



ENGLISH HERITAGE

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Napoleonic gun tower and defensive line

Paul Pattison

SURVEY REPORT

ARCHAEOLOGICAL INVESTIGATION SERIES

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A NAPOLEONIC GUN TOWER AND DEFENSIVE LINE

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*A photograph of Clarence
Tower, taken from the
north-west in 1961
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ABBREVIATIONS USED IN THE TEXT

AA	Anti-aircraft
CRE	Commanding Royal Engineer
DRF	Depression range-finder
RA	Royal Artillery
RE	Royal Engineers
RGA	Royal Garrison Artillery
RSJ	Rolled steel joist
SAM	Scheduled Ancient Monument
TA	Territorial Army
TF	Territorial Force
WD	War Department



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GLOSSARY

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

Carronade

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

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

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

Depression range-finder

An instrument used to work out the position of a target - its range - to enable a gun to accurately fire at it

Embrasure

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

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

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 and often massively reinforced with earth and other materials to absorb in-coming shell fire

Haxo casemate

A casemate constructed on the *terreplein*, providing gun crews with protection against enfilade fire



GLOSSARY (Continued)

Howitzer

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

Infantry step

A low platform in the rear face of a rampart, with a low parapet to enable infantry fire

Gunroom

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

Lamp recess

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

Loophole

A narrow opening in a wall 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*

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

Newel

A spiral stairway of circular plan

Parapet

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

Piquet house

A small guard or sentry post

Pivot

The point about which an artillery piece is traversed

Racer

A curved steel track set into the gunfloor. The wheels of a traversing carriage 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

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

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 asurprise 'sally' or counter-attacks

Scarp (or escarp or curtain)

The inner slope or revetment of a ditch

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

Smoke vent

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

Terreplein

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

Traversing slide carriage

A carriage for an artillery piece which enabled it to be moved through a fixed arc. The slide mechanism allowed the gun to recoil smoothly and facilitated reloading.



1. INTRODUCTION

Between November 2000 and January 2001 staff of English Heritage (Cambridge Office) undertook selective recording in a Napoleonic gun tower at Fort Clarence, Rochester (Kent) (Scheduled Ancient Monument (SAM) Kent 202) (Fig 1). The survey resulted from a request by Swift Ltd, to meet SAM consent conditions for recording, imposed as part of their conversion of the gun tower for domestic use. The recording and investigation was initially confined to part of the basement level, where two identical artillery embrasures were to be broken out to enable access, and the roof level, where a new building was to be added. More comprehensive investigation took place subsequently on the remainder of the tower and on the complex of galleries (tunnels) beneath it, including one leading down towards the River Medway and terminating in casemated gunrooms known as the West Casemates.

When first built, Fort Clarence stood in open country to the south-west of the old town of Rochester, although it is now engulfed by the subsequent urban sprawl. The ‘fort’ was in reality a short defensive Line, running east to west for 530m (580 yards) across a ridge known at the time as St Margaret’s Heights, between the Maidstone road and the River Medway. This Line formed the westernmost element in an early 19th-century extension

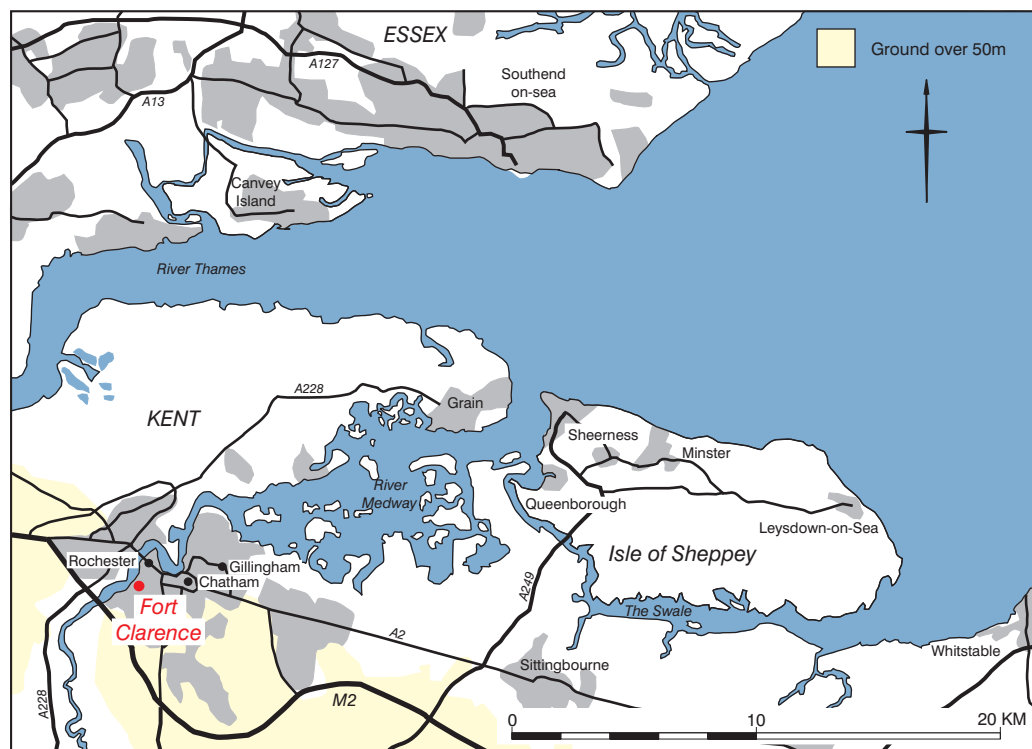


Figure 1
Fort Clarence; location plan

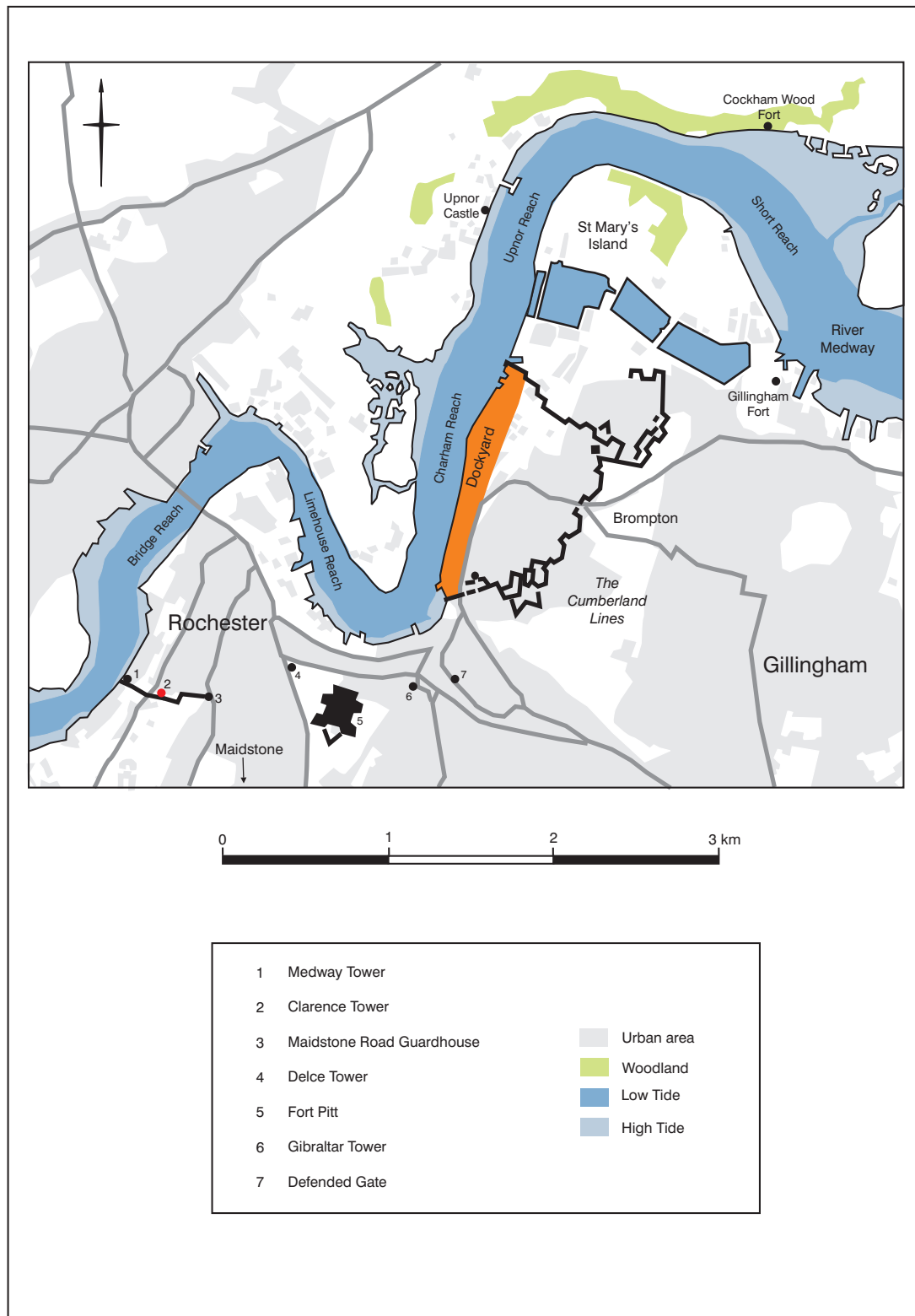


Figure 2
Plan showing the defences of Chatham Dockyard at the end of the Napoleonic Wars in 1815



to the defensive cordon around the great naval dockyard at Chatham (Fig 2). These extended defences did not simply fulfil a long established need to update and enhance the flank defences of the dockyard. The bridge forming the river crossing at Rochester lay at the eastern end of a vital military road established along the North Downs in the first decade of the 19th century. It was planned that, in the event of an invasion, military forces would be concentrated in camps at key points along this road in order to repulse it. The road was essential for the logistical support of these field forces and Chatham was to form a barrier fortress to the rear on the most likely line of the enemy advance. The extension of the Chatham defences to the Medway, in order to protect the river crossing at Rochester from a landward attack from the direction of Maidstone was, therefore, a vital element in the counter-invasion strategy. It is in this context that Fort Clarence assumes its full significance.

The extended defences were built between 1803 and 1815 - a major undertaking which took the form of a series of intervisible detached works comprising, from east to west, a defended gateway on the road to Maidstone out of Chatham, Gibraltar Tower, the massive Fort Pitt, Delce Tower and Fort Clarence. Fort Clarence, the only part constructed as a Line, comprised a continuous rampart with a parapet for infantry defence, a revetted ditch, a massive gun tower (*Clarence Tower*) positioned on the crest of the ridge in a central pivotal position, a defensible guard house at the east end on the Maidstone Road (the *Maidstone Road Guard House*) and a smaller gun tower at the west end next to the river (the *Medway Tower*) (Fig 3). Additionally, close defence of the ditch itself was possible from two sets of casemated gunrooms built behind the scarp revetment (the *East and West Casemates*). A large area to the rear of Clarence Tower was walled in and probably served for parade and drill, while a substantial house was built on its north-western margin for the fort governor (the *Governor's House*). Finally, adjacent to Clarence Tower, a bridge that carried the Rochester-Borstal road across the Line was protected by loopholed chambers and an arched gateway.

Today, only Clarence Tower, the Governor's House, parts of the Line and the East and West Casemates remain. From the roof of Clarence Tower, the strength of the position can be appreciated, with its panoramic views along the Medway from north around to south-west; over the Maidstone road to the south-east and to Chatham Dockyard on the north-east.



Figure 3

Plan showing the principal elements of the defences built at Fort Clarence, 1808-15. Sand = rampart; yellow = ditch; solid red = building above ground; outline red = building below ground; green = bridge across the Borstal to Rochester road (Reproduced by permission of the Director General of the Ordnance Survey)



2. HISTORICAL BACKGROUND

Fortifying St Margaret's Heights 1808-15

The desire for a fortification on St Margaret's Heights, as part of a wider scheme to extend the land defences of the dockyard, dates to the late 18th century. One example of such intent followed an inspection by the senior Committee of Engineers in 1783, when Colonel Debbieg RE drew up an idealised sketch plan for new defences which included a small work on St Margaret's Heights (PRO: MPH/1/296). The onset of war with France in 1793 underlined the need to extend the defences but it was only the imminent threat of invasion which precipitated new works. Fort Pitt was begun in 1803 and in 1804 the Board of Ordnance began negotiations with the Bishop of Rochester and others to acquire the land required for fortifications on St Margaret's Heights (PRO: MPH/1/438). Although the purchases were not finalised until 1812 and 1815 respectively, the acquisitions were secure enough for the Board to authorise the Commanding Royal Engineer (CRE) at Chatham to take possession of the main land parcel on the 1st August 1808. Further land was taken over in 1811 to allow access for construction along the rear of the works (PRO: WO/396/7; 9; 76).

A survey plan dated 1809, entitled '*Projected Works on St Margaret's Heights*', is an engineer's working drawing. It shows the planned course of the Line coloured, as well as an alternative course in pencil, partly erased, which had clearly been rejected. However, even the coloured course is not that eventually adopted, especially that part of the Line descending to the Medway on the west (PRO: MPH/1/588/1-2). The final course of the Line must have been established soon afterwards, and the major construction of the earthworks and buildings took place between 1810 and 1813.

By November 1810, the earthworks of the Line were well advanced; a note on a section drawing of that date specified that the scarp and counterscarp between Clarence Tower and the Medway Tower should be revetted in 14-inch brickwork (PRO: Work/31/311). Nevertheless, the Line between the East Casemates and the Maidstone Road Guard House was unfinished at the end of 1811, and is shown as such on a plan of December 1811 and a section taken in January 1812 (Fig 4; PRO: MPH/1/585/6 ; Work/31/314). However, this part of the Line appears to have been finished by the October of 1812 (PRO: MPH/1/585/7).



- ① Maidstone Road Guard House
- ② East Casemates
- ③ Clarence Tower
- ④ West Casemates
- ⑤ Medway Tower

Figure 4
A map of Fort Clarence, dated December 1811, showing progress to that date. Note the incomplete section of the Line between the East Casemates and the Maidstone Road Gatehouse. North is at the bottom of the page (PRO: MPH/1/585/6, © Public Record Office, by kind permission)



Work on most of the buildings appears to have progressed simultaneously. By the end of 1811, the Medway Tower and the Maidstone Road Guard House were almost finished, with only the roof and parapet levels still requiring attention. A section drawn in January 1812 shows that both Clarence Tower and the West Casemates were in an advanced state (PRO: MPH/1/585/2-3; Work/31/313). Nevertheless, the drawings accompanying the annual estimates of expenditure for 1813 reveal that some construction remained to be done on the Maidstone Road Guard House and the Medway Tower, and also on a guard house next to Clarence Tower which at that time had only just been proposed (PRO: MPH/1/585/2-4). It is likely that all of these were largely completed in 1813.

An early design for Clarence Tower was prepared by Lt Col D'Arcy - the CRE Chatham and officer in charge of the whole project - and attracted comment from Lt Col William

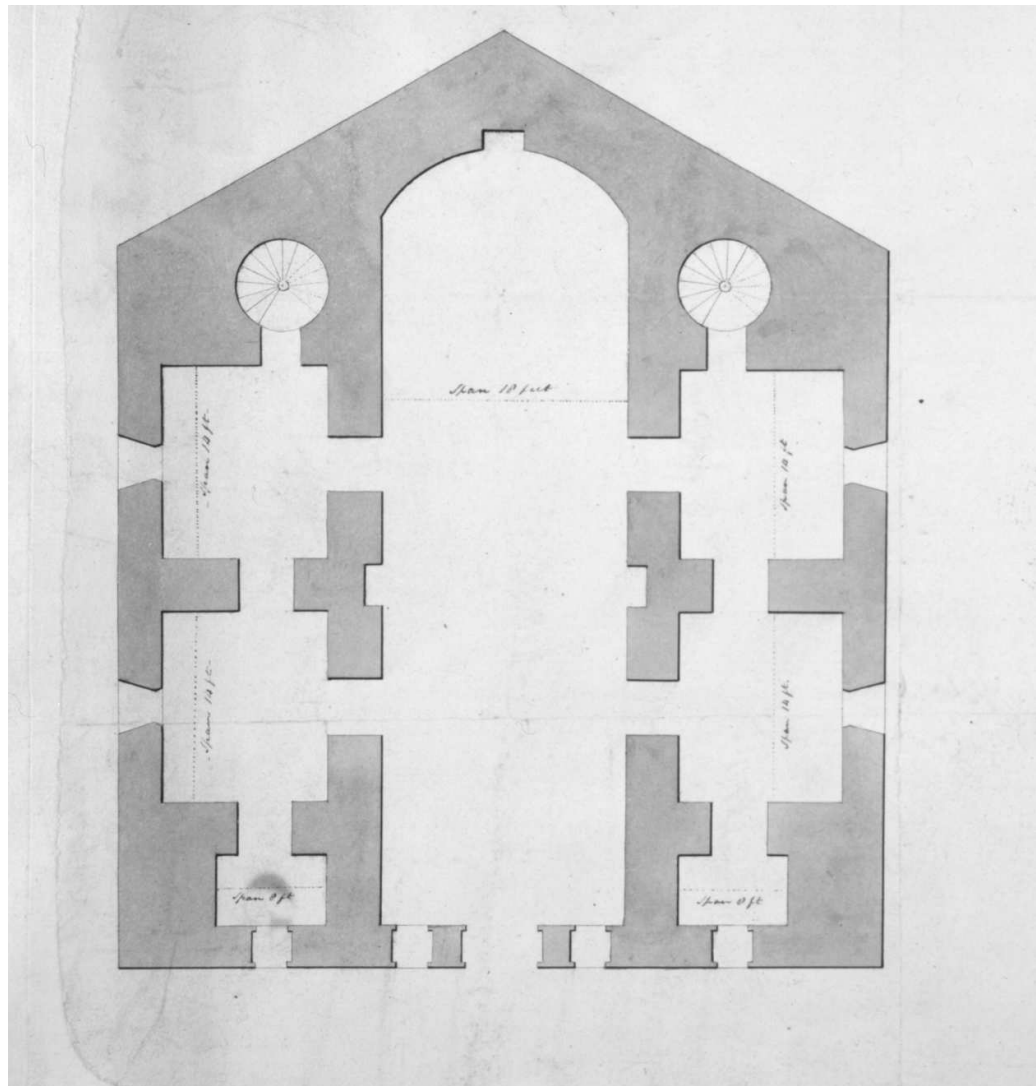


Figure 5
An early design for the plan of Clarence Tower, dating to 1809 (south is at the top of the drawing). Compare this with Figs 6, and 7, the latter showing the plan eventually adopted (extract of PRO: MPH/1/585/1 © The Public Record Office, by kind permission)

