north-west wall of the cutting (NMR: WD/2481).

In 1877, the main magazine was designated by the letter "H" and could hold the enormous quantity of 1400 barrels of black powder (PRO: WO/78/2755/1-2).

In 1893, by which time a small room had been added on the south-west side of the porch, the structure of the magazine was deemed vulnerable to shellfire from seaward and it was quickly modified to provide extra bombproofing (Fig 54). The lighting passage and eastern section of the ramped passage were roofed over with timber boards and tarred canvas supported on railway sleepers, to give headroom of 8ft 6in (2.59m). The space above was filled with earth and the magazine roof asphalted before the whole structure was covered by a large profiled earthwork mound which projected up to 10ft (3.05m) over the original roof (NMR: WD/2482).

Further alterations were made, involving the removal of the bombproofing, because the structure appears with a pitched roof surrounded by an open passage in 1942 (NMR; HLA/549/6053).

The magazine was partially damaged and infilled as part of works by HMPS, although it may be reasonably well preserved underground.

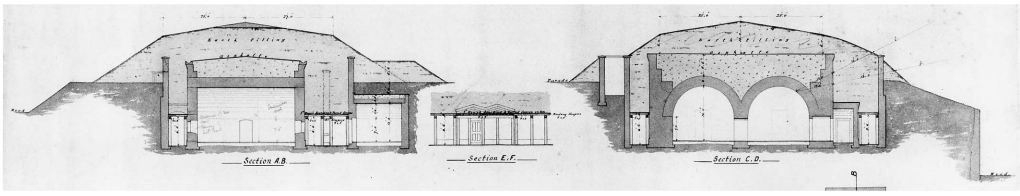

Figure 54
Sections through the Main Magazine in 1893, after extra bombproofing had been added (extract of NMR: WD/2482 © English Heritage)

The Well and Pump House (Figs 49 and 56)
The search for a secure water supply, capable of sustaining a garrison force, was an urgent tactical problem to which Major General Twiss directed his attention when work resumed on the Citadel in 1805. Soon after, Twiss was able to report to the Board of Ordnance that '*sinking the well in the Citadel ... we found water at the depth of 420ft ... which in my opinion will secure us about 25ft of water when the springs are at the lowest*'. This well was on the eastern edge of the Parade Ground, close to the temporary barracks erected in the same year. Twiss concluded his report as follows: '*I now recommend that the Board* [of Ordnance] *do immediately contract for a simple machine to work with three buckets in this well on the same principle as that I had constructed in the cliff casemate in Dover Castle*' (Coad & Lewis 171-2).

A well house was constructed and appears in outline, along with a smaller building to the north, on a plan of the Citadel dating from no later than 1809 (PRO: MPHH/1/228/3).

Later plans, dating from 1810, 1830 and 1851 give similar information, the 1851 plan labelling it as '*well*' (PRO: MR/1/1349; WO/55/2562/8; WO/55/2931). A more detailed representation of the building, on a plan of the Gorge Casemates dating to 1855, shows a large square underground chamber, marked '*Well*', off which a smaller rectangular chamber opens to the south (possibly a '*coal store*' but the labelling is practically illegible) (Fig 35; HMPS: 402516). Light entered through windows in the north and west walls, each served by a light well which is semicircular in plan. Access was from the same stair shaft serving the Gorge Casemates, via a short gallery leading to the east of the square chamber. No plant is indicated, but there was a steam engine here in 1858, probably a Cornish pumping engine.

In 1858, the Interim Report of the Barrack and Hospital Improvement Commission noted the inadequacy of the Citadel water supply - the *only* supply for the whole of the Western Heights because it was least likely to be compromised by enemy incursions. In particular, the '*steam engine is stated not to be of sufficient power to keep a constant supply, in consequence of the large amount of water wasted by the men*'. At that time, the proposed new works on the Heights must have threatened to overwhelm the existing supply system. As a palliative measure, the Commission recommended that '*Each ablution room and privy should be furnished with a separate cistern*', but the conclusion identified the water supply as '*The chief defect of the Western Heights Barracks*', and stated that '*either economies should be effected ... or a larger engine should be purchased*' (PRO: WO/33/587; 589; 591). Shortly afterwards a much larger Pump House was constructed over the existing well, to take a larger engine. It was probably completed in or around 1861, the date of the earliest surface water tank, or 1863, the date of a winch installed in the Engine Room.

The Pump House of the 1860s survives and comprises two large sunken chambers - an Engine Room and Boiler Room - with only *c*1 metre of brickwork visible above ground, where the end walls are carried up to twin gables with a cogged raking cornice (Fig 55). The Engine Room occupies the position of the earlier Well House but extends further south. Adjoining it to the west is the Boiler Room, which projects slightly further to the north. Both chambers have segmental brick vaults, covered in concrete laid to shallow pitches (giving a central valley over the spine wall) and topped with a layer of asphalt. The roofs have been stripped of their bombproof layer of earth, leaving a ventilator exposed above the Engine Room vault.

Figure 55
The 1860s Well and Pump House, from the south. The gables of the sunken Engine Room (centre) and Boiler Houses (right) are just visible. The flat concrete roof over the lobed walls of the light wells was installed sometime between 1930 and 1945. The water tank dates to 1891 (NMR: AA043943 © Crown copyright 1998)

A slight discrepancy between the 1855 plan and one of 1930 suggests that the access from the stair shaft may have been realigned as part of the 1860s work, but the doorway looks undisturbed (HMPS: unref). It now opens onto a small light well, with the Engine House entrance opposite beneath a cogged eaves cornice. The fan-lit entrance, and a window to its north, both have semicircular heads and chamfered frames. The door has flush-beaded panels.

Both chambers were lit by a series of glazed timber screens and windows looking out onto apsidal light wells, giving an unusual lobed appearance to the plan (Fig 56). The Boiler Room was well lit by these light wells, with screens to north (removed) and south, and three lunettes beneath sub-vaults to the west. The western light wells were inter-linked by segmental-headed doorways, and could be entered, for maintenance purposes, from doorways at either end of the west wall. The Engine Room was lit rather less generously, but has a screen to the north and across the western half of the south end. A wide communicating doorway has been reduced in size with inserted blockwork. Iron gas-lamp brackets, cast in a 'stiff-leaf' form, are mounted on the walls. In the northern light well there is a tall, slender, freestanding structure, of tongued-and-grooved planks under a lead-covered gabled roof. It is not marked on the 1930 drawing and its function is not known.

The Engine Room is spanned transversely by a heavy I-section wrought-iron beam of riveted construction, positioned over the well head (Fig 57). This supports an axial beam, similar in form but of lighter scantling, the other end of which is lodged in the south wall and from which a pulley wheel is suspended. This would have been used to install and

Figure 56 *Plan showing the1860s Well and Pump House*

Figure 57
The Engine Room, showing the lifting beam and light well partition (NMR: AA044020 © Crown copyright 1998)

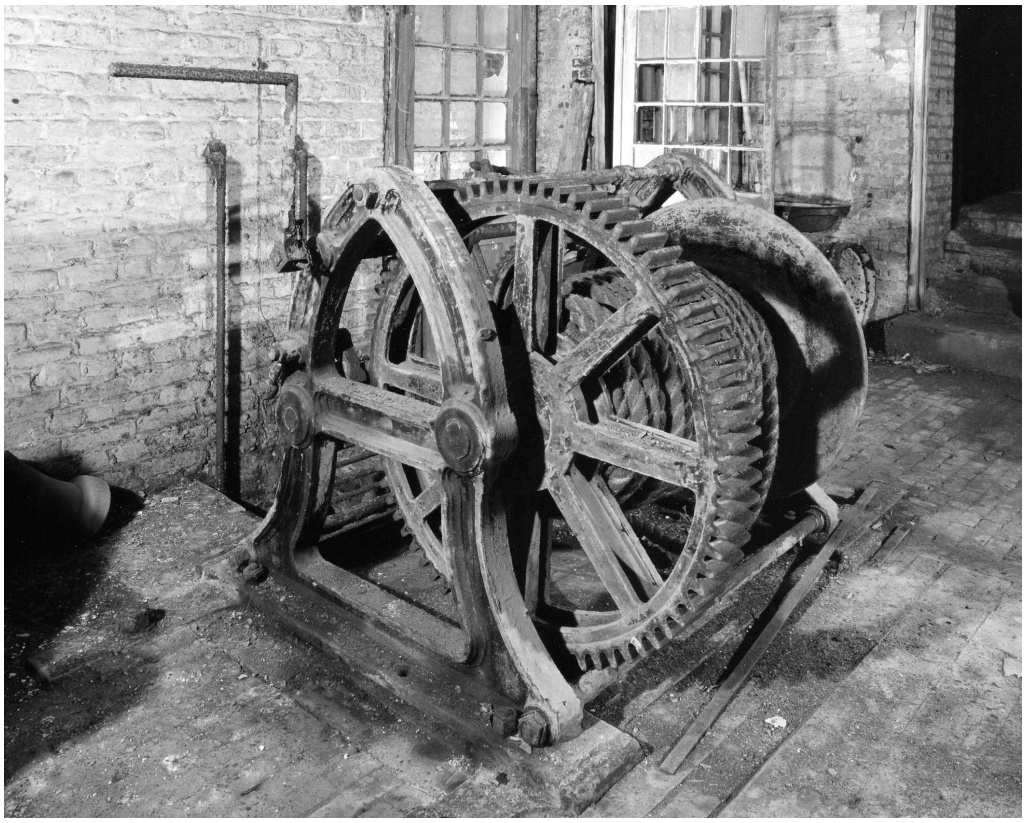

Figure 58
Hand-operated winch in the Engine Room (AA044013 © Crown copyright 1998)

remove heavy items of plant. There is also a lifting ring in the crown of the vault at the northern end. These appear to have been used in conjunction with a hand-operated winch (Fig 58), located at the south end of the chamber and bearing the name of the maker: '—[illegible] HICK & SON C & M [constructed & manufactured?] BOLTON 1863'. A painted sign reads 'TESTED 10.3.[19]59 SWL [safe weight laden] 1 TON'. It appears that maintenance of heavy pumping machinery in the well was also envisaged as stages of cast-iron lattice are set into the side of the well with connecting ladders. The 1930 plan shows that they allow a person to descend to the spring at the bottom of the well shaft.

Beneath floor level there is an elongated pit extending southwards from the well shaft. This appears to have formed the bed for the steam engine, and incorporates a raised base towards the southern end - possibly a cylinder base. It narrows towards the shaft, where there are some massive gritstone blocks. The shaft is capped by a grid of iron joists over which lie iron plates with fish-bellied ribs to the underside. North of the well shaft, still below floor level, there is a barrel-vaulted chamber.

Two masonry bases in the north-west corner are for either a Steam Booster Pump or a Centrifugal Booster Pump, both indicated on the 1930 plan. The plan shows that they were used for circulating water between the two underground storage tanks to the west. The base for the steam booster pump is identifiable by a cut-out in its west side for a small fly-wheel. A cylindrical tank mounted on scrolled brackets on the wall above these bases may also be part of the pumps. The small size of the bases suggests that this plant may date from the end of the 19th century or later, when compact engines were widely available.

The Boiler Room contained two boilers in 1930, and this probably reflects the original arrangement. They were served by a large stack positioned in the northern light well. Although the boilers have been removed, the footings for a wall supporting them at the fire-box (south) end are still visible. The boilers were placed so as to leave unobstructed access, via the southernmost light-well on the west side, to a Coal Store, which opened beyond. The store has been partially infilled or demolished; the remainder was still full of coal in 1998, as were the adjacent light wells. A square-section brick-lined shaft close to the south-east corner of the Boiler Room may be part of the route for the steam supply to the pumping machinery.

To the west and north-west of the Pump House there were two underground tanks, numbered 1 and 2 respectively. No 1, to the west, was the first to be built and according to the 1930 plan, it had a capacity of 46,660 gallons. No 2 was constructed at some time between 1871 and 1930, and held 47,592 gallons. These were supplemented at the Citadel by much smaller 'high-level' tanks on the surface, the earliest of which is dated 1861 (see below).

A small Pump House, roughly square on plan with a doorway onto a small area on the east side, was built over an air shaft alongside the well, immediately north of the Engine Room light well. A structure in this position is indicated as early as the 1880s, though the present building appears to be later (HMPS: 402594). It is annotated '*Electric Pump House*' in 1929 (HMPS 402582) and has brick walls and a modern-looking flat roof (perhaps concealing earlier concrete). It appears to be the only part of the complex still in regular use.

The walls of the light wells have been raised by seven courses of brickwork (including two courses incorporating ventilation holes) and then roofed with a 30cm layer of reinforced concrete (Fig 55). The quality of the bricks and concrete suggest that this work dates to the Second World War. It was done after 1930 and before October 1945 when an aerial photograph shows both casemates and the light wells beneath a single earth mound (NMR: 1066/UK944/6091).

The Water Tanks (Fig 49)

Three small 'high-level' water tanks are located on the surface, one by the Pump House and two on the *terreplein* above the West Postern Gate. Tanks at this level would be required to maintain an adequate head of water to supply surface buildings. The completion of the Citadel during the 1850s and 1860s explains the earliest high-level tank, dated 1861. Others followed in 1891 and 1901, also periods of rapid expansion of surface facilities. All the tanks are constructed from cast-iron flanged panels bolted together.

The 1861 tank is the more northerly of the two above the West Postern Gate (Fig 59). The maker's plate reads: 'Wm GRAHAM & SONS | TRIG LANE, UPPER THAMES S^{t} | LONDON | C & M | 1861'. It is hexagonal and sits on a brick base in English bond and currently has a shallow pitched wood and felt roof. The adjacent tank is of similar construction but has a maker's plate dated 1901. The full legend reads: 'DOUGLASS .

Figure 59
Twin water tanks set into the western rampart of the Citadel , erected in 1861 (nearest) and 1901 respectively (NMR: AA043942 © Crown copyright 1998)

BROS . L^{D} | BLAYDON . ON . TYNE | C & M . 1901'. In 1929, the 1861 tank is shown as connected to the 5-inch water main leading from the maze of plumbing linking the two underground water tanks to the Pump House. The 1901 tank is connected to a spur from the same main, suggesting it was built to augment the 1861 tank. Each had a capacity of 9,392 gallons (HMPS 402582).

The water tank beside the Pump House is slightly larger than the other two tanks, with a capacity of 9,568 gallons. It has a more elaborate hexagonal base of hard red brick laid in English bond on a stepped plinth, with darker red brick forming the angles. The openings have basket arches in gauged brick, linked by a continuous roll moulding, and the windows have sills formed from two courses of bull-nosed blue brick. A similar moulding forms the base of a frieze which incorporates, above the entrance, a terra-cotta plaque (identical to those on the Hut Barracks of the Western Outworks: see below) bearing Queen Victoria's cipher and the date 1891. Stepped and cogged brick courses form a cornice at the base of the tank, which does not have a maker's plate visible.

This tank is labelled Tank Ho[use] in 1911 and is shown to be connected to the underground Tank No 1 outside the Pump House (HMPS 402581). The provision of a door and windows in the base suggests that machinery such as a pump or valves needing regular maintenance or adjustment were installed.

The Officers' Quarters (Figs 49, 65-6)

The Officers' Quarters, at the time of survey utilised as the Administration Block of HMYOI Dover, occupies a sunken area on the south-east side of the Citadel, parallel to the *tenaille*. The excavation of the site began in the Napoleonic phase, and two large buildings are shown here on a plan of 1810 (PRO: MR/1349). These were removed after 1815. Subsequently, around 1860, the sunken area was enlarged to east and west in advance of construction of the Officers' Quarters. The building was probably completed in 1861, the date which appears on the royal coat of arms above the central north entrance, as well as cast on to the bases of a series of iron lamp standards around the building.

The building is reached from the Parade Ground and the Main Gatehouse via a short road leading to a stair, which descends in front of the principal entrance. Twin ramps, diverging from the head of the stair and descending to either end of the sunken area, were provided for horses and wheeled traffic.

The lack of suitable quarters for officers was recognised in 1853, when proposals were made to complete and re-arm the Citadel. At that time, temporary provision was made for officers in some of the existing casemates (PRO: WO/55/785). The need for something better was highlighted by the Barrack and Hospital Improvement Commission, whose Interim Report on the Western Heights defences in 1858, noted that '*Up to the present time no Officers' Quarters nor accommodation for headquarters of a regiment have been provided*' (PRO: WO/33/587; 589; 591). In seeking to remedy this deficiency, attention would also have been paid to recent reports on permanent accommodation in the Army. The *Barracks Accommodation Report* of 1855 had urged the greater segregation of different ranks, who had hitherto often been housed in different parts of the same building (Douet 1998, 128-9). The Royal Commission, appointed by Palmerston in 1857 to investigate Army Sanitation, concerned itself mainly with accommodation for other ranks, where the worst excesses were to be found, but its findings concentrated attention on the wider need for adequate sanitation and ventilation (*ibid*, 139).

Although the Officers' Quarters has been attributed to Major Jervois, the attribution needs to be qualified (Douet 1998, 158-9). Defences in the Channel Islands, designed by Jervois from 1853 onwards, located secure barracks buildings, intended as a '*keep of last resort*', in the gorge. Although not in the gorge, the Officers' Quarters at the Citadel have similar characteristics (*ibid*, 158). However, Jervois delegated the works at Dover to Captain du Cane, who probably played the major part in detailed design and construction.

Figure 60
The Officers' Quarters, south elevation (NMR: BB032722 © Crown copyright 1998)

Plans and drawings of the principal elevations survive, dated 1859, together with detail drawings of a number of internal features (detailed below).

The following account is based on a rapid assessment during which some rooms were not available for inspection. Much information has been derived from the contemporary drawings but the interpretation of these, available only in the form of rather poor microfilm copies, poses certain difficulties; some annotations are irrecoverable and they occur in two forms. Room names in bold capitals are in character with the titling of the drawings and appear to be original. These are mostly clearly legible. Smaller features are annotated in lower-case cursive letters, still bold, and are probably also original, but few can be interpreted with certainty. Others, in a much fainter cursive script, are nearly all illegible, but represent later amendments. The interpretation below follows the bold annotations unless stated otherwise, and uses initial capitals to distinguish room names (and some other features) verified in this way. Doubtful readings are indicated by a question mark in brackets.

The exterior

The building, in a Tudor Gothic style, has an elongated cruciform plan, the principal axis lying roughly north-east to south-west – here treated as east-west – with short central projections, or porches, to north and south (Fig 60). It consists of two storeys set over a basement and beneath what was formerly a bombproof roof capable of being used as a fighting platform. It is the only Citadel building to be distinguished by the use of red

brick as its principal facing material. The brickwork is laid in English bond, with limestone dressings (mostly concealed by stucco repairs), including door and window surrounds, the moulded top course of the plinth, and the corbelled eaves, from which the stone-coped brick parapet rises. The heavily fortified and buttressed ends of the building, however, which are comparable in detailing to the contemporary *caponiers* at Drop Redoubt and Detached Bastion, have more durable gritstone masonry and are divided into three by pointed buttresses incorporating shouldered set-backs (Brown *et al* 2001, Pattison 2001). Similar pointed buttresses flank the entrances in the north and south porches, which have flush stone quoins to the corners.

The building consists of fifteen bays, all of similar length with the exception of the seventh bay from the west, which is longer. This bay does not correspond to the centrally placed north and south porches, but is one bay to the west of them, and is distinguished externally by the presence of twin ground-floor windows and a large four-light first-floor window on each elevation. The four-light windows identify the position of the Mess Room, which extends across the full depth of the building and lies above the Mess Kitchen and associated rooms. Two asymmetrically placed stair bays, four from the west and five from the east, are distinguished on both elevations by canted oriel windows on the first floor, beneath which entrances are located. Elsewhere each bay generally has a two-light mullioned window on each floor, the basement and ground-floor windows having square heads, while the first-floor windows have four-centred heads to each light beneath overall four-centred arches. Most of the openings are set in moulded surrounds consisting of a series of chamfers and a deep cavetto, but the oriels and the side-lights flanking the entrances have a simpler double-chamfer moulding. Windows of two or more lights are stone-mullioned, while the oriels also incorporate transoms. A number retain hornless sashes which are probably original. The normal fenestration pattern is varied in a number of places at ground-floor and basement level. Narrow single lights flank entrances and, at basement level, the stairs rising to them, while windows of two unequal lights respect asymmetrical internal divisions in a number of bays. In addition, on the north side of the westernmost bay there is a single-light window, the variation resulting from an adjacent small arms loop. The return walls of the two porches have square-headed single lights on the ground floor, and square-headed small arms loops, singly or in pairs, in a variety of positions, the majority at first-floor level. The loops have splayed reveals.

The principal front was on the south side (Fig 60). Here the eaves decoration is much more elaborate than on the north elevation, reflecting the fact that the upper part was

visible from outside the Citadel. It takes the form of three tiers of decorative machicolation, whereas on the north and end walls a single row of large square brackets is employed. The brick parapet is taller on the south elevation and has alternating deep and shallow stone copings, giving a castellated profile to the brickwork. On the north elevation this treatment is reserved for the porch parapet. The principal entrances were also in the south elevation, though entrances in the same positions to the north may have been more commonly used given the building's situation. Those in the central bay, occupying the north and south porches, provided access principally to the Mess Room. They were originally both recessed behind a wide four-centred arch springing from moulded corbels, but were differentiated by the fact that the north entrance was placed asymmetrically to accommodate a segmental-headed small arms loop alongside. This difference was swept away when the north entrance was remodelled in 1928. The two entrance bays also differed on the first floor: to the south there is a window with a hood mould, while to the north the royal coat of arms (with 'V 1861 R.' in raised characters) is set above two segmental-headed small arms loops covering the north approach.

Further entrances, with double-chamfered surrounds, occupied the two oriel bays and gave access to rooms allocated to individual officers and their servants. The entrances were equipped with cast-iron boot-scrapers consisting of clustered shafts with moulded bases and caps, the latter linked by a four-centred arched scraper. The south entrances (for officers) open onto the stair-foot in the normal manner, whereas access via the north entrances (for servants) involves passing under the stair before ascending. A south entrance in the easternmost bay, and a north entrance in the second bay from the east, served separate quarters for the Commanding Officer. Finally, a north entrance in the fourth bay from the east provided access to ground-floor rooms in this bay and the next to the east, forming the Quartermaster's Stores. The external doorways all have similar arched heads incorporating sunk spandrels, and are placed centrally, flanked by narrow single lights in all cases except one. The exception is in the north elevation in the second bay from the east, where the doorway is placed off-centre next to a wider than normal single light.

The end elevations, faced entirely in gritstone, are framed by large pointed buttresses, and divided into three bays by much smaller buttresses. Only the central bay incorporated a window, and only on the first floor, where each served to light one end of the long axial corridors. At the west end there was a further entrance, now blocked, beneath the window, serving the Field Officer's Quarters.

The defensive features

The position of the Officers' Quarters was chosen in order to afford the maximum possible protection against artillery fire or naval bombardment while avoiding the disadvantages, in terms of light and ventilation, of casemated buildings. Its security depended on the Citadel defences remaining unbreached. Once breached the building would have been severely compromised by its low-lying position within the Citadel and by its multiple entrances and large windows. Even so, as the treatment of the main north entrance demonstrates, some attention was paid to rendering the building capable of a last-ditch defence, through the incorporation of substantial water-storage capacity, and through the provision of small arms loops and access to a roof-top fighting platform. As already described, three segmental-headed loops on the north side of the north porch covered the *terreplein* and the main approach from the Parade Ground. They were supplemented by narrowly splayed loops raking both sides of the porch on both floors, and similar loops flanking both north oriels and towards either extremity of the north elevation. Other loops, splayed widely in tapering square-headed apertures, flanked the area on the north and south sides of the building. On the south elevation small loops raked the sides of the porch, as on the north, but given its position behind the scarp of the South Ditch, other defences were considered unnecessary.

Further defensive fire was concentrated in the east and west end walls. Built in gritstone, these are of a design similar to that of the end walls of the Drop Redoubt and Detached Bastion *caponiers*. Buttresses divide each end into three bays, the central bay narrower than the other two. On the ground floor each bay incorporates a recess beneath a four-centred arched head. The back of each recess is battered, and except in the central bay of the west elevation, where an entrance was positioned, each incorporated a loop or loops. To the west there is a single loop in each recess (Fig 61), but to the east, opposite where two galleries emerge from under the gorge rampart, the armament is increased to two paired loops flanking a singleton. At the top of the batter a narrow slot, now blocked with timber, functioned as a '*murder hole*', allowing fire to be directed downwards into

Figure 61
The Officers Quarters; detail of loophole in the W end wall (NMR: AA043956 © Crown copyright 1998)

Figure 62
The Officers' Quarters; metal framed internal casement over a gun loop (NMR: AA043960 © Crown copyright 1998)

Figure 63
The Officers' Quarters; armoured shutter to a first-floor window on the west side of the north porch (NMR: AA043959 © Crown copyright 1998)

the dead ground close to the wall. At both ends on the first floor, widely splayed segmental-headed loops flank a central four-centred arched window. The first-floor loops at the west end are high enough to sweep the *terreplein*; those to the east are less well positioned. Internally, at least one of the loops (first floor, north porch) retains a metal-framed casement, which may reflect the original provision throughout the building (Fig 62).