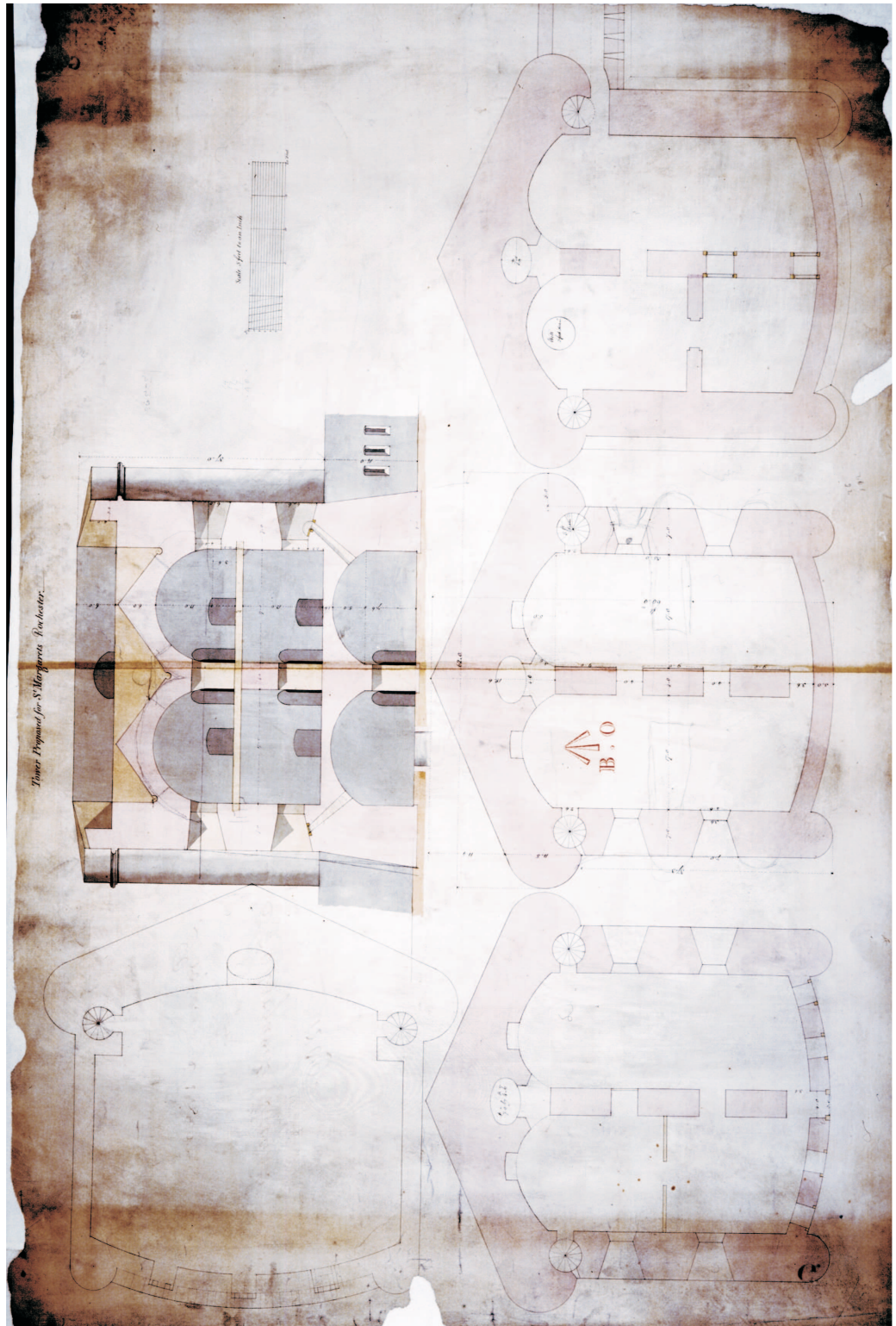


Figure 6
Plans and section dated 1809, showing the revised form of Clarence Tower proposed by Lt Col d'Arcy. It shows a structure very close to that subsequently built, with the exception of the newel stair positions. North is at the bottom of the page, the section is east (left) to west (right) (PRO: MPH/1/588/3 © The Public Record Office, by kind permission)

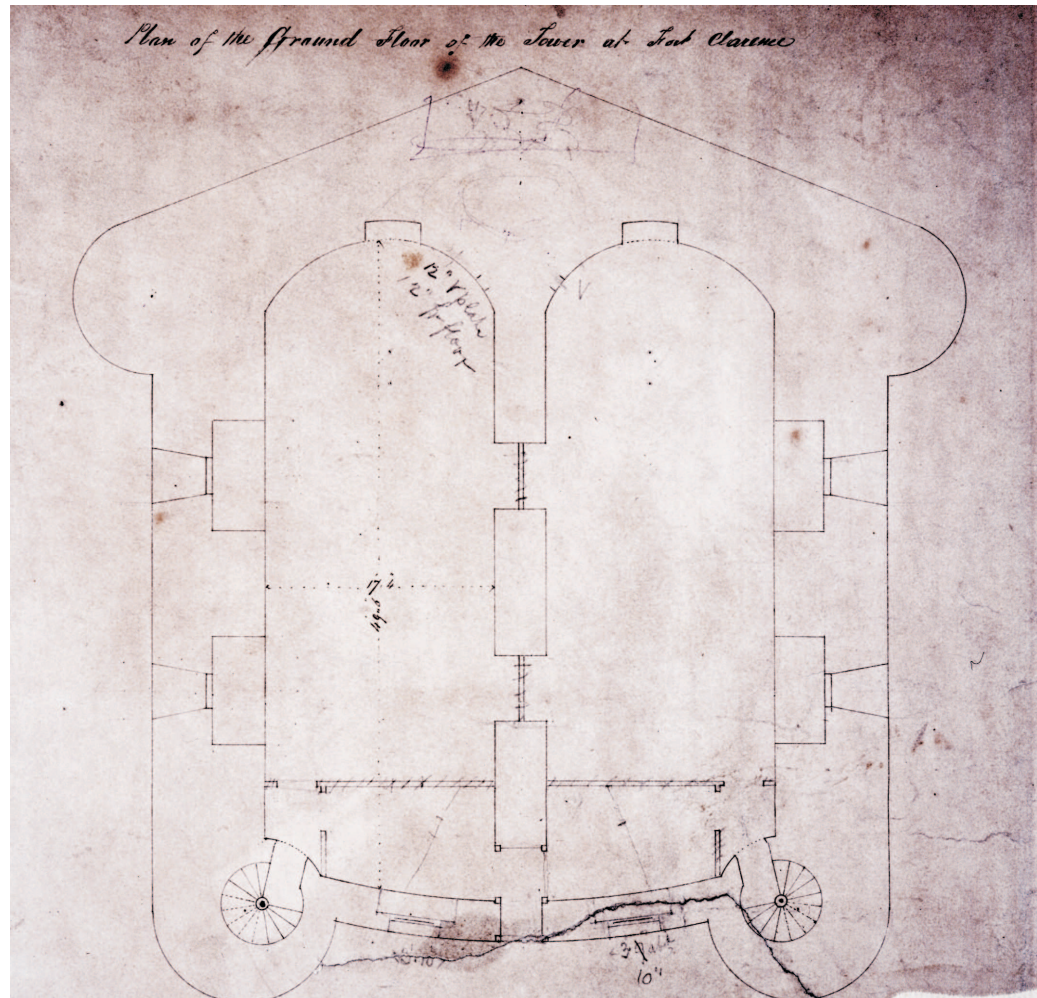


Figure 7
The ground floor plan of
Clarence Tower, as
finalised 1809-10. Note
the sketched position of
the ammunition lift as an
ellipse in the thick wall
of the south salient at
the top of the drawing
(PRO: Work/31/306 ©
The Public Record
Office, by kind
permission)

Twiss, CRE Southern District, in June 1809 (Fig 5; PRO: MPH/1/585/1). Although this drawing shows several design features which were adopted, its form is quite different from that shown on a second drawing, also of 1809, which is very similar to the structure eventually built (Fig 6; PRO: MPH/1/588/3). Final alterations placed the newel stairs in turrets in a more protected position on the north side, or rear of the tower, as shown in a third drawing (Fig 7; PRO: Work/31/306).

It seems likely that the major construction work was completed in 1813, with fitting out of the individual buildings and the construction of additional structures thereafter; notably the Governor's House and a Chapel in the compound to the north of Clarence Tower. The whole fort appears to have been garrisoned and armed for a short time, judging by the fourteen 12-pdr cannon, twelve 18-pdr carronades and six 12-pdr carronades which were present in January 1819 (Gulvin 1976, 19,25). The following month, 4,500 barrels of gunpowder were removed from the fort, a quantity far exceeding



the capacity of the Main Magazine and it seems probable that all of Clarence Tower was utilised as a temporary powder store for the district, as shown on a contemporary plan (PRO: WORK/31/308).

The Lunatic Asylum 1818-1844

The end of the war with France in 1815 resulted in disarmament on a considerable scale and many fortifications were put to new uses. Between 1805 and 1819, a general hospital was established in the casemates at nearby Fort Pitt and within a few years of 1815, Fort Clarence was '*occupied as an Hospital for Insane Persons, of the Army Medical Boards' order of 18th September 1818*'. The former Governor's House was occupied by officers of the Army Medical Board, while Clarence Tower, the Guard Houses and the Casemates were considered ideal for confinement of the mentally ill. The main concern at that time was security rather than treatment and conditions must have been primitive (PRO: WO/55/2458). By 1823-4 Fort Pitt received a purpose-built hospital but it seems that no such provision was made at Fort Clarence for the mentally ill (RCHME 1998, 89).

In 1830, there had been little or no new building at Fort Clarence but the Army Medical Board rented a cottage to provide quarters for its officers, just north of the former Governor's House which had also been converted for insane officers. The open areas of the Line were let to tenant graziers, from whom the CRE Chatham enjoyed '*the Benefit from the Grass...as is customary*' (PRO: WO/55/2543). The Asylum remained largely unchanged in 1841. The Board land along the Line was let to three individuals, one of whom was George Pratt the Deputy Governor, '*for the employment of Insane Patients*' while the '*grass benefit*' belonged to the CRE Chatham. The former Main Magazine was utilised as a '*Bathing Room for insane patients.*' The Asylum was abolished in 1844 and inmates were transferred to Shorncliffe and then Yarmouth; a new asylum was built at Fort Pitt c1850 (PRO: WO/43/764; EH: NBR No 100722).

District Military Prison 1845-1870

The 1835 Royal Commission on Military Punishments recommended the provision of new local prisons for each designated military district. Accordingly, in 1845-6, Fort Clarence was converted as such for the Chatham sub-district and in 1846 had a governor and staff comprising 21 warders and servants, with accommodation for 22 prisoners in cells and a further 84 '*in association*'. In 1851 there was provision for the governor, 8 warders and 184 prisoners and furnished with '*the necessary Mess Rooms, Cooking Houses, Storehouses and buildings for accommodation of the Officers and Men*'. The land around the Line was let out to tenants for yearly rents (PRO: WO/55/2920).

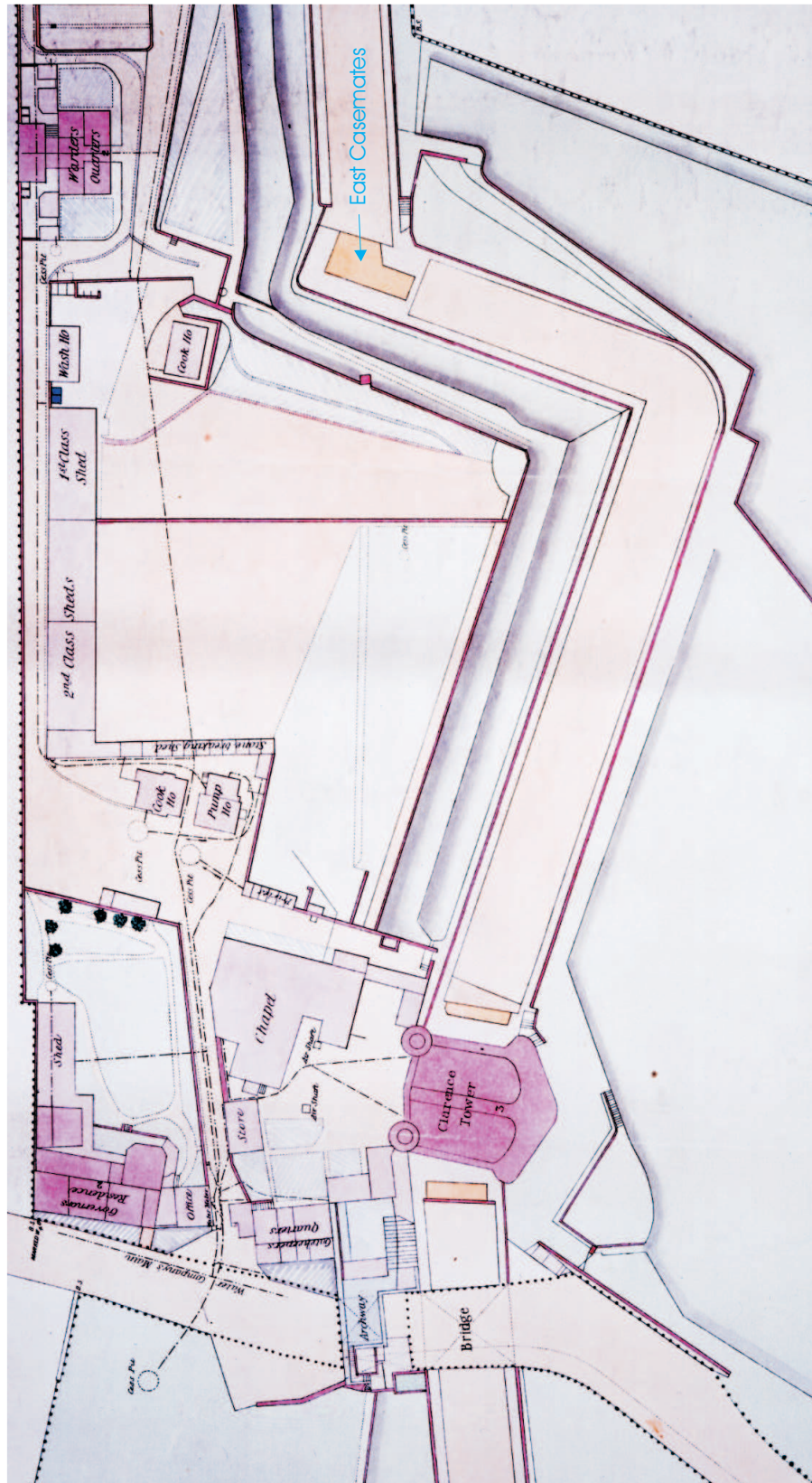


Figure 8
Fort Clarence Military Prison, extract from a plan of 1879, showing the proliferation of buildings which occurred from c 1845 to the north of Clarence Tower and the East Casemates. Text in blue is added by the author (PRO: WO/78/3194 © The Public Record Office, by kind permission)



In 1869, the Royal Commission on Courts Martial recommended the establishment of a central military prison and the closure of the district prisons like Fort Clarence. Financial provision for such prisons occurs for the last time in army estimates for 1869-70 (PRO: Work/14/2624). Although there were no units stationed here after 1870, a fine plan of the prison dating to 1879 indicates its continuing use for military punishment; moreover, considerable expansion had taken place, with numerous buildings established on the parade and along the rear of the Line (Fig 8). It was, apparently, used as a local detention barracks in 1880 but by 1901 the cells were described as '*awaiting condemnation*' (PRO: Work/14/2624; WO/78/3194). No prison buildings have survived above ground though a partial photographic record was made in 1961 (NMR: AA61/2536-55).

Miscellaneous Uses 1870-1913

Very few records exist as to the use of Fort Clarence during this period. It seems to have provided limited and periodic barrack accommodation for '*miscellaneous details*', while maintaining cells for 22 prisoners. In 1913 it was transferred to the County Association for Territorial Force (TF) purposes (PRO: Work/14/2624).

Territorial Force (Territorial Army) use 1913-1955

From 1913, the fort buildings were put to a range of purposes connected with the TF (later called the TA); the first being No 1 Company Kent Royal Garrison Artillery (RGA). Between the wars, other TA artillery units were based here, initially as the HQ and accommodation for a battery of the Kent Coast Brigade Royal Artillery (RA) (subsequently = the Kent Heavy Brigade and the Thames and Medway Regiment RA). Subsequently, the 166th City of Rochester Anti-Aircraft (AA) Battery of the 55th AA Brigade RA were installed. The 166th manned the heavy (4.5-inch) AA guns at nearby Fort Borstal following the outbreak of the Second World War, but HQ was maintained at Fort Clarence. A photo taken in 1961 of the Napoleonic chapel, shows the RA regimental badge painted on one of its interior end walls, perhaps indicating re-use as a drill hall. A circular mounting for a light AA gun survives on the open ground immediately west of Clarence Tower in Clarence Gardens on the other side of the Rochester-Borstal Road. Between 1940 and 1944, the 33rd Battalion (Short Brothers) Home Guard also occupied and trained at Fort Clarence (PRO: Work/14/2624). After 1945, the 166th became the 455th and remained until September 1955. Thereafter it was used by the 583rd (Kent) Bomb Disposal Squadron RE (TA) (PRO: Work/14/2624).

Civilian use 1958-99

In 1954 negotiations began between the Ministry of Defence and the Post Office for transfer of Fort Clarence to civilian use. The Ministry of Works became involved and

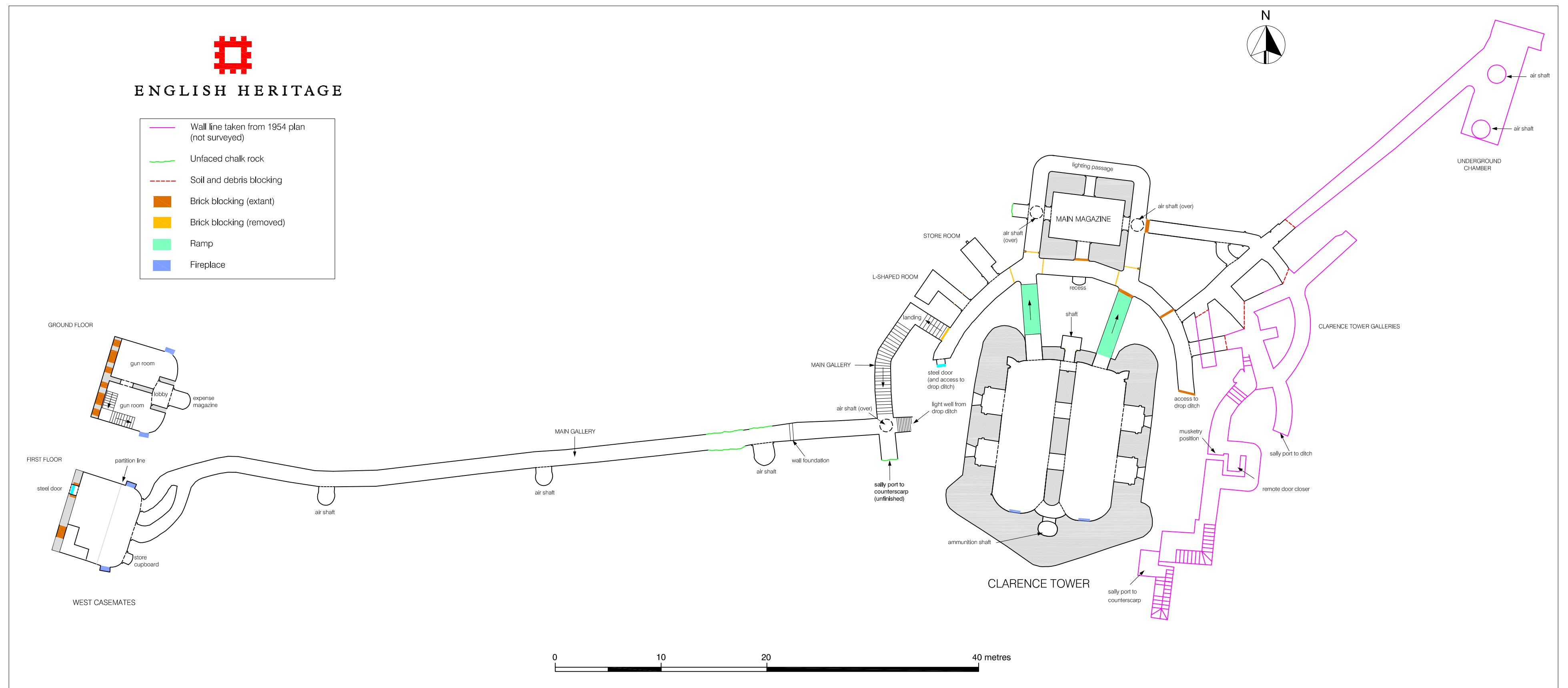


conducted research as to whether the structures - in particular Clarence Tower - was worthy of protection as a Scheduled Ancient Monument. Following a visit by the Minister, scheduling was rejected in March 1958. By April, the Post Office had occupied the site and were using Fort Clarence for the storage of cable drums; a new roof had been put onto Clarence Tower (PRO: Work/14/2624).

In 1963-4 the General Post Office demolished the military buildings north of Clarence Tower and the East Casemates - the original Chapel and all of the Prison structures - using the rubble to fill the ditch of the Line between them. New buildings were erected and remained in use until the closure of the Post Office facilities in 1999. Clarence Tower is now protected as Scheduled Ancient Monument no Kent 202.

Figure 9
The north elevation of Clarence Tower, with refurbishment nearing completion, in December 2002. Note the Portland machicolations, original entrance at first floor centre and new entrance at ground floor centre. The structure above the machicolations is modern (author)







3. ARCHAEOLOGICAL DESCRIPTION AND INTERPRETATION

There follows a description and analysis of Clarence Tower and the West Casemates. Other elements of Fort Clarence, no longer extant or not investigated as part of the current work, receive brief summaries in Section 5. For words and letters in **bold**, see the figure given at the beginning of that section. Other figure references appear in the body text.

A) CLARENCE TOWER

Summary (Fig 10)

This tower resembles a medieval keep, complete with machicolations, murder holes and twin turrets, in deliberate reflection of its older counterpart in the centre of Rochester (frontispiece, Fig 9). It sat astride the Line, with its east and west faces looking along and originally providing flanking artillery fire along the ditch, scarp and counterscarp. The roof formed a platform for longer range artillery defence.

It is constructed entirely of brick, laid usually to Flemish bond, with detail in either Portland stone, sandstone or Yorkstone. In plan it has five sides. Two on the south are formed into a shallow salient angle and thickened to between 2.8m (9ft 2in) and 4.34m (14ft 3in) to deflect and resist hostile artillery fire. The east and west sides have embrasures for artillery while the north side, slightly convex between projecting rounded turrets at the north-west and north-east angles, is the entrance elevation.

A cordon runs around most of the tower at the base of parapet level, usually of four brick courses, though the lower course on the north elevation is of sandstone. The cordon on the salient is of Portland stone, shaped to a rounded profile, above two projecting courses of brick. There are additional brick/Portland cordons higher on each turret.

The tower has four stories comprising a basement, a ground floor, a first floor with the original entrance and an open roof with a parapet and two turrets which contain newel stairs linking all stories. The basement, ground and first floors were heated by fireplaces and provided both troop accommodation and fighting spaces for artillery, while the roof acted as a lookout and fighting platform for the defence of the ground south of the Line.

The basement provided access to the Main Magazine, in a sunken position north of the tower, and to underground galleries serving sally ports, the West Casemates and a large



subterranean chamber. The Main Magazine is bombproofed by a thick covering of earth and chalk shaped into a steep-sided earthwork with a flat top flush with the ground floor on the north side of the tower.

The north, entrance elevation exhibits some architectural pretension; on the ground floor there were originally two windows, with the main door at first floor level through the central of three tall openings, the other two forming windows immediately above their smaller ground floor equivalents (Fig 9). A timber stair probably provided access to the main door. Door and windows all have semi-circular arched heads of four orders. Above



Figure 11
*Artillery embrasures in
the west elevation of
Clarence Tower, at first
floor, ground floor
(centre) and basement
levels, in December
2002(author)*



Figure 12
 Plan of the basement level of Clarence Tower



them, the parapet is machicolated, with three murder holes corbelled out in oversize but finely cut Portland stone ashlar and positioned exactly above the fenestration below.

Immediately above the main door on the first floor, a square Portland stone plug served to drain a large cistern, built in the body of the tower between the first floor vaults and the roof level (see below).

Both east and west elevations have six large embrasures, two on each of the basement, ground and first floors. From the exterior, all are similar, with shallow segmental arched heads, splayed sides and sills, and large parabolic relieving arches (Fig 11).

The roof level is flat and finished with a parapet that slopes to the exterior on four sides, while the fifth (north) side is taken up by the elaborate machicolations and twin turrets. The top of each turret formed a look-out position and is reached via an external stone stair and simple open entrance; each is furnished with its own sloping parapet. A small storeroom - certainly a secondary feature - adjoins the north-west turret. On the inside centre of the south salient, a small porch covers the entrance to a vertical ammunition shaft which contained within the body of the salient and carried down through each level to the basement. There are infantry firing steps along the east and west sides of the roof level.

Inside, the basement, ground and first floor levels are each formed by a pair of adjacent casemates. These are separated by a thick spine or party wall, which has several doorways for communication between the pairs. Most of the interior surfaces of the casemates are coated with several layers of whitewash and retain miscellaneous evidence for fixtures and fittings of all periods.

The basement (Fig 12)

The basement casemates are mirror images, of essentially rectangular form with apsidal south walls, slightly curved north walls and semi-circular arched vaults (Fig 13). The floor is a concrete replacement of 20th-century date; the original was probably brick or stone flags. Four openings link the casemates through the party wall, here 2.75m (9ft) thick. All are original and each has a semi-circular arch of four orders. The southernmost is rebated for doors from the western casemate into the base of the ammunition shaft (see below), while the central two form short passages through the party wall, with rebates for doors on the central axis. The fourth and northernmost opening now links to a later



Figure 13
Clarence Tower,
basement level of the
east casemate, looking
north. The entrance at
centre rear of the photo
leads to the Main
Magazine, the one on
its right leads into the
NW turret (©NMR:
AA031464)



entrance cut through the north wall of the tower into the base of an external vertical **shaft**. The short passage through the wall to the shaft has a flat crude ceiling of stout timbers and is rebated on the external face for a wooden frame, painted dark red, for double doors which opened in towards the tower. The internal corners of the passage are chamfered and stopped. The shaft is rectangular, built in red brick laid to Flemish bond, ascending to ground level where it is framed by ferrous beams. On a photograph of 1961, the shaft is associated with an RSJ projecting from the bricked-up first floor entrance above it, to which lifting gear was attached (Fig 14). It is probable, therefore, that the shaft is of 20th-century date, for raising and lowering heavy items into the basement for storage.

The apsidal south walls of the casemates have central **fireplaces** with projecting secondary surrounds in brown salt-glazed moulded bricks. The original fireplaces were taller and recessed, with segmental arched heads supported by iron bands which can still be discerned. In the wall above each fireplace is a blocked regulatory vent to the flue.

In the angle formed at the junction of the south and west walls of the west casemate, a vertical **groove**, 0.10m (4in) square ascends right up through the vault, and continues upwards through the vaults above to roof level (it is bricked up on first floor). It seems likely that this carried services or communications between floors.



Figure 14

The north, entrance elevation of Clarence Tower in 1961. Note the RSJ projecting centrally at first floor level, with lifting gear linked to a winch in the shed below. This was for lifting heavy loads up and down from basement level via a vertical shaft, for which the trapdoors can just be seen at ground level
(© Crown copyright NMR: AA61/2554)

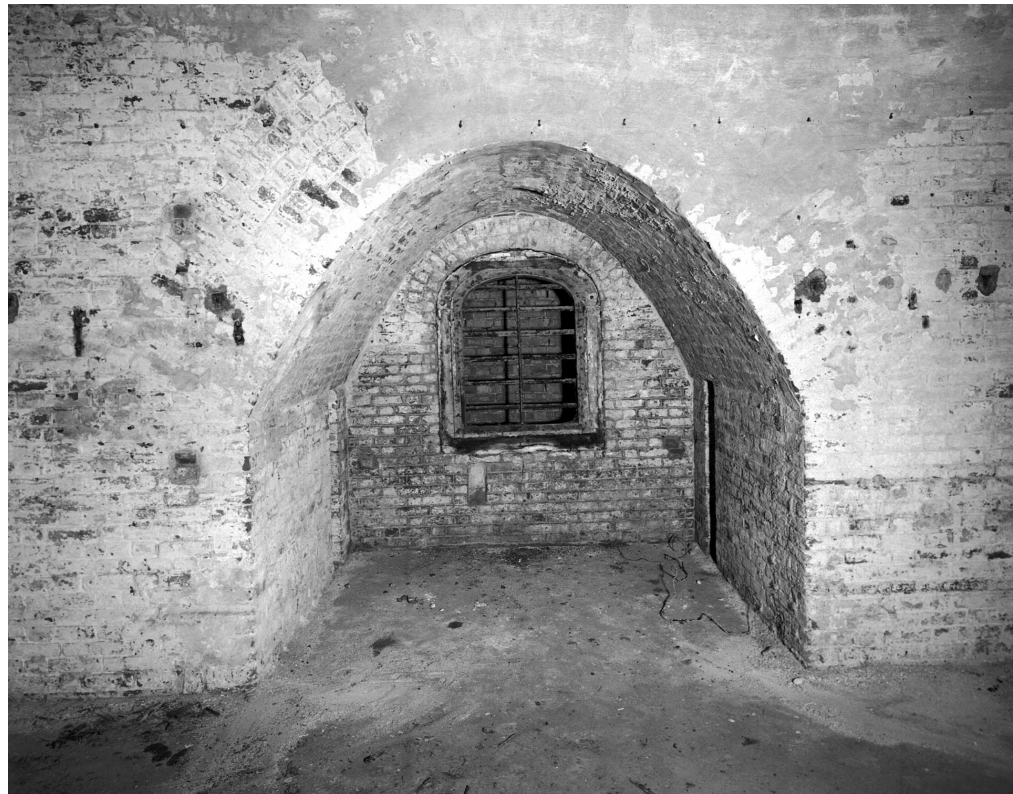


The north wall of each casemate contains two doorways, also with semi-circular arches of four orders. The rebates, for double doors, have been whitewashed following removal of the frames (as have all frame rebates in the building). The outer doorways, originally for doors opening into the casemates, led into the turret newels and thence up to all other floors. The inner doorways, originally with doors opening out of the casemates, give onto short ramps leading down to the Main Magazine, the West Casemates and galleries.

The outer walls of each casemate incorporate two large rectangular recesses, 2.45m (8ft) wide and 1.95m (6ft 5in) deep, capped by parabolic vaults 2.42m (8ft) high, groined in at 90° to the main vaults and finished by six-order arches (Fig 15). The end wall of each recess contains a substantial embrasure with a sill 0.90m (3ft) off the floor, while the side walls have opposing vertical slots, 1.23m (4ft) high, 0.23m (9in) wide and 0.11m (4¼in) deep, possibly for securing a timber carriage for an artillery piece (Fig 15). One slot retains an inclined sandstone lintel. Under each embrasure there is a small vertical recess with a segmental section, 0.37m (1ft 2½in) high, 0.14m (5½in) wide and up to 0.08m (3in) deep; this possibly accommodated a mechanism for elevating and depressing the artillery piece. A single brick-built ventilator in the crown of each vault served to draw off the smoky discharge after firing.



Figure 15
Clarence Tower;
artillery recess in the
basement west
casemate, with its
secondary barred frame
of asylum or prison
vintage (© NMR:
AA021155)

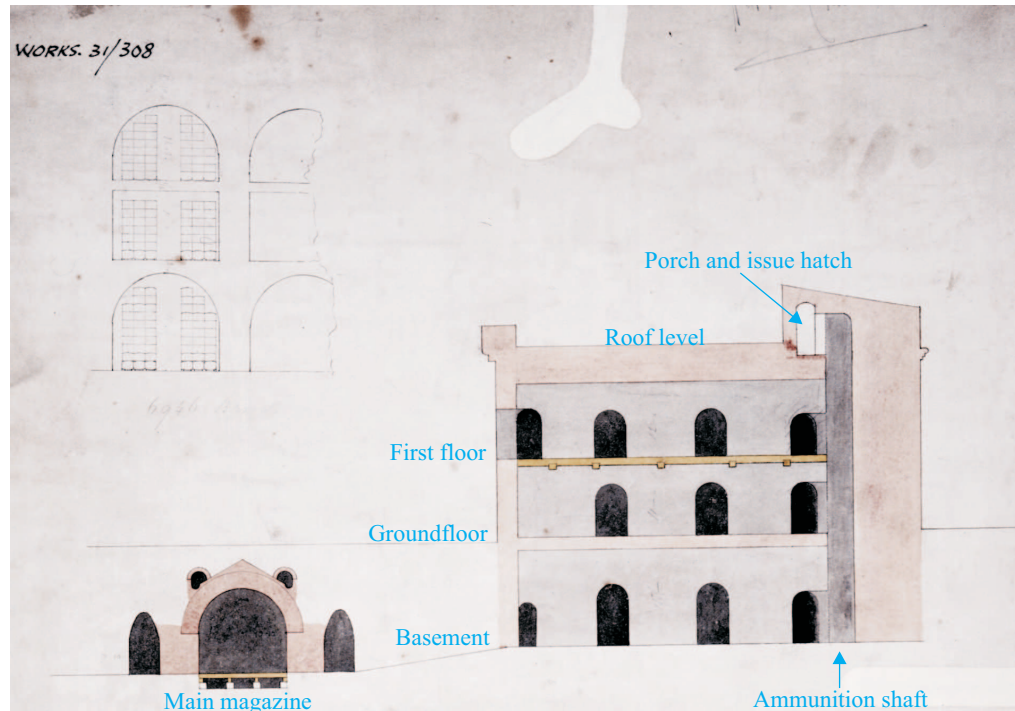


The embrasures are finished with segmental arches passing horizontally through the wall thickness, while the sides and sill are splayed outward and downward respectively to the exterior. The sill is of sandstone slabs. There are no traces of shutters to close the embrasures but the internal faces contained (or had contained) a timber frame of heavy scantling, 0.15m (6in) square, peg-jointed in four pieces. They are recessed and anchored into the brickwork in such a manner that they must be original. At some time, a secondary frame of slighter wooden strips was nailed and screwed into place, with grooves for the insertion of steel bars, no doubt when the site was in use as a lunatic asylum and prison. Additionally, there is evidence for the insertion of shelves across the back of all the recesses at arch and sill level. In the late 20th century, all of the embrasures were blocked with brickwork and render.

The entrance to the **ammunition shaft** is through a semi-circular arch of four orders, just inside which are traces of a surface-mounted doorframe, probably for double doors opening into the shaft.



Figure 16
North-to south section through Clarence Tower, undated but c 1815 (north is on the left). Note the position of the ammunition shaft. Text in blue is added by the author (extract of PRO: Work/31/308 © The Public Record Office, by kind permission)



The shaft extends vertically from basement to roof, for lifting ammunition from the Main Magazine to all floors and also providing ventilation (Fig 16). It is a flattened circle in plan, with a diameter of 1.83m (7ft) east to west by 1.47m (4ft 10in), constructed entirely of brick headers. Rings of sockets in the brickwork just below ground, first and roof levels indicate the position of stout timber floors, originally pierced by trapdoors, through which ammunition and other supplies were hauled up. In the base of the shaft, an apsidal brick setting is of unknown purpose but probably secondary. On the roof, the top of the shaft pierces the sloping parapet in the centre of the south salient (see below).

The ground floor (Fig 19)

The party wall on this level is reduced in thickness to 1.23m (4ft ½in). To each side, a vaulted casemate, taller than those in the basement, contains both the ground and first floors (Figs 17-18). The floors at ground level are concrete replacements, while the first floor, a substantial timber structure, survives only in the eastern casemate.

As in the basement, the casemates are mirror images, with details of construction and finish virtually identical to those below. Nevertheless, there is a little variation. The party wall has four openings, the two in the centre with semi-circular arches and rebates on their centre lines for wooden doorframes, one of which retains its frame of five peg-jointed pieces, for double doors opening into the east casemate. However, the



Figure 17
Clarence Tower, west casemate ground and first floor levels looking north. The timber floor structure has gone, leaving only the stone corbels from the tie beams. Note the different design of the artillery embrasures on the ground and first floors (at left) (© NMR:AA020022)



Figure 18
Clarence Tower, west casemate ground and first floor levels, looking south from the north-west turret. Shows the spine wall and the apsidal south wall with fireplaces on both levels (© NMR:AA021140)



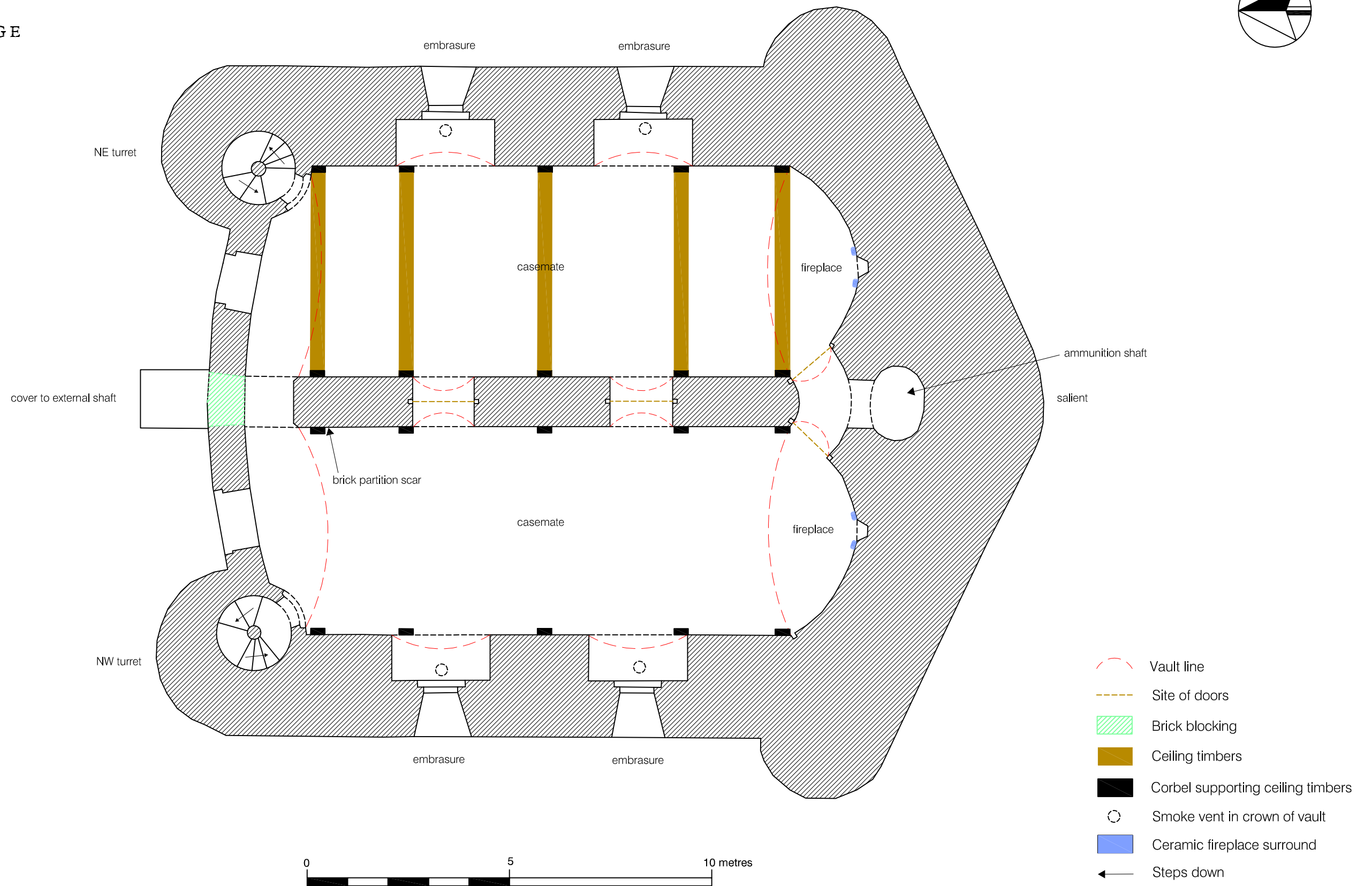
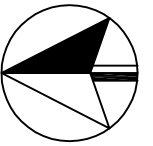


Figure 19
Plan of the ground floor of Clarence Tower



northernmost opening is a later breach, 1.22m (4ft) wide, with a flat head formed by four deep timber planks forming a crude lintel; this support was clearly insufficient as the brickwork above has slumped. This opening in turn provided access to a breach in the north wall of the tower, on the line of the party wall and with similar timber supports, which itself was subsequently blocked with crude brickwork. It formed an entrance to the external rectangular shaft which descends to the basement (see above).