The double-leaf doors to the Entrance Halls were provided with additional armoured protection, as one of the 1859 drawings makes clear. The inner leaves, which survive, were of two stop-chamfered panels, the upper panel glazed beneath a four-centred arch. The more stoutly constructed outer doors, consisting of planks overlying a cross-braced frame, have been removed, but the recessed hinge pintles for them survive. They had a fully armoured exterior face and were square-headed, beneath a similarly armoured, but fixed, *tympanum*. The Entrance Halls were also provided with iron-reinforced window shutters, one of which survives on the first floor of the north porch (Fig 63; HMPS: 402531).

Structural features

The internal structure, as at the casemated barracks of the Western Outworks (see below), consists of a series of very thick transverse walls from which segmental vaults spring below roof level. These vaults would originally have been covered with sand to render them bombproof. The structure of the basement ceilings is concealed for the most part but appears to employ two varieties of fireproof construction. In the basement I-section transverse wrought-iron beams are exposed in a number of places, together with axial iron joists of similar sectional form but slightly lighter scantling; stout laths of square section rest on the lower flanges of the joists and on these concrete is laid (Fig 64). The laths were underdrawn with plaster. This represents a somewhat inferior variant of the method patented by Henry Hawes Fox in 1844 and developed and marketed by James Barrett. The method described here is inferior in that the beam soffits (though not the joist soffits) are left exposed and therefore vulnerable to fire, whereas Fox's system stipulated the complete encasing of the iron in plaster. The system was more widely adopted following the expiry of Fox's patent in 1859, and the Officers' Quarters must represent one of the earliest such uses (Hurst 1996).

Figure 64
The Officers' Quarters; ceiling of one of the basement rooms, showing fireproof construction and circular inspection aperture (the room housed a water tank) (NMR: AA043963 © Crown copyright 1998)

The basement plan carries the annotation, '*Fox & Barret's [sic] Floors over all the Basement except the Tanks*'. The water storage tanks were located in the central bay, the third bay from the west and the fourth bay from the east. Here the ceiling consists of five shallow segmental vaults springing from axial iron beams, a form of fireproof construction which was widely used in industrial buildings of the early and mid-19th century, having first been employed by Charles Bage at Ditherington Mill, Shrewsbury, in 1797. Of the three bays where it occurs, the central bay contained a large compartment, the full width of the main range, which was sealed off from other areas of the basement, including the under-floor voids beneath the two porches. The other two each contain two small windowless sealed compartments, north and south of an axial corridor corresponding to the central vault. The tanks, now removed, were each served by one or more round apertures cut out of a single gritstone block and placed in the crown of the

vault, either one or two per vault (Fig 64). On the ground floor these are positioned so as to allow their use with minimum disruption, all but two being placed within service rooms, store-rooms or circulation areas. They may have served as inspection hatches, but could perhaps also have been used to draw water from the tanks under siege conditions. Water was supplied from the Pump House (HMPS: 402604).

The ground-floor ceilings, which are currently underdrawn, are shown by contemporary drawings to be of conventional timber-joisted construction. This is confirmed by field evidence where the ceilings are exposed, the joists being of softwood and deep-sectioned (29 x 6cm) with crossed spacers. Trimming joists are tusk-tenoned. On both the ground and the first floor there are stone cornices with a chamfered underside, in the former case acting as a corbel-course, in the latter as an impost at the springing of the vault. The corbel-course arrangement is parallelled at the South Flank Casemates in the Western Outworks, where it is similarly associated with a timber first-floor structure (see below). One variation in the structure is occasioned by the longer than normal bay immediately west of the central bay. Here the Mess Room floor is supported by a flitched beam, spanning from north to south, the flitch-plates secured with hexagonal nuts and bolts. The beam is exposed in the Mess Kitchen below.

The interior (Figs 65-6)

The interior of the building was divided into three distinct and non-communicating areas. The Officers' Quarters formed the largest part, occupying the ground floor minus four bays at the eastern end, the first floor with the exception of the two easternmost bays, and having access to almost the whole of the accessible areas of the basement. In addition it enjoyed access to the roof-top. The Commanding Officer's accommodation was confined to the two easternmost bays of the ground and first floors and a single room at basement level. The third section, comprising the two ground-floor bays adjoining the CO's quarters, formed the Quartermaster's Stores. There is some evidence that the brick carcass was set out in such a way as to permit flexibility in the future use of the building. This is particularly apparent from the distribution of smoke flues, which appear to allow for fireplaces or stoves in rooms unlikely to have required heating in the original layout of the building. The contemporary plans indicate smoke flues using a circular symbol which, at least on the copies consulted, appears to have been blacked in. This was probably to distinguish them from what appear to have been ventilation flues, denoted by a smaller circle, not blacked in. The full number of flues is shown on the roof-level plan (HMPS: 402578) but the ground and first-floor plans also show flues rising from the floor below. The numbers and positions of flues can only be reconciled, in some cases, by

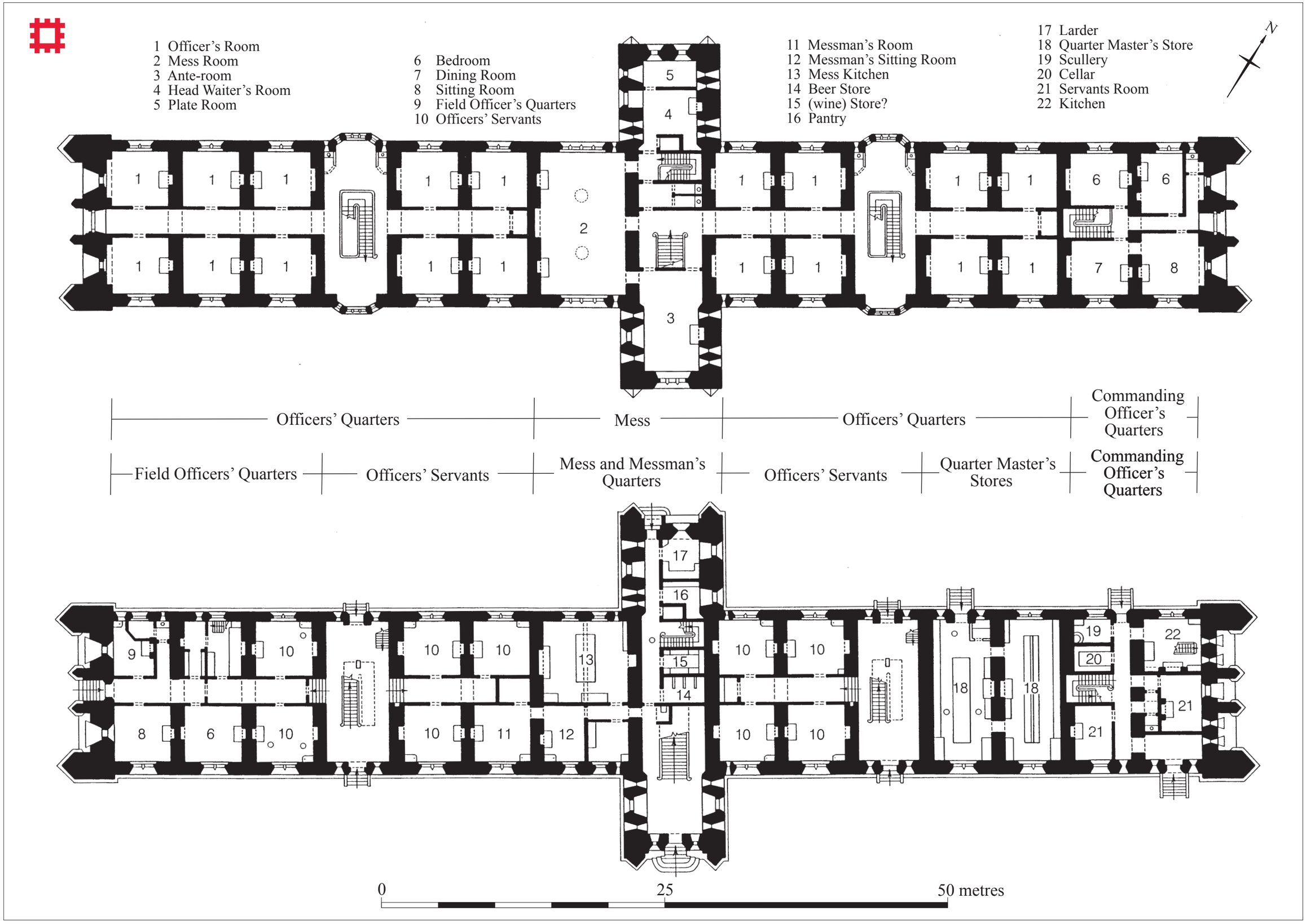

Figure 65 *The Officers' Quarters; ground (lower drawing) and first floor(upper drawing) plans (after HMPS: 402584)*

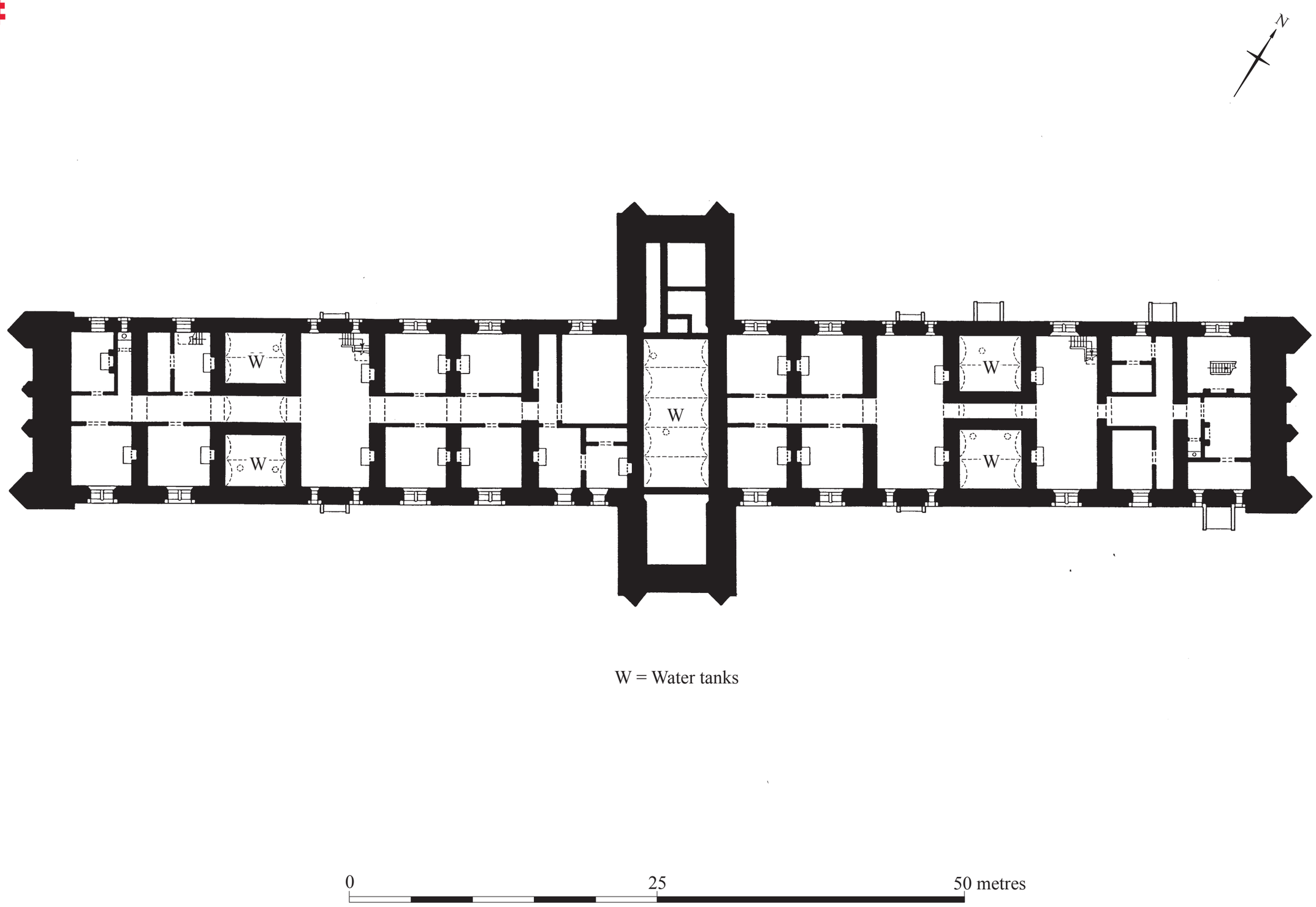

Figure 66 *The Officers' Quarters; basement plan (after HMPS: 402579)*

positing flues rising from small service rooms. The discrepancy is particularly marked in the CO's Quarters. In the fifth bay from the east there is a further complication. At basement level there are two recesses, as though for fireplaces, on the east wall, but this is the only wall which both the 1859 and the 1953 plans concur in showing without flues or stacks. Instead these plans show two flues rising to separate stacks from the basement on the west wall. Elsewhere minor variations can be identified between the 1859 and 1953 plans, perhaps explicable by changes in the way the building was used at different dates.

The Officers' Quarters

The Officers' Quarters provided living accommodation and mess facilities for the Field Officer, for the other officers stationed at the Citadel and for the Messman and servants who attended them. The Quarters were served by entrances and stairs in the central bay and in the two oriel bays (Fig 65). A further entrance, in the west elevation, was reserved for the Field Officer's use. The oriel bays had in common a lower floor level, with a correspondingly lower basement ceiling, than the remainder of the ground floor. None of the original stairs has survived, but their form can be deduced in part from contemporary plans. They each consisted of a single straight flight rising to a landing that extended around a large well, enabling the ground floor to derive much of its light from the oriels. The stair well in the west oriel bay is still apparent from the trimmed area in the ground-floor ceiling.

Between these circulation areas the accommodation consisted for the most part of well-proportioned rooms, square on plan, heated by fireplaces positioned on the cross-walls, and disposed in groups of four or six on each floor, each group divided in two by an axial corridor. The principal exception to this pattern was the Mess Room and its associated facilities, which occupied the bay immediately west of the central entrance bay, and extended both eastwards into the latter and, on the ground floor only, into the next bay westward as well. Broadly speaking, the first floor constituted a *piano nobile* on which the better rooms were placed; the ground floor was occupied mainly by servants; and the basement was devoted principally to storage.

Fixtures and fittings reflected gradations of rank to some extent. For the Field Officer's '*best rooms*', as well as the two communal rooms for officers - the Mess and the Ante-room - the chimneypieces incorporated a moulded four-centred arch within an overall moulded square head, and foliate carving to the spandrels and mantel shelf. The same design is found in the principal rooms of the CO's Quarters. In the Officers' Rooms the design was a square head with rounded haunches and a stop-chamfer. Those in the

Servants' Rooms had a narrower chamfer and a four-centred head. None of these was seen: the majority, and perhaps all, have been removed or blocked (HMPS: 402583). In the basement the only surviving chimneypiece is in cast iron, with a bold bolection-like moulding. The standard form of door on the ground and first floor – of which a number remain – consisted of four stop-chamfered sunk panels, and was set within a moulded architrave. In the corridors the architrave was carried up to accommodate a segmental-headed over-light, providing borrowed light. Doors to service rooms had a simpler beaded architrave. In the basement ledged-and-braced plank doors were hung on strap hinges in segmental-headed openings with simple chamfered frames (HMPS: 402634). Some of these, too, survive.

The officers' accommodation

The officers' rooms occupied the whole of the first floor with the exception of the two bays for the CO at the east end (Fig 65). Each room was entered from the corridor via a doorway placed centrally in relation to the room, and was lit by a large two-light window. Most of the rooms have a segmental-arched recess on the wall opposite the fireplace. These may have housed a 'press', as was the case in smaller recesses in the servants' rooms (see below). The absence of recesses from the rooms in two bays appears to result from flue positions in the adjoining rooms rather than gradations of status. Toilet facilities took the form of two cubicles, one in each corner, located on the first floor on the north side of both oriel bays. These do not survive. They appear to have consisted of lightweight timber screens, with the doorway placed in a canted corner. The screens were probably not full-height, so the cubicles would have been effectively lit by the oriels, but in addition each was served by a small loop.

The plan appears to indicate that only the rooms to the east of the central bay enjoyed direct communication with the Mess. From the rooms to the west it was necessary to descend to the ground floor and leave the building, re-entering via the principal entrance and stair.

The officers' servants accommodation

The officers' servants occupied roughly half the area of the ground floor, their accommodation forming two distinct blocks separated by the Mess and its associated features, and sandwiched between the Field Officer's Quarters and the Quartermaster's Stores (Fig 65). There were originally nine rooms allocated to officers' servants, exactly half the number devoted to officers, suggesting that the servants lived two to a room. The

figure of nine is arrived at by counting the northern room in the third bay from the west as one. The contemporary ground-floor plan shows this divided in two by a dog-leg partition, but the partition appears to be a secondary feature, cutting across the lettering denoting the original room use. In all other respects, notably the fenestration and the provision of a single sink, the room resembles the other servants' rooms. Their rooms were similar to the officers' but the recesses opposite the fireplaces were narrower. They were occupied by '*presses*' consisting of a dresser set on top of a double-doored cupboard (HMPS: 402632). Unlike in the Officers' Rooms, the ground-floor plan shows what may be sinks in the corner of each room against the external wall. Two latrines set into the bank on the north side of the area were probably intended for the officers' servants, along with those working in the Mess establishment.

The Field Officer's Quarters

The Field Officer and his servant occupied a small suite of rooms comprising the westernmost two bays of the ground floor (Fig 65). A separate entrance was provided in the central bay of the western end wall, where the plan shows a flight of steps and a door frame, in contrast to the small arms loop occupying the corresponding position at the east end. On the south side of the corridor the Field Officer had a Sitting Room to the west and a Bedroom to the east. To the north, the western bay was occupied by a servant's room and bathroom sharing a single window, and a WC lit only by one of the loops. The eastern bay, divided unequally in two – hence the asymmetrically divided two-light window – provided service rooms. One room incorporates what looks like shelving, but the annotations are illegible. The Field Officer evidently messed with the other officers. A separate kitchen was not provided and only a doorway in the corridor separated his rooms from those of the officers' servants.

The Mess facilities and Messman's accommodation

The other main element of the accommodation was the Mess and its associated facilities. Together these occupied the ground and first floors of both the central bay and the adjoining bay to the west, and part of the ground floor of the next bay westward (Fig 65). The Principal Entrance (so-named on the plan) was on the south side of the central bay, opening onto a vestibule at the foot of the '*principal staircase*'. This is depicted in a sectional drawing dated 1859 (HMPS: 402597). It took the form of a single straight flight, with an open string, slender balusters (probably of iron, as in the CO's Quarters) and a handrail which was scrolled at the curtail and wreathed at the landing. Off the U-shaped landing, semicircular-headed openings gave onto the corridors to east and

west, and two doorways (now blocked) with segmental-arched over-lights gave access to the Ante-Room in the south porch.

The Ante-Room was divided from the landing by a braced timber partition, reinforced with iron 'L' and 'T' straps. Inside the room a Gothic panelled dresser (the name applied to it in the drawing is illegible) was raised on a podium at the north end, between the twin doorways off the landing. The room was well-lit by a large three-light south-facing window and by a single light in the west wall. A fireplace was positioned on the east wall. Most of the remainder of the east and west walls was taken up by loops.

Officers would have gathered in the Ante-Room before proceeding, via a doorway in the west wall, to be seated in the Mess Room. Alternatively they could enter directly from the Landing. The Mess Room occupied the whole of the bay lying immediately west of the central bay. It was heated by two fireplaces on the west wall, and the vault was enlivened by five bays of ribs (now mostly concealed by a suspended ceiling) springing from moulded corbels. Between the two fireplaces there was a large recess with a four-centred arched head. Large four-light windows to north and south provided ample illumination during daylight hours, but two circles depicted on the 1859 plan probably indicate the positions of gasoliers for night-time use. Detail drawings survive of the skirting and Mess-Room doors, dated 1859 (HMPS: 402637).

The ceremonial appropriate for an officers' mess was catered for by rooms positioned on the first floor of the north porch, communicating with the Mess Room via a third doorway. In the northern one-third of the porch there was a Plate Room in which valuable items could be stored securely. Most of the remainder was taken up by the Head Waiter's Room, which appears to have had a fireplace on the east wall. The panelled boxing for a Lift, or dumb-waiter, rising from the Passage below, intruded into the south-west corner of the room; the Lift opened onto a lobby to the west (HMPS: 402637). South of the Head Waiter's Room and Lift there was a service stair, and between that and the main Landing there was a lobby and two WCs, evidently for the use of officers.

Food was stored and prepared on the ground floor. A small doorway, offset westwards on the north front of the north porch, formed a service entrance for staff and deliveries. It gave onto a Passage off which (from north to south) opened a Larder, a Pantry, the Lift already referred to and the service stair, which was of dog-leg form. The passage continued past the stair, giving access to two windowless service rooms. The one to the

south has racks or bins and is labelled '*Beer*'; the name of that to the north is indistinct but it is fitted with shelves and was probably a wine cellar, the use noted on a later plan of 1897.

The Mess Kitchen opened westwards off the Passage beneath the northern two-thirds of the Mess. The 1859 plan shows a large, roughly square room lit by two north-facing windows. It is spanned north-south by the flitched beam referred to above. A large fireplace is shown on the west wall, and what appears to be a central table and a variety of cupboards and shelves. These include a dresser and a dwarf press, for which original drawings survive (HMPS: 402632). South of the Mess Kitchen an axial passage extends westwards from the main Passage, with doorways opening north into the Mess Kitchen and south into an unnamed room, probably a scullery as recorded in 1897. At the west end a third doorway leads to the Messman's Sitting Room, on the opposite side of which another doorway gives onto his Bedroom, one of the standard square rooms. Off this to the north is a small windowless Messman's Store, occupying the space elsewhere reserved for the main axial corridor.

The basement

The basement functions as two distinct units, interrupted by water tanks in the central bay (Fig 66). Each unit is also reduced to the width of a corridor in two more bays (third from the west, and fourth from the east) where further tanks are located. Otherwise the two units extend the full length of the building, except that the room occupying the northern side of the easternmost bay does not communicate with the remainder of the basement. This room is shown on the 1859 plan as part of the CO's Quarters. For reasons that are unclear the windows in the western part of the basement have splayed jambs internally, while those in the eastern half have jambs consisting of a series of brick rebates, or steps.

The dimly lit, stone-flagged basement rooms are mostly labelled Stores (other annotations are indistinct) but they are provided in many cases with fireplaces, indicating that the possibility of prolonged occupation was envisaged in siege conditions. There was originally no external access (the entrance at the west end is a later insertion). Officers and their servants gained access to the two areas via trap-doors and step-ladders in the north-east corner of each oriel bay, while the Field Officer had access to another step-ladder descending from a service room (HMPS: 402634; 402632). The CO's access to the basement, by contrast, was confined to a single room forming part of his own Quarters. The duplication of stairs enabled the upper floors to be evacuated rapidly but would have created two distinct defensive units.

The form of the basement rooms is largely dictated by plan arrangements on the floor above. For the most part they consist of square rooms disposed on either side of an axial corridor, but at either end of the building and underneath the Mess Kitchen a more complicated arrangement results. It is possible that in an emergency specialised functions, such as cooking and associated storage, or quarters for senior officers, were accommodated in these areas. Few fixtures and fittings are indicated on the surviving plans, one of which is concerned mainly with footings, water supply and drainage, but in the northern half of the full-width rooms occupying the oriel bays shelves are shown on either side of a transverse partition. Another full-width room occupies the third bay from the east, underneath the eastern bay of the Quartermaster's Stores, and is labelled Armament Store. It is here, in the southern half of the room, that the fireplace with a bolection-like cast-iron surround was noted. The open form of the room, however, is reminiscent of barrack accommodation for other ranks, and taken with the presence of fireplaces may indicate that it was intended as the officers' servants' quarters in an emergency. Toilet facilities appear to have been provided directly underneath the Field Officer's WC and underneath another used by the CO's servants.