In the north elevation, each casemate originally contained a single window. The eastern window survives, with a round arch of four orders and a sill set 1.34m (4ft 5in) above the floor; the frame is missing. The western example has been converted to a door by cutting down through the brickwork, infilling the arch and inserting a flat reinforced concrete lintel. This conversion is probably of 20th-century date, to allow easier access to the ground floor and probably went hand-in-hand with removal of the stair arrangement to the original first-floor entrance; it had double doors in 1961 (Fig 14). A vertical **groove** in the party wall of the west casemate, near its north end, now infilled and rendered, may have held a light partition wall and is close to one indicated on the design plan of 1809-10 (Fig 7). The occurrence on the walls of sawn-off timber fittings from shelving, multiple nails and screws and other ferrous fittings, attest to more intensive use in the 20th century and probably explains the conversion of the window to a door. The west casemate has a pencil graffito above the fireplace reading ‘840323 Weld Hut One Room 901 Squadron(illegible)’, suggesting workshop use by the Shorts Company.



Figure 20
*The interior of
Clarence Tower, east
casemate, showing the
ground floor with
original ceiling,
artillery recesses
(right) and window in
north elevation (left) (©
NMR: AA020013)*



Figure 21
*Clarence Tower, detail
showing the structure of
the ceiling in the
ground floor east
casemate. The wooden
props at left are
modern (© NMR:
AA020015)*



The artillery recesses in the outer walls are shallower than those in the basement, at 1.15m (3ft 9in), but otherwise identical (Fig 20). The sides of their embrasures contain opposing iron fittings, now broken but probably for holding back wooden shutters; a lead plug in each vault may have housed a bolt to secure a shutter in the closed position.

In the east casemate, the surviving ceiling is of close laths secured to the joists by hand-made ferrous nails, the whole finished with plaster (Fig 21).

The first floor

The first floor entrance to Clarence Tower is in the centre of the north elevation, on the line of the party wall. The outer face is guarded by double iron gates, opening inwards on pintle hinges secured in large stone anchor blocks at high level in the side walls, and in mortices in a stone threshold (although the latter has a later concrete cap) (Fig 22).

Each gate has seven square-sectioned uprights tapering at the top to plain points. These are secured at the base and near the top by horizontal bars; two more bars form a central panel infilled with a decorative cross and loop motif. The centre panel also supports, on the eastern gate, an external mortice lock. It is likely that the lock was moved from the



Figure 22
*Secondary phase iron
gates in the north
elevation of Clarence
Tower, guarding the
first floor entrance (©
NMR: AA020019)*

internal face of the gate, and from one gate to the other, to judge by cut-outs in the side walls of the same size and shape, and at the same level. Further security was provided by two iron loops on the west gate, probably for a vertical bolt anchored in the threshold.

The gates are secondary; they are shorter than the vault, the gap above closed by two horizontal iron bars anchored into the brickwork. Also, the anchor blocks for the hinges have a tile course beneath and patched brickwork around them. Thirdly, for the open gates to rest flush against the side walls, slots were cut in the vault to accommodate the spiked points.

These slots overlap the rebates for doorframes at the inner face of the entrance. These probably do not reflect the original main doors and curiously are stopped at the springing of the vault by inserted sandstone slabs (they might have held half doors). They probably supported doors set at right angles to the entrance and opening into each casemate, creating a small 'lobby' immediately inside the entrance.

In this 'lobby', the floor has been removed and the end of the party wall rebuilt at low level to accommodate a large I-section RSJ which formerly projected through the entrance to the exterior; its sawn-off stump remains. This supported lifting tackle associated with the external vertical shaft described above (Fig 14). The vault contains a rectangular hatch with a wooden frame, rebated for a trapdoor 0.57m (1ft 10½in) by 0.43m (1ft 5in), purpose unknown.

The first-floor casemates are similar to those below. The original floors were of timber and that in the eastern casemate survives, carried on five massive cross-axial pine tie beams anchored into rebates in the side and party walls, supported on quarter-round stone



Figure 23
Clarence Tower; the first floor east casemate, showing the boards, window frame removed from the north elevation, and the ocular artillery embrasures in the east wall (© NMR: AA020009)



corbels (Fig 23). The rebates are finished by single-order shallow segmental arches. Each tie beam, 0.28m (11 in) square, is clad with 5cm (2 in) planking which is chamfered and stopped at each end. Twelve joists, each 0.25m (10 in) deep and 0.09m (3½ in) wide run axially over the tie beams and are secured into the north and south walls in rebates 0.11m (4½ in) wide, 0.22m (9 in) high and 0.11m (4½ in) deep, with stone sills (Fig 21).

The timber boards, of varying length but uniformly 0.17m (6½ in) wide, are secured to the joists by wooden pegs that are roughly trimmed to a round cross section of up to 1.5cms (½ in). All of the main beams and the joists are branded at regular intervals with the Board of Ordnance symbol (Fig 24), presumably to discourage theft of even the shortest

Figure 24
The Board of Ordnance symbol, as branded onto one of the first floor timbers in Clarence Tower. The symbols are each 3.5cms tall (© NMR: AA031469)



section of timber. There has been some patching of the floor. During removal of the floorboards by Swift Ltd, a group of clay pipes was revealed, concealed between the floor boards and the east wall. These pipes, probably secreted here by an inmate of the military asylum between 1818 and 1844, were a



welcome find, providing a tiny snapshot of life in such an institution (see full report in Section 6).

There is a small area of stone flag flooring over the party wall at the entrance to the ammunition shaft.

The entrances in the party wall and to the turrets are identical to those on the floors below. The east and west walls are corbelled out to begin the vault c1.0m above the floor, and contain several sockets and timber plugs from shelving and other fittings. The vault of each casemate contains a single ceramic vent pipe.

The artillery embrasures are ocular; with parabolic vaults over and shallow segmental vaults under. The sides are parallel and the sills horizontal (Fig 23). All retain their heavy timber frames and in the east casemate, the southern recess retains its secondary iron bars similar to those in the basement. A tertiary rectangular frame - still of 19th-century date - has been placed over this frame and secured into the brickwork, housing double inward-opening windows of eight lights each, with segmental arched heads. The other three recesses have more fragmentary evidence for identical windows.

The roof (Fig 25)

Before the present alterations began, the original roof level was covered by a temporary timber and felt roof installed during the Post Office ownership. This was built with its east and west sides sloping steeply inwards to a central section inclined very gently to the north for drainage. Upon removal, it was found to rest on three brick dwarf walls, aligned north to south, which had been cut into an original brick **gun floor** (Fig 26).

The roof area is sub-rectangular, with dimensions of 15.0m (49 ft 2in) north to south by 14.1m (46ft 3in), defined by a **parapet** and with several layers of brick paving forming the gun floor. Into this space at the north-east and north-west angles intrude the arcs of the turrets, in the latter case with a small rectangular **store room** attached, while in the centre of the southern arc is the **porch** to the ammunition shaft (Fig 26). Both turrets project high above the gun floor.

In order to build the dwarf walls for the modern roof, broad construction trenches had been excavated through the original brick floors until a solid base for foundations was encountered. This base was provided by the brick vaults of three original large **cisterns**

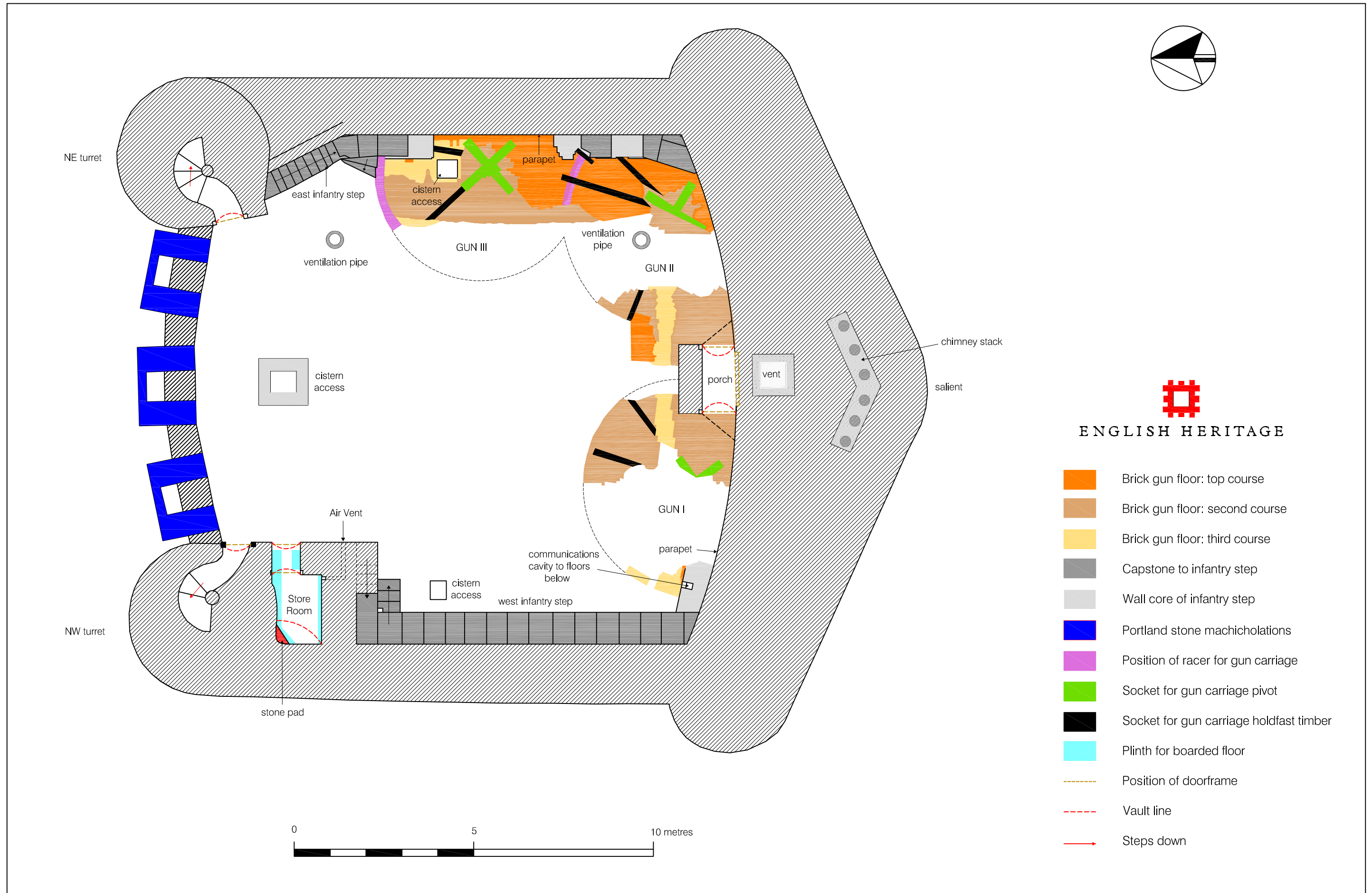


Figure 25
Plan of the roof level of Clarence Tower



Figure 26
The southern end of the roof level on Clarence Tower, showing the porch to the ammunition shaft and the fragmentary original brick gun floor. Note also the three intrusive dwarf walls, built to support a temporary roof structure (© NMR: AA020032)

which are situated in the otherwise chalk and rubble-filled space between the roof level and the first floor casemate vaults (see below).

Installation of the modern roof resulted in almost total loss of the northern half of the **gun floor** and its replacement with a thick layer of sandy soil and brick debris. However, part of the southern half remains, seven brick courses, or 0.64m (2ft 1in) deep, the top course entirely of stretchers laid on edge in an elaborate decorative manner. All of the bricks are handmade and stamped with the Board of Ordnance motif; each brick is approximately 0.22m (8½in) by 0.10m (4in) by 0.06m (2½in).

Within the extant part of the gun floor are traces of three semi-circular gun platforms. These have recesses in the paving for the timber mountings of artillery pieces on traversing slide carriages covering the south, west and east approaches to the tower.

The position of **gun no I** is damaged by the later dwarf wall (Fig 27). It has only a very small patch of the top layer of paving but the site of the cross-shaped gun holdfast partially survives as a recess in layers two and three. Also apparent are two mortar scars



Figure 27
Clarence Tower; the south-western corner of the roof level, showing the emerging semi-circle of gun position no I, badly damaged by a broad trench cut for the insertion of a 20th-century dwarf wall for a later roof (© NMR: AA021135)



radiating to the rear of the platform from the holdfast, probably from timbers to which the gun racers were formerly secured: the site of the outer racer survived in one fragment of brickwork.

The site of **gun no II**, also damaged, is slightly better preserved and has identical arrangements (Fig 28). Also, a **ceramic ventilator** from the first floor casemates exits through the gun floor and was presumably originally covered by a grille flush with the brick surface. The survival of the top layer of paving indicates that the holdfast cross-timbers were

0.74m (2ft 5in) long, 0.25m (10in) wide and 0.18m (7in) deep. The longest radiating timber was at least 2.68m (8ft 10in) long, 0.15m (6in) wide and 0.10m (4in) deep. The position of the outer racer was indicated by a 1cm deep recess on the edge of the gun platform.

The western part of **gun no III** has been cut away but the position of the holdfast is complete, as are the scars of two securing timbers for the racers, and part of the position of the rear racer (Fig 29). Just north of the holdfast is a manhole for one of the large cisterns under: it presumably had a cover flush with the gun floor. A second ceramic ventilator from the first floor casemates emerges just to the north of the gun platform.

In all three gun positions, traces of the holdfast timbers survived, in a much decayed condition, indicating that the timbers remained *in situ* after the guns themselves were taken down. The outer edges of the gun platforms are crossed by infantry steps, which run alongside the east and west parapets, but it is possible that they are contemporary and functioned together. However, the **west infantry step** is of finer construction than its partner opposite. It is supported on four semicircular brick arches and capped with large sandstone slabs some 6cms (2½in) thick (Fig 30). From it, there are steps down to the gun floor and the beginning of steps up to the north-west turret, over the adjacent



Figure 28

Clarence Tower; the south-eastern area of the roof, showing the position of gun no II, cut by a trench for the insertion of a 20th-century dwarf wall. The flagstone (at centre) covers the ventilator from the casemates below; to its right is the rebate for the holdfast and two radiating rebates for timbers which anchored the gun racers (© NMR: AA021137)



Figure 29

Clarence Tower; the eastern area of the roof, showing the cross-like rebate for the holdfast of gun no III, and the adjacent shaft to one of the roof cisterns (© NMR: AA021138)





Figure 30

*Clarence Tower;
western infantry step .
The stone flags above
the relieving arches
have been removed.
The trench at centre is
cut through original
chalk infill which itself
sits above the vault of
one of the roof cisterns.
The brown soil and
rubble deposit over the
chalk post dates the
removal of the brick
gun floor(© NMR:
AA031471)*



storeroom. The upper surfaces of the flags are dressed and have a secondary thin asphalt coating; the edges and undersides are rough-hewn. The parapet rises 1.33m (4ft 4in) above the flags and is of perfect height for musketry, its outer face sloped steeply downward to enable close defence of the Line. The **east infantry step** is of cruder construction, comprising a low plain brick wall, with similar but smaller flags, carried right up into the north-east turret on a flying buttress built against the turret and parapet walls. The space underneath this buttress was originally open and rendered, perhaps for use in the storage of small supplies, but was subsequently blocked with brickwork in stretcher bond. The east parapet is identical to its western counterpart.

The roof area also contains three inspection holes leading to short shafts which emerge in water cisterns under the gun floor. These are semi-circular vaulted tunnels, with concave bases running most of the tower's length on a north-south orientation. The central cistern is the largest and all three probably held an emergency water supply.

The shaft to the central cistern, sealed by a modern dwarf wall, has a rectangular section, 0.73m (2ft 5in) east-west by 0.61m (2ft), descending 0.60m (2ft) to the vault of the cistern, which is 13.22m (43ft 4in) long, 1.35m (4ft 5in) wide and 1.03m (3ft 4in) high, with a concave base 0.26m (10in) below the vault base (Figs 31-2). The vault is in stretcher bond but the lowest courses have gaps of one brick width, every other brick, to



Figure 31
*Clarence Tower;
interior of the large
central cistern, situated
between the roof level
and the first floor
vaults, looking north to
the drainage aperture
(© NMR: AA021147)*

allow percolation of water into the cistern from the surrounding infill material. The base has two overlapping tile courses at the edges, after which it is entirely lined with sheet lead. The base is very slightly inclined to drain towards the north wall of the tower, where a small aperture, sealed by a stone blocking plug from the exterior, provided easy drainage prior to maintenance. Small brick drains enter the cistern from both sides at the north end; these may be from the gun floor.

The flanking cisterns are of identical construction but smaller at 0.98m (3ft 2½in) wide and 0.80m (2ft 6½in) high, with smaller shafts from the inspection holes (Fig 32). The vaults are slightly asymmetrical in section, with the outer edges ending at a higher level than the inner edges. Towards the north end, the western cistern was rebuilt with a shallower vault to accommodate the vertical foundation of the store room above, which afterwards formed one side of the cistern itself. Also, at its the north end, the vault ends and a small square drain leads from it around the north-west turret; staff from Swift Ltd informed me that this drain is carried in a spiral around and down the turret, and exit holes can be seen on the exterior brickwork. The south end of this cistern has a steeply sloping tiled face, partly obscured by a brick pillar carrying the services and communications from the casemates below.

A small **storeroom** abuts the north-west turret, built at the same time as or just earlier than the infantry steps (Fig 34). Its entrance has a segmental arch of four orders, rebated

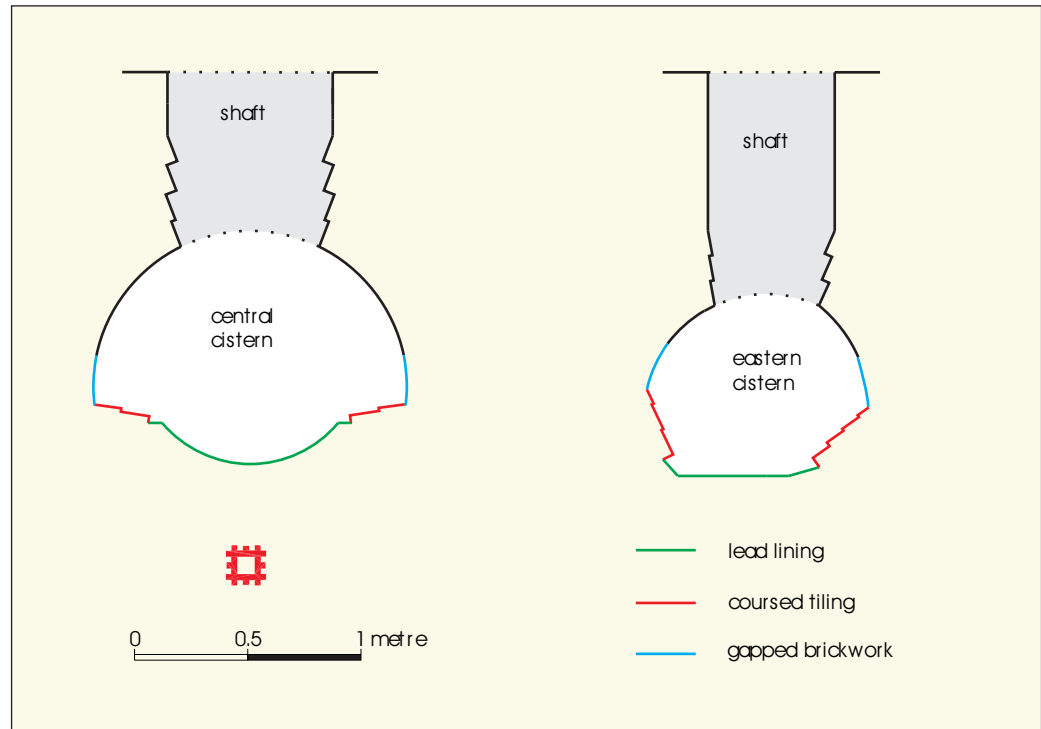


Figure 32
*Sections of the cisterns
built under the roof of
Clarence Tower*

for a timber doorframe, subsequently bricked up. The interior has a short entrance passage, at the end of which the walls are disturbed by rebates for a secondary door. Beyond it, the main part of the store has an asymmetrical plan caused by the curved outer wall of the turret, and a half vault with the higher end to the north. The north and south walls have a plinth for a raised timber floor. The south wall, close to the south-west corner, has a recess 0.32m (12½in) tall, 0.10m (4in) wide and 0.11m (4½in) deep, ending in a sandstone slab perforated by twelve small holes. This is a ventilator which exits to the exterior via a narrow slot with a sandstone lintel. The south wall has the remains of two sets of timber plugs at head and knee height; these may have anchored shelves. Built into the north-west corner, a Yorkstone plinth 0.18m (7in) thick, cuts across the angle and is mirrored by an almost identical Yorkstone pad, inserted into the wall 0.99m (3ft 3in) above it. The latter has a small rebate in its upper surface, purpose unknown.