The roof

The 1859 plan of the roof is labelled *terreplein* indicating that it was to be used as a fighting platform (HMPS: 402578). From the first floor of the oriel bays, separate iron stairs rose to the roof-top, where they emerged through south-facing doorways set in gambrel-shaped gables. These appear to survive beneath a modern waterproof skin, but the stairs have been removed. A plan dated 1871 shows bomb-proof layer heaped up over both stairs (PRO: WO/78/2755/12). In the central bay there was another stair, though the door to the roof is shown on the 1859 elevation drawings occupying a narrow gable of conventional form. Here the 1871 plan shows an exposed feature, unprotected by a bomb-proof layer. This access to the roof was removed when a roof-top Fire-Control Post was added in 1940.

The doors emerging from these stairs were protected from hostile fire by the tall parapet along the south elevation, including the returns of the south porch. On the north elevation the parapet was lower, except on the porch and its return walls, where it matched that to the south. This defect appears to have been remedied by revetting an earthwork traverse along most of the length of the roof, returning at either end to give protection against flanking fire. The traverse was interrupted in the central bay, where the parapet of the north porch afforded sufficient protection. Here the 1871 plan indicates a clear area, giving access from the central stair to infantry steps around three sides of each porch. It

also indicates that the flues rising in the cross-walls were treated in one of two ways. Those in the northern half of the building rose more or less vertically to emerge in stacks. Those in the southern half were raked southwards to stacks placed - presumably for protection - directly against the parapet wall.

The Commanding Officer's Quarters

The CO's Quarters occupied the easternmost two bays of the ground and first floors and one room in the easternmost bay of the basement (Figs 65-6). The ground floor provided service rooms while, in keeping with the *piano nobile* elsewhere in the building, the COs living quarters were placed on the first floor.

The principal entrance was from the south and gave onto an Entrance Hall, at the west end of which a doorway led into a transverse passage extending the full width of the building. A window at the south end lit both the passage itself and the foot of the stair positioned midway along the west side. At the north end there was a service entrance. This provided convenient access to the Kitchen on the east side, and the Scullery and Cellar [?] on the west. The Kitchen was a large room with a fireplace on the south wall; a flying flue extended westwards to the cross-wall. Various fixtures are indicated on the plan, one of which may be a dresser against the west wall. Although indistinctly marked on the available plans, there appears to have been a trap-door and step-ladder giving access to the basement room directly beneath the Kitchen, which was inaccessible from the remainder of the basement. This room, labelled the CO's Larder on the 1897 plan, was probably unheated. The basement plan shows a fireplace-like feature, but may indicate nothing more than the brick piers required to support the Kitchen fireplace above. There are, however, more flues indicated on the plans than can be accounted for in this part of the building. The Scullery which, like the Kitchen, is lit from the north, had a domestic copper in the south-west corner. The Cellar, positioned between the Scullery and the stair, is unlit but well ventilated, and is shown lined with shelves. Beyond the stair on the south side of the building lay a Servant's Room. Opposite this and the stair, in the easternmost bay, there was a more complicated arrangement of lobbies reached from the transverse passage by two doorways piercing the cross-wall. A second Servant's Room lay between the Kitchen and the Entrance Hall, and was heated by a fireplace on its west wall, again served by a flying flue; between this wall and the transverse wall there were two interconnecting lobbies leading to a WC at the south end. The latter appears to have had borrowed light from the Entrance Hall.

Figure 67
Officers' Quarters; stair on ground floor of COs Quarters, from the NE (NMR: AA043958 © Crown copyright 1998)

The stair is poorly lit at ground level, deriving most of its illumination from fanlights above two doorways off the stair-head, and from an axial Passage extending from the stair-head to the east wall. The compartment is not a generous one, and an arched recess in the west wall is required to give sufficient space for the half-landing. The stair is of dog-leg form, with fluted cast-iron column balusters and a more elaborate cast-iron newel at the curtail step (Fig 67). The simply moulded hardwood handrail is wreathed at the turn and scrolled at the curtail. The present basement stair is modern.

There were four principal first-floor rooms, all heated by fireplaces on the central transverse wall. The better rooms were to the south. The largest, a Sitting Room, opened off the Passage and occupied the south-east corner, while a Dining Room, opening straight off the stair-head and thus more conveniently serviced, occupied the south-west. The Dining Room had a large buffet recess in the west wall. North of the stairs was the larger of two Bedrooms, where a similar feature in the west wall may have served as a bed recess. A smaller Bedroom opened off the north side of the Passage and lacked a recess. The narrow space between this room and the east wall was utilised for the CO's WC. Both here and in the Sitting Room, a broad recess in the east wall facilitates the use of the small arms loops when required.

The Quartermaster's Stores

The ground floor of the third and fourth bays from the east formed the Quartermaster's Stores, with a separate north entrance in the fourth bay (Fig 65). Here the Quartermaster Sergeant would have maintained stores of clothing, footwear and equipment. Access was

controlled by a small office positioned next to the entrance. This was formed from plank partitions topped with what appears to have been a balustrade serving as a borrowed light for the remainder of the bay. The Office was just wide enough to contain a desk, placed across the window (HMPS: 402635). Each bay consisted otherwise of a single large room, two doorways in the common wall facilitating movement around the stores. The cross-walls were lined along much of their length with wooden shelves on cast-iron brackets, and further shelves were arranged back-to-back in the centre of the eastern room. In the centre of the western room there was a long table incorporating drawers, and a Press, incorporating two tiers of cupboards with Gothic-panelled doors, stood at the south end of the west wall. Fireplaces located centrally in the common wall might be thought unusual in a store, and may suggest that an alternative use was anticipated, though they also occur in Company Stores built at the Citadel as late as the 1920s.

The environs

The surrounding area is cut into the chalk bedrock and revetted on the east and west sides. To the south the damage to the tenaille and South Ditches has exposed the Officers' Quarters to view from the seaward. To the north there is a graded earthen slope. At the point where the road from the Parade Ground meets the steps descending to the Officers' Quarters, sinuous ramps branch off to east and west, allowing horses and wheeled traffic to reach the level of the area. Smaller stairs descend to the area roughly midway along the ramps, apparently serving, though not directly opposite, lesser entrances to the building; these stairs are not shown on the earliest plan and appear to be secondary. The north end of the road and the head of the stairs are both flanked by pairs of cast-iron lamp standards. Similar standards are found in the sunken area surrounding the building, and were originally supplied with gas. They stand on chamfered octagonal stone bases, have fluted shafts and Corinthian capitals, and are cast 'BIRTLEY | 1861' (Birtley is about five miles south of Gateshead, Tyne and Wear). Off the north side of the sunken area, on either side of the steps, two sets of WCs are set back into the slope. These are contemporary with the main building, but were being altered in 1911, such that in 1929 they were assigned to the Messman (west) and the Orderly Room Clerks (east) (HMPS: 402581; 402582).

Later alterations

Within the currency of the original 1859 plans a number of changes of use are recorded. These take the form of cursive annotations to the plans and are concentrated in the two bays of the ground floor lying between the central bay and the eastern oriel bay, originally designated Officers' Servants' Rooms. Only the annotations in the more easterly bay are legible. The room to the north is labelled Sitting Room, and that to the south Club Office

[CO's Office?]. On the first floor, the Landing in the eastern oriel bay is labelled Billiard Room in the same hand. There are probably other annotations, now irrecoverable.

The 1897 Citadel Plan

Numerous changes had occurred by the time this plan, dated April 1897, was prepared (PRO: WO/78/2426/6). Of the various room suites, only the Quartermaster's Stores, the Mess and and the Messman's accommodation remained unchanged. In the CO's Quarters the original first-floor Dining Room served as a second Sitting Room, and the CO also enjoyed the use of a ground-floor Office on the south side of the sixth bay from the east. The officers' accommodation was augmented by the creation of a Billiard Room on the south side of the stairs in the eastern oriel bay. Although eighteen officers were accommodated, as before, on the first floor, three more occupied ground-floor rooms lying between the Mess facilities and the western oriel bay, where previously officers' servants had been housed. The former Field Officer's Quarters were now allocated to the Quartermaster; the former Bedroom became a Living Room (in addition to the existing Sitting Room) and two servants' rooms were made available for the Quartermaster's use as Bedrooms. The remaining servants' rooms, between the central bay and the eastern oriel bay, were reassigned to administrative uses: the bay next to the central bay became a Court Martial and Lecture Room to the north and an Orderly Room to the south, while the corresponding positions in the next bay to the east were occupied by another Orderly Room to the north and the CO's Office to the south.

The displaced officers' servants were now accommodated in the basement. Here the water tanks remained *in situ*, though disused, and those in the central bay continued to prevent communication between the two halves of the basement. The full-width rooms in the oriel bays were still designated Stores, but between the eastern oriel bay and the west end of the building nearly all the rooms – thirteen in all – were termed Servants' Kitchens. This usage, capitalising on the provision of fireplaces noted above, suggests day-rooms, whereas the original servants' accommodation had taken the form of bedrooms; presumably sleeping accommodation was found elsewhere. Among the Servants' Kitchens there were a number of Stores, principally below the Messman's Quarters. The easternmost three bays were now occupied by the Royal Artillery, with the exception of the CO's Larder. The accommodation consisted of an Office in the third bay from the east, and Stores elsewhere.

Alterations, 1911-47

Information on 20th-century changes is provided by two overall plans of the Citadel and by basement and first-floor plans of the Officers' Mess. A sheet including basement and first-floor plans is dated 1921, with revisions of 1929 and minor annotations (possibly revisions as well) up to 1947 (WD/unref). One overall plan is dated 1911 with revisions of 1921 (HMPS: 402581); the other is identical but incorporating revisions of 1929, including alterations to the Officers' Quarters firmly dated to 1928, which are typed and presumably pasted on. Later amendments, probably of 1947, are handwritten in an italic script and include the bridge added in 1940 (HMPS: 402582). The original lettering on both plans is handwritten in a style with Art Nouveau characteristics (notably the form of 'h' and 'n').

By 1947, the whole of the basement, including those parts of the central and oriel bays which were formerly occupied by water tanks, was in use as a hospital. The Hospital had twelve wards besides a room or rooms set aside for officers, an [Operating] Theatre, its own Cookhouse and toilet facilities, and a series of stores.

During the 1920s there were improvements in sanitation, and in 1921 it was proposed that electric lighting replace that of gas (HMPS: 402581; 402629). Two major changes were either accomplished, or in progress, in the same period. One was the removal from the building of officers' servants, while the other was an increase in office accommodation, reflecting the growing bureaucratisation of the Army. The officer establishment had remained unchanged since 1897 at 21, three of whom continued to occupy ground-floor rooms. The three westernmost bays of the ground floor, latterly the Quartermaster's Quarters, appear to have formed made into offices between 1911 and the 1929, one room being assigned to the CO, who seems to have vacated his Quarters in favour of the Field Officer.

The ground floor of the central bay was comprehensively remodelled in 1928 (it is possible that other alterations referred to above are of the same date). The north entrance was enlarged and became the principal entrance, while the original Larder and Pantry, service stair, wine and beer cellars were removed to make way for a new Hall and stair, the latter rising southwards. The original main stair was also swept away and in its place a Wine Store, another Store, a Larder and a Pantry were created in the southern half of the bay. These were linked by a passage along the west side, terminating at a side entrance inserted in the west wall of the porch. The original south entrance appears to have been converted into a window for the Pantry.

The enlarged north entrance occupies the full width between the buttresses, and consists of a door set in a recessed and partly glazed pitch-pine screen with bolection-moulded panels. The stair, also in a late 17th-century idiom, has a broken main flight, a quarter-landing and a short second flight. It has panelled newels with tapering shafts and turned finials, open strings with carved cheeks, slender turned balusters and a mahogany handrail. Another feature possibly belonging to this phase is a ventilation shaft with an octagonal, stone-capped brick base, on the west side of the north porch. In spite of its Gothic form it is not bonded into the wall, nor does it appear on the generally meticulous 1859 drawings. On a plan of 1953 it appears as '*timber vent. shaft strapped to wall*' (HMPS: 100666).

Drawings dated 1938 document the creation of an external entrance to the basement, on the north side of the third bay from the east (HMPS: 402670; 402671). The external steps are sheltered by a reinforced concrete roof.

In October 1940 drawings were prepared for a single-storeyed Fire-Control Post on the roof of the Officers' Quarters (HMPS: 402695). This was placed atop the central bay, offset towards the south such that the original parapet formed the south wall. The walls were otherwise of brick, while the four-bay roof had a covering and beams of reinforced concrete. The accommodation comprised an Observation Post, which had wrap-around glazing above the parapet, a Chart Room, Telephone Exchange, Men's Room, Men's Sleeping Room and Officers' Rest Room. All but the Telephone Exchange were heated by stoves. East and west entrances, via either the Men's Sleeping Room or the Officers' Rest Room, were afforded blast protection by small porches, which also incorporated a Chemical Closet apiece. For ease of access a bridge was constructed linking the slightly higher *terreplein* to the west with the roof-top. The Fire-Control Post was still present in 1953, but was subsequently removed. The bridge remains.

Between 1932 and 1933 a new Quartermaster's Store was built on Citadel Road, where the shelving and other fittings were re-erected (HMPS: 402687; 402487). Perhaps at the same time – and certainly by 1947 – the former Quartermaster's Stores, latterly the RA Stores, were being used as Mobilisation Stores, but the northern one-third of each bay had been partitioned off, providing a store in the third bay and a lobby in the fourth. From the latter a stair, inserted through the fireproof vault in the position of the former Office, descended to the basement Hospital, replacing the stair in the adjoining oriel bay. The Quartermaster's Office was now in one of the former Servant's Rooms in the CO's

Quarters, while the other Servant's Room was occupied by the Quartermaster's Clerk. The CO and his staff occupied the westernmost three bays of the ground floor.

Post-military use: Her Majesty's Prison Service

During the post-war use of the Citadel successively as a Borstal, a Youth Custody Centre and a Youth Offender Institution, the Officer's Quarters were adapted to new purposes. Plans dated 1953 show the building divided between a first-floor Education Block over ground-floor Stores in the western half, an Administration Block extending east of the centre, and a Hospital in the former CO's Quarters at the east end (HMPS: 100666). The Hospital remained a separate unit but its cellar was integrated with the remainder of the basement. The Education Block comprised a series of classrooms and an Assembly Room in the former Mess Room. Both oriel bays were put to more intensive use, with a series of new partitions. At basement level an entrance was inserted in the west wall, the water tanks were removed, creating six more rooms, and doorways were inserted linking the east and west basements for the first time. The five easternmost bays, including the CO's Larder, were adapted to form a 'Separate Cell Block', incorporating offices, stores, ten cells (two to a room) and washroom facilities. Numerous other minor changes to the fabric of the building are apparent since the ending of military use, including a more generous allocation of toilet facilities.

Plans dated 1987 describe the building as the Admin, Punishment, Hospital and Reception Block (HMPS: 305875; 305877; 305879; 305881). Among the changes recorded are the integration of the Hospital (formerly CO's) accommodation on both floors, via the former Pantry and Dining Room.

The Canteen, later Recreational Establishment & Regimental Institute (Fig 49)

The Canteen (c1860)

The former Canteen is situated on the north side of the Parade Ground, across which it had uninterrupted views prior to the construction of the Dining Rooms and Cook House immediately to its south. It consists of a fourteen-bay main range, oriented roughly east-west, from which a much shorter but wider rear range, offset slightly west of centre, projects northwards. This morphology has been complicated by a series of additions.

Original drawings of the Canteen do not appear to have survived, but it was probably begun at the end of the 1850s, as were the nearby former Coal Yard and Straw Barn. (HMPS: 402527). This would be in keeping with the recommendations of the Barrack

and Hospital Improvement Commission's Interim Report on the Western Heights, which called, among other things, for the provision of day rooms and reading rooms in order to create '*a higher tone of social habits*' among the common soldiery (PRO: WO/33/587; 589; 591; Douet 1998, 128). Canteens provided liquid refreshment, including alcohol, but were deemed more suitable than neighbouring public houses, since they were supervised by a pensioned NCO (following the recommendations of the 1855 *Barracks Accommodation Report* (*ibid*, 128)) and could also provide for '*higher*' pursuit.

The Canteen was certainly built by 1870, when it appeared in outline on the site plan for an Armourer's Shop nearby to the east, backing onto the Coal Yard to the east. (HMPS: 402499). Further detail is provided by the Citadel plan of 1871, which depicts it as three component parts. The largest part comprised the whole of the rear range together with the adjoining portion of the main range; east of this the main range is marked Recreation Room, the whole building being labelled Canteen (PRO: WO/78/2755/12).

As originally built the Canteen was single-storeyed, with a T-plan, but with a main range of thirteen bays (the easternmost bay is an addition). The walls have yellowish 'grey stocks' in stretcher bond. On the main range the original openings have flat arches in a gauged Gault brick. The rear range was plainer, with cambered brick arches. The western end of the main range is single-storeyed with a flat roof and may retain its original form. Detail drawings produced in 1913 show the original ground floor ceiling to consist of a series of closely spaced shallow segmental vaults, carried by transverse I-section iron beams and supporting a flat concrete roof, a form of construction also used in the much smaller Armourer's Shop (HMPS: 402655). Similar 'fireproof' vaults, though arranged axially are employed at the contemporary Officers' Mess (see below).

It is likely that the use of the building was in most respects similar to that depicted on a plan of 1897, the first surviving plan to show internal divisions in detail. At this time, the western four bays of the main range formed a Tap Room. Four narrower bays roughly corresponding to the width of the rear range were occupied by a Bar to the rear and two small rooms, marked Tap and Shop, to the front. East of these there was a three-bay Library and finally a two-bay Recreation Room, each with independent access from the front, the latter with a large east-facing window. The rear wing formed the Canteen Sergeant's Quarters. The main block provided a Living Room to the south and a Bedroom to the north. The former communicated with the Bar via a lobby with a separate external doorway, and another door opening into a Store. A WC and a shed for coals were attached to the north end of the rear range (PRO: WO/78/2426/6).

Probably in the mid-1890s a second rear range was added, west of the original one, forming a separate NCOs Room. It does not appear on a block plan of 1893 but is shown on the 1897 plan (NMR: WD/2313; PRO: WO/2426/6). This flat-roofed addition enjoyed independent access. One of its two entrances was placed opposite a doorway, presumably inserted in the west wall of the Canteen Sergeant's Living Room. Also before 1897, a Coffee Room was added in a flat-roofed block projecting rearwards from the Recreation Room. The projection in its north wall was probably for a stack. In the same period, but at the opposite end of the main range, a urinal was built, also on the rear.

The Recreational Establishment (1913-14)

Towards the end of the 19th century, the Canteen became known as the Recreation or Recreational Establishment. It is clearly labelled '*Canteen*' on the 1897 plan but the equivalent facility at South Front Barracks in November 1896 was referred to as a '*Recreational Establishment*', suggesting that the transition to the new name was progressive during the 1890s (PRO: WO/78/2426/6). At South Front Barracks a very similar range of facilities was offered, including a Coffee Bar, but the plan was quite different; the Tap Room had a stage at one end and domestic accommodation was provided on the first floor for the canteen sergeant, and on two floors for another (unspecified) official (Pattison and Williams 2001b).

The Citadel Recreational Establishment was partially raised and extended between May 1913 and March 1914 (Fig 68). The new upper floor was restricted to the eastern two-thirds of the original main range, but extended eastwards over an added fourteenth bay; the new work is visible on the south front in a slight change of brick colour. The extra bay respected the front wall of the Bread and Meat Store, added in 1888, and was not as wide as the remainder of the range. The addition of an upper storey required the provision of a stair, housed in a two-storeyed block projecting southwards from the main range, somewhat east of centre. The new work matched the original in its use of grey stock bricks. On the ground floor the added bay repeated the use of gauged brick window heads in Gault brick, including a tripartite window in the east wall which perhaps reproduced the form of the earlier east window. On the upper floor, however, plain flat brick arches were employed and the windows are narrower. The storeys were separated by a dentilled string course, which extends around the added bay and other additions, and matches the new eaves cornice. The flat roof of the raised portion was of concrete.

Of the surviving drawings detailing the 1913 alterations the one that is potentially the most useful is available only in a severely degraded form but another, showing drainage

Figure 68
The former Canteen and Regimental Insitute building in the Citadel, from the east (NMR: AA043938 © Crown copyright 1998)

and gas services, contains information on room uses (HMPS: 402591). The eastern part of the ground floor, formerly the Library and Recreation Room, was the Supper Room. This was heated by two fireplaces on the rear wall, reflecting its twofold origin. The Supper Room doubled as a Lecture Room and incorporated a stage in the added bay at the east end. Entertainments other than lectures were catered for by the provision of two Dressing Rooms, housed in the former Coffee Room, which was extended slightly eastwards in order to communicate directly with the stage. The main entrance was now via the added stair block, one bay east of the earlier Library entrance, or through the former Recreation Room entrance further east. West of the Supper Room the central area was divided between Stores, a Grocery Shop and a passage, which gave at its west end onto the three-bay Soldiers' Room (replacing the Tap Room), this forming the portion of the main range that remained single-storeyed. The position of the Soldiers' Room fireplace is east of centre on the rear wall, placed back-to-back with another heating the NCOs Room, now the Corporals' Room, a position which may date from the addition of the latter. A covered way provided access from the main range to the Corporals' Room, extending part of the way along its east side.

The original rear range was altered to service the new Supper Room, at the expense of the canteen sergeant's living quarters. Against the main range the former Living Room became a Kitchen, with a fireplace on the north wall, placed back-to-back with another heating a Scullery (the former Bedroom), out of which a small unnamed room, probably a

larder or pantry, was partitioned off to the west. Along the east side of the Kitchen and Scullery, but extending further northwards, were (from south to north) a lobby, an Office (apparently occupying the former Store) and a newly constructed Bedroom. The two main rooms, which each had a corner fireplace, were for the use of the canteen sergeant. A small yard containing a shed was positioned against the east wall of the Office.

The added first floor augmented the social and educational facilities available to the common soldier. The concrete stair opened onto a passage off which a small Reading Room opened to the north, with a three-bay Library to the west and a Billiard and Games Room (four bays, including one above the stage) to the east. The two larger rooms were each heated by a fireplace on the rear wall, the Reading Room by a corner fireplace.

The Regimental Institute

In 1929, the building was referred to as the Regimental Institute, for which a partial plan survives (HMPS: 402582). In 1933 a series of improvements were proposed (HMPS: 402585; 402541). These centred on the extension of the first floor along the original rear range, and infilling, at ground-floor level only, the space between this and the range containing the Corporals' Room. The first-floor extension was primarily concerned with improved accommodation for staff, and in keeping with its domestic nature it has a lower eaves level than the earlier part of the first floor. The detailing is plain, with cambered brick window heads.

These additions were accompanied by a number of changes to room uses. The Supper Room was now called the Restaurant, and although it kept its stage the Dressing Rooms were turned into Lavatories. A second entrance was inserted in the second bay from the east (now reinstated as a window). In the central area some partitions were removed to create a Bar (over a cellar) and a small Office, these two rooms replacing the Store and Grocery Shop. Openings, supported by concrete lintels, were pierced through the wall dividing the Bar from the Restaurant, and were filled by a bar counter (HMPS: 402543). The Soldiers' Room was reduced in size to allow for a larger Corporals' Games Room at the western end of the main range, heated by a fireplace inserted in the north-west corner. A new double porch on the front wall provided separate access to the two rooms. The former Corporals' Room was enlarged by the infill block and renamed the Corporals' Restaurant. Hatches allowed drinks to be served directly from the Bar to both the Corporals' Restaurant and the Soldiers' Room (HMPS: 402544).

The Kitchen and Scullery were retained in essentials, the latter given access to a new Larder and Kitchen Store to the west. The Office appears also to have been retained, but the Bedroom was sacrificed to provide a staircase with just a small ground-floor Coal Store opening off it to the north. The wooden stair, lit from the east by a mezzanine-level window, served the much enlarged domestic accommodation for the NAAFI manageress on the first floor (HMPS: 402643). She enjoyed the exclusive use of a Bedroom and Sitting Room, and probably of the Bathroom, but other NAAFI staff presumably shared the Common Room. In the earlier part of the first floor a combined Library and Reading Room to the west freed up space for a central Writing Room.

In 1945 a timber-built NAAFI Sales Kiosk was added under the stairs in the main entrance (HMPS: 402688). In 1998, the building as a whole was the Chaplaincy of HMYOI Dover.

The Coal Yard and Straw Barn (Fig 49)

Drawings dated 1860 detail proposal plans for a Coal Yard and Straw Barn, to be situated east of the Canteen. It was subsequently built (HMPS: 402527). As built, two single-storey buildings, in brick with slate roofs, stood at opposite ends of the Coal Yard; a Wood Store on the east and a Straw Barn on the west.