In the south wall of the tower, access to the ammunition shaft is protected by a small **porch** that projects into the gun floor (Fig 26). Its north elevation is plain, with fossiliferous limestone capstones 0.11 (4in) thick, beyond which the roof slopes down at the same angle as and continuous with the parapet. The east and west elevations of the porch contain squat doorways which are angled back to the parapet such that they face north-west and north-east respectively (Fig 33). These are only 1.53m (5ft) high and would have functioned as issue hatches for ammunition. Each is surmounted by a



Figure 33
*Clarence Tower; detail
of the entrance to the
porch to the
ammunition shaft at
roof level (© NMR: AA
021128)*

segmental arch of four orders, resting on a fossiliferous stone pad built out from the parapet. In the porch side walls, the outer sides of the entrances are rebated for wooden doorframes (each with a thin sandstone cap) but the inner sides, in the parapet wall, are not; possibly the frames there were surface-mounted.

Inside the porch, the entrances are linked by a vaulted passage whose floor is sunk at least 0.43m (1 ft 5in) below the gun floor (the floor of the passage is rough and may have been brick-paved) but there are no traces of steps. The western entrance was

blocked with brickwork at some time but the east entrance seems to have remained open, its brick sill projecting just one course above the gun floor.

From the passage there is a four-order semi-circular arched opening, rebated for a wooden doorframe (probably with double doors), to a short lobby before the ammunition shaft. The doors opened into the lobby and rested against its side walls. Floor level in the shaft was 0.45m (1 ft 6in) lower than that in the passage and lobby; the positions of the joists are marked by a ring of sockets in the brickwork.

The top of the ammunition shaft emerges through the sloping parapet as a subcircular aperture. The surrounding brickwork is levelled up clear of the parapet and was probably originally covered by a grille to enable air and light to enter the shaft; at present, it has a square steel cover with a central circular hole.

South of the shaft, the flues from the casemate fireplaces emerge. They are organised as a single brick stack, 0.83m high and 0.53m (1 ft 9in) wide, in the shape of a shallow chevron parallel to the south salient. It is built mainly in stretcher bond, with a concrete cap through which the remains of six chimney pots project.



The turrets

The turrets rise the full height of the tower and link all levels via half-landings, from which the usual semi-circular arched openings, rebated for double doors, open into the casemates. Each turret contains a newel stair with stone treads and risers anchored to a circular newel post. The latter is made of specially moulded bricks, with spaced circular gritstone levellers, each of which is 0.15m (6in) deep. Both stairs are lit by five small windows which have narrow, loophole-like exterior openings splaying to the interior. In several instances, the internal peg-jointed wooden frames survive, 0.50m (1 ft 7½in) wide and 0.42m (1 ft 4½in) high, with a single casement of two lights, hinged on the left side. These windows pass through a wall thickness of 1.68m (5ft 6in) and functioned purely to light the stairs; they could not fulfil any realistic defensive role.

Drainage off the roof was conducted down through the thickness of each turret wall in a complex spiralling cavity which required good maintenance to prevent blockage. A series of slots in the external walls acted as overflows, while cleaning may have been effected via 0.29m-square (11½in) apertures, now blocked, situated at intervals in ascending the newel stair. Both internal slots and external apertures have stone lintels.

At roof level, the newels emerge through the usual semi-circular arched doorway onto the gun floor. However, the structure of both turrets is carried higher to provide circular lookout or observation platforms, positioned above the Portland cordons and reached via



Figure 34
*Clarence Tower; the
NW turret. The
right-hand entrance is
to the newel stair, the
left-hand to the store
room (© NMR:
AA021108)*

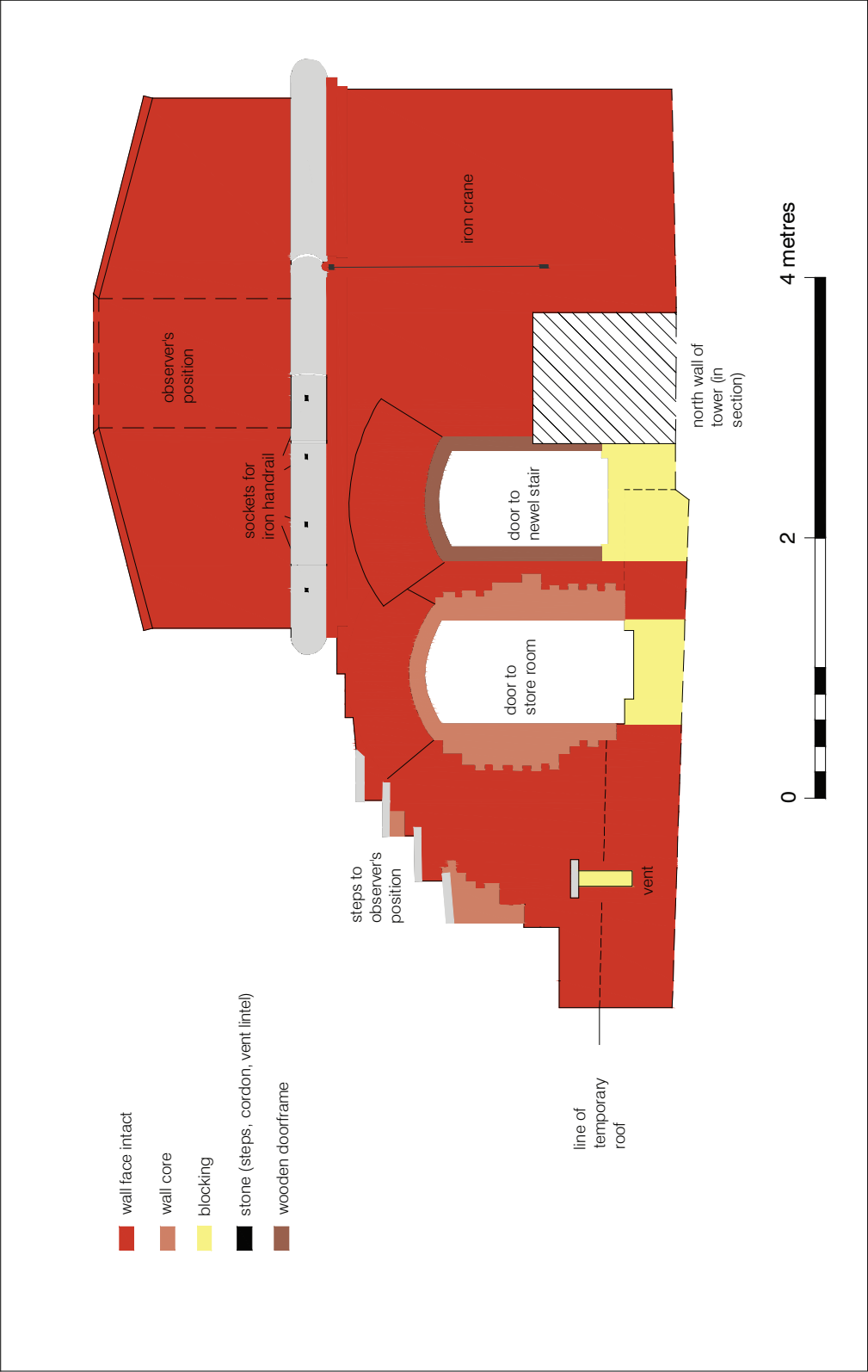


Figure 35
Elevation drawing of the NW turret and store room



Figure 36
*Clarence Tower; the
NE turret. Note the
steps over the flying
buttress, ascending to
the observation
platform (© NMR:
AA020048)*



independent stairs linked back to the infantry steps (Figs 34-6). At the top of each stair, the cordon is broadened to form a walkway and has sockets in its outer surface which formerly anchored a metal hand rail that terminated at the entrance to the observation position. Each entrance is a simple opening 0.86m (2ft 10in) wide at the exterior, tapering to 0.7m (2ft 3½in) inside; inner and outer faces are finished in Portland capstones. Each entrance emerges into the small circular observation space, 0.99m (3ft 3in) in diameter, with a stone flagged floor, protected by a parapet 1.47m (4ft 10in) tall internally, sloping to the exterior and covered by a protective layer of asphalt.

The interior of the observation position in the north-east turret is rendered and contains an inserted concrete pillar for a DRF instrument. This is 1.22m (4ft) high and 0.50m (1ft 7½in) square, with an iron supporting bracket for a telephone and recess in the rear face 0.13m (5in) square and 0.23m (9in) deep. The top of the pillar incorporates three circular recesses in a triangular pattern for mounting the instrument. This feature dates to the 20th century and would have been used during gunnery training.

The north-west turret has a small iron davit inserted to the brickwork on its north-east face, overhanging the north elevation of the tower. This is of unknown date but would have enabled the lifting of materials from the ground floor to the roof.



B) THE MAIN MAGAZINE (Fig 10)

The Main Magazine is situated to the north of Clarence Tower in what was a protected position in the angle between the tower and the Guard House. It is a sunken and vaulted structure sealed beneath a thick layer of earth and chalk bombproofing which is profiled into a steep-sided earthwork with a flat upper surface at ground-floor level. The magazine, approached through twin entrances in the north wall of the basement, has a concrete floor recessed some 0.92m (3ft) lower than that of the basement. These entrances, with semi-circular arches of four orders, give onto short galleries, each 1.55m (5ft 1in) wide and 2.7m (8ft 10in) high, descending via shallow ramps to a **lighting passage**. The galleries appear to have been closed by doors at their upper ends but only the scars from surface-mounted frames remain. The eastern ramp retains its brick floor but the gallery had been blocked with later brickwork at its lower end. The western ramp is a concrete replacement with only fragments of its brick predecessor at the lower end; this gallery had also been blocked - and subsequently cleared - so that only the scar of the blocking remained.

The lighting passage is 1.52m (5ft) wide and extends around the rectangular **magazine**, with neatly rounded corners which are corbelled out in support of a parabolic vault 3.0m (9ft 10in) high. Its original brick floor survives well on the south; elsewhere it has been removed or replaced with concrete. The passage provides access to the magazine via three entrances on the south, west and east, to a lamp recess on the north, and also to the separate gallery complex (see below). The walls have traces of green paint in what must have been a continuous band up from the floor to a height of 1.2m (4ft).

At the base of the west ramp, entry to the western arm of the lighting passage was at some late stage controlled by an inserted brick wall containing a flat-headed doorway, served by double inward-opening doors. This seems to replace an earlier surface-mounted frame, marked only by a line of spaced gaps in the brickwork 1.28m further north, marking the position of wooden bricks - now rotted out - to which it was secured. Opposite the magazine entrance, there is an apsidal niche capped by an identical parabolic arch rebated for a wooden frame, originally with double outward-opening doors. The niche, only 1.59m (5ft 2in) deep, has an unfinished rear wall of rough-hewn chalk bedrock; it is probably the entrance to a gallery that was never cut. In the vault between the niche and the magazine door is a circular shaft, ascending to the surface, with corbelling of the brickwork resulting in a slight upwards taper. This may have served to light and ventilate the passage and could also have been used for loading and unloading.



Figure 37
Clarence Tower; the main magazine, looking north-west. Note the parabolic entrance and the lighting recess (at right) (© NMR: AA020011)



The east passage has an identical shaft in the corresponding position and an identical parabolic arch opposite the magazine entrance; the latter, however, leads into a complex of galleries (see below).

The magazine is in red brick laid to English bond to a rectangular plan, measuring 6.7m (22ft) by 4.26m (14ft), with a semi-circular vault 3.42m (11ft 3in) tall (Fig 37). These dimensions tally with those given in returns dated 1821, 1830 and 1841 (PRO: WO/55/2458; 2543; 2920). The north and south walls are much thicker, at 1.9m (6ft 3in) than the east and west (end) walls, at 0.65m (2ft 1½in). Inside, the English bond brickwork has several coats of whitewash, with traces of a dark green paint - as in parts of the lighting passage - to a height of *c* 1.2m (4ft) above the concrete floor. The latter replaced an original suspended timber floor (Fig 38). There are opposing entrances from the lighting passage positioned centrally in the end walls, each with a parabolic arch of

Figure 38
Clarence Tower; north-south section of the main magazine, showing the semi-circular vault, suspended timber floor and parabolic vaults of the lighting passage (PRO: Work/31/309 (extract)© The Public Record Office, by kind permission)



three orders, rebated internally and externally for wooden doorframes which must have supported two sets of double doors that opened into the passage and into the magazine respectively. The rebates have gaps where timber bricks, for anchoring the wooden frames, have rotted.



The north wall is pierced by a large central lamp recess opening through to the lighting passage, with a flat sill 0.92m (3ft) wide and a semi-circular arched head, of three orders, 1.19m (3ft 11in) tall. The recess had timber frames at both ends, the rebates with identical arrangements for securing the joinery as the entrances, presumably with fixed glazing on the magazine side and doors opening into the lighting passage (Fig 37).

Opposite the recess in the south wall, the third entrance is 1.22m (4ft) wide and 2.04m (7ft 8in) high, but now blocked flush with the outer face by later brickwork. It also has a semi-circular arch of three orders and is rebated for doorframes inside and out. In the wall of the lighting passage opposite this entrance is an apsidal niche under a semi-circular arch of three orders, 1.22m (4ft) wide and 0.78m (2ft 7in) deep. It has no rebate but spaced and coursed-in wooden bricks were to secure a flush-mounted frame. It is likely that this was a store for small spares or small arms.

Inside, the north and south walls of the magazine have two levels of spaced gaps in the brickwork; 0.5m (1ft 8in) and 1.39m (4ft 7in) above the floor, where wooden bricks have decayed. These probably secured a timber framework for wooden lining to the magazine.

Scars from the removal of electric lighting conduit can be seen at the vault springing.

C) THE GALLERY TO THE WEST CASEMATES (Fig 10)

From the base of the western ramp, a gallery leads away from the magazine and lighting passage, ultimately to the West Casemates. The gallery has the same parabolic vault as the lighting passage; the first 8.5m is level and slightly curved, with three openings in its northern face. It ends in a fourth, blocked opening overlooking the site of the drop ditch outside the west face of the tower. This opening may originally have served to light the gallery or for maintenance of the drop ditch; it is partly blocked by brickwork and contains a steel door, 1.92m (6ft 3½in) high and 0.79m wide (2ft 7in) with a flat concrete lintel, inserted for access when the drop ditch had been infilled at some time in the 20th-century. The sill is positioned 0.78m (2ft 7in) above the gallery floor and if there are steps up, they are obscured by a large deposit of debris.

Of the three openings on the north side of the gallery, the first is the entrance to a small **store room**, the second to an **L-shaped room** and the third forms the **main gallery** to the West Casemates.



The **store room** has a semi-circular arched opening rebated for a wooden doorframe. This gives onto a short lobby with a semi-circular vault, near the inner end of which the brickwork has been cut away for a secondary doorframe rebate. Beyond it, the store room is a small rectangle of 3.07m (10ft) by 1.82m (6ft), with a shallow segmental vault. The brick bond used throughout is almost entirely of stretchers and the walls are double-skin; a niche in the rear wall may have been a ventilator but it has been broken out such that only part of its stone lintel survives. The floor has gone but was formerly of timber boards; a similar small niche below the former floor level connected to the cavity and provided under-floor ventilation. The ventilation of this room suggests that it had an original magazine-related function, perhaps for storage of fine powder, fuzes or perhaps lamps.

The central of the three openings gives onto a curious **L-shaped room**. Its entrance is rebated for a doorframe and capped by a semi-circular arch and the initial 1.04m (3ft 5in) has a flagged floor. Thereafter the floor, although at the same level, is of rubble; the vault is stepped down and the door would have stopped against it. The vault continues to the corner of the L, where a half-vault is set at right angles to it. The end of the L is blocked to form the room but originally opened onto the landing of the main gallery (see below). The rubble is, therefore, probably a fill concealing steps leading down to the landing, so that the room was originally an alternative route to the main gallery, guarded by doors at the upper end. The date of conversion to a room is unclear but the blocking is well executed and incorporates a metal ventilator. The walls contain some pencil graffiti, the earliest dated to 1932 but including some of earlier date eg '*P G Ham, Prisoner*'; perhaps the room was a small cell.