The Coal Yard was defined by a high wall, buttressed at intervals to give five bays to north and south and three on the end walls. On the south side a large gateway, flanked by buttresses rising full-height in the form of piers, occupied the second bay from the east. The easternmost bay of the yard was filled by the low Wood Shed, presenting four open-fronted bays to the yard beneath a monopitch roof. The open front was supported on slender columns, probably of cast iron. It was probably always a Wood Store, the use specified in 1911 (HMPS: 402581).

The Straw Barn was a taller building with a large segmental-headed doorway in the south gable, three ventilators in the west wall and one more high up in each gable. The roof was of clasped-purlin form. By 1897 the Straw Barn was being used as a Fire Engine House, as it was also in 1921 and 1929. The complex has been demolished since 1947 (PRO: WO/78/2426/6; HMPS: 402581; 402582).

The Armourer's Shop (Fig 49)

The Armourer's Shop formed part of the improvements mooted at the end of the 1850s but it was not completed until March 1870 (HMPS 402499). Situated on the eastern side of the Coal Yard, it was a single-storeyed building, roughly square in plan, with a small projection on the north side. It was constructed of grey stock brick with a flat concrete roof, composed of three shallow segmental vaults, supported by wrought-iron beams. The roof was pierced by two cowled vents. The entrance was in the south wall, and there were large segmental-headed windows to south and east. There was a forge against the north wall, with a stack above, and benches along the south and east walls. The projection, on the right-hand side of the forge, housed a drying closet.

Between 1870 and 1871 the Armourer's Shop was extended northwards for the full length of the Coal Yard wall, the addition shown on the Citadel plan of 1871 and on an 1888 block plan included with drawings of the Bread and Meat Store (PRO: WO/2755/12; HMPS: 402495). A communicating doorway was inserted to the left of the original forge to link the two phases. Marked 'Forge' on the 1897 plan, and known as the Smith's Shop by 1911, the addition had its own entrance from the north. It had windows to north and east, and contained a second forge against the west wall (PRO: WO/78/2426/6; HMPS: 402581). It has been demolished since 1947 (HMPS: 402582).

The Armoury, later Laboratory, then Medical Inspection building (Fig 49)

A little to the south-east West Flank Casemates there was a two-cell building, about which little is known. It was the Armoury in 1871 but its origin is unknown (PRO: WO/78/2755/12). It was built of brick with a slate roof. On a plan dating probably to the 1880s, it is labelled as a Laboratory, a type of building in which shells were filled with explosive (HMPS: 402594). In 1911 it was in use as the Armament Offices and in 1929 as the Medical Inspection Building, incorporating a Waiting Room at the eastern end and a larger, heated consulting room for the Medical Officer to the west (HMPS: 402581; 402582).

The Troop Stables, later Stables/Mobilization Vehicles Stores, then Garage (Fig 49)

Between 1871 and 1888 stables were built to the south of the Armourer's Shop (PRO: WO/78/2755/12; HMPS: 402594). They are referred to as '*Troop Stables*' on a drawing, dated 1888, of the adjacent Bread and Meat Store (see below), and '*Transport Stables*' for 27 horses on the 1897 plan of the Citadel (HMPS: 402495; PRO: WO/78/2426/6).

The Officers' & Transport Stables and Mobilization Vehicle Stores (Fig 49)

The earliest detailed drawings date from 1903, by which time the stable building had been adapted for additional use for mobilization equipment (HMPS: 402689). These indicate a weatherboarded timber structure with large doorways in the north and south gables, opening onto a central nave. In 1903 stalls and boxes for horses remained on either side of the nave at both ends; originally they must have extended full length. The wide span of the eight-bay roof was carried by queen-post trusses and incorporated a long ventilator on the ridge. A small structure close to the north-east corner of the building was a Dung Pit.

The 1903 partitions were inserted in the central part of the building, not on the truss lines but amounting to the greater part of five roof bays. This area now served other purposes, with five large doorways inserted in the west wall. At the northern end six stalls, a Harness Room and a Store were retained to serve as the Officers' Stables. At the opposite end the same provision was made for the Transport Stable, with the difference that the Harness Room and Store were against the south gable, rather than in the body of the building. The next bay to the north now housed the General Service Wagon, Parade Cart and Regimental Transport, and beyond that another bay was designated the Gun Shed. The remainder of the altered portion was allocated to Mobilization Vehicles.

The Mobilization Store

Apparently as part of the same scheme, a small and plain single-storeyed building, now used as an indoor garden, was built a little to the south of the Stables to serve as a Mobilization Store, a function consistent with its sparse fenestration. It is constructed in brick, laid in English bond and now painted, with a gabled roof of Welsh slate. The 1903 plan shows a porch on the south gable, as does the 1911 plan which also records a single-bay addition on the north end (HMPS: 402689; 402581). This has been removed, leaving a scar. The building is marked '*Workshop*' on the 1930 plan of the Citadel (HMPS: 402582). In the north gable there is a window with a stone lintel and sill and a horned sash. There are similar small windows, now blocked, to north and south. The south gable has a large inserted doorway with a concrete lintel.

The Garages

In 1938 the Stables and Vehicle Shed (as the building had become known) was converted into garages, each with two large sliding doors to the west, making the building fully open-fronted (HMPS: 402690). At the same time a six-bay garage extension was built at

the south end. This was steel-framed with an external covering of corrugated sheeting. The roof was carried by steel trusses incorporating a long ventilator.

The Carpenters' Shops (Fig 49)

A simple Carpenter's Shop was built sometime between 1871 and 1888 against the north wall of the Coal Yard, at its eastern end, with an entrance in the east end and four windows in the north wall. It was in use by a 'pioneer' in 1911 (PRO: WO/78/2755/12; HMPS: 402594; 402581). A second Carpenter's Shop is shown on the 1897 plan to the east of the Armourer's and Smith's Shops, marked simply '*Shed*' on the 1888 plan of the Bread and Meat Store, changed for use by an RE plumber by 1911 and demolished before 1947 (PRO: WO/78/2426/6; HMPS: 402495; 402581; 402582). From around 1933, the Carpenter's Shop was established in the disused Dining Room just east of the West Face and West Flank Casemates.

The Artillery Store, later Shoemaker's Shop (Fig 49)

On the south-west face of the Citadel, between the casemated barracks nos 12-14 and 15-17, there was a single-cell Artillery Store at the foot of the *talus*. It was built between 1871 and 1888, of brick with a hipped slate roof (PRO: WO/78/2755/12; HMPS: 402594). Before 1911 it was adapted as a Shoemaker's Shop for the repair of army boots, probably replacing a similar facility, which in 1897 was located in one of the casemates in the Upper South Lines Casemates (PRO: WO/78/2426/ 6). It has been demolished.

The Soldiers' Room (Fig 49)

Within the same period (1871-88) a Soldiers' Room was built to the north of the western end of the Canteen/Regimental Institute. This had a gabled roof and clasping buttresses to the corners. In 1929 it remained in the same use, a partition dividing it between a Soldiers' Room and a smaller Bar (HMPS 402582). It has been demolished.

The Bread and Meat Store (Fig 49)

Around 1888 a Bread and Meat Store was built east of the Canteen, not as depicted on the surviving site plan, but on an east-west orientation, separated from the Canteen by the width of a passage, with its east end abutting the earlier Straw Barn (HMPS: 402495). The Bread and Meat Store was a single-storeyed building with a hipped roof and a verandah along the south front. The eastern three-fifths formed the Meat Store, served by a louvre set centrally on the roof, while the western two-fifths served as the Bread Store.

The Warrant Officers' Quarters Nos 1 and 2 (Fig 49)

No 1

This was built between the Main Entrance and the Pump House between 1871 and 1891, when it appears on the block plan accompanying drawings of No 2. It probably dates from 1890, as indicated on drawings also detailing additions of 1897, though the very great disparity between its design and that of No 2, dated 1891, is remarkable (PRO: WO/78/2755/12; HMPS: 402530). In its original form it was a single-storeyed U-plan building with a four-bay main range oriented roughly north-west to south-east, and single-bay rear ranges projecting north-eastwards from either end. It was plainly built of brick, probably rendered, with a flat concrete roof, and provided two mirror-plan dwellings.

Details of the internal arrangements can be deduced from drawings for alterations in 1897 (HMPS: 402530). Each dwelling was entered through a side door in the rear range, one half of which served as a Lobby. This opened onto a Living Room or Sitting Room (both alternatives are given), heated by a large fireplace on the cross-wall and doubtless doubling as a kitchen. From the Living/Sitting Room a doorway led into a Scullery forming the other half of the rear range. This had a corner stack, probably for a domestic copper. Beyond the Living/Sitting Room, in the main range, there was a smaller unheated Bedroom.

The 1897 proposals enlarged the building but also adapted it for single occupation, bringing it into line with the improved standard of accommodation afforded by No 2 (see below). The Living Room at the north-west end became the Kitchen. The two Bedrooms were combined to form a large Living Room, with an inserted fireplace on the south-east cross-wall, the Sitting Room at the south-east end became the main Bedroom, and the former Lobby and Scullery behind it were turned into a WC and Bathroom respectively. Two further small bedrooms were added between the rear ranges, projecting somewhat further and heated by corner fireplaces.

No 2

This single-storeyed building, built to designs dated 1891, offered a considerable improvement in the standard of accommodation offered by No 1 as first built. (HMPS: 402481). It was built in between No 1 and the Main Entrance, which it abutted. It had brick walls, blue brick window sills and chamfered plinth courses and a flat zinc roof. The irregular plan consisted of a main range, two rooms deep, at the south-east end of

which a wing, also of two rooms, projected slightly on the south-west front. At the north-west end a small, lower annexe projected. The exterior is given a degree of elaboration which contrasts with the austerity of No 1. The front, at least, had buff terra-cotta flat arches, which interrupted a frieze of Arts-and-Crafts-style brick decoration, and the entrance, occupying the re-entrant of the wing, was embellished with a balustraded porch.

The entrance gave onto a passage off which the Kitchen, and beyond it a Scullery, opened in the main range. On the opposite side, doors opened into the Living Room at the front of the wing, and the main Bedroom to the rear, their fireplaces back-to-back on the cross-wall. Two further Bedrooms, heated by corner fireplaces backing onto the Kitchen stack, occupied the rear of the main range. The annexe contained a WC and a store for coals.

The Sergeants' Mess Establishment (Fig 49)

The former Sergeants' Mess, now used as a Garden Store and Security Office, is located on the south side of the Parade Ground. It was built between February 1898 and February 1899, replacing a makeshift establishment in the Short Casemates. The original layout and some other details are recorded on a set of drawings dated 1900 (HMPS: 402630). The single-storeyed building has grey stock brick cavity walls incorporating bands of a deeper red brick, and stands on a chamfered plinth of blue brick. The openings have cambered heads and the windows have stone sills and what appear to be the original horned sashes. The windows on the west elevation (and presumably the south originally) are larger than those elsewhere on the building. The flat concrete roofs of the principal ranges, laid over steel joists, are also an original feature, though disguised by a boarded fascia intended to link the original work visually with a two-storeyed addition of *c*1970. The latter obscures the original south front of the Mess.

The main range, distinguished by its greater height, formed a large Mess Room extending east-west across the south end of the building. On the west wall there is a terra-cotta plaque with Queen Victoria's cipher and the date 1898. The entrance was via a lower block adjoining to the east, which contained a lobby, wash room and WCs. The Mess Room was heated by fireplaces at either end and divided by a light partition to give a Dining Portion in the western end and a Billiard Room in the larger eastern part, where a lantern provided additional light. The lower range to the rear comprised the Kitchen (linked to the Dining Portion by a serving hatch), Cook's Room (the cook had a separate room with its own entrance, reflecting his status as a senior NCO), Scullery, Larder, Store

(set over a Beer Cellar with an external 'barrel way' or drop) and Bar. The rooms were supplied with gas via the Officers' Mess supply, and by water pumped from the Citadel well. A rear entrance opened onto a walled yard flanked by a Coal Store and an Out House incorporating a WC. These had hipped roofs originally, but now have flat roofs; they lack the plinth or banding of the other ranges. The yard wall has been demolished.

Between 1900 and 1911 a Reading Room was added, projecting southwards from the Dining Portion, from which it was entered. It was a well-lit room heated by a fireplace on the west wall. In 1940 an L-plan timber hut was added, linked to the Reading Room by a short covered way, to provide a Dining Room and Ante-Room '*for dining strength of 70 members*' (HMPS: 402681). The plan labels the former Reading Room '*to be part of Dining Room*'. The Dining Portion of the original Mess continued in use. Both the Reading Room and the hut were removed *c*1970 (possibly earlier in the case of the hut) when the large two-storeyed Store was built against the original south front of the Mess. Other modifications of this date or later include the blocking of the doorway linking opening into the Cook's Room from the yard.

The Shower Baths and Drying Rooms (Fig 49)

Between the areas lying behind the South-West Flank and South-West Face Casemates, the former Cook House (see above) became the focus for a large complex of Shower Baths, Boiler Rooms and Drying Rooms, the earliest parts dating to between 1897 and 1911 (PRO: WO/78/2426/6; HMPS: 402581). Drawings for one of the shower blocks survive, dated June 1928 (HMPS: 402489). This shows a single-storeyed brick-built shower block, with a gabled and slated, steel-trussed roof, and an attached flat-roofed boiler room.

The Cook Houses and Dining Rooms (Fig 49)

The 1911 Cook House

The West Flank Casemates were originally provided with a casemated Cook House just to their north. Proposals for a new Cook House, built across the face of the earlier one, were drawn up in February 1911. The new building was to serve half a battalion, and was planned in conjunction with the conversion the two northern rooms of the West Flank Casemates from barrack rooms into Dining Rooms. A covered way linked them together (HMPS: 402693). The earlier Cook House was converted to storage purposes while the former Ablutions Room serving the casemates was adapted to serve as the Wash-up.

The new Cook House was a single-storeyed steel-framed building of four bays, with a roughcast exterior. The timber hipped roof was laid originally with Countess slates and incorporated a zinc-sheeted lantern ventilator, once fitted with pivoting windows but now reduced in height to a low felted platform. The west entrance, incorporating a top-light, survives, but the tall windows have been blocked (they show as patches in the roughcast exterior). A large stack was positioned on the rear (west) wall while a single-flue stack rose from the south-west corner. Before 1927 a lean-to was added against the north wall. A plan of that date labels it '*Existing Preparation Room*'(HMPS: 402492).

The 1927 Dining Room

After little more than fifteen years the use of the West Flank Casemates for dining ceased; they were, perhaps, too poorly ventilated to perform the function well. Drawings made in 1927 detail proposals for a new Dining Room, built immediately north of the 1911 Cook House, to which it was linked by a short covered way (HMPS: 402492) (there are two further drawings of 1929, which add detail of heating apparatus consisting of two boilers, a calorifier, radiators and two hot closets - HMPS: 402674; 402676).

The new Dining Room, now converted to a Gymnasium, is a single-storeyed building, gabled north-south (Fig 69). It has eleven bays of pier-and-panel construction in yellowish brick, laid in English bond on a chamfered plinth, with pale brick flat arches to the original openings and concrete sills to the windows. The piers incorporate moulded brick imposts. The roof is carried on steel trusses and covered with Welsh slate.

Figure 69
The 1927 Dining Room, from the NE (NMR: AA043940 © Crown copyright 1998)

Food was brought in from the Cook House via the former covered way (the entrance has been replaced by two small windows). All but the southernmost bay of the interior was occupied by the Dining Room, diners entering through porches on either side of the fifth bay from the north. Food could be kept warm in two closets at the southern end. Empty plates and crockery were dealt with in the Wash-up, forming the western half of the southernmost bay. The other half formed the Boiler House, with its own east entrance; above the Boiler House a loft served as the Tank Room. The boilers were fed from a small flat-roofed Coal Store, which remains, projecting from the south gable, and were served by a small stack, now dismantled.

The 1932 Cook House & Dining Room extension

Just five years later, in 1932-3, the Dining Room was extended to provide a new Cook House and additional dining accommodation (HMPS: 402565; 402691). The Cook House, together with an expanded range of service rooms and facilities, formed the centre of the new complex, set between the 1927 Dining Room to the west and a new Dining Room to the east. The additions were again in yellowish brick, with roofs of Welsh slate carried on steel trusses (HMPS: 402664).

The new Dining Room formed, when viewed from the south, a balancing wing to the old. It was slightly broader, but just nine bays in length. Broadly similar in style, it is plainer in detailing, lacking a plinth and moulded imposts, and having arches turned in the same brick as is used for the walling (Fig 70). The trusses bear on padstones, visible externally

Figure 70
The 1932 Dining Room, from the NE (NMR: AA043939 © Crown copyright 1998)

at the piers. Entrances, sheltered by porches, were positioned on the south and east walls. The Dining Room occupied the whole of the interior.

The new Cook House formed part of a T-plan range, the stem of the 'T' aligned north to south. The Cook House occupied the centre of the east-west range, extending backwards into the stem of the 'T', while Serveries opened onto the Dining Rooms on either side of it, and Wash-ups alongside received dirty crockery. New openings were broken through to connect these with the existing Dining Room. Additional space on each side of the Cook House was taken up by a Calorifier and a Bread Store for each Dining Room. There was a large Preparation Room to the rear of the Cook House, and beyond that three rooms closed off the range: from west to east, a Cook's Lobby, a slate-shelved Larder and a separate Meat Larder. A small block in the western re-entrant of the 'T' contained a Stoking Room for a large Rhodes Oven and a fuel store. In a separate compartment entered from outside, a stair descended to a basement Boiler House and Coal Store, which was the subject of revision proposals in October 1932 (HMPS: 402606).

Plans drawn up for improvements in 1939, on the eve of the Second World War, are more legible than the 1932 drawing and detail many of the features of a large army catering establishment (HMPS: 402672). The Cook House contained a freestanding four-oven coal-fired range, a *bain marie* alongside, a site for a fish fryer, a 72-inch range, a new vegetable boiler, 20-gallon stock pot, four steam pans, a new tilting pan and a wet steam oven. The Serveries were equipped with hot-plates and two tea boilers were to be installed in each Dining Room. In the Wash-ups, following the improvements, dirty crockery went first to the stripping table, then to a washing machine, and finally to the 'cleans' table.

The effect of these changes was to leave the 1911 Cook House available for other uses. According to drawings dated February 1932 the original building was divided between a Carpenter's Shop and a Weapons Training Store, while a Plumber's Shop occupied the former Preparation Room (HMPS: 402686).

Under HMPS management a Kitchen continued to operate in the eastern Dining Room and the successor to the T-plan range, while the earlier Dining Room to the west has been adapted for use as a Gymnasium. A lean-to addition against the west elevation belongs to this period. The T-plan range was damaged by fire: the south walls of the two Wash-ups remain, but otherwise this area has been rebuilt. The new work has a different footprint, but broadly matches the east Dining Room in appearance.

The Company Office, Company Store and Sergeants' Bunk (two buildings) (Fig 49)

These two buildings, which contained stores of clothing, small arms and sundry supplies, were erected to a common design dated 1928, at the same time that the Company Stores and Office building was constructed on the Western Outworks. One (here referred to as the south building) was located immediately north of the area behind the South-West Flank Casemates, while the other (the north building) stood a little to the west of the Regimental Institute (HMPS: 402540). The buildings, now demolished, were single-storeyed, of rendered brick, with slate roofs gabled roughly north-south. They consisted of three cells, each with independent access on the east front. The Company Store, heated by a stove on the west wall, was at the north end and formed the largest room. The Office occupied the centre, and had a fireplace back-to-back with another in the Sergeants' Bunk, intended for two sergeants. The south building seems to have retained this pattern of use throughout the military presence at the Citadel. The north building was adapted between 1929 and 1947 to serve as a Welfare Clinic, though changes to the fabric of the building appear to have been minimal (HMPS: 402582). An undated plan exists showing a proposal to extend one (or perhaps both) of the buildings northwards, to enlarge both the Company Store and Company Office (HMPS: 402660). The proposal does not appear to have been carried into effect.

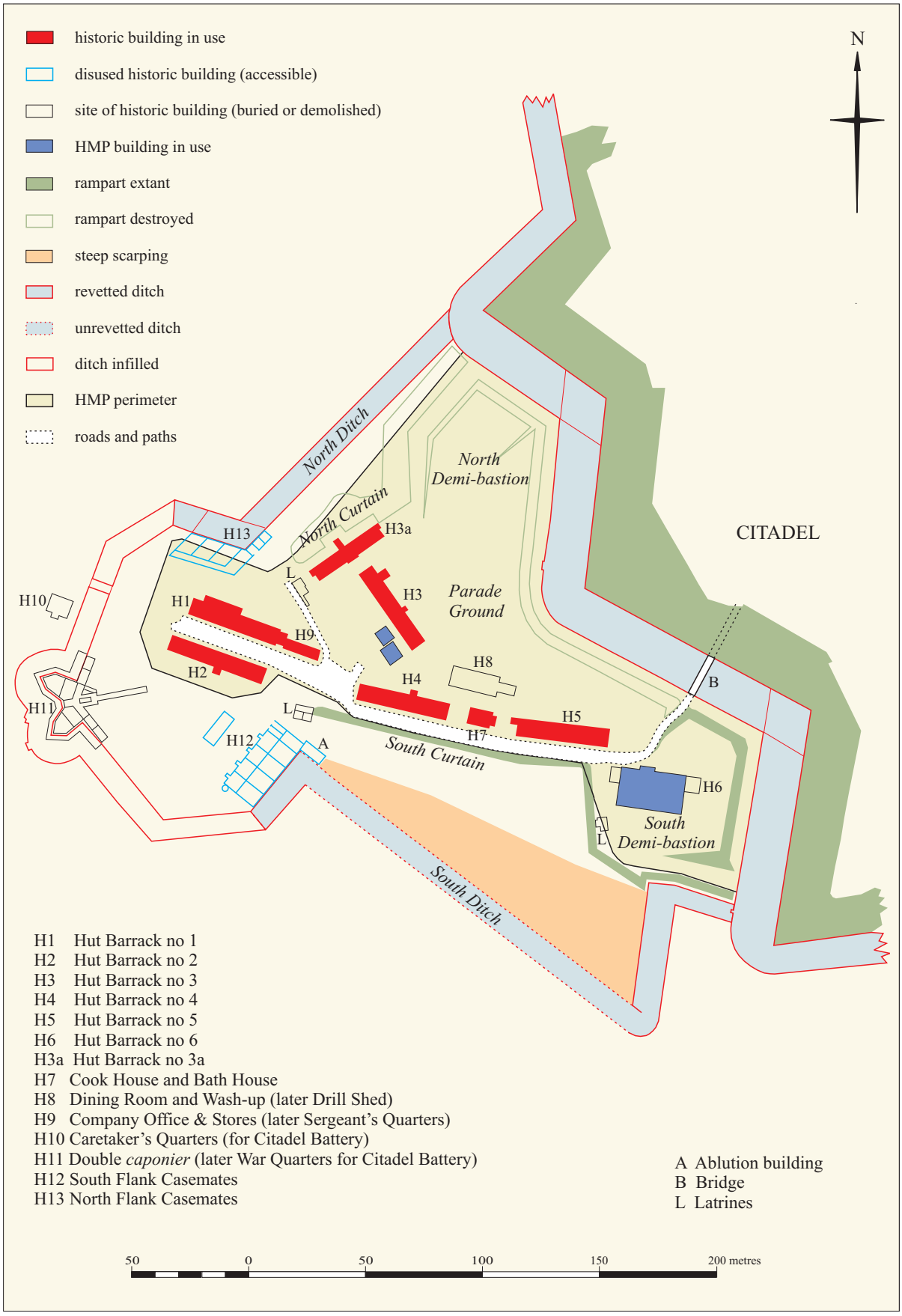

Figure 71
Plan showing the Western Outworks c1998 (text in italics indicates the nomenclature of the fortress used from the later 19th century onwards)

4. THE WESTERN OUTWORKS: DESCRIPTION AND INTERPRETATION

SUMMARY (Fig 71)

The construction of the Western Outworks was in full progress by February 1860 (PRO: WO/33/2775). The defended perimeter - essentially an irregular polygonal work of ditch and rampart - took in an area of flat ground on the Heights as far as a very narrow point on the ridge, thereby providing for more complete and effective defence of the western approaches to the fortress (Fig 71). Its ditch sprang from and returned to the main ditch of the Citadel. Access between the Citadel and the Western Outwork was provided principally by a new bridge, via the West Sally Port.

The ditch incorporated powerful flank defences in the form of a Double *Caponier* and, behind the scarp revetments, two sets of defensible casemated barracks - the North Flank Casemates and the South Flank Casemates. The rampart followed a different course to the ditch such that it was shaped to include a west bastion overlooking the Double *Caponier* and two demi-bastions, the North and South Demi-Bastions. While the ditch was secured by its flanking casemates, the three bastions and the rampart connecting them commanded the longer approaches to the fortress from the west. Despite this, there is no evidence of fixed artillery; this remained in the Citadel and from the outset it may have been intended to deploy mobile artillery in the Western Outwork if required. Accordingly, as designed and completed in the 1860s, there were no buildings on the Parade Ground, as is evident on the 1871 plan of the Citadel (PRO: WO/2755/12). However, in the late Victorian period and after, a group of Hut Barracks was constructed on the southern half of the area.

THE DEFENCES (Fig 71)

The ditch between the North Flank and South Flank Casemates, including the Double *Caponier*, was infilled in the 1960s but its course can just be seen due to subsidence of the fill. The remaining sections of ditch are thickly overgrown and access is difficult. It was probably intended to revet the counterscarp in knapped and faced flint, interspersed with red brick string courses; sections of such work are visible along the North and East Ditches. However, the counterscarp of the South Ditch was not finished; it comprises unrevetted chalk bedrock interspersed with patches of chalk block walling (which elswehere was used *behind* the outer brick or flint facing) and later concrete facing.

Figure 72
The Double Caponier *of the Western Outworks, from the SW c1959 (© Dover Museum, ref D07891)*

The scarp revetment was probably built in brick; only short sections are visible in the North Ditch, where it has been partly replaced in concrete, and the East Ditch. The South Ditch is mainly unrevetted bedrock, with patches of chalk blockwork.

Much of the south rampart is intact, including the South Demi-Bastion, as is the precipitous scarping of the slope between the rampart and the South Ditch. In contrast the western rampart and west bastion are lost to infilling, while the north rampart has been levelled to produce a flat area inside the present security compound. The southern part of the east rampart is also extant; it follows the main trace of the Citadel and was probably created by remodelling of the Citadel counterscarp bank; as such it is a reformed section of the early work laid out during the American War.

The Double *Caponier*, later War Quarters for Citadel Battery (Fig 73)
This account is derived from historic plans. The two-storeyed Double *Caponier* provided a powerful defence at the western end of the Western Outworks (Fig 72). The double form allowed each *caponier* to flank one principal face of the main ditch with carronade and small arms fire, while loops for small arms also covered the ditch between and around the two *caponiers*, in particular the approach to a sally port set between them on the lower level. The revetment of the *caponiers* was protected by a drop ditch, which

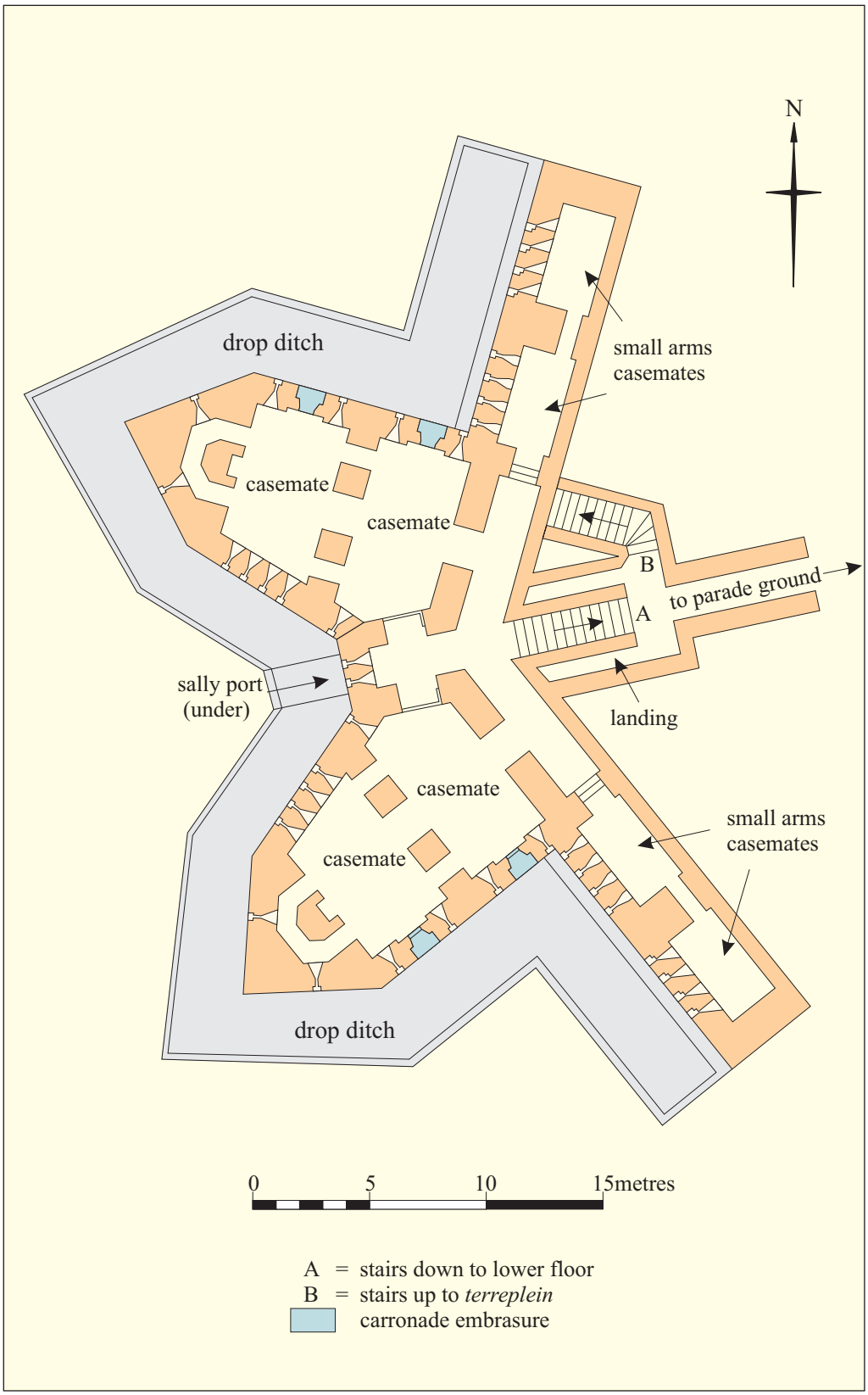

Figure 73
Plan of the upper floor of the double caponier *in the Western Outworks (after HMPS 402478; 402484)*

prevented an attacker getting close to the embrasures and loops. The sally port, protected by a drawbridge across the drop ditch, also provided access to a covered way on the counterscarp. The ditch counterscarp revetment was constructed in the form of two lobes: twin stairs against each lobe allowed for the rapid manning or evacuation of the covered way via the sally port.

The earliest drawings are revisions dating from February 1863 and probably show the structure much as built, despite some later amendments (Fig 73; HMPS: 402478; 402484). In spite of its singular form, the Double *Caponier* has features in common with the contemporary *caponiers* on the Western Heights at Drop Redoubt and North Centre Detached Bastion (Brown *et al* 2001, Pattison 2001). It was reached via a long stair descending in a gallery from the Parade Ground. The gallery opened onto a wider landing area on the upper level, in the centre of which a further stair descended to the lower level. The west end of the landing overlooked the approach to the sally port underneath it and was formed into a small arms position with twin loops in the face wall and twin 'murder holes' in the floor to cover the drawbridge below.

The *caponiers* were irregular on plan, with pointed ends, and were each divided into two heated rooms by a thick wall. The fireplaces were equipped with regulators placed high up in sub-vaults. The floors of the upper rooms were carried on cast-iron beams of inverted-T section, and were probably laid with flagstones.

On both levels, each room had a single carronade embrasure (later converted to a window) flanked by single small arms loops in one wall, and one or four small arms loops in the opposite wall. A U-shaped gallery at one end on each level gave access to a further pair of loops in the pointed end of each *caponier*.

On either side of the landing were the small arms galleries extending behind the ditch scarp revetment. Each consisted of two casemates, linked through entrances towards the rear of the thick party walls. The 1863 drawings show four small arms loopholes per casemate, although by 1921 the northernmost and southernmost casemates each had only one large opening (see below) (NMR: WD/unref). On the lower level, two expense magazines were positioned one on each side of the stair and entered via small lobbies opening off the small arms galleries.

Following the construction of the Citadel Battery outside the Western Outworks to the west in 1898-1900, the Double *Caponier* was adopted as the War Quarters for the battery, with barrack accommodation for 46 men in 1911 and 1929. It was probably for this purpose that the alterations were made in the northernmost and southernmost casemates of the small arms galleries to provide Ablutions and WCs. As part of this conversion, the loops were blocked and replaced by a single window (HMPS 402581; HMPS: 402582).

The North Flank and South Flank Casemates (Fig 71)

These were built as defensible casemated barracks, their small arms galleries serving to prevent an enemy force from gaining offensive positions in the ditch and on the counterscarp. Additionally, incorporated into the *terreplein* above the South Flank Casemates are four casemates for artillery, with a magazine in a sunken gorge behind. These were intended to mount carronades to flank the South Ditch, counterscarp and *glaçis*. Whether guns were actually mounted is uncertain but there was no armament in 1887 or after (PRO: WO/33/2775). No corresponding artillery positions were provided for the North Flank Casemates, as the North Ditch of the Western Outworks was covered by artillery mounted in Salient B at the north-west angle of the Citadel.

Systems of detached flank works like those in the Western Outworks, intended to close gaps in the defence of a trace, often with casemated artillery positions, are characteristic of the work of Jervois and Du Cane. They were employed extensively by them in the fortifications around Plymouth and Portsmouth (Saunders 1989, 169-76). Another feature of contemporary military architecture is the construction of defensible casemated barrracks incorporating a sunken gorge; another fine example was built on the Western Heights from 1860, at South Front Barracks (Pattison and Williams, 2001b).

The South Flank Casemates *(Fig 75)*

These casemates are positioned in the re-entrant where the South Flank (here facing south-east) meets the South Ditch. They are constructed against the rock-cut scarp face of the ditch, forming its revetment, in two ranges arranged at right-angles to one another (Fig 74). The larger of the two ranges, oriented roughly north-east to south-west, provided casemated barrack rooms on two basement levels, the lower of which has a floor level more than a storey's height above the bottom of the ditch. Above the rear half of the barrack rooms are a series of casemated gunrooms which accommodated carronade positions. These were served by a magazine on the opposite side of a sunken courtyard in the gorge. An undated but possibly original record drawing refers to them as '*Haxo*

Figure 74
The South Flank Casemates of the Western Outwork, from the south. Above the capping course of the main elevation, earthworks protect a series of casemated gun positions, the front wall of which is just visible (NMR: BB032747 © Crown copyright 1998)

casemates', a type usually open to the rear, but from the outset these appear to have been enclosed to double as Officers' Quarters (HMPS: 402575). The smaller range comprises two small arms galleries, each with three small casemates, that open south-eastwards from the north-east end of the two barrack floors of the main range. They served to flank the main range and the ditch but in peacetime doubled as the Cook House (upper floor) and Ablutions (lower floor), as shown on a plan of 1897 (HMPS: 402514).

Throughout the South Flank Casemates most of the timber features and other fixtures have been removed, but the brick shells are intact, together with vestiges of some fixtures and fittings. The walls are faced with yellowish-brown bricks known as grey stocks. Where the walls are built back-to-earth they are rendered, and a ventilated dry area separates them from the chalk face (this is visible to the rear of the north-eastern bay of the lower small arms gallery). A stone eaves course incorporates a wall-head gutter draining the bombproof earth roofs that cover the entire structure.

The architectural embellishment of the barrack-room fenestration is worthy of note. The large paired south-east-facing windows, those on the upper floor with semicircular heads, those on the lower floor with flat heads and inverted relieving arches (the latter

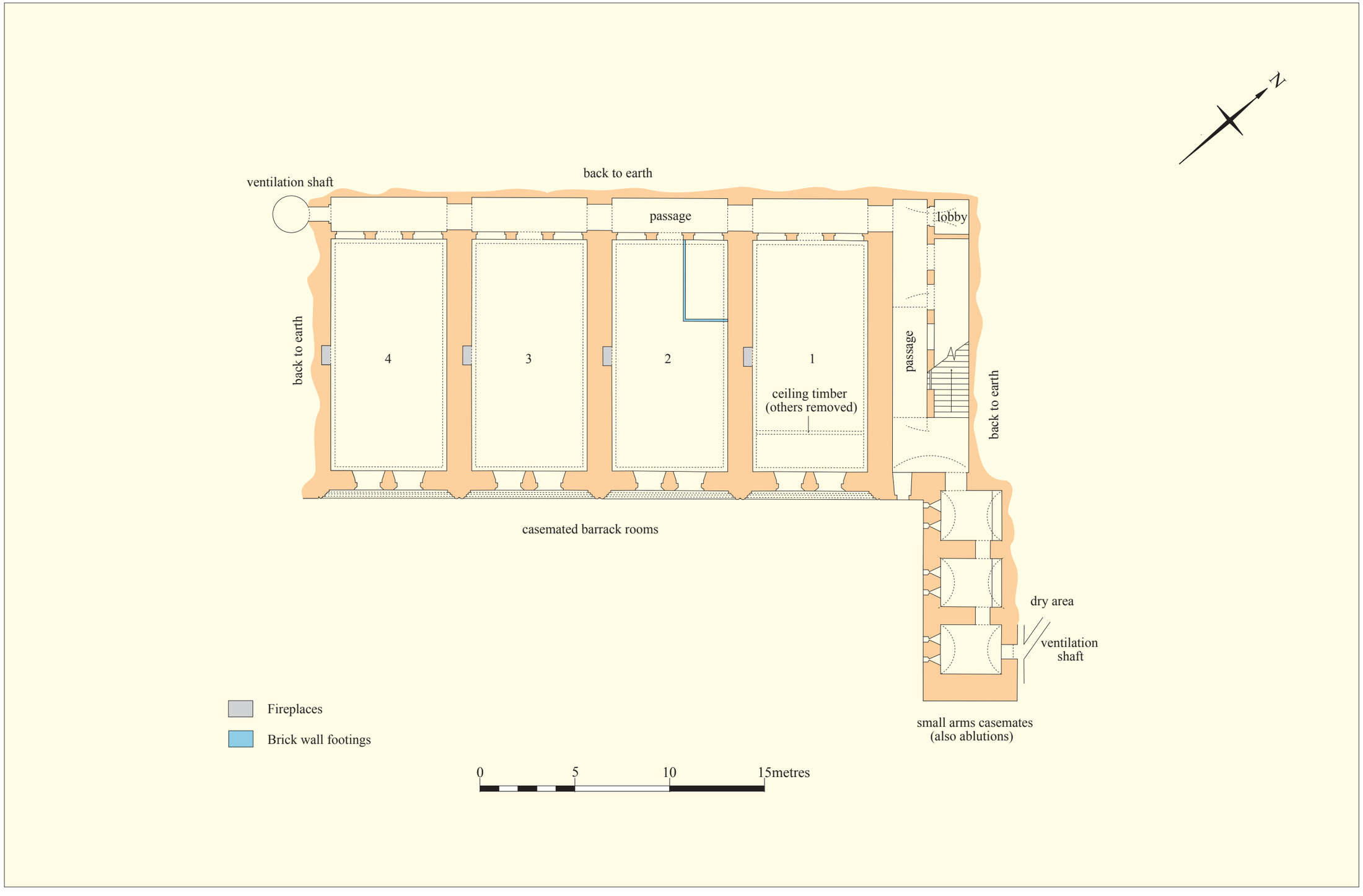

Figure 75 *Plan showing the Soldiers' Barracks (Lower Basement) in the South Flank Casemates of the Western Outworks*

only visible internally), have two chamfered orders of orange-red rubbed brick and shelving brick sills externally. Each pair is recessed within a giant arcade of deep segmental (nearly semicircular) arches turned in alternating plain and quarter-round orders of the same rubbed brick, set within a further half-round moulding. At the base of each recessed panel the brickwork batters out to the plane of the wall.

In contrast, each casemate in the adjacent small arms galleries was illuminated only through a pair of small loops with anti-ricochet reveals and stone lintels and sills. The vaults of the upper casemates are visible externally but lack the elaboration of the barracks arcading. Beneath each casemate the wall batters back from ground level within a recess framed by a segmental-arched opening of chamfered red brick. These recesses, similar to contemporary examples found elsewhere on the Western Heights - at the Officers' Mess and the *caponiers* at Drop Redoubt and North Centre Detached Bastion - allow small arms fire to be directed steeply downwards to the base of the scarp wall (see above; Brown *et al* 2001; Pattison 2001).

The barracks occupy five bays from north-east to south-west, the divisions being formed by transverse brick walls 1.31m (4ft 3½in) thick. The narrower north-eastern bay incorporates the stair and circulation space linking the barracks with the small arms galleries, while the remaining four bays each provide a barrack room on each level (Fig 74). The barrack rooms are lit from the south-east and linked by a passage along the north-west side. Each bay has a segmental brick-vaulted ceiling extending the full depth of the building at the upper level, while the rooms on the lower level formerly had flat ceilings of timber construction. Two plans of 1897 indicate that the lower rooms housed eleven men each while the upper rooms housed ten (HMPS: 402514; PRO: WO/78/2426/6). They were numbered 1 to 8, working from north-east to south-west and from the lower level upwards.

The entrance to both ranges is from ground level in the courtyard to the rear of the north-eastern bay, opening on to the stair. The lintel has been replaced in ferro-concrete, and the doors, set behind brick rebates, have been removed. In the south-west wall at the top of the stair there is a small original opening with a sandstone lintel and sill; when the doors were closed this provided borrowed light for the stair head from a small compartment containing a water tank. From the principal entrance, a long straight flight of stone steps with a simple wrought-iron balustrade descends to a stone-flagged landing on the upper basement level. The landing is lit by a small south-east-facing window, adjacent to which is a doorway to the small arms galleries. Beneath the stair there is a

small lockable room in the north corner of the bay, labelled '*Lobby*' on the 1897 plan (HMPS: 402514). A second straight flight descends to the lower basement level, where there was a similar arrangement (Fig 76).

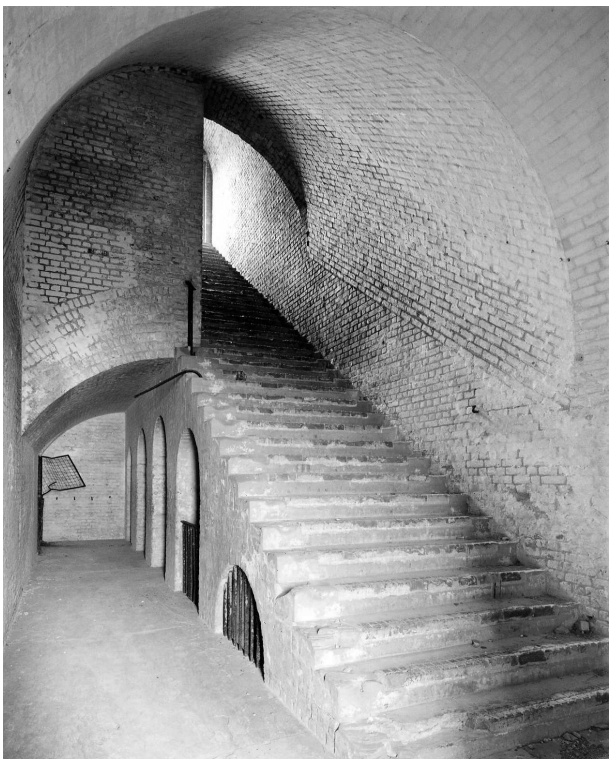

Figure 76
Stairway between levels in the South Flank Casemates, looking NW (NMR: AA043996 © Crown copyright 1998)

The passage linking the four barrack rooms on each floor was positioned along the rear wall, and care was taken to ensure adequate light and ventilation. The passages were lit by large square-headed windows providing borrowed light from the barrack rooms to the south-east. The windows have timber lintels set beneath segmental brick relieving arches, and were supplemented by top-lights to the central entrances of each barrack room. This arrangement survives intact in room no 6 on the upper level; elsewhere the remains are fragmentary, but indicate a consistent pattern. Within the passage, opposite each barrack-room door, there is a boot-scraper set into the wall. Ventilation was provided by a large shaft, circular on plan, positioned at the south-western end of the passage and rising to ground level. A low semicircular-headed doorway on the lower level opened into the base of the shaft, and on each level the passage was connected to the shaft by means of a circular aperture. Air was drawn in from the ditch wall via ducts, indicated by patterns of airbricks located on the piers and above the crowns of the arcade. The yellow airbricks are pierced by a distinctive arrangement of four elongated hexagons surrounding a lozenge.

There was also a tunnel (currently inaccessible) cut through the chalk, which departed from the passage in the south-western bay of the upper level. At its entrance, the double-leaf doors are heavily built with a layer of vertical boards on a second, diagonal, layer. According to a plan prepared in 1921 the tunnel emerged in the ditch somewhere to

the south-west. It may have been intended as a sally port for defence of the ditch and counterscarp (NMR: WD/unref).

With the exception of the ceilings (see above) the barrack rooms on each floor are identical in their general arrangements. Each was heated by a stove flued into a fireplace on the south-west wall, supplied with draught ducted through the cross-walls form the exterior. The fireplaces have brick jambs and sandstone lintels, which are pierced by the flue rising to squat brick stacks on the earth roof, each with a sandstone cap with three circular openings for the flues (one is presumably a foul-air flue). On the upper floor barrack room no 6 retains a cast-iron surround, which is probably original. The other three have been replaced by glazed bullnosed-brick surrounds, perhaps in the early 20th-century refurbishment (see below). Remains of the trimmers have also survived.

The barrack rooms on the lower level had suspended timber floors (now removed) and timber ceilings supported on timber cornice beams to north-west and south-east, and a continuous stone corbel course to north-east and south-west (Fig 77). Both the beams and the corbel courses have a chamfered underside. They supported transverse beams, of which only the south-eastern examples in the third and fourth bays from the south-west survive. Each beam is the sole survivor of a flitched pair, and each is chamfered with stops respecting two notches on the soffit. These appear to relate to former timber partitions or screens, though none are discernible on the various available drawings. In barrack room no 1 the joists and tongued-and-grooved boards also survive south-east of the beam. Copper sheeting associated with these remains may have had a fire-retarding purpose, but could not be examined at close quarters. The

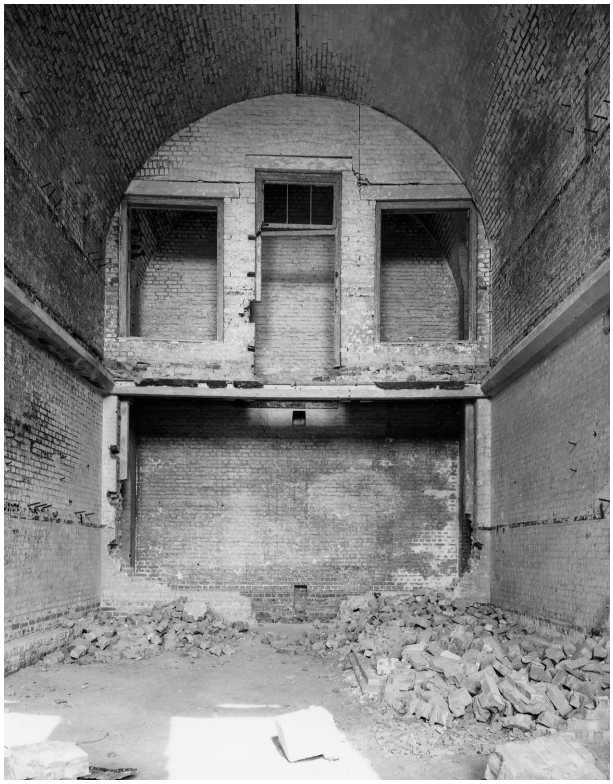

Figure 77
Interior of the South Flank Casemates, showing both barrack rooms in a single casemate. The floor between levels has been removed, leaving just the corbel course, but on the upper level, the door and windows onto the communicating corridor remain (NMR: AA043995 © Crown copyright 1998)

upper-floor rooms have vaulted ceilings, each incorporating a small sub-vault above the fireplace. Ventilation is provided by inlets in the front wall, with foul-air extraction by means of two roundels in the crown of the vault, in addition to a third roundel in each bay which is positioned above the passage.

The complement of eleven for each lower barrack room, as given on the 1897 plans, is confirmed by the remains of timber and iron fixtures on the north and south walls (HMPS: 402514; PRO: WO/78/2426/6). Each soldier had an allocation of space for a bed, together with a rack for belongings, distributed three on either side of the fireplace and five along the opposite wall, leaving a space at the north end of the north-east wall which was allocated for other purposes. On the upper level the 1897 plan indicates just ten men to each room, but in 1911 and 1921 the complement was eleven (PRO: WO/78/2426/6; HMPS: 402581; NMR: WD/unref).