The opening onto the main gallery has a parabolic vault and leads down a short flight of brick steps to the landing, thereafter turning sharply south-west and descending a longer flight of steps on a curving course. Each step is approximately 0.35m (13½in) wide with wooden half-treads; the right side of the stair has an inserted metal handrail. The foot of the stair coincides with a crossing, from which the main gallery leads off to the west. However, two short sections of gallery lead east and south respectively; the former ascends via steeply battered and stepped brickwork to an opening of parabolic form, now bricked up: this emerged in the the west face of the drop ditch against the west side of the tower. The brickwork is too steep to have formed a walkway and it is likely that the opening was a light well for the main gallery. The southern section of gallery ends with jagged brickwork at a rough chalk face and is, therefore, unfinished; it lies directly under the ditch of the Line and the intention was probably to construct a sally port onto the

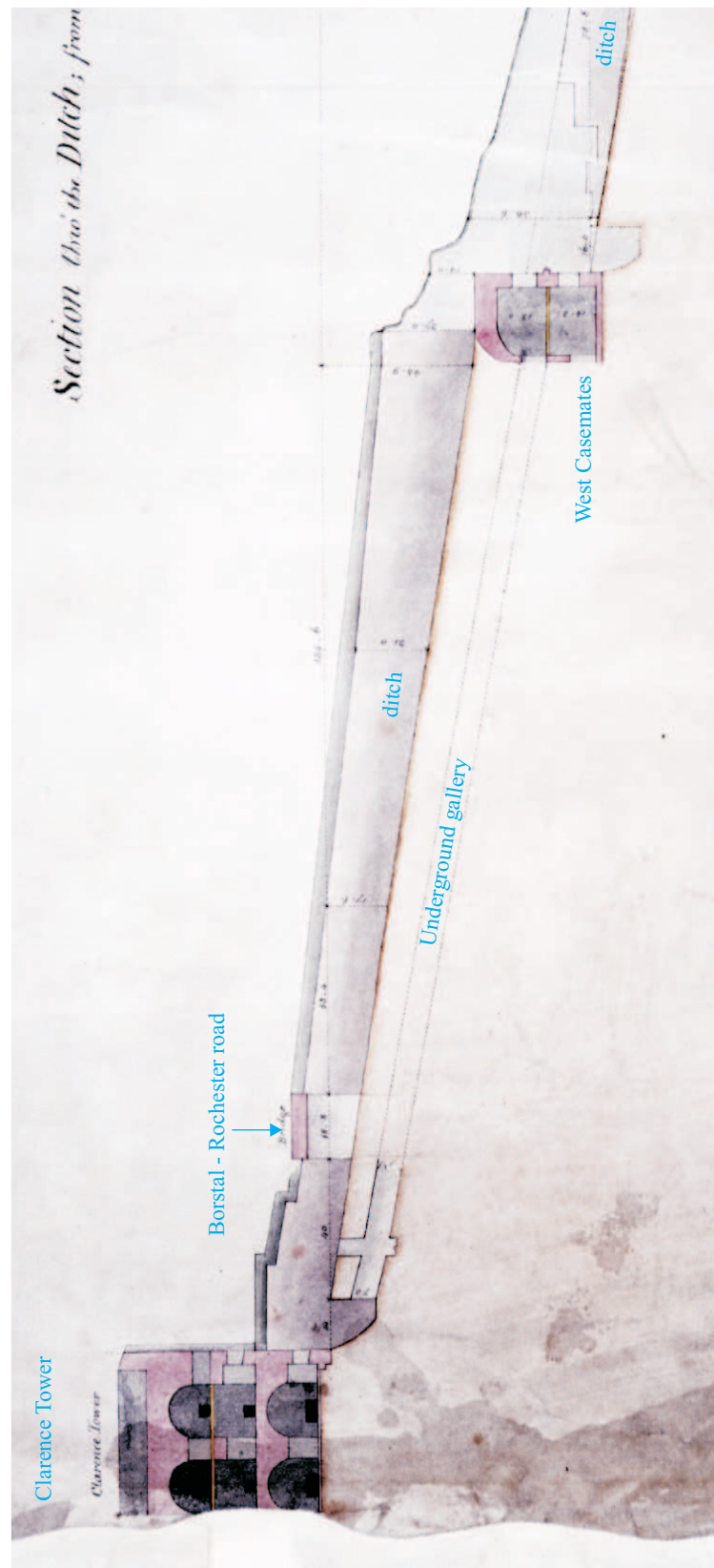


Figure 39
Section drawing of 1810 showing the Line between Clarence Tower and the West Casemates. Text in blue is added by the author (extract of PRO: Work/31/313 © The Public Record Office, by kind permission)



counterscarp. From the crossing, a circular brick ventilation **shaft**, 1.7m (5ft 7in) in diameter ascends vertically to the surface, its brickwork corbelled upwards and emerging in the ditch of the Line, though now capped by a steel plate (floor to plate is 6.35m (20ft 10in)).



Figure 40
*The main gallery
connecting the West
Casemates with
Clarence Tower,
looking east (© NMR:
AA020017)*

The main gallery descends moderately from the crossing, running directly underneath the ditch of the Line (Figs 39-40). It is ventilated by three vertical brick **shafts**, situated in recesses off the south side of the gallery, which have semi-circular arched openings and half vaults groined in at 90° to the main gallery. The circular shafts ascend to the ditch; two are capped and the other blocked by debris.

The first few metres from the crossing are a mixture of English and Flemish bonds and at 6.78m (22ft 3in) there are a series of missing headers in the side walls, perhaps indicating a doorframe, while a little further on a low **wall**

crosses the floor. Close by, a stone block set into the north wall 1.28m (4ft 2in) from the floor, bears the inscription W(ar) D(epartment) and arrow symbol. Immediately opposite the second shaft, and to the west on both sides, the brickwork is incomplete, leaving areas of bare chalk rock.

As it approaches the West Casemates, the gallery starts a gentle curve northwards, before curving abruptly to the south-west and dividing into two. These enter the first floor of the West Casemates through adjacent entrances.



D) THE WEST CASEMATES (Fig 10)

Clarence Tower defended the Line for half of its course towards the Medway. However, the steepness and angle of the natural slope dictated that both a substantial step and a change of angle was required in the ditch, leaving a potential blind stretch down to the river. Consequently, the West Casemates were constructed up against the step to cover the Line down to the Medway Tower (Fig 39). The result was a two-storied structure, constructed against a vertical cut in the natural chalk, with a drop ditch at its base. Today, the drop ditch and the main ditch have been infilled to such an extent that only the first floor of the West Casemates is visible; only the interior of the ground floor could be inspected (Fig 41-2).

The gallery emerges onto the first floor of the West Casemates through two entrances. There are steps down to the ground floor in the south-east corner. Although the first floor was probably defensible through two windows, it may have been more of an off-duty room than the ground floor, which has four musket loopholes in addition to identical



Figure 41

The photo shows the first floor elevation of the West Casemates looking east from the ditch of the Line: the ground floor is hidden by infilling of the ditch (© NMR: AA020024). The drawing shows the elevation in 1814, without the blind windows flanking the central high window of the first floor, one of which is visible in the photograph (PRO: Work/31/314 (extract) © The Public Record Office, by kind permission)

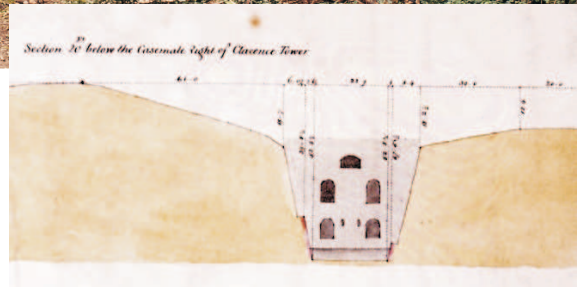




Figure 42
*The West Casemates,
interior at first floor
level showing windows
in the west wall (©
NMR: AA020006)*



windows; it also has a small expense magazine. This fenestration is almost but not quite that shown on a section drawing made in 1814 (Fig 41).

The southern entrance is the larger and has a parabolic arch of four orders, emerging through the centre of the east wall. Placed symmetrically to each side are identical openings with semi-circular arched heads of three orders; the one to the north is the second entrance; that to the south is a recessed **store cupboard**, 1.01m wide, formerly with four shelves. All three are rebated for wooden frames securing double doors.

The floor of the casemate is concrete and of 20th-century date, 0.15m (6in) thick, replacing a timber original of which there is no trace. The room is essentially rectangular in plan though the north-east and south-east corners are rounded. Construction is in brick, mainly red, which is almost entirely whitewashed, including the rebate for the south doorframe. The rebates for the north doorframe and the store cupboard are not whitewashed, suggesting that their doors remained *in situ* for longer.

The casemate has an axial brick vault made up of two sections which are of different phases. The eastern section, about two-thirds of the total, is a rebuild or thickening in Flemish bond - the remainder of the casemates being in English bond. This thickening has resulted in a short vertical step up to the original section of the vault on the east.



At the eastern ends of the north and south walls are identical fireplaces, in opposing positions. These are similar to the originals in Clarence Tower but in this case were not remodelled with glazed brick surrounds. Both are partially blocked by four courses of brickwork from the floor, perhaps for the insertion of a later grate.

The south wall faces onto the ditch and was illuminated by a symmetrical arrangement of three large windows (Figs 41-2). Through the outer two it was possible to defend the ditch while the third is placed centrally, high in the crown of the vault, for illumination. However, the exterior elevation has another pair of small semi-circular windows, placed symmetrically on either side of the high central one. At first sight these appear to have been blocked but in fact were blind; a small architectural conceit.

The two low windows have semi-circular arched heads of three internal and four external orders, capped on the outside by fine drip moulds of two projecting courses. The south window, now entirely bricked up, has a secondary concrete sill. The north window was converted to a doorway, no doubt after the infilling of the ditch to first floor level, by cutting away the brickwork below the original sill. On the inside, the cut is crudely patched with inferior brickwork to narrow the opening, which was capped by a flat concrete lintel while the original arched head was bricked up. Partial removal of this blocking has revealed the rebate for the original window frame. The door is of sheet steel, hinged on the north to open outward, and secured on a steel frame.

The upper window is broad and squat with a shallow segmental arch of three orders and identical drip mould. It is bricked up flush with the external face but on the inside sits in a rectangular recess of one brick thickness. An inserted Crittall-type metal-framed window of 20th-century date remains *in situ*, divided into 17 lights in three rows, incorporating a drop-down opening section.

These alterations to windows, the construction of the concrete floor and the infilling of the ditch to first floor level point to a significant refurbishment of the West Casemates in the earlier part of the 20th century.

On the east wall, framing the central entrance, is the scar of a brick or timber structure. The brick has not been whitewashed, showing that the structure was in place earlier. At the top angles of this scar, patched brickwork indicates two sockets; these are at the same level as two more blocked sockets occupying opposing positions at the springing of the



vault at the eastern ends of the north and south walls. Taken together, these probably held timbers securing a partition dividing the upper floor into two, perhaps along a line flush with the change in the vault. Vertical timber battens laid across the top part of the scar probably represent the remains of dry-lining for the room.

The ground floor is reached through an opening in the concrete floor, guarded by a steel handrail, down an L-shaped stair of bolted steel construction. This lower room is divided into three chambers by original full-height brick partition walls. One wall, aligned east to west, divides the major part of the room equally into north and south chambers and originally supported the first floor timbers (along with corbelled-out brickwork on the north and south walls of the north and south chambers respectively). However, it does not span the full length of the casemate, stopping before shorter partition walls which spring from the east wall to create a small **lobby**.

The north and south chambers are **gun rooms**, linked through a semi-circular arched opening in the party wall, rebated for a wooden doorframe on the north side. Each chamber contains a fireplace, in the north and south walls respectively, directly below

those on the upper floor and of identical type. The west wall in each chamber contains a large central window, identical to those on the upper floor and placed directly below them. To either side are musket loopholes with segmental arched heads of two orders. Both the windows and the loopholes are bricked up flush with the wall face.



Figure 43
*The West Casemates,
ground floor; expense
magazine in the east
wall (© NMR:
AA020018)*

The tiny lobby, closed by a door from each casemate, served to control access to a small recess in the east wall, forming an **expense magazine** (Fig 43). The recess is 2.49m (8ft 2in) high, 1.57m (5ft 2in) wide and 1.83m (7ft) deep, with an apsidal end and a parabolic



vault entered through an arch of three orders, rebated for a wooden frame supporting double outward-opening doors. Two rows of spaced wooden stretchers in the rear of the recess are the securing points for built-in shelves. The recess is large enough to hold a ready supply of powder and ball for immediate defence of the ditch, the casemates being at some distance from the main magazine.

From the form of these casemates it would *seem* that the defence of the ditch to the Medway Tower was to be by infantry firing from four loopholes on the ground floor, as the design of the four windows is not for artillery. Even with infantry parapets on the Medway Tower, which would have enabled partial crossfires to be established, this would not have been a particularly effective defence. However, there *were* two artillery pieces - 18-pdr carronades - in the casemates in February 1819 (Gulvin 1976, 27), so it seems that the windows could be removed in an emergency.

The partitioning of the ground floor into four elements for defence is clear; two gunrooms, a shifting lobby and an expense magazine. Although not so clear, the first floor did *not* have musket loopholes and may, therefore, have been a barrack and mess for the guard. However, the provision of two fireplaces suggests a similar partitioning into north and south chambers and there *is* evidence for a 'lobby' at the east end. Any partition on this floor would have been of light construction, which would have been cleared when the concrete floor was inserted. It is possible, therefore, that although each floor had a slightly different function, the original design was similar with the rear (east) of each casemate for storage and comfort while the front (west) was kept clear for fighting.

Finally, there is no sally port into the ditch or onto the counterscarp and it is likely that this part of the defensive scheme for the Line was not completed, an observation perhaps supported by the various unfinished brick details of the gallery serving the casemates.

E) CLARENCE TOWER GALLERIES (Fig 10)

This was incompletely explored due to blockings, collapses and dangerous conditions, most particularly contractors' machinery working above ground. They are depicted, probably in their entirety, on a survey plan undertaken in 1955 (PRO: WORK/14/2624). The intricate mesh of galleries shown on this survey - a maze almost - with frequent crossings, intersections and apparently dead ends, can only have been designed to enable staged defence by creating confusion among an attacking force and enabling surprise to be effected by the defenders. For the garrison, however, the galleries had several destinations. Two served **sally ports** into the ditch and onto the counterscarp of the Line



immediately south-east of Clarence Tower. The latter incorporated a **musketry position** with adjacent remote door closing mechanism, enabling the gallery to be sealed in an emergency. A third gallery led to the drop ditch on the east side of Clarence Tower, like its counterpart on the west side, and may have provided light and access for maintenance. A fourth headed north-east to a large rectangular underground chamber beneath the parade. This chamber, ventilated by two circular air shafts, may have been both an off-duty room in peacetime and an assembly area for troops defending the galleries in wartime - a kind of *place of arms* - and the plan indicates a recess on its eastern side which may have been the beginning of a gallery intended to lead to the East Casemates. This would have established a complete underground defensive communication between the East Casemates, Clarence Tower, the Main Magazine and the West Casemates.

During the present survey, only part of the gallery complex was accessible and subject to a brief inspection. The galleries are cut at many angles, with intersections only a few metres apart; there is an undecipherable combination of semi-circular and parabolic vaults, many rebates for doors and varying use of brick bonds. Three entrances were encountered from Clarence Tower, one in the centre of the east wall of the lighting passage around the Main Magazine and two in the east wall of a gallery curving southwards from the south-east corner of the lighting passage to the sally port into the ditch.



4. DISCUSSION

Although the concept of a tower for artillery defence was a long established one, by the late 18th-century they were not commonly employed in systems of fortification in the British Isles. However, the last decade of the 18th century and the first of the 19th witnessed the return to favour of the gun tower as part of a system for the defence of the coastline and its harbours against an expected invasion. This is seen emphatically in the Martello towers of the Channel Islands, the east and south coasts of England, Ireland and the Northern Isles. In all these cases, the towers were equipped with artillery for coastal defence of clearly defined points such as beaches and harbour entrances. In contrast, the use of towers in the British Isles at this time *along a defensive Line on the land front* - as at Fort Clarence - is rare and should be seen as unusual. Compare, for instance, the construction of the continuous Lines to defend the Western Heights of Dover, under the same CRE Southern District, Major General William Twiss (until 1809); those Lines incorporated similar flanking defences for the ditches but there were no towers; the major artillery provision was on the *terreplein* or in scarp and counterscarp gun rooms.

The unusual nature of Fort Clarence is reinforced by the fact that it was constructed at a time of transition in fortress design and construction, from an older system of continuous bastioned lines to the newer system of detached but mutually supportive independent works. Fort Clarence and the contemporary defences, established between the Chatham Lines around Chatham Dockyard and the River Medway, ie Fort Pitt, Gibraltar Tower, Delce Tower etc - clearly possess elements of both systems, underlining their transitional nature. Fort Pitt, for example, is a late example of a traditional bastioned fort but included a massive multi-tiered casemated barrack and gun tower on the north side and a central gun tower of similar plan to Clarence Tower. Most probably, Fort Clarence and its allied defences were a compromise in more than one sense; an economic alternative to extending the Cumberland Lines from Chatham to the River Medway and a practical application of old and new principles of defence.

Fort Clarence itself is a remarkable hybrid. Although it was constructed as a Line with ditch, rampart, parapet, counterscarp and casemated flanking defences - all for immediate defence - the inclusion of *three* towers is remarkable and provided artillery and infantry defence over the longer land and river approaches. It *was* a serious fortification. The discovery during the works by Swift Ltd of three artillery emplacements and infantry steps on the roof of Clarence Tower is a welcome confirmation of this capability (the roof-level store room - a secondary feature - occupies space enough for a fourth gun).



The armament withdrawn in 1818 was a combination of 12-pdr cannon (range 1700yds at 5° elevation), 18pdr carronades (range 1780yds at 5° elevation) and 12-pdr carronades (range 1000yds at 5° elevation). Although it is likely that most of the carronades were in the gun rooms for ditch defence and the cannon mounted on the roof levels of the towers for longer range work, it is also possible that weapons were mounted in combination, as in the east coast Martello towers where one 24-pdr cannon was frequently mounted with two 24-pdr carronades or two 5.5-inch howitzers.

Clarence Tower is itself a striking and unique construction; there is no other surviving gun tower of its type in the British Isles and it is unlikely that many others were built. Moreover, surviving records enable us both to witness the evolution of its design from 1809 and to realise how much experimentation the engineer officers were undertaking. Its loose affinity and similarity of basic principles with the contemporary Martello towers is of considerable interest, especially when we realise that the same officers undertook their design; the signature on many of the Fort Clarence plans, that of Lt Col Robert D'Arcy, reveals the same engineer who had designed and built Martello towers as a captain and Commanding Engineer in Minorca between 1800 and 1802 and who had a hand in the design of similar towers in Ireland (Clements 1999, 53-5, 162-3).

Clarence Tower was the centrepiece of the Line, around which the whole defence pivoted; here was a Main Magazine serving the whole fort and the principal control position, with all-round visibility over the ground to be commanded. Its mock-medieval appearance is a welcome and amusing architectural conceit which surely is a deliberate and pretentious act - a reflection of the great Norman keep only a kilometre to the north-west in Rochester. The machicolations are wonderfully exaggerated and - had an enemy force progressed this far - the murder holes a futile and last-ditch attempt at defence - quite different from those more practical examples on Martellos in Minorca, Ireland and Jersey.



5. APPENDIX I: THE OTHER DEFENCES OF FORT CLARENCE

Substantial parts of the Line defences of Fort Clarence have been destroyed or infilled. In all cases where evidence does survive, only a brief inspection was made during the current survey. The following are notes only and are not a substitute for a fuller investigation.

A) The Line (Fig 44)

A short section of the Line is visible immediately west of the site of the Maidstone Road Guard House, alongside Ethelbert Road. This comprises the ditch only, the rampart having been modified and landscaped for a public path and adjacent gardens to the east. From just east of the Maidstone Road, a 30m stretch is well-preserved, with battered brick revetments in English bond up to 4m deep and a flat, original base some 8m across. After 30m, the ditch is crossed and blocked by an inserted brick wall, also in English bond, which is the butt for a miniature rifle range established for the TA in the first half of the 20th century. Thereafter the ditch is gradually infilled to greater depth westwards up the slope such that, by the time it reaches level ground near the site of the East Casemates, it is completely concealed. Infilling progressed mainly from the east so that there is now a west-facing slope over the course of the ditch. It is, however, presumably well-preserved below ground.

Another section of the Line can be seen in the woodland of Clarence Gardens west of Clarence Tower and the Rochester-Borstal Road. Although definition has been lost and a new slope created by infilling immediately west of the road, the ditch emerges with well-preserved revetments and continues up to and over the West Casemates. As at the Maidstone Road end, the rampart has been modified by landscaping. However, in the woodland there is the earthwork of the military path or road which wound its way down the hill from Clarence Tower to the Medway Tower, along with what is probably a the remains of a small brick piquet house on the brink of the artificial cliff. The woodland would merit further investigation to ascertain and record anything which survives of the scarping and terracing works undertaken by the Napoleonic engineers.

After the step down effected by the elevation of the West Casemates, the ditch revetments continue for another 20m on a new alignment, before truncation by an artificial cliff face at the east end of Oliver Twist Road; the ditch can be seen clearly in section at this point.



Figure 44
 Map showing the surviving visible elements of Fort Clarence:
 1 = Clarence Tower; 2 = The Governor's House; 3 = Earth bombproofing over the Main Magazine; 4 = West Casemates; 5 = Picquet House; 6 = Rifle butt
 Blue = ditch revetments and other fort walls; yellow = ditch bottom; green = earthwork; red = building
 (Reproduced by permission of the Director General of the Ordnance Survey)



B) The Medway Tower

Now gone, this structure stood at the west end of the Line at Fort Clarence and was described in 1811 as a ‘defensible Guard House’ (PRO: MPH/1/585/3). It was a three-storied tower built into the rampart of the Line and comprised adjacent casemates with basements and ground floors, with a partly casemated/partly open first floor. In each casemate, the basement and ground floor levels were contained in a single semi-circular vaulted chamber, subdivided by a timber floor as in Clarence Tower (Fig 45).

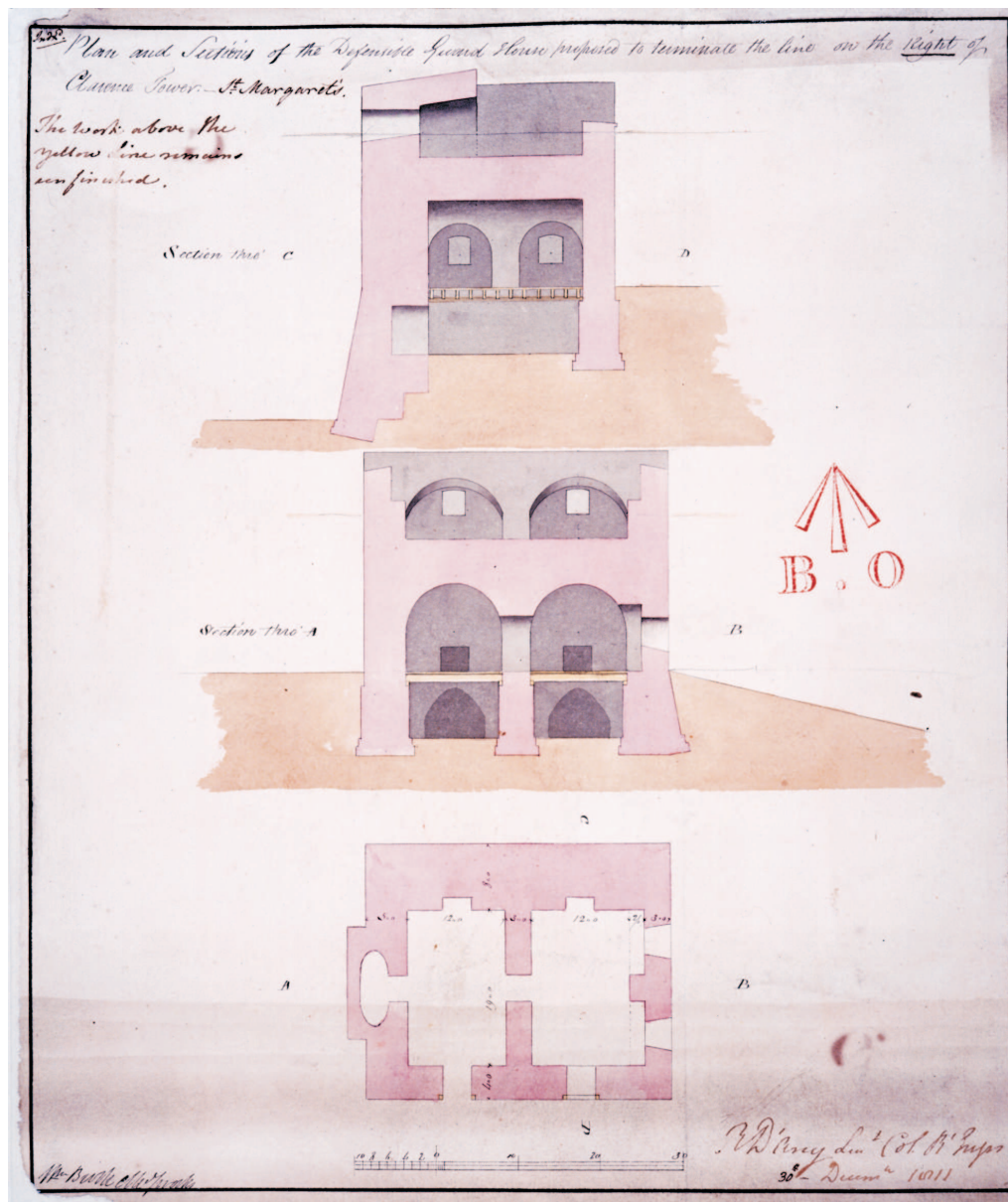


Figure 45
The Medway Tower, as
drawn in 1811 (PRO:
MPHH/1/585/3 © The
Public Record Office,
by kind permission)



The basement, below ground, provided storage for ammunition and other supplies.

At ground floor level, the rear (north) wall of each casemate had a fireplace, with an entrance in the opposite wall. The west casemate was for a gun room; its west wall pierced by two embrasures, splayed for traverse and depression and looking out over the river. The east casemate probably formed a barrack and mess in peacetime and an ammunition handling area in times of action; its east wall had a built-in elliptical recess; probably an ammunition shaft like that at Clarence Tower. The spine wall had a doorway for communication between the casemates.

The first floor had two semi-covered vaulted 'casemates' - resembling haxo casemates - each with a single embrasure facing south upstream along the river bank and the low ground bordering it. The remaining three sides were furnished with infantry parapets, most notably to flank the rampart of the Line as far as the West Casemates.

In January 1819, the tower was armed with two 12-pdr cannon and two 12-pdr carronades (Gulvin 1976, 27)



Figure 46
The Maidstone Road Guard House, south-west face of the salient, in 1961. The formidable nature of the gun complement facing along the Maidstone Road, only half of which is shown in this photograph, is immediately apparent
(© Crown copyright NMR: AA61/2536)

C) The Maidstone Road Guard House

Now destroyed, this structure was a squat tower or blockhouse, positioned at the east end of the rampart of the Line and formed in plan as a shallow chevron, with a south face thickened and formed into a salient; the ditch of the Line terminated against this face. Like the Medway Tower, it was also described in 1811 as a '*defensible Guard House*' (PRO: MPH/1/585/2).

The three-floor arrangement was identical to the Medway Tower, with a basement for storage but



entry to the ground floor was via a stair turret in the re-entrant angle to the north, necessary because of a shallow ditch protecting the north wall (Fig 47). Inside, the ground floor was a continuous gun room with four embrasures in vaulted bays, two each on the south-east and south-west walls, splayed for traverse and depression along the Maidstone Road. There were musket loopholes in the east and west end walls, a single fireplace in the salient angle and windows flanking the stair turret in the north wall.

The first floor was identical in concept to the Medway Tower, a form of haxo casemate but here with four embrasures, two in each of the south-east and south-west faces,

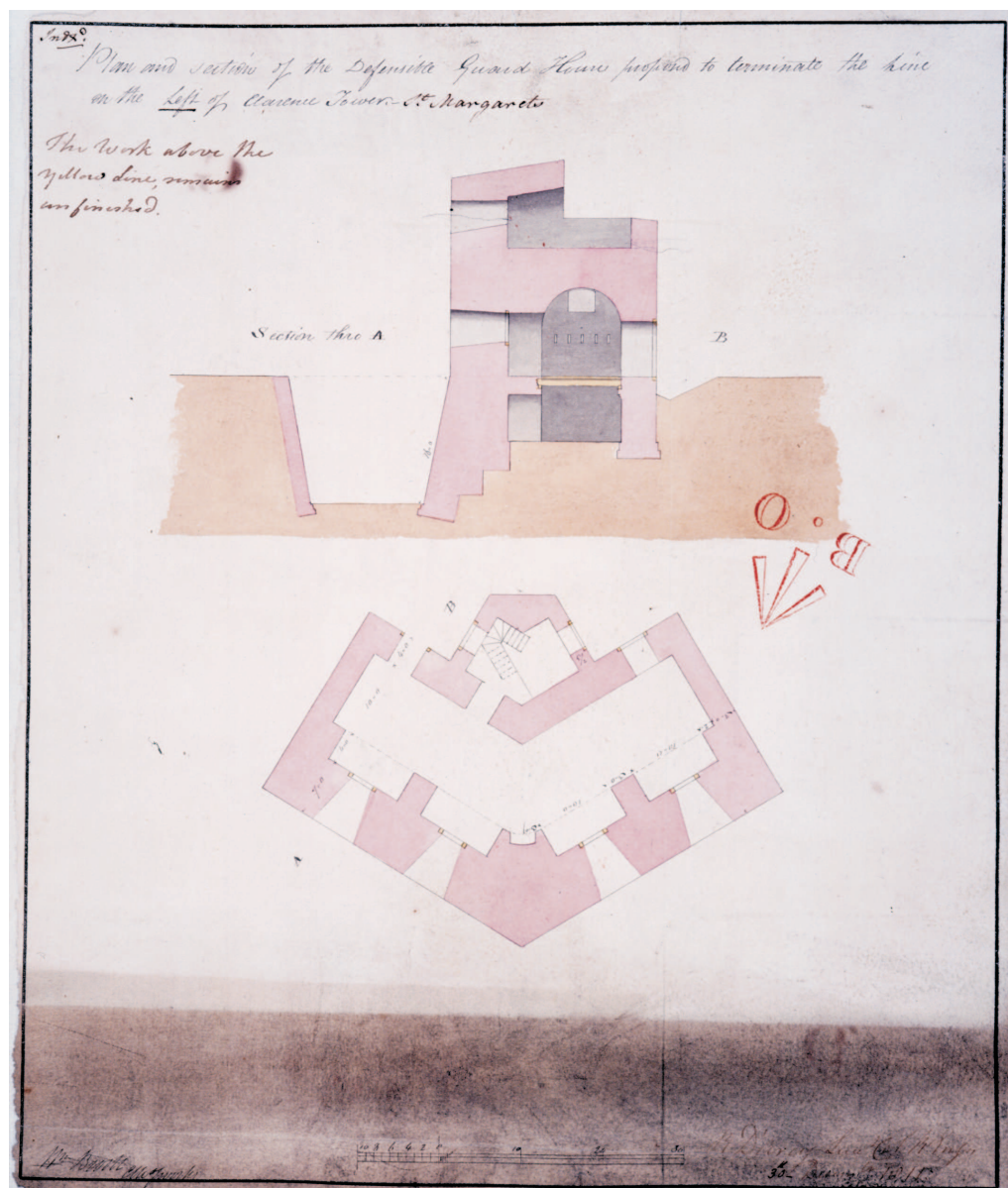


Figure 47
The Maidstone Road
Guardhouse, as drawn
in 1811 (PRO:
MPHH/1/585/2 © The
Public Record Office,
by kind permission)



positioned exactly above those on the floor below (Fig 46-7). The remaining sides were formed into an infantry parapet. In January 1819, the guard house was armed with four 18-pdr carronades (Gulvin 1976, 27).

D) The East Casemates

This is a group of two-storied casemates constructed in pairs behind the scarp revetment in a right-angled section of the ditch of the Line. They are intact and were not damaged by the redevelopment of the site. However, only a brief inspection was made during the course of the present survey, insufficient for a considered description and interpretation.

From surviving plans, it is clear that one pair looked east along the ditch to the Maidstone Road, the other pair providing flanking fire south along a section of the ditch not raked from Clarence Tower. The pairs were linked through two casemated ante rooms wrapped around the re-entrant angle, one of which was loopholed for musketry westward and both of which had flights of steps leading to entrances on the surface (Fig 48).

The two stories of each casemate were contained within a single semi-circular vaulted chamber, separated by a heavy timber floor. Each casemate was provided with a single embrasure, splayed for traverse and depression in the usual manner, arranged as a four in

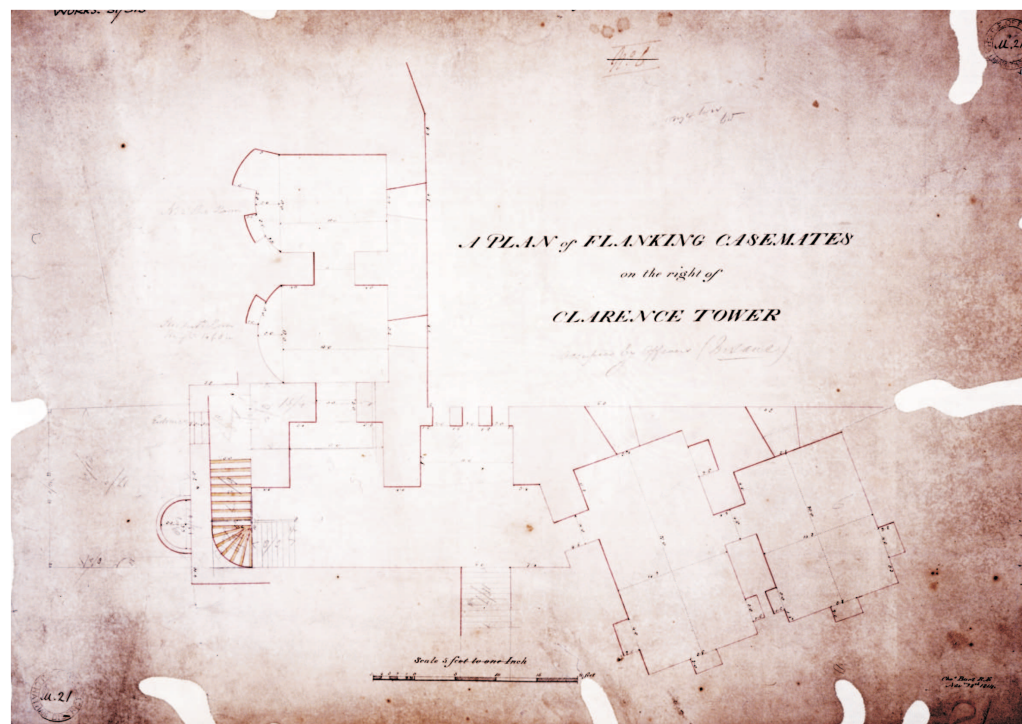


Figure 48
*The East Casemates, as
drawn in 1814 (PRO:
WORK/31/315 © The
Public Record Office,
by kind permission)*



two pairs - one above the other - covering each flank. A variety of recesses were provided for storage, together with a fireplace in each rear wall. However, those casemates covering the ditch down to the Maidstone Road have a rectangular plan and are of slightly different lengths, the others have apsidal rear walls and are the same size.

In January 1819, there were four 12-pdr carronades in these casemates (Gulvin 1976, 27).



6. APPENDIX II: CLAY TOBACCO PIPES FROM CLARENCE TOWER

Dr D A Higgins, 26 October 2001

Introduction

During 2001 Clarence Tower, part of a Napoleonic fortification in Rochester, Kent, was refurbished and a programme of salvage recording undertaken by English Heritage. During the course of this work the building contractors discovered a number of clay tobacco pipe fragments. The majority of these were discovered following the removal of the wooden first floor that divided a vaulted brick casemate on the eastern side of the tower. The pipes were apparently concentrated against the eastern wall of the tower, between two artillery recesses, as if they had been dropped beneath the floorboards following periodic removal of the skirting board. Unfortunately these pipes were not seen *in situ* before being collected up by the builders, which makes it hard to be sure of their original position and distribution. Furthermore, it is not now possible to be sure that all the pipes under the floor found their way into the present group or that this group was not contaminated with other pieces found elsewhere in the tower during the building works. Despite these reservations, the pipes comprise an interesting and coherent looking group, the majority of which were certainly found sealed beneath the first floor of the tower. It is this group of pipes, discovered by builders during the refurbishment work, that form the subject of this report.

The Pipes

A total of 48 pieces of pipe, comprising 13 bowl, 31 stem and 4 mouthpiece fragments were recovered during the refurbishment works. All the pipe bowls have been well smoked and some retain quite substantial deposits of carbonised material, presumably tobacco, within them. Many of the fragments are quite large with fresh looking breaks, suggesting that they have been sealed beneath the floor since the time that they were broken and that they have not been disturbed since. The longest surviving stem fragment measures 195mm and four of the bowls are still complete (some of the others appear to have been recently broken during recovery). None of the bowls have any evidence for an internal bowl cross. The four surviving mouthpieces are all of thin, cylindrical form and all have simple cut ends without any sign of a tip coating. The stems are also of a similar fairly thin, cylindrical, form and several of them are clearly from curved pipes. These features are all characteristic of pipes dating from between the late eighteenth century,



when curved stems were introduced, and the mid nineteenth century, when short-stemmed ‘cutty’ pipes with nipple mouthpieces were introduced.

The dating of this group can be refined further by looking at the bowl forms. The 13 different bowl fragments represent a minimum of 12 different pipes, which can be divided into at least 5 distinct mould groups. The earliest group is represented by three London Type 27 heel bowls, which are usually dated to c1780-1820 (Atkinson & Oswald 1969, Fig 2), but which may in fact have been produced slightly earlier and later than this. The Fort itself was not constructed until the first decade of the nineteenth century, thus providing a *terminus post quem* for these Type 27 pipes, the suggested date range for which is c1800-1830.

The three Type 27 bowls all have plain bowls and all three were produced in the same mould (Fig 49, 1). Although rather fragmentary, the bowl rims appear to have been lightly wiped, a finishing technique sometimes found at this period and not present on the other pipes from this site. The Christian name initial of the maker appears to have been altered in the mould at some point, leaving a rather indistinct symbol. The dominant letter now appears to be T, but with a bar extending from the upright that suggests it was previously an F. There are several known London area pipemakers with the initials TW at this period but none of them are very local to Rochester. The occurrence of three identical examples, however, suggests local manufacture and it may be that future documentary research will identify a maker with these initials in the area.

The other four identifiable bowls types are all fairly squat variants of the London Type 28 form, which was current from c1820-1860 (Atkinson & Oswald 1969, Fig 2). One very fragmentary example has an unmarked spur and traces of possible leaf decoration on one of its seams. Not enough of this bowl survives to be sure of what form its decoration might have taken originally (Fig 49, 2). All of the other examples are both marked and decorated. There is one fragmentary piece with lettering on the stem and traces of moulded decoration on the bowl (Fig 49, 3). The design is very fragmentary but there part of a ‘chain’ flanking horizontal lines and with a dotted ‘border’ around it on the left hand side of the bowl. There is the base of a wreath containing a ‘V’ shaped point on the right hand side of the bowl. These fragments almost certainly represent a Masonic design, almost identical to that shown in Fig 49, 4. The fragmentary bowl also has leaves on the bowl seams and a branch flanking the stem lettering, the surviving part of which reads “BI/ /M”. The only known London area makers whose name and work place match these letters are the Birchalls of Chatham. There was a George Birchall, recorded



working from c1803-1840 (Oswald & Le Cheminant 1989, 6), a Charles Birchall, recorded from 1839-51 and a William Birchall, recorded from 1855-67 (Hammond, unpublished lists). This attribution does not help with dating since the Birchalls were clearly operating over most of the 70 years from 1800-70, which is a wider date range than that obtained from the pipe itself. The bowl form and style of decoration suggest that this piece was most probably made by one of the earlier Birchalls, either George or Charles, around 1820-50.

The two remaining bowl types provide rather tighter dating evidence for this group. There are three examples of a Masonic pipe with the initials JA on the heel and four examples of a spread eagle design with the initials JA on the spur and the lettering J ANDERSON / ROCHESTER along the stem (Fig 49, 4 & 6). All of these pipes can be attributed to Joseph Anderson, who is recorded working at the Common in Rochester from 1828-59 (Hammond, unpublished lists). The Anderson pipes are particularly significant since there do not appear to be any previously published examples that can be attributed to this maker. Furthermore, the products of this single maker represent just over half of all the bowls recovered, suggesting that the bulk of the pipes were discarded beneath the floor during a fairly limited period of time.