The small arms galleries incorporate three rooms on each level. These have axial segmental vaulted ceilings, the segments of the lower rooms noticeably shallower than those of the upper rooms, which are nearly semicircular. The rooms are linked by doorways towards the rear of the dividing walls, and thus clear of the area around the small arms loops. Each room has two loops with lintels and sills of sandstone, the latter shelving steeply to permit downward firing (Fig 78). Smoke was extracted through ceramic pipe vents, set high on the rear wall on the lower floor, and in the crown of the vault on the upper floor. In the lower gallery, slits in the floor are 'murder holes' that allowed fire to be directed at the base of the scarp wall, eliminating a potential blind spot in the field of fire. The wall batters steeply inward to the

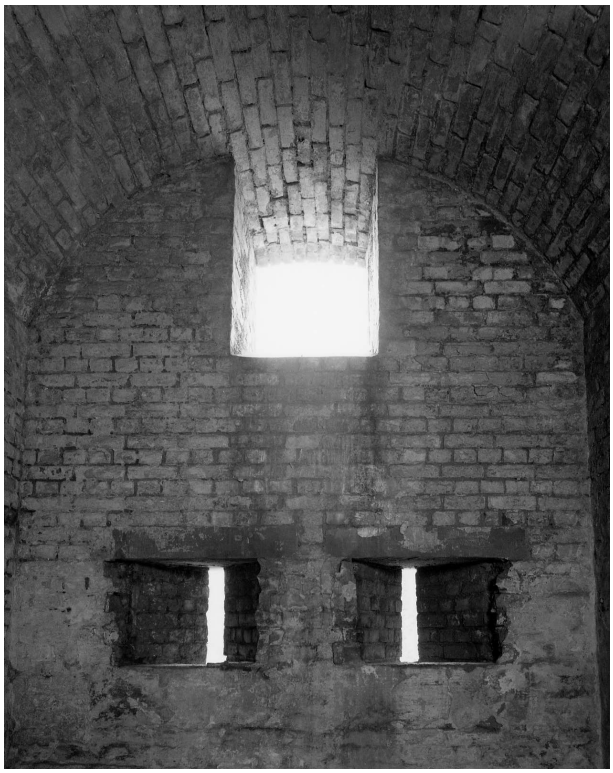

Figure 78
Interior of a small arms chamber in the South Flank Casemates, showing the twin loops with a window (probably inserterd later) above(NMR: AA043999 © Crown copyright 1998)

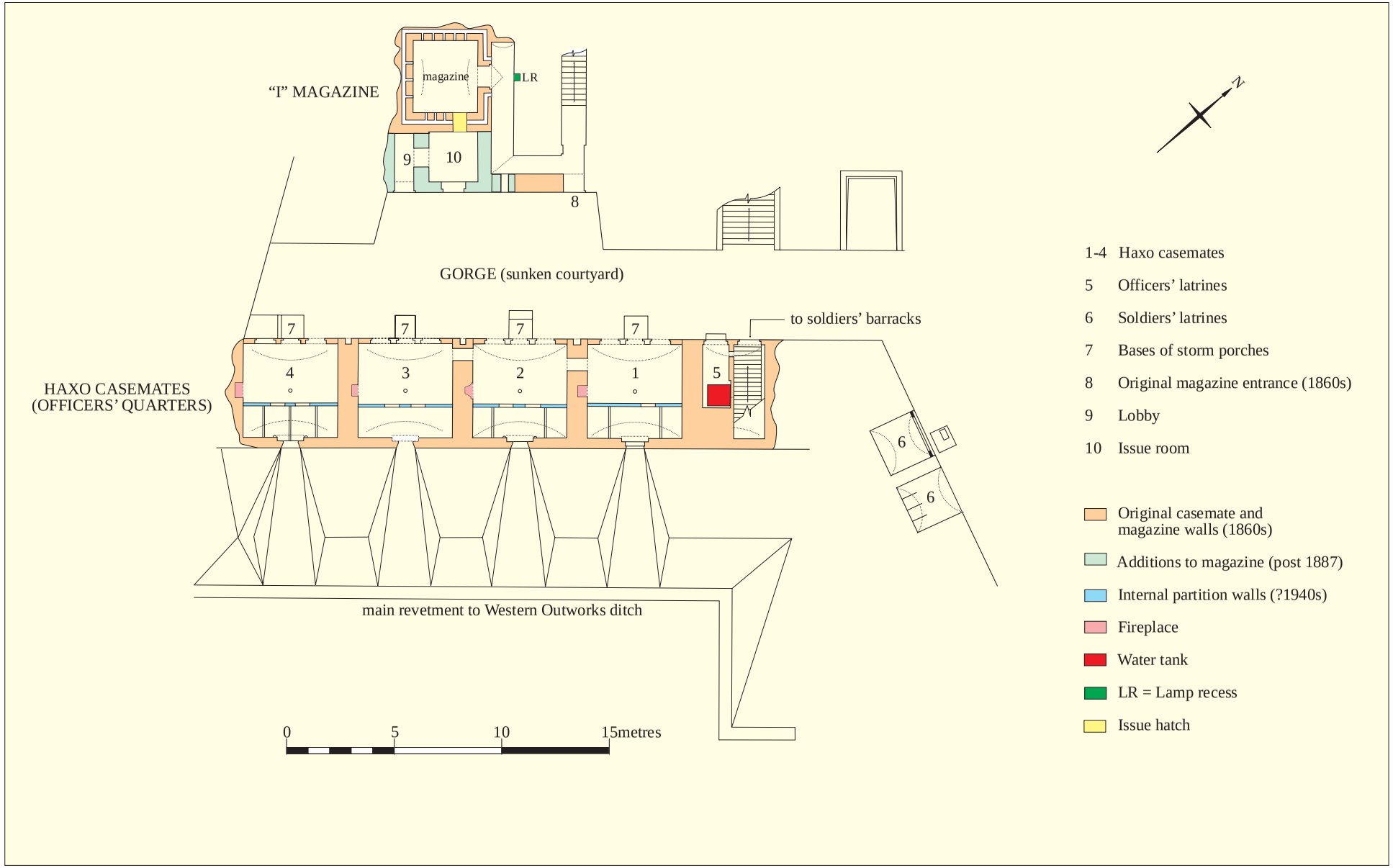

Figure 79 *The Western Outworks: plan showing the Haxo casemates (Officers' Quarters) and adjacent "I" Magazine, all part of the South Flank Casemates*

slot, within a chamfered and segmental-arched recess. The slots are blocked.

The other uses of the galleries are indicated on the 1897 plan. This shows the lower level given over to Ablutions, with a Bath House in the south-eastern casemate. The Cook House occupied the upper level, with a coal store in one corner of the north-western casemate, a sink in the corner of the central one, benches against the rear wall of both and what may have been the cooking range against the south-east end of the south-eastern casemate (HMPS: 402514).

The 'Haxo' casemated gunrooms *(Fig 79)*

These four revetted casemates (numbered 1 to 4 from the north-east) are located in a range above the casemated barracks. The range includes a fifth bay at the north-eastern end, which accommodates the barracks entrance and stair, together with a small compartment, now holding a water tank, which formed the officers' latrines in 1897 (PRO: WO/78/2426/6). This arrangement demonstrates that the Haxo casemates, although oddly positioned in relation to the barracks below, are contemporary with them.

Embrasures in the south-east front of the casemates look down the South Ditch and its *glaçis*. Substantial profiled earthworks protect the embrasures and the surrounding face wall (Fig 74). To the rear the casemates open onto a paved sunken courtyard forming the gorge, on the opposite side of which there is a magazine serving the gun positions. This arrangement protects the gun crews from reverse and enfilade fire coming from the west and south-west respectively. The sunken courtyard also served as an assembly area for troops ascending from the barracks below, while rapid access to the remainder of the Western Outworks was facilitated by placing a broad stair at the rear of the area directly in line with the stair rising from the barracks. Soldiers latrines occupied two bomb proof casemates set in the revetment at the eastern end of the area.

An undated, probably original, mid-19th-century drawing depicts the gun positions but also shows, on the rear wall facing onto the sunken area, porches similar to those at the contemporary Officers' Quarters at Drop Redoubt. These porches are shown on the 1871 plan of the Citadel (PRO: WO/78/2755/12). The undated plan describes the building *as 'Haxo casemates to be used as officers quarters'* (HMPS: 402575). In 1897 they were designated *'Unmarried Quarters (Haxo Casemates)* (PRO: WO/78/2426/6). Haxo casemates, named after the French military engineer General François Haxo, were always positioned on the rampart and distinguished by the absence of a rear wall, as for

example at Fort Nelson, near Fareham, and Fort Brockhurst, near Gosport, both in Hampshire. This allowed free movement for the gun crews, while the flank walls and vault provided protection against enfilade fire - particularly necessary on exposed outworks. Haxo casemates were favoured by Jervois and Du Cane in the design of detached works and were extensively used by them around Plymouth and Portsmouth, but no other examples have been found on the Western Heights (Saunders 1989, 169-76). Since Haxo casemates are generally distinguished by the absence of a rear wall, the use of this term poses certain problems. It is possible that the rear of each casemate was originally open, as original and inserted walls may not be readily distinguishable since in either case they are built up under the vault. However, the phrase '*to be used as*' does not appear to indicate a future intention, as the drawing also indicates '*Lower Floors to be used as Soldiers Barracks*', where no change of use is likely. In general, the drawing has the appearance of a record plan rather than a set of proposals and it seems most likely that the rear walls are original. This suggests that the term '*Haxo*' is used loosely in reference to the raised and exposed position of the casemates, as if on a conventional rampart.

Figure 80
Interior of a Haxo casemate in the South Flank Casemates, showing the original vault with circular smoke vent, fireplace, and the inserted wall (at left) partioning off the front of the casemate (NMR: AA043998 © Crown copyright 1998)

Some support for this view comes from the presence of several features. Each casemate has a fireplace, and while these are a standard feature of conventional casemates they are not necessarily a feature of Haxos. Each has a circular aperture in the crown of the vault; again these are characteristic of casemates intended to serve as barracks, either permanently or in siege conditions, but would be superfluous in freely-ventilated Haxo casemates (Fig 80). Furthermore, the air bricks in the walls facing the sunken area have the same geometrical motif as is found in the lower barracks and elsewhere in work of this period. Finally, the large size of the casemates (6.1 x 6.0m or around 20ft square) suggests that they were intended for occupation.

The casemates have the segmental brick vaults characteristic of the mid-19th-century works at the Western Heights, with facing bricks of the same yellowish-brown colour as the remainder of the South Flank Casemates. The bombproof layer spread over the vaults is retained by a parapet with stone coping resting on stepped-out brick courses. The elevation facing the courtyard has openings, largely surviving in the south-western casemate but fragmentary elsewhere, with cambered arches of gauged red brick and lime-putty pointing, and sandstone sills. Each bay had a central doorway flanked by windows. The surviving doorway has a rendered and scored surround indicative of the finish in the former porches, which had flat slate-slab roofs. The ditch ends of the casemates are closed beneath the vaults by brickwork panels incorporating a single rectangular embrasure with a sandstone lintel and sill beneath a deep segmental relieving arch consisting of six rows of brick headers. They are interspersed with substantial buttresses.

Located inside no 3 are the main component parts of a wrought-iron shutter over the embrasure (Fig 81). The mechanism consisted of two vertical guide rails flanking the embrasure and secured to the wall by bolted lugs. Above each rail a pulley wheel was mounted running in a bracket suspended from the soffit of the lintel. Presumably the wrought-iron shutter ran between the rails and was lowered to rest on the floor when the embrasure was in use; it could not be hoisted up clear of the embrasure as there is inadequate headroom. The otherwise identical nature of the casemates, and the rails for another shutter in no 1, suggest that the arrangement was common to all of them.

It is not certain whether or not these shutters were fitted at the time of construction, but it is likely. Massive iron shields were added to coast artillery batteries after reports received from observers of the American Civil War (1859-1863) and it is probable that slighter shutters sufficed for less exposed land front positions. The fitting of shutters in the South Flank Casemates may be related to their position, potentially exposed to artillery fire from warships to the south. Carronade embrasures elsewhere in the Citadel and across the Western Heights retain similar evidence for the mounting of internal iron shutters, for example at the Gorge Casemates (see above) and in the gun casemates of North Centre Bastion (Pattison 2001). A further refinement, probably by virtue of the dual use of the casemates as Officers' Quarters, was the provision of outward-opening hinged iron shutters set in an iron frame.

In common with carronade positions elsewhere on the Heights these positions are provided with various mountings essential for the operation of the gun carriage.

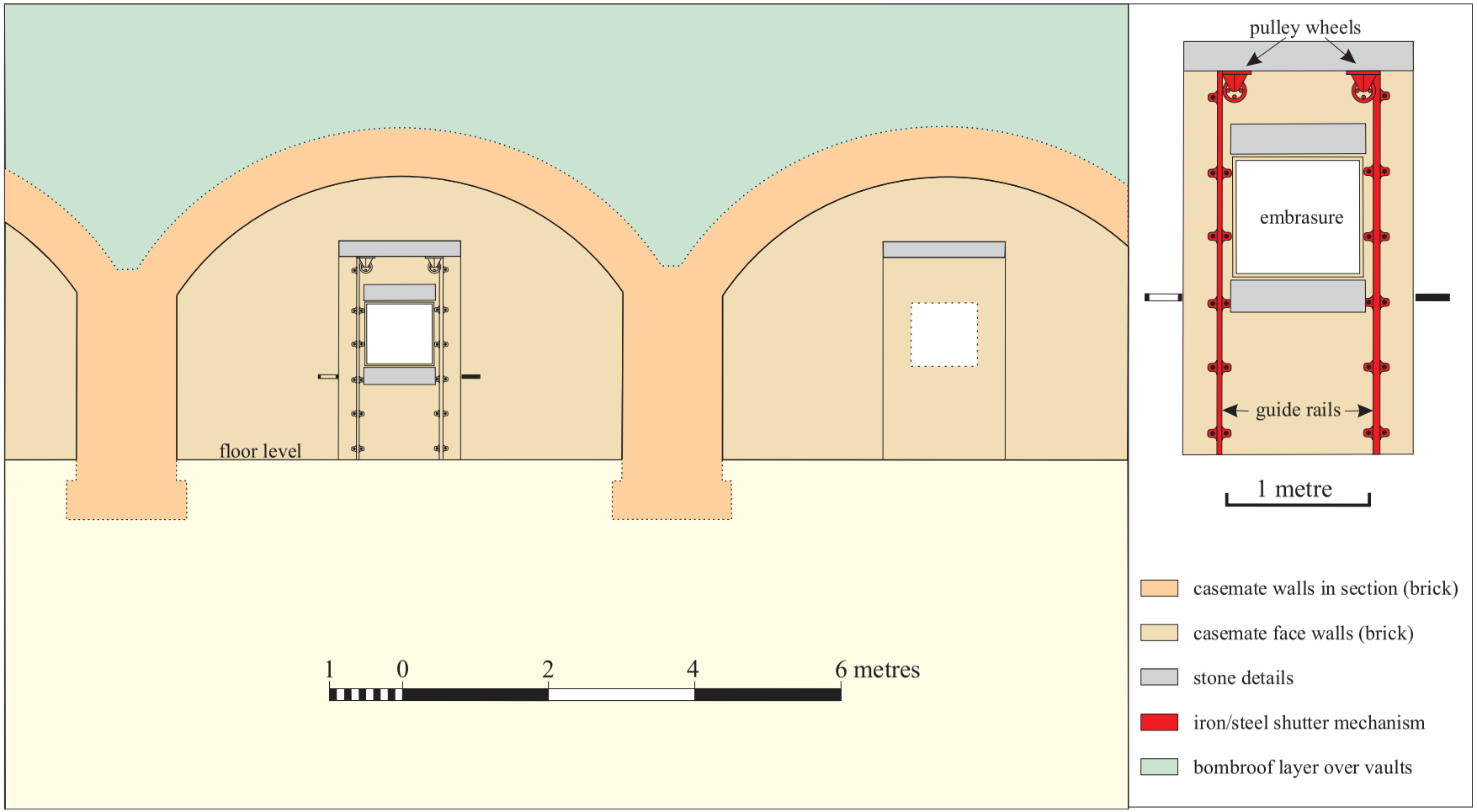

Figure 81
South Flank Casemates: elevation of the face wall of No 3 Haxo casemate, showing the wrought iron shutter over the carronade embrasure, with detail

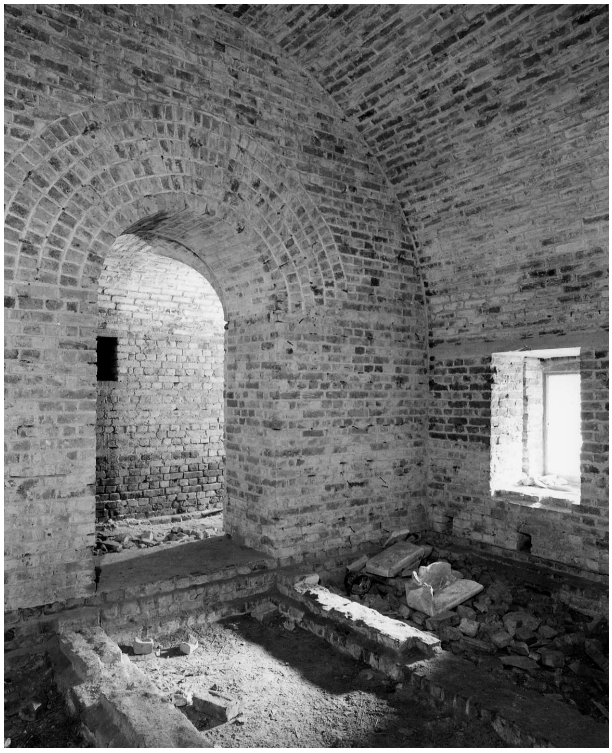

Figure 82
The interior of "I" Magazine in the South Flank Casemates, showing the entrance and (at left) hatch to the shifting room (NMR: AA044000 © Crown copyright 1998)

Cast-iron rings set in the wall on either side of the embrasure provide anchor points for the ropes and pulleys used to traverse the timber gun carriage. Another ring mounted in the top of the vault is for the attachment of a rope from the cascable of the carronade to absorb the recoil.

'I' Magazine *(Fig 76)*

The magazine is directly opposite the gun casemates, its entrance elevation recessed into and protected by a thick layer of earth which covers the whole structure. The original layout is shown on a drawing dated 1882, when it was designated '*I Magazine*' (NMR: WD/2411A). The entrance from the courtyard is through a doorway, formerly with a semicircular head, onto a narrow vaulted passage leading to the interior of the Western Outworks via a series of steps. A separate passage opens off it to the west; this served as a shifting and issue lobby and incorporates a dog-leg to protect the magazine against blast. Set in the wall directly opposite the magazine entrance is a recess for a magazine light. The magazine interior, of conventional design for the Western Heights, is of cavity wall construction, with an axial semicircular vault and, originally, a suspended timber floor. It is well ventilated by air ducts in the wall cavities, drawing air through grilles set in the passage wall on either side of the rebated magazine entrance (Fig 82).

Later alterations to the South Flank Casemates

On the south-east side of 'I' magazine are two rooms not shown on the 1882 drawing, occupying the position of the former earth bombproofing between the magazine and the courtyard. One room is linked to the magazine by a hatch in its north-west wall, and connected to the courtyard through the second room, a tiny lobby on its south-west side. It appears that these rooms were added after 1887, as part of a programme for strengthening all of the magazines on the Western Heights that was recommended by the Committee on Military and Commercial Ports in June 1887; another conversion is known

on North Centre Detached Bastion (PRO:WO/33/2775; Pattison 2001). Together, these rooms formed a new shifting area for handling and issuing powder. As part of the work, three new openings were made in the revetment facing the courtyard an entrance into the tiny lobby; a window/issue hatch for the new shifting room and a window to light the original shifting passage. The new openings have semicircular heads except for the shifting room window, which has a segmental head in red brick.

In 1897, the Haxo casemates provided Unmarried Quarters for eight NCOs, while the barracks below continued to accommodate 84 ordinary soldiers (PRO: WO/78/2426/6). Several minor alterations probably date to the early 20th century: the ablutions facilities in the small arms galleries were upgraded. This entailed blocking the small arms loops and replacing them with louvred windows set high beneath the vault. Slate shelves and fragments of other fittings survive, including peg-racks. Glazed brick fireplaces survive in three of the upper-floor barrack rooms, and are probably roughly contemporary. The stair was altered by setting blue-brick paviours into the original stone treads.

The Soldiers' Quarters were still in use in 1929,while the former Officers' Quarters were assigned as Sergeants' Barracks by 1911 (NMR: WD/unref; HMPS: 402581). By 1929, nos 3 and 4 remained as sergeants' accommodation but no 2 was a Company Store and no 1 a Company Office. Moreover, no 3 is shown divided in two by a brick wall (HMPS: 402582). Subsequently, partition walls rising to the vault springing were inserted in the remaining casemates, using a cheap pink stock brick which suggests construction during the Second World War (Fig 80). Inside the smaller rooms created by the partitions are three dwarf walls running between the front wall and the partition wall. These walls rise to just above the sill height of the embrasure; indeed the central wall in no 3 is keyed into the embrasure by four courses of brickwork built between its jambs. There is no evidence for a suspended floor at this height and no clear means of access to the partitioned-off areas, beyond two hatches or ventilators set high in the walls. It may be that these areas were adapted for storage, perhaps as temporary magazines.

Aerial photographs taken in October 1945 show considerable activity around the casemates (NMR: 1066/UK/944/6089-90, 98). The profiled earthwork on the South Flank was cut into, forming a retrenchment; on the *terreplein* side of this there is a polygonal concrete-walled enclosure for a light anti-aircraft gun, perhaps the remains of another and a shelter or predictor mounting. A path leads back to the casemates and magazine suggesting that the two sites were connected, perhaps serving as magazines

and crew shelters. The lack of any grass growth on the area surface suggests that it was in regular use and the porches for each casemate were intact.

In 1947, the former Officers' Quarters appear still to have been in use, but the Soldiers' Quarters were disused (HMPS: 402582).

The North Flank Casemates *(Fig 71)*

The North Flank Casemates are positioned in the obtuse re-entrant where the North Flank meets the North Ditch. They are constructed against the rock-cut scarp face of the ditch, forming its revetment, in two ranges (Fig 83).

At the time of survey, the condition of the building was very poor, with large sections of the front wall collapsing or overgrown. Parts of the upper floors of the barracks had collapsed or been removed, and the stair passages were judged to be unsafe. For this reason they were not closely examined.

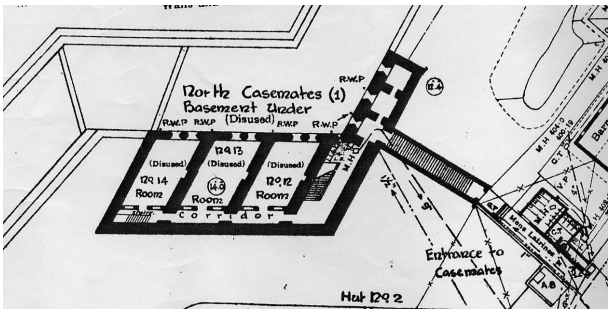

Figure 83
Plan of the North Flank Casemates, dated 1930 (402582 © HMPS)

The building is two-storeyed, comprising a main barrack range orientated east-west, with a small arms gallery projecting north-eastwards from the eastern end. In essentials, and in the architectural treatment of the ditch elevations, they are similar to the South Flank Casemates, but there were significant variations in the plan-form. The casemated barrack rooms, numbered 9 to 14 (from east to west, bottom up) and each housing nine men in 1897 and 1911, have a similarly arcaded front, but there are only three of them, rather than four (PRO: WO/78/2426/6; HMPS: 402581). They differ also in that the re-entrant they occupy forms an obtuse angle, not a right angle, with the result that the barrack rooms and the adjoining stair and circulation area have trapezoidal plans.

In the absence of a surface range such as the Haxos at the South Flank Casemates, access was via a stair descending through a gallery from the Parade Ground to the south-east, opening into the southern chamber of the small arms gallery. The tunnel, near the top of which latrines were located, is now blocked. Between the two levels of the casemates the

stair was similar to that in the South Flank, as was the general arrangement of the passage access to the barrack rooms, the floor construction and the disposition of fireplaces and other fixtures within the rooms. The fireplaces each have a ventilation slot placed directly over them, with a large iron flap to control the airflow. This appears to be a method of controlling the draft on the fire. The hearthstones on the upper floor were trimmed in a timber and wrought-iron box laid across three parallel joists. Ventilation for the barrack rooms is provided by vents under the floors, a vent in the end wall opposite each barrack room doorway and a circular vent set in the crown of the vault, emerging on the surface of the bombproof roof. The stubs of wrought-iron equipment racks in the walls show that each barrack room was actually designed to accommodate eleven men.

The entry to the small arms galleries from the stair bay on both floors has a rebate for a doorframe. Unlike in the South Flank this allowed the occupants of the small arms positions to close themselves off from the more vulnerable barracks, while retaining the ability to retreat to the *terreplein* and Parade Ground. They consist, like those in the South Flank, of three rooms on each of two floors, but differ in that each room has just a single loophole. The loopholes, which have segmental heads and anti-ricochet reveals, provide a good field of fire along the ditch, with those on the upper level able to cover the top of the counterscarp and the *glaçis.*

In a variation on the arrangement at the South Flank, the upper galleries are here provided with 'murder holes' rather than the lower. This appears to be because the lower level of the casemates is much closer to the level of the ditch bottom than at the South Flank. The ditch wall of the small arms galleries is carried at the upper level by an arcade of segmental arches. Beneath these the lower level is battered in between the piers. The upper level thus projects over the lower level, allowing the creation of a slot through which small arms fire could be directed at the base of the batter. Internally each loophole is placed in a room divided from the next by a brick cross-wall, in the rear of which is a connecting doorway. Pipe vents set at the top of the vault in the rear walls provide ventilation. On the lower floor, the corroded remains of a two-part pintle-hung iron shutter for the loop remain in the south-western room.

The small arms galleries doubled as a Cook House on the upper level, and Ablutions on the lower, the uses recorded in 1897 (PRO: WO/78/2426/6). They were, however, disused by 1911 (HMPS: 402581). The remains of sinks are visible in the central rooms on both floors, where the loops have been converted into windows. A low vaulted tunnel cut into the chalk from the rear of the northern room on the upper level may be some form

of drain connected with this later use. Other latrines and sinks were placed in the stair bay adjoining the barracks.

Alterations to barrack room no 11 on the lower level are shown on a plan drawn in 1921 but incorporating modifications made up to 1929 (NMR: WD/unref). Between these dates, the western window was modified to provide an entrance directly from the ditch. The opening, together with a partition forming a passage between the ditch and the original passage serving the barrack rooms, is labelled '*new*' in a hand belonging to the 1929 revisions. A staircase against the rear wall, close to the end of the new passage and rising only to the upper floor, is probably part of the same scheme of works. Access to the ditch, at a time when the casemates were deemed to be redundant, seems to have been the motive for the alterations, since the barracks are labelled '*disused*' in the same hand.

The Hut Barracks (Fig 71)

The Western Outworks were developed in 1890-1 to provide surface barracks and associated facilities. The structures built are close in date to those of the St John's Road Ordnance Store (1891 onwards) and may similarly have been part of the mobilisation policy which required barracks to be capable of receiving large-scale troop reinforcements at times of need. The Citadel - now referred to as Citadel Barracks - had to accommodate a regular infantry battalion (up to 1000 men) and be able to provide temporary accommodation for reservists. It is unclear what relationship the buildings may have acquired, within a decade of their construction, with the coast artillery emplacements of Citadel Battery which were built nearby to the west. A plan drawn in 1911 designated the Double *Caponier* on the Western Outworks as War Quarters for Citadel Battery, intended for a complement of 46 men (HMPS: 402581). It is possible that the 1890-1 buildings in part provided peacetime accommodation for the gun crews, access to the battery being provided by a bridge crossing the North Ditch (HMPS: 402609).

The surviving buildings of 1890-1 are single-storeyed and constructed of red brick on a blue brick plinth. The roofs were originally of Welsh slate. Most of them were ranged on either side of a terraced road originally linking the Citadel with the South and North Flank Casemates and Double *Caponier* but subsequently extended across the North Ditch to Citadel Battery (Fig 71). The road left the Citadel via the West Sally Port and bridge, passing through the counterscarp in a cutting with a 19th-century brick retaining wall in English bond.

Barrack Huts nos 1-6 (numbered from west to east)

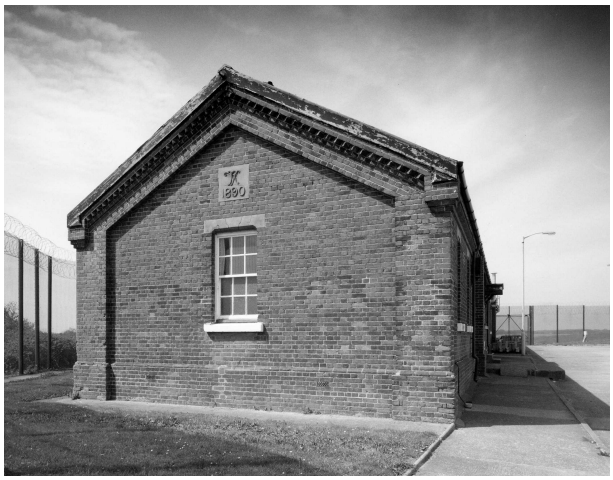

Figure 84
Barrack Hut No 1, in the Western Outworks, showing the royal cipher on the east gable (NMR: AA043992 © Crown copyright 1998)

These were all thirteen-bay barrack huts and five of them survive, nos 1-5, all bearing a terra-cotta plaque on one gable, with the cipher of Queen Victoria and the date 1890 (Figs 84-5). A modern store and boiler house occupies the site of no 6, which was demolished after 1947. All but no 3 were located beside the road. A further hut, no 3a, was built to a different plan in 1928-9 and is discussed separately below. A plan of 1911 indicates that nos 1-6 were originally constructed to a common plan, which follows a design proposal of 1890 (HMPS: 402581; 402658). Several of the huts occupy terraced sites, which are cut into the Parade Ground, but this has no defensive purpose and in fact the exposed position of the buildings reflects the waning importance of the Western Heights as a defensible artillery fort.

Only limited internal access to the buildings was available during the survey, but in no 3, for example, all original internal partitions have been removed (they can be identified by

Figure 85
Barrack Hut No 5, in the Western Outworks, from the SE (NMR: AA043991 © Crown copyright 1998)

paint scars), and the other huts may have been similarly modified. There have been several minor flat-roofed additions, some of the stacks have been dismantled and all of the huts have been rendered on their south and west faces, but their external form remains largely intact. The following account is based primarily on external observation and surviving record drawings.

The huts have clasping buttresses at each corner and corbelled brick verges incorporating a cogged raking cornice. The same cogged detailing occurs on the eaves. The openings have flat arches formed of moulded and joggled terra-cotta voussoirs. The windows have stone sills and are fitted with horned sashes. A single window in each gable is three panes wide, whereas those in the sidewalls are narrower with two panes. Airbricks below floor level and under the eaves have distinctive quatrefoil piercings. The roof, which survives in some (perhaps all) cases, consisted of composite timber trusses, with timber rafters and collars, and wrought-iron triangulating rods. In no 3 the undersides of the roof slopes have horizontal boarding. Cowled ventilators were distributed along the ridge.

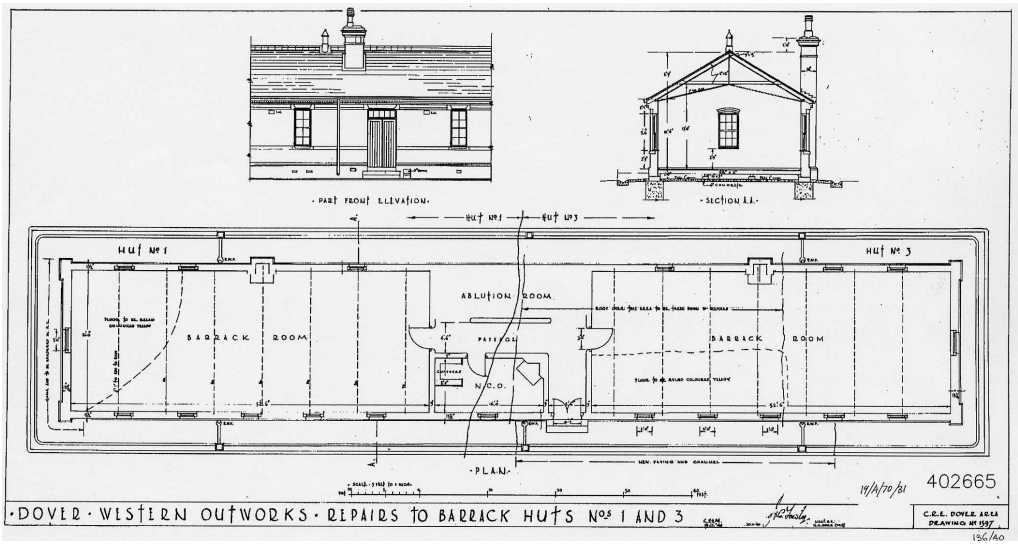

Figure 86
Drawings of Barrack Hut 1 and 3, made in 1940, showing that they remained largely unaltered from the original design of 1890-1 (402665 © HMPS)

The same plan was adopted regardless of the relationship between the hut and the road, so that the front, incorporating the sole original entrance, was in every case on the south side. Each hut consisted of two large barrack rooms placed either side of a central area in which the entrance, Sergeant's Bunk (a small room) and Ablution Room were located (Fig 86). Each barrack room accommodated 21 men, 12 along the front and 9 along the rear: the difference reflects the position of the stove, roughly central to the rear wall, served by a projecting stack and flanked internally by shelves. Both stacks survive on no 4 and one

remains on no 2. The barrack rooms were linked to the entrance by an axial passage through the central area, off which the Sergeant's Bunk and Ablution Room opened, borrowed light being contrived from the latter. The Sergeant's Bunk was placed immediately west of the entrance on the south front, and incorporated a corner fireplace and a cupboard fitted with shelves. The fireplace was flued into a small stack rising just in front of the ridge. None of these stacks survive.

The Ablution Room contained a row of sinks along the rear wall, with a seat at one end. On the opposite wall, between the twin entrances from the passage, was a row of pegs for hanging clothes or towels. At the extreme ends of this wall were placed coppers, encased in white glazed brick, for boiling water for two baths, which occupied cubicles intruding into the Ablution Room but which were entered directly from the barrack rooms, the arrangement of beds along the rear wall allowing for access. The bath cubicles were lit by small rear windows, the Ablution Room by three windows of the normal pattern except that the sills are higher. The Ablution Room was served by an additional ventilator cutting through the roof slope. A revised version of the original drawing shows the western bath in an enlarged cubicle, enclosing the seat and no longer accessible from the barrack room; the 1911 Citadel plan shows both that this revision was carried out and that it was the only bath in each hut (HMPS: 402614; 402581).

Between 1921 and 1929, the complement of each hut was reduced to a sergeant and 36 men. Bathing facilities were removed to provision elsewhere on the site (see below) and a WC took the place of the bath cubicle; the other original bath position was occupied by a urinal housed in a small flat-roofed projection on the rear wall (HMPS: 402581; 402582). One of these survives on hut no 5. Drawings dated 1940 record repairs to nos 1 and 3, indicating that they were substantially unaltered at that date (Fig 83; HMPS: 402665).

Between 1929 and 1947 no 4 was adapted to provide a Games Room in the western barrack room, while the eastern room was divided between a Recreation Room and quarters for six men (HMPS: 402582).

The Cook House (later Bath House) and Dining Room (later Drill Shed) *(Fig 71)*
This small building, rendered externally, was the original Cook House serving the barrack huts and is recorded in an '*amended plan, as executed*' dated 1890 (HMPS: 402502). It also appears in outline on a plan of 1897 (PRO: WO/78/2426/6). Situated between barrack huts 4 and 5, it consists of a gabled main block with a corrugated asbestos roof, and a 20th-century flat-roofed addition against the east gable.

The original Cook House of *c*1890, now heavily altered, corresponds to the eastern two-thirds of the main block. It was a square single cell on plan, with a timber verandah to the south front. The tiled roof was pyramidal, surmounted by a finial and pierced on each slope by a Kite's Ventilator. The verandah sheltered a central entrance flanked by two windows, and there were a further two windows in each of the east and west elevations. The blind north wall incorporated the flues for an oven flanked by boilers, and a hot-plate returning along the east wall. Further along the east wall there was a cupboard placed over a coal bunker, and another feature which may have been a bench. A dresser and sink were ranged along the west wall, and there were two benches in the middle of the room.

Drawings dated 1899 record two variant proposals to add a Bath House for an NCO and three men to the rear of the Cook House. This involved extending the terrace, producing a scarp which, though softened subsequently, is extant. The Bath House had a shallow-pitched lean-to roof and a rear wall pierced by four small arched windows, each lighting a bath cubicle. One cubicle, for the use of NCOs, was entered from the west via a lobby, while the remaining three, for other ranks, were entered from the east end via a passage. One proposal involved the installation of a hot-water tank, set over a boiler on the west wall and served by an added flue (HMPS: 402622). In the event the alternative proposal was followed: the hot-water tank was installed in the same position but set over a relocated sink, the dresser being displaced onto the south wall, while the '*hot water apparatus*' and added flue were placed against the east wall (HMPS: 402501). A plan and cross-section and a detail drawing of the hot-water apparatus, both undated, also survive. The engineer's name is given as Edward Deane, of 1 Arthur St, London Bridge (HMPS: 402680, 402657). There is also a drainage plan dated August 1899 (HMPS: 402673).

In 1922 a plan was proposed for a Dining Room and Wash-up. This indicates that a Preparation Room had been added against the west end of the Cook House since 1899 (HMPS: 402668). Built of brick, it was entered from the south, in the position of the present window, and lit from the west by three windows and by one on the north. It survives, corresponding to the western bay of the present building, distinguished by a higher plinth on the rear wall. A WC was added to the west end of the Bath House in the same period.

According to the 1922 plan the proposed Dining Room was to accommodate 312 men at tables of sixteen or eight, the smaller tables corresponding to the positions of two free-standing stoves. A later drawing, dated 1925, suggests that the eight-man tables and a number of the larger ones were not required (HMPS: 402505). The building consisted

of a main range forming the Dining Hall, with a narrower range at the east end containing a Lobby, connected by a covered way to a new doorway inserted in the east wall of the Cook House. Beyond the Lobby was the Wash-up, containing sinks, plate racks, etc. The walls of the new building were of timber, except in the Wash-up which had timber on low concrete walls, beneath corrugated iron roofs carried on timber trusses. It was cut into rising ground to the rear, but its floor level was nevertheless some 8ft higher than that of the Cook House. The building had a short life, as in February 1932 drawings were prepared for the partitioning of the Cook House to serve as a Band Institute Store, Drums Store and Boiler House, and the Preparation Room became a Signal Store (HMPS: 402686). This made the Dining Room redundant, and in 1933 a revision to the drawing noted *that 'no further maintenance charges to be incurred in upkeep of this building*'; instead it was denominated a Drill Shed (HMPS: 402612). A note on another plan records that it was destroyed by enemy action in 1940 (HMPS: 402582).

It is possible that the alteration of the Cook House and Preparation Room was not carried out according to the 1932 proposals. If it was, the change was short-lived, as by 1947 the remaining buildings had become a Bath House complex. The former Cook House contained a series of baths and showers, the former Bath House contained further shower cubicles and the Preparation Room had become a Drying Room (HMPS: 402582). It is possible that the pyramidal roof of the Cook House, still present in 1932, was replaced at this time with the present gabled structure. The former Bath House was demolished subsequently and the original Cook House entrance seems to have been replaced by another to the west. What remains today is the Cook House and the later Preparation Room, both much-remodelled and currently used as a Canoe Shed. The flat-roofed addition dates from after 1947.

Barrack Hut No 3a

This, the most northerly barrack block, is terraced into the *terreplein*. Its different form and plain neo-Georgian detailing set it apart from the 1890 buildings, though it provides similar accommodation on a broadly similar plan. Drawings dated August 1928, and subsequently maintained as record plans, indicate that it was intended for 30 men and one NCO. Construction began in October 1928, with completion the following September (HMPS: 402504, 402616).

Fenestrated as ten bays, the building has brickwork in English garden wall bond and a renewed slate roof carried by timber king-post trusses (Fig 87). On the south front, the two central bays form a shallow hipped projection corresponding to the entrance and the

Figure 87
Barrack Hut No 3a, in the Western Outworks, from the SE (NMR: AA043993 © Crown copyright 1998)

NCOs room, while to the rear a deeper projection, also hipped but off-centre, forms a sanitary annexe. The openings have cambered gauged-brick arches and stone sills; the gables and eaves, by contrast with the other barrack huts, are plain and the gables were originally unfenestrated.

With the exception of the sanitary annexe, the interior was broadly the same as in the earlier huts. Two large barrack rooms, accommodating fifteen men each, flanked the entrance, NCOs room and Ablution Room, but the passage, instead of being L-shaped, was T-shaped to provide access to the annexe as well. The barrack rooms were each heated by a pair of fireplaces or stoves, positioned back-to-back and freestanding within the room. The NCOs Room had a corner fireplace and the Ablution Room had an '*ablution bench*' along the rear wall. The annexe incorporated a rear entrance, urinals and three WCs.

The Company Office & Stores Building (later Sergeants' Quarters) *(Fig 71)*

The former Company Office and Stores building is located immediately east of Barrack Hut no 2, to which it is now connected by a modern link. It is narrower than the barrack huts and plainly detailed. Like Barrack Hut no 3a, to which it is linked stylistically (eg by its rendered exterior), it dates from 1928 (HMPS: 402540). On the south front there were originally three entrances, the outer ones flanked by a pair of windows apiece, the third placed off-centre alongside a fifth window. The windows have square heads and stone sills. The three-cell plan provided a Company Office, heated by a fireplace, flanked by a Company Store (for clothing, etc) to the west and a Weapon Training Store to the east.

Both the stores were heated by stoves which, as in the barrack huts, were flued into a stack on the rear wall. The stacks have been dismantled.

The uses of the building seem to have changed at an early date, judging by a 1932 drawing which proposed the relocation of the Company Office to the eastern room and the use of the other two as Company Stores. The western entrance was blocked, and instead a doorway was inserted in the cross-wall to the east; the Weapon Training Store was moved to the recently vacated 1911 Cook House in the Citadel (HMPS: 402686). A drawing dated 1940, labelled '*proposed rebuilding*', actually shows the rearrangement proposed in 1928 (Fig 88; HMPS: 402508). By 1947 the building was being used as Sergeants' Quarters (HMPS: 402582).

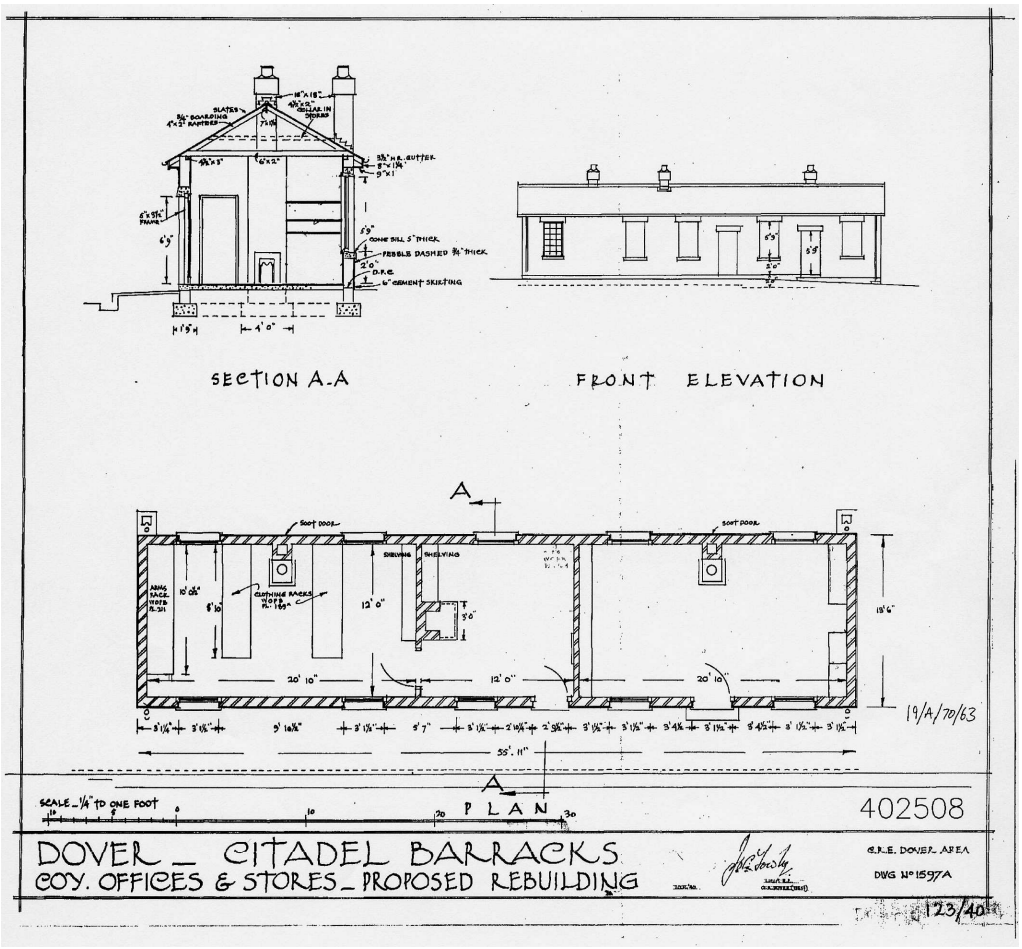

Figure 88
Drawings of the Company Office and Stores in the Western Outworks, dated 1940 (402508 © HMPS)

Prison use

From the 1950s onwards the Hut Barracks were adapted to form specialised accommodation for the vocational training of prisoners. A drawing dated 1957 sets out HMPS proposals to convert no 3 to form the Bricklayers Shop, and no 3a to form a Painters' Shop, uses which continued at the time of survey. In no 3 this involved clearing the interior of all partitions and other obstructions and creating an Instructor's Office and a Tool Store in the westernmost bay. In no 3a, an Office and Store were contrived in the former Sergeant's and Ablutions Rooms. Here, the fireplaces were removed from both barrack rooms and the eastern was divided into seven rooms, six of them placed either side of an axial corridor with a larger room at the eastern end lit by two inserted windows (HMPS: 100671). One of the inserted windows was subsequently blocked when a low boiler house was added. The other huts may have been converted at about the same time: in recent years no 1 was used as the Welders' Shop, no 2 for Mechanical Services, no 4 for Electricians and no 5 as general Workshops. Various small flat-roofed additions post-date 1947, including a boiler house linking No 2 to the former Sergeants' Quarters and a number of other small boiler houses and sanitary annexes. A small detached building to the rear of no 3, currently used as a liquid petroleum-gas store, has pier-and-panel walls and a flat ferro-concrete roof, suggesting a wartime construction date, but is not shown in 1947 (HMPS: 402582). Nos 2 and 4 have 20th-century roofs of corrugated asbestos cement and a number of chimney stacks have been rebuilt in Fletton bricks. Doorways were inserted in the gables of several huts, mostly in the former window position.

5. CONCLUDING REMARKS

The first remarkable thing about the Citadel is its survival. This is due manily to its remaining in the public domain after the military departed in the mid 1950s. In the care of Her Majesty's Prison Service, the revetments and some of the internal buildings have been well maintained, though inevitably there have been losses due to the need for larger, purpose-made structures, and the Parade Ground has been largely taken up with these. Nevertheless many buildings survive and constitute a remarkable ensemble that illustrates the gradual transformation of the Citadel from a defensible garrisoned fortress to a mobilisation centre and barracks. Particularly striking is the eclectic yet impressive Officers' Quarters - a building of quality and pretension - the casemates of the Western Outworks with their exquisite brickwork detail, and the honeycombe of underground casemates and galleries, much of which are in a relatively undisturbed state that has not been subject to vandalism. Yet it is perhaps wrong to single these out from the many other structures which together illustrate so well a military garrison of the 19th and early 20th shoe-horned into an ageing an unsuitable space, and where much small detail survives.

Remarkable also is its very form. Initially planned as a tiered and bastioned fieldwork, it was adapted during the Napoleonic conflicts into a permanent work which looks like an unusual hybrid between the older bastion system and the newer polygonal system of fortification. As such it is a rare example of such a land front fortress in the British Isles.

6. SURVEY AND RESEARCH METHODS

The archaeological and architectural surveys were carried out by Paul Pattison, Moraig Brown, Duncan Garrow, Adam Menuge and Andrew Williams. For the earthworks, 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 recorded on a PC using Key Terra-Firma 5 and Autocad 2000i software. Buildings were surveyed on site using measuring tapes and conventional graphical methods, and worked up on a PC using Autocad and Microstation software.

All photography is by Steven Cole and Alun Bull: finished drawings are the work of Paul Pattison, Moraig Brown, Adam Menuge, Allan Adams and Andrew Williams.

This report has been researched and written by Paul Pattison, Adam Menuge and Andrew Williams.

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 Number TR 34 SW 222, Unique Identifier 468101).

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7. ACKNOWLEDGEMENTS

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402517 *Citadel Dover Plan and Section of the Long Casemates shewing in Yellow the proposed New Work.* Dated 21st May 1853

402518 As 402517

402527 *Western Heights, Dover. Plan, elevations and sections for Citadel Coal Yard and Straw Barn. Item 77 Barrack Annual Estimate 1860-61*. Dated 5th September 1860.

402530 *Dover, Citadel Barracks, Record Plan of Warrant Officer's Quarters No 1*. Dated November 1890.

402531 *Dover Citadel. Details of doors for entrance hall to Officers' Quarters*. Dated 1st October 1859.

402540 *Dover, Citadel Barracks, Proposed Company Offices, Stores and Sergeants Bunks*. Dated 22nd May 1928.

402541 *Dover, Citadel Barracks, Regimental Institute. Proposed Improvements to.* Dated 18th May 1933.

402543 *Dover, Citadel Barracks, Regimental Institute. Proposed Improvements to. Details of Counter.* Dated 18th May 1933.

402544 *Dover, Citadel Barracks, Regimental Institute. Proposed Improvements to.* Details of doors, cupboards etc, dated 18th May 1933.

402550 *Dover Defences, Western Heights, Citadel, Main Entrance and Guard Room*

402556 *Dover, Citadel Barracks, Proposed Hutments*. Dated 1939

402565 *Dover, Citadel Barracks, Proposed Cook House & Dining Accommodation*. Dated 27th July 1932.

402575 *Dover Defences, Plan, Elevation and Sections of Casemates in South Flank of Advanced Work West of the Citadel*. Not dated but clearly original *c* 1863.

402578 *Dover Citadel. Officers' Quarters. Roof Plan.* Probably 1859.

402579 *Dover Citadel, Officers' Quarters. Basement Plan*. Date illegible but probably 1859.

402581 *Dover Western Heights, Citadel Barracks & Western Outworks Ground Floor Plan. Proposed Electric Lighting.* This fine record plan was originally drawn in 1911, with alterations to show proposed electric lighting installation of July 1921

402582 *Dover Western Heights, Citadel Barracks & Western Outworks Ground Floor Plan.* Another copy of the 1911 plan, printed in 1930, incorporating anotations to November 1929 and with further annotations to July 1947

402583 *Dover Citadel, Officers' Quarters. Chimney piece for Officers' Quarters.* Dated 1st October 1859.

402584 *Dover Citadel, Officers' Quarters. First Floor and Ground Floor plans*. Dated 1859.

402585 *Dover, Citadel Barracks, Regimental Institute. Proposed Improvements to.* Dated 8th July 1933.

402591 *Dover Citadel Barracks, Recreational Establishment. Plan showing new storey and improvements to ground floor.* Dated 1913.

402594 *Dover Western Outworks Record Plan of Drainage, Gas and Water*. Undated but on internal evidence it belongs to the period 1871-88.

402597 *Dover Citadel. Details of principal staircase & partition to anti-room etc in Officers' Quarters.* Dated 1st October 1859.

402606 *Dover, Citadel Barracks, Cookhouse, revised plan of Boiler House.* Dated 5th October 1932.

402604 *Dover Citadel, Officers' Quarters. Block plans shewing the general arrangement of the drains, surface channels, water pipes.* Undated but stylistically of the 1859 series.

402609 *Dover, Citadel Barracks, Bridge from Citadel Barracks to Western Outworks*. Undated but probably around 1890 to link the Citadel with the hut barracks in the Western Outwork.

402610 *Dover Citadel, Record Plan of Officer's & Transport Stables & Storage for Mobilisation Equipment, Vehicles etc*. Dated 1905

402612 *Dover, Citadel Barracks, Western Outworks (Proposed Dining Room and Wash-up).* Function crossed out and replaced by *Drill Shed.* Undated.

402614 *Dover, Western Heights, Proposed Barrack Hut for 1 sergeant and 42 rank and file*. Dated 13th August 1890.

402616 *Dover Citadel Barracks, Barrack Block for 30 men and 1 NCO.* Dated 3rd August 1928.

402622 *Dover Western Outworks, Plan and Section shewing proposed Bath House supplied with hot and cold water built in rear of Cook House, for 1 NCO and 3 men.* Dated 8th May 1899.

402629 *Dover Western Heights. Citadel Barracks & Western Outworks. Basement and First Floor Plan. Proposed Electric Lighting.* Dated 22nd June 1921.

402630 *Dover Citadel, Record Plan of Sergeants Mess Establishment*. Dated 27th February 1900.

402632 *Dover Citadel. Officers' Quarters. Detail of dresser, dwarf press for mess kitchen press for officers' servants' rooms and step ladder.* Dated 1st October 1859.

402634 *Dover Citadel. Detail of internal doors, Officers' Quarters.* Dated 1st October 1859.

402635 *Dover Citadel. Officers' Quarters. Details of table press, shelves, office, with desk for Quartermaster's Store*. Dated 1st October 1859.

402637 *Dover Citadel. Details of lift for Mess Establishment, Officers' Quarters*. Dated 1st October 1859.

402639 *Plan and Sections of proposed N.C. Officers Privies and New galleries leading from Casemates 9, 10, 11, and from the Area of Long Casemates to Shaft 'A'*. Dated November 1854.

Plan and Sections of proposed N.C. Officers Privies and New galleries leading from Casemates 9, 10, 11, and from the Area of Long Casemates to Shaft 'A', November 1854

402643 *Dover, Citadel Barracks, Regimental Institute. Proposed Improvements to.* Details of staircase, wardrobes etc, dated 8th July 1933.

402645 D7 Militia Camp Proposed alterations to huts 1 & 8 for accommodation. Dated 2nd March 1943.

402660 *Head Quarters Wing Store*. A drawing showing proposed extension to Company Stores etc. Not dated

402650 *Dover. Citadel Barracks. Proposed lantern lights to casemate Nos 9, 10, 11, 12, 13, 14, 18, 19, 20. Sheet No 3 (of set of 3).* Dated 1st October 1913.

402651 *Dover. Citadel Barracks. Proposed lantern lights to casemate Nos 9, 10, 11, 12, 13, 14, 18, 19, 20. Sheet No 2 (of set of 3).* Dated 1st October 1913.

402652 *Dover. Citadel Barracks. Proposed lantern lights to casemate Nos 9, 10, 11, 12, 13, 14, 18, 19, 20. Plan showing details. Sheet No 1 (of set of 3).* Dated 1st October 1913.

402655 *Dover Citadel Barracks, Recreation Establishment. Plan of Details*. Dated 17th May 1913.

402657 *Edward Deane, 1 Arthur Street East, London Bridge EC, Proposed Hot Water Apparatus for Baths, Western Outworks, Dover*. Undated.

402658 *Dover, Western Heights, Proposed Barrack Hut for 1 sergeant and 42 rank and file*. Dated 13th August 1890.

402664 *Dover, Citadel Barracks, Proposed Cook House & Dining Accommodation: Details.* Dated February 1932.

402665 *Dover, Western Heights, Repairs to Barrack Huts Nos 1 and 3*. Dated 19th November 1940.

402668 *Dover Citadel Barracks, Western Outworks, Proposed Dining Room and Wash-up.* Dated 8th May 1922.

402670 *Dover. Citadel Barracks. Officers' Mess. Proposed entrance to S.A.A Store in Basement.* Dated 1938

402671 As 402670.

402672 *Dover, Citadel Barracks, Proposed Improvements to Cookhouse.* Dated August 1939.

402673 Dover, Western Outworks "Bath House", Plan shewing drainage revised. Dated 3rd August 1899.

402674 *Dover, Citadel Barracks, Dining Room Heating Apparatus, sketch of.* Dated 18th March 1929.

402676 *Dover, Citadel Barracks, Dining Room Heating Apparatu.* Undated but presumably 1929.

402680 *Edward Deane, 1 Arthur Street East, London Bridge EC. Dover Western Outworks, Proposed Hot Water Apparatus for Baths*. Undated.

402681 *Dover, Citadel Barracks, Proposed additions to Sergeants Mess*. Dated 7th March 1940.

402686 *Dover, Citadel Barracks & Western Outworks, Proposed Re-appropriation of Cook Houses and Company Office Block.* Dated 25th February 1932.

402687 *Dover. Western Heights. Proposed Quartermaster's Store for Citadel Barracks*. Dated 11th March 1932.

402688 *Citadel Barracks Regimental Institute, Sales Kiosk for NAAFI.* Dated 12th February 1945.

402689 *Dover Citadel, Record Plan of Officer's & Transport Stables & Storage for Mobilization Equipment, Vehicles etc.* Dated 24th June 1903.

402690 *Dover, Citadel Barracks, proposed conversion of existing Stables and Vehicle Shed, with extension to form Garage*. Dated 3rd October 1938.

402691 *Dover, Citadel Barracks, Proposed Cook House & Dining Accommodation.* Dated February 1932.

402693 *Dover, Citadel Barracks, Proposed Cookhouse for half battalion*. Dated 1st February 1911.

402695 *Dove. Citadel Barracks. Proposed F.C.Post on roof of Officers' Mess.* Dated 17th October 1940.

100666 *HMP Dover. The Citadel. Ground Floor and First Floor Plans.* Dated 18th September 1953.

100671 *HMP Dover. Conversion of Buildings No 3 & 3a into Bricklayers and Painters VT Shops.* Dated 28th June 1957.

9. PHOTOGRAPHS TAKEN DURING THE SURVEY

AA043932 The Citadel. Gorge Casemates: interior of gunroom showing embrasure, smoke vent and later joists for a wood floor (B&W)

AA043933 The Citadel. Gorge Casemates: Interior of gun room of the SE casemates, showing fireplace and passage to expense magazine, from the SE (B&W)

AA043934 The Citadel. Gorge Casemates: View through central SE gunroom and passage beyond to stair shaft, from the SE (B&W)

AA043935 The Citadel. Gorge Casemates: Reinforced door with gallery, leading from SE stair passage to the gunrooms (B&W)

AA043936 The Citadel. SW Flank Casemates: North elevations to casemated barracks numbers18-20, from the NE (B&W)

AA043937 The Citadel. Entrance to the Long Casemates, in a revetment wall SW of the Officers' Quarters, from the NE (B&W)

AA043938 The Citadel. Former Regimental Institute building, from the E (B&W)

AA043939 The Citadel. Former Dining Room (eastern) from NE (B&W)

AA043940 The Citadel. Former Dining Room (western) from NE (B&W)

AA043941 The Citadel: The Main Entrance: Guardhouse, cells and detention rooms from the parade ground (B&W)

AA043942 The Citadel. Twin 9000-gallon high level water tanks from the NW (B&W)

AA043943 The Citadel. SE gables of casemated Boiler and Engine rooms, showing the light-well parapet (B&W)

AA043944 The Citadel.Top of stair shaft to the Gorge Casemates with 9000 gallon water tank beyond. From the SE (B&W)

AA043945 The Citadel. Top of stair shaft to Gorge Casemate and later concrete roof to casemated Engine Room and Boiler House, from the east (B&W)

AA043946 The Citadel. Entrances to intertwined spiral stairs leading to Boiler Room and the Gorge Casemates. From the east (B&W)

AA043947 The Citadel. Hand-operated winch in engine room (Colour)

AA043948 The Citadel. Centre NW Bastion guard room from SW (B&W)

AA043949 The Citadel. Centre NW Bastion guard room from the north (B&W)

AA043950 The Citadel. Centre NW Bastion guard room from the NE (B&W)

AA043951 The Citadel.Centre NW Bastion; entrance to guard room from the NE (B&W)

AA043952 The Citadel: guard room of centre NW Bastion, window in SE end (B&W)

AA043953 The Citadel: Centre NW Bastion. Interior of guard room showing entrance with flanking counterweight chambers for drawbridge (B&W)

AA043954 The Citadel: Centre NW Bastion, interior from SE (B&W)

AA043955 The Citadel: Centre NW Bastion. Interior of guard room from the SE (Colour)

AA043956 The Citadel: Officers' Quarters; detail of embrasure and murder hole in SW end wall (B&W)

AA043957 The Citadel: Officers' Quarters; basement level, embrasure with inserted windows; Fox and Barrett ceiling (B&W)

AA043958 The Citadel: Officers' Quarters; Stair on ground floor of CO's Quarters, from NE (B&W)

AA043959 The Citadel: Officers' Quarters; armoured shutter to first floor window on west side of north porch (B&W)

AA043960 The Citadel: Officers' Quarters; Musket Loop with inner casement (B&W)

AA043961 The Citadel: Officers' Quarters; Musket Loop with inner casement (B&W)

AA043962 The Citadel: Officers' Quarters; basement ceiling showing Fox and Barrett construction exposed (B&W)

AA043963 The Citadel: Officers' Quarters; Jack-arched fire proof ceiling over former basement level water tanks, showing inspection roundel (B&W)

AA043964 The Citadel: base of newel stair shaft from Inner NW Bastion to Centre NW and Outer NW Bastion from the W (B&W)

AA043965 The Citadel: Painted sign on wall of gallery leading from Inner NW Bastion to Centre NW Bastion (B&W)

AA043966 The Citadel: underground gallery connecting Inner NW Bastion to Centre NW Bastion from the SE (B&W)

AA043967 The Citadel: NW Bastion; Right Flanking Casemates; detail of carronade embrasive, covered by steel shutter loopholed for small arms (B&W)

AA043968 The Citadel: NW Bastion; interior of expense magazine in the Right Flanking Casemates from the NE (B&W)

AA043969 The Citadel: Inner NW Bastion, Right Flanking Casemates:detail of ventilators in expense magazine from SW (B&W)

AA043970 The Citadel: Inner NW Bastion ; Right Flanking Casemates: reinforced doors at rear of casemate leading to expense magazine (B&W)

AA043971 The Citadel: Inner NW Bastion; Right Flanking Casemates: reinforced doors leading to expense magazine (B&W)

AA043972 The Citadel: Inner NW Bastion; Right Flanking Casemates; detail of fireplace (B&W)

AA043973 The Citadel: Inner NW Bastion; Right Flanking Casemates. View towards entrance to counterscarp gallery from the south (B&W)

AA043974 The Citadel: Inner NW Bastion; detail of entrance to counterscarp gallery from Right Flanking Casemates, showing reinforced door from the SE (B&W)

AA043975 The Citadel: Inner NW Bastion: Right Flanking Casemates; detail of doorway in party wall from the W (B&W)

AA043976 The Citadel: Inner NW Bastion;Right Flanking Casemates: detail of doorway in party wall from the W (B&W)

AA043977 The Citadel: south end of counterscarp gallery showing steps up towards Inner NW Bastion, with light recess, from the NW (B&W)

AA043978 The Citadel: NW Bastion ; counterscrp gallery, general view from the NW (B&W)

AA043979 The Citadel: NW Bastion; Counterscarp gallery; detail of reinforced door from the SE (B&W)

AA043980 The Citadel: NW Bastion; Counterscarp gallery: detail of musketry casemate and loopholes from the NE (B&W)

AA043981 The Citadel: NW Bastion; interior of musketry casemate off the counterscarp gallery, from the east (B&W)

AA043982 The Citadel: NW Bastion Counterscarp Casemates; blind entrance to unfinished gallery, from the SW (B&W)

AA043983 The Citadel. Cross ditch between Inner and Centre NW Bastions, from the SW (B&W)

AA043984 The Citadel. Blocked entrance, with stone lintel, in the scarp revetment of the N ditch (B&W)

AA043986 The Citadel. Infantry banquette and pivot for swing bridge, both at the SW end of the tenaille, from the W (B&W)

AA043987 The Citadel. SW corner, looking ENE along the ditch towards the Short Casemates (B&W)

AA043988 The Citadel. West ditch, south end, from the south (B&W)

AA043989 The Citadel. The west ditch, from the SE above West Postern, showing windows to West Flank Casemates (numbers 13 and 14)(B&W)

AA043990 The Citadel. The west ditch, showing the scarp revetment with windows to SW Face and SW Flank Casemates (numbers 9-14), from the WNW (B&W)

AA043991 The Citadel (Western Outwork). Barrack hut no.5 built in 1890, from the SE (B&W)

AA043992 The Citadel (Western Outwork). East gable of 1890 barrack hut no.1, showing detail of terracotta plaque with date and royal cipher (B&W)

AA043993 The Citadel, Western Outwork: barrack hut built 1928-9, from the SE (B&W)

AA043994 The Citadel, Western Outwork. General view of the South Casemates, from the S (B&W)

AA043995 The Citadel, Western Outwork. South Casemates, interior of two-storey barrack room with floor removed and partially intact partition wall. From the SE (B&W)

AA043995 The Citadel, Western Outwork. South Casemates, interior of two-storey barrack room with floor removed and partially intact partition wall. From the SE (Colour)

AA043996 The Citadel (Western Outwork) . South Casemates; stair from barrack rooms up to the gorge, from the ESE (B&W)

AA043997 The Citadel (Western Outwork). Stair from barrack rooms to the gorge; detail from the SW (B&W)

AA043998 The Citadel (Western Outwork). South Casemates, upper floor, showing wall partitioning original gunroom for accommodation. From the NW (B&W)

AA043999 The Citadel (Western Outwork). South Casemates; detail of musket loopholes in defensible ablution and latrine block, from the NE (B&W)

AA044000 The Citadel (Western Outwork). South Casemates magazine interior, showing entrance from the NW (B&W)

AA044001 The Citadel (Western Outwork). South Casemates; magazine interior showing vents to cavity and dwarf walls for raised timber floor, from the SE (B&W)

AA044002 The Citadel. General view from the N (Colour)

AA044003 The Citadel. General view from the N (Colour)

AA044004 The Citadel: Gorge Casemates; intertwined stair shaft showing steps and walls (B&W)

AA044005 The Citadel. Gorge Casemates: detail of composite doors and vaulting (B&W)

AA044006 The Citadel. Gorge Casemates: southern group; interior of northern most casemate showing entrance, brick floor and equipment rack (B&W)

AA044007 The Citadel. Gorge Casemates: southern group; central casemate of outer set, showing blocked embrasure, doorway and fireplace (B&W)

AA044008 The Citadel. Gorge Casemates: detail of cast iron equipment rack (B&W)

AA044009 The Citadel. Gorge Casemates: detail of fire surround and hearth (B&W)

AA044010 The Citadel. Gorge Casemates: northern group; expense magazine with later diesel tank (B&W)

AA044011 The Citadel. Pumphouse; interior of boiler room looking north (B&W)

AA044012 The Citadel. Pumphouse; interior of engine room looking west with lifting beam and lightwell partition (B&W)

AA044013 The Citadel. Pumphouse; detail of hand-operated winch in engine room (B&W)

AA044014 The Citadel. Detail of hand-operated winch in engine room (B&W)

AA044015 The Citadel. Detail of scrolled bracket (gas fitting?) on the wall of the bombproof engine house (B&W)

AA044016 The Citadel. Pumphouse; metal manhole cover (over the well) in the floor of the engine room from below and looking south (B&W)

AA044017 The Citadel. Pumphouse; engine pit and well below the floor of engine room, looking south (B&W)

AA044018 The Citadel. Pumphouse; lightwell at the north end of the engine room with timber pipe riser (B&W)

AA044019 The Citadel. Pumphouse;engine room showing winch, hoist beam and light-well partitions. Looking east (Colour)

AA044020 The Citadel. Pumphouse; interior of engine room showing lightwell partition, looking west (Colour)

AA044021 The Citadel. Pumphouse; detail of hand-operated winch in engine room (Colour)

AA044022 The Citadel. Pumphouse; interior of engine room looking east with winch, lifting beam and light-well partition (Colour)

AA044023 The Citadel. Inner NW Bastion, Right Flanking Casemate:detail of doorway in party wall from the W (B&W)

BB032719 The Citadel. SW Face Casemates: The east elevation to casemated barrack numbers 9-11, and remains of circular shaft to the Long Casemates in the foreground (B&W)

BB032720 The Citadel. Gas Meter House (left), entrances to gorge Sally Port (centre) and gallery to South Lines Casemates (right, blocked) from the SW (B&W)

BB032721 The Citadel: The Officers' Quarters from the E across the damaged tenaille (Colour)

BB032722 The Citadel: The Officers' Quarters from the SE across the damaged tenaille (B&W)

BB032723 The Citadel: The Officers' Quarters from the E across the damaged tenaille (B&W)

BB032724 The Citadel: Roof of the Officers' Quarters showing covers to the heads of stairs, from the NE (B&W)

BB032725 The Citadel: Roof of the Officers' Quarters showing banquette from the W (B&W)

BB032726 The Citadel. The western ditch, scarp and counterscarp revetments to NW Bastion from the SE (B&W)

BB032727 The Citadel. The western scarp revetment of the NW Bastion showing the cross ditches, from the NW (B&W)

BB032728 The Citadel. The eastern scarp revetment of the NW Bastion showing the cross ditches, from the N (B&W)

BB032729 The Citadel. The eastern scarp revetment of the NW Bastion showing the cross ditches, from the N (Colour)

BB032730 The Citadel. Blocked musket loopholes in the counterscarp revetment of the NW Bastion, from the W (B&W)

BB032730 The Citadel. Blocked musket loopholes in the counterscarp revetment of the NW Bastion, from the W (Colour)

BB032731 The Citadel. Anti-ricochet strips against the counterscarp of the ditch opposite the gorge casemates, from the W (B&W)

BB032732 The Citadel. Blocked embrasures of the gorge casemates, from the SE (B&W)

BB032733 The Citadel. Blocked Sally port in the scarp revetment of the gorge ditch, S of the East: Gatehouse, from the NE (B&W)

BB032734 The Citadel. The gorge rampart and ditch, south end , from the NW (B&W)

BB032735 The Citadel. South end of gorge rampart, showing relieving arch, from the NE (B&W)

BB032736 The Citadel. SE end of the gorge rampart, showing steps and infantry banquette from the SW (B&W)

BB032737 The Citadel. The entire South Face, showing the inner ditch and, at left, the remains of the tenaille. From the NE (B&W)

BB032738 The Citadel. South inner ditch, showing at right the junction with the gorge ditch, from the NE (B&W)

BB032739 The Citadel. South inner ditch, from the SW, showing scarp revetment and doorway (formerly leading onto a bridge) (B&W)

BB032740 The Citadel. South inner ditch: door in the scarp revetment formerly leading onto a bridge, from the SE (B&W)

BB032741 The Citadel. The Long Casemates, SE elevation (B&W)

BB032742 The Citadel. Blocked ditch of the Western Outlook at its junction with the Citadel west ditch, from the E (B&W)

BB032743 The Citadel. The west ditch with the west Postern and windows, the West Face and West Flank casemates (numbers 15-20) from the S (B&W)

BB032744 The Citadel. The West Postern from the W (B&W)

BB032745 The Citadel. The west ditch counterscarp showing scar of former steps to the Western Outwork, from the E (B&W)

BB032746 The Citadel, Western Outwork: general view of the South Casemates, from the SW (B&W)

BB032747 The Citadel, Western Outwork. general view of the South Casemates, from the S (Colour)

BB032748 The Citadel. General view from the W (B&W)

BB032749 The Citadel (Western Outworks). South Casemates, first floor of corridor linking casemated barrack rooms (with floor removed). Looking SW (B&W)

BB032750 The Citadel (Western Outworks). South Casemates, ground and first floors of service corridor linking casemated barrack rooms (B&W)

BB032751 The Citadel (Western Outworks). South Casemates, detail of fire place and cast iron fire surround on first floor of barrack room (B&W)

BB032752 The Citadel (Western Outworks). South Casemates, detail of equipment rack and cupboard mountings on south wall of barrack room (B&W)

BB032753 The Citadel (Western Outworks). South Casemates:detail of doors at first floor level in west wall of service corridor (B&W)

BB032754 The Citadel (Western Outworks). South Casemates; detail of doors at first-floor level in west wall of service corridor (B&W)

BB032755 The Citadel (Western Outworks). South Casemates: Haxo Casemate showing pulleys and guide rails for embrasure shutter (B&W)

BB032756 The Citadel (Western Outworks). South Casemates; magazine SE elevation (B&W)

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.

ROYAL COMMISSION ON THE HISTORICAL MONUMENTS OF ENGLAND

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National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon SN2 2GZ