The decorative motifs used on the Anderson pipes are typical of London area products and many similar examples could be quoted. Two significant points of comparison, however, can be made with the finds from the Tower of London and from the Dartford area. Recent excavations at the Tower of London have produced a large number of decorated pipes from the moat deposits. These include Masonic pipes of a similar general form to the Rochester examples but differing in detail. The London examples are all based on a Type 27 form rather than a Type 28 and the range and layout of the Masonic motifs used is slightly different (Higgins, forthcoming). Furthermore, no spread eagle designs were found in the moat deposits, despite this being a fairly common design in the London area. On the other hand, the style and flanking motifs of the named stems is very similar on both the Tower moat and Rochester examples. The Tower moat was filled between 1843 and 1845, showing that these styles were current during the 1830s and 40s. In contrast, another Tower of London group was recovered from the demolition deposits associated with the Lion Tower, which was levelled during the early 1850s. These deposits produced squat Type 28 forms, similar to the Rochester examples but with just leaf decorated seams to the bowls (Higgins, forthcoming). The Tower evidence, therefore, shows close links in the name styles but only general similarities of Masonic motifs in the pre-1843 to 1845 deposits with a closer match of bowl forms, but not



decoration, in the early 1850s deposits. This might suggest that the Rochester forms should be placed in an 1840s or early 1850s context rather than being earlier.

The Dartford parallels are to be found amongst the products of Thomas Pascall, who worked at Overy Street from c1832-59 (Baker 1979; Hammond unpublished lists). Marked pipes attributable to this maker include examples of both Masonic and spread eagle pipes that closely match the Rochester finds in both form and decorative motif (Baker 1979, 14). Unfortunately, the working dates of Pascall are almost identical to those of Anderson and so do not help refine the dating of the Fort Clarence group. Both of these makers worked in North Kent, outside the suburbs of London. It may be that the bowl forms and decorative repertoire used here were not exactly the same as in London, thus diminishing the significance of any comparison with the Tower finds. In any event, the Anderson pipes form the bulk of the Rochester group and can be dated to c1828-59. The absence of any cutty fragments suggests a date before the 1850s, thus narrowing the most likely deposition date to c1830-50. The Tower finds might argue for an a deposition date after c1843-5 on the basis of bowl forms and individual motifs, but this hypothesis needs to be tested with more detailed study, especially with regard to regional differences in style.

Mould Types

Although five basic mould types have been identified and described above, there are some inconsistencies between the spread eagle examples that either indicate that two very similar moulds were in use or that the decoration on a single mould was reworked at some point during its life. Pipes were made in metal moulds cast from a wooden pattern. Surviving pipe moulds are overwhelmingly made of cast iron but it is possible that earlier ones may have been made of brass, which would wear more quickly but which would be easier to engrave or stamp with decoration. The few surviving patterns are made of wood and some appear to have a wax or plaster lining into which decoration could be worked before the mould was cast.

When the spread eagle bowls produced by Anderson are compared it is evident that they all derive from the same basic pattern. Detailed examination, however, shows very slight differences in the fine detail. These differences are generally so slight that they could be due to a number of factors, such as wear during the lifetime of the mould or simply the differential take up of detail between two different rolls of clay during moulding. A more tangible difference is, however, evident between the named stems that appear to be associated with this bowl type. The most complete bowl has the lettering J.ANDER/



/CHESTER surviving along the stem. This overlaps and appears to be from the same mould as a stem with the surviving lettering /DERSON / ROCHE/, as shown reconstructed in Fig 49, 6. There is another stem, however, with the surviving lettering /SON//ROC/, as shown in Fig 49, 5. The size, form and spacing of the lettering appear to be the same in all three examples. Likewise the position and, especially, the orientation and spacing, of the arrow motifs flanking the lettering appears to be identical, suggesting that all of these examples derive from a common mould type. What is not the same is the treatment of the leaves on the foliage spray at the end of the lettering.

In the restored example, Fig 48, 6, the leaves on both the stem sides and bowl seams are represented by plain ovals with a central rib. In the separate stem fragment, Figure 5, the leaves have serrated edges. There are other slight differences in the numbers of berries and in the form and spacing of their stalks that make it clear that these two fragments are not identical. Close inspection of the serrated leaves suggests that they have been added over plain leaves, which are sometimes visible as a slightly larger 'shadow' beneath the serrated leaf. This indicates that the mould with the serrated leaves is a later version than the one with plain leaves. Furthermore, the size and spacing of the serrations on the leaf edges is irregular but repeated in an identical manner on each leaf. This repetition shows that the same tool, which was used to stamp another complete leaf each time one was required, formed each of the leaves. The question remains, however, as to whether this change was made in the original pattern before a second mould was cast or whether it represents a single mould where the pattern had become worn and parts of it were reworked. Further examples of this particular type of pipe might help resolve this point, since more points of detail could then be compared. Until then, these fragments raise interesting questions about the way in which pipe moulds were created and used.

Reworked Stems

One of the most notable features of this assemblage is the number of reworked stems present. These are stems that show clear signs of having been modified after they have been broken. Two of the broken stems attached to bowls and six of the loose stems have reworked ends. The two bowls are both plain TW types. In both cases the broken stem end has been made into a smooth surface by rubbing it against an abrasive surface or material. The edges have not been rounded off. In one instance the stem has broken only some 5mm behind the bowl while in the other example about 36mm of stem survives (Fig 49, 1). The flat ground surface of these examples contrasts with the loose stem fragments where it is principally the broken edges rather than the broken end itself that has been reworked. All six of the loose stems have at least some rounding of the broken edges. In



three instances the rounding is very slight, just forming a slight bevel at the broken edge. These fragments are all plain and have lengths of 70, 71 and 85mm. The 71mm long fragment is just opening into a bowl at its other end. Another plain fragment with a length of 51mm has a much more pronounced bevel, which extends almost half way across the broken end of the pipe. In the final two examples the broken end has first been smoothed and then a bevel added all around the edge. One of these is a plain stem with a length of 125mm and the other a J Anderson named stem with a length of 66mm (see composite drawing, Fig 49, 6).

In each of these six loose stems it is the thinner end of the stem that has been reworked, i.e., the end farthest from the bowl of the pipe. This does not represent a random distribution and clearly suggests that when a pipe was broken the damaged end was smoothed so that the pipe could continue to be used without the smoker having sharp edges in his mouth. This is a useful observation given the dating and context of these pipes. Documentary references show that broken pipe stems were also used as hair curlers and some reworked pipe stems have been interpreted in this way. The wearing of wigs, however, had generally died out by around 1800, well before the date of these fragments. Furthermore, fragments used as hair curlers would be expected to show equal rounding of both ends. Another reason for reworked stems appears to be their use like sticks of chalk for drawing. Civil War graffiti and worn pipe stems have, for example, been found together in the siege deposits at Pontefract Castle in Yorkshire (White, forthcoming, A). These pipes tend to have angled facets rather than flat ends or bevelled edges. Idle doodling, such as the stems that appear to have been held against a cutler's wheel at a site in Sheffield, provides another explanation for reworked stems (White, forthcoming B). The Rochester stems, however, do not fit into any of these other categories and provide compelling evidence for the reuse of broken pipes. The recovery of eight ground ends with a minimum number of 12 bowls suggests that as many as two-thirds of these pipes were being re-used in a broken state before finally being discarded.

Pipe Cleaner

One of the Fort Clarence fragments contains unique evidence for the use of a pipe cleaner. The Birchall bowl fragment (Fig 49, 3) has what appears to be a piece of straw projecting from the stem bore into the base of the bowl cavity. The bowl cavity itself contains burnt residue from having been smoked and so the straw was clearly inserted after the pipe had been used, presumably to act as a pipe cleaner. The straw must then have become stuck or broken in the pipe with the result that the whole thing was discarded with the straw still in



place. The dry conditions under the floor have preserved the straw, which would not have survived in most other archaeological contexts, making this is the only known instance of a straw being found in a pipe bore. The unusual preservation circumstances make it impossible to say whether straws were commonly used as pipe cleaners or whether this was an idiosyncratic attempt to bring a blocked pipe back into use.

Discussion

From the dating evidence available, it would appear that either two periods or one longer phase of pipe deposition are represented. The plain TW bowls date from *c*1800-30 and are unlikely to have been produced much after this. This means that they could either have been deposited when the Fort was built or at some time during its use up to *c*1830. The bulk of the pipes, however, appear to date from *c*1830-50 and clearly represent the deposition of pipes within the building after its initial construction. Following its construction in the 1800s, the Fort was subsequently used as a military asylum from 1819-1845 and then as a military prison from 1845-1880. These later pipes must either have been introduced during refurbishment work or during one of the Fort's later phases of use. The only refurbishment falling within the 1830-50 date for the main group of pipes is the change from asylum to prison in 1845. On the other hand, the high incidence of re-used pipes and the attempt to clean a blocked pipe with a straw both suggest an environment where pipes were in short supply and / or there was a surplus of spare time to tinker with them. This argues against their being deposited by busy builders during a refurbishment programme. Furthermore, ground ends occur on both the earlier plain forms of *c*1800-30 and on the later decorated ones of *c*1830-50. This demonstrates a common link between the two types of pipe and so it is suggested that they all derive from a single phase of activity rather than two separate depositional events. The pipes would all fit within the 1819-45 date bracket when the Fort was being used as a military asylum. This would also be the sort of environment in which reworked ends might be expected to appear.

The balance of probability is that this assemblage represents a group of pipes smoked and then hidden or discarded behind the skirting by the inmates of a military asylum during the period 1819-45. These pipes were clearly produced and obtained locally and they provide the first evidence for the range of forms and decorative motifs that were being employed by the Rochester makers. They also provide a fascinating insight into the social history of this period and show how important the artefacts associated with a building can be. Archaeologists devote great efforts to recording and interpreting the objects from below ground contexts while paying scant attention to those that may



survive within standing structures themselves. Artefacts sealed, concealed or simply lost beneath floors, in wall cavities, chimneys, lofts or within the actual structure of a building itself can all shed light on the interpretation, phasing and use of that structure and they can be just as coherent and datable as those found below ground. Objects contained within standing structures are especially vulnerable to loss during building works and more attention should be paid to their proper recording and recovery. The history of Fort Clarence would have been much the poorer had it not been for the chance recovery of this group of pipes.

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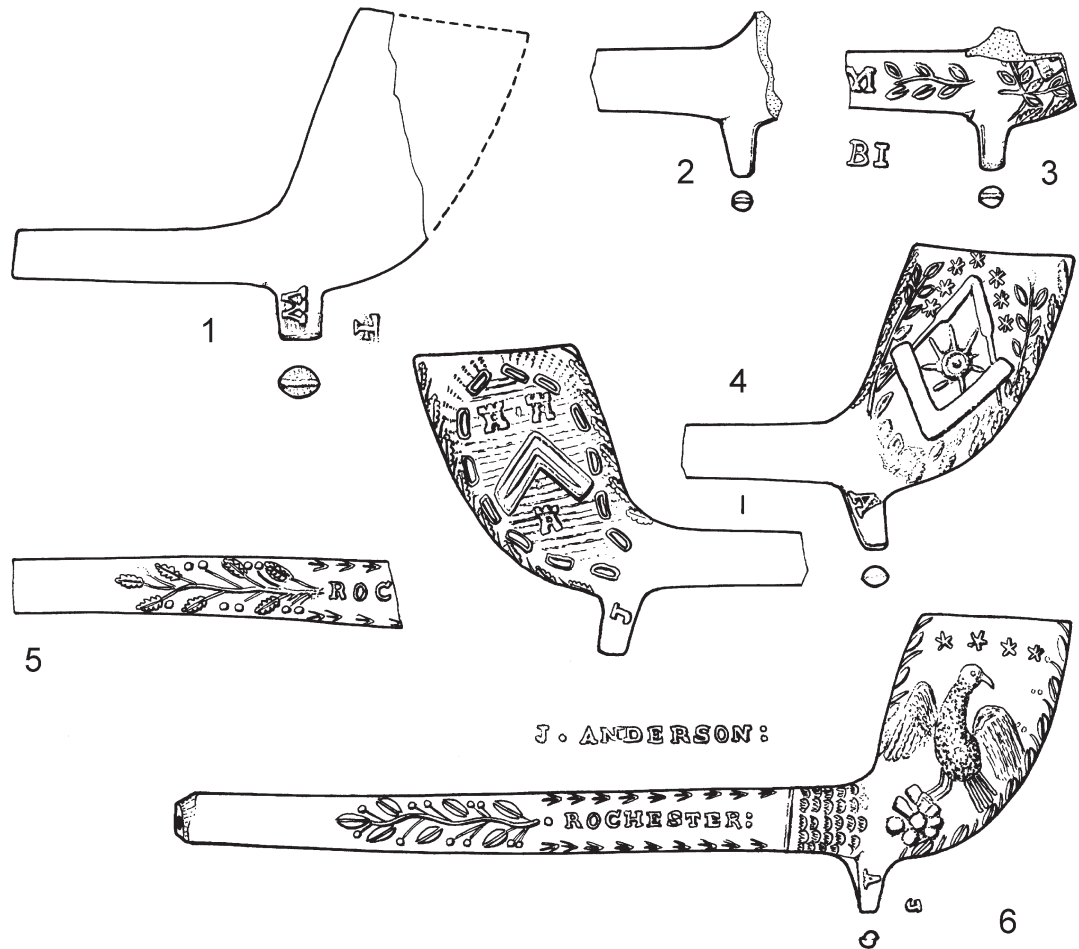


Figure 49

1. One of three identical plain bowls dating from c1800-1830 and marked with the moulded initials TW. The T appears to have been re-cut in the mould, possibly over a letter F. Rims wiped but none of the heels trimmed; all have stem bores of 4/64". This example has the broken end ground smooth at 36mm from the bowl. Another example is ground smooth at just 5mm from the bowl.

2. Spur fragment of c1820-50. One seam has traces of possible leaf decoration, but not enough survives to be sure. Stem bore 4/64".

3. Spur fragment of c1830-50 with the lettering BI / M on the stem – almost certainly one of the Birchalls of Chatham. Traces of different moulded decoration on each side of the bowl – almost certainly a Masonic design very similar to that shown in Figure 4. This fragment is very unusual in that it has a straw projecting from the stem bore into the bowl cavity. Stem bore 5/64".

4. One of three identical Masonic pipes with the moulded initials JA for Joseph Anderson of Rochester, recorded working from 1828-59. All have stem bores of 4/64".

5. Stem fragment marked /SON / ROC/ for Joseph Anderson of Rochester, recorded working from 1828-59. Almost certainly from a pipe with the spread eagle design on the bowl (Figure 5) but a mould variant with serrated rather than plain leaves on the stem. Stem bore 4/64".

6. Composite drawing of two overlapping fragments showing a bowl type made by Joseph Anderson of Rochester, recorded working from 1828-59, and decorated with a spread eagle on each side. The overlapping stem fragment has been ground smooth and given a bevelled edge after being broken at 92mm from the bowl. Another overlapping fragment extends the stem to 145mm from the bowl, at which point it is still 6mm thick. Four bowls of this type and three matching stems (including that shown in Figure 5) present in the group. All have stem bores of 4/64".



7. SURVEY AND RESEARCH METHODS

Fort Clarence was surveyed by staff of English Heritage Archaeological Investigation based in Cambridge; Paul Pattison, Moraig Brown, David McOmish and Cathy Tuck. Survey was undertaken using a Leica TC1610 electronic theodolite and EDM, augmented with tapes using normal graphical methods. The resulting data were processed in Key Terra-Firma 5 and AutoCAD 2000i. This report was researched and written by Paul Pattison, with assistance on drawings by Louise Barker, with work on the clay tobacco pipes contracted to David Higgins. It was prepared using Corel Draw 8 and Corel Ventura 8 software.

All photography is by Alun Bull.

Documentary research was undertaken by Paul Pattison in the Public Record Office at Kew.

8. ACKNOWLEDGEMENTS

The author is grateful to Clague Ltd and Swift Ltd for their co-operation in this project. In particular, all staff on site, carrying out the conversion of Clarence Tower for domestic use, were always helpful and co-operative. Thanks are also due to Peter Kendall, Inspector of Ancient Monuments, for his help and encouragement.



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MPHH/1/585/2 *Plan and Sections of the Defensive Guard House proposed to terminate the Line on the Left of Clarence Tower*, signed 30th December 1812

MPHH/1/585/3 *Plan and Sections of the Defensive Guard House proposed to terminate the Line on the Right of Clarence Tower*, signed 30th December 1812

MPHH/1/585/4 *Plan, Elevation and Section of the Guard House proposed to be Erected on the East of the Gateway at St Margaret's Height and to accompany the Chatham Estimate for the year 1813*



MPHH/1/585/5 *Sketch from the Prince of Wales Bastion to St Margaret's Heights and added in front of Rochester Bridge and also to accompany the Chatham Estimate for the year 1813*

MPHH/1/585/6 *Plan shewing the state of the Works at St Margaret's, signed 30th December 1811*

MPHH/1/585/7 *Plan of the Work occupying St Margaret's Heights and added on the Right and Left of Clarence Tower in front of Rochester Bridge and also to accompany the Chatham Estimate for the year 1813*

MPHH/1/588/1 *Projected Works at St Margaret's 1809*

MPHH/1/588/2 *Projected Works at St Margaret's 1809, fair copy*

MPHH/1/588/3 *Tower Proposed for St Margaret's, Rochester, dated 1809*

WO/43/764 Various papers including some concerning the '*Military lunatic asylum at Fort Clarence, Chatham condemned and closed - defective and miserable accommodation*'

WO/78/3194 *Chatham Military Prison: Fort Clarence, dated 1879*

WO/396/7 *Report on Lands at Chatham Lines, the Property of the War Department by Samuel Howlett, 15th August 1859*

WO/396/9 Another copy of *Report on Lands at Chatham Lines, the Property of the War Department* by Samuel Howlett 15th August 1859, including a plan on which is the note *land taken possession of 1808 though paid for later*

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Work/31/301 *Plan of the military prison at Fort Clarence, not dated*

Work/31/302 *Plan of the military prison at Fort Clarence, not dated*

Work/31/305 *Plan of Basement Story changed to Fort Clarence: Plan of Basement Story of Tower, not dated*

Work/31/306 *Section of the Tower at Fort Clarence*

Plan of the Upper Floor of the Tower at Fort Clarence

Plan of the Ground Floor of the Tower at Fort Clarence



Plan of the Basement Floor of the Tower at Fort Clarence, all undated

Work/31/307 No 1 of 2 *Plan of Middle Story* changed to Fort Clarence: *Plan of Middle Story of Tower*, not dated

Work/31/308 *Fort Clarence* Section and plan of the tower and magazine, not dated

Work/31/309 *Section no 1 of 4 Fort Clarence Tower*, not dated

Work/31/310 *Section of the ground from the foot of St Margaret's Tower to the River Medway*, not dated

Work/31/311 *Section on the line of the east scarp of the Ditch from St Margaret's Tower to the Maidstone Road*, dated 7th February 1810

Work/31/312 *Section from the Casemate (= East Casemates) left of Clarence Tower to the Defensible Guard-house Maidstone Road*, not dated

Work/31/313 *Section through the Ditch from the right of Clarence Tower to the River Medway*, dated January 12th 1812

Work/31/314 *Sections through various parts of the works at St Margaret's as they were on the 2nd January 1812*

Work/31/315 *A Plan of Flanking Casemates on the Right of Clarence Tower* , dated November 28th 1814

Work/31/316 *No 3 Plan of the Casemates called the Officers' Lower House, Fort Clarence, Chatham* , not dated but similar style to Works/31/315 and probably of the same date

Work/31/317 *Section through the Left Flanking Casemate St Margaret's* , dated July 1815

Work/31/318 *Plan and Section of the defensible Guard House (= Maidstone Road Guardhouse) proposed to terminate the Line on the Left of St Margaret's Tower*, not dated

Work/31/319 *Plan of the Lower Casemates in the Officers' Lower House, Fort Clarence, Chatham* dated 14th June 1841

Work/31/320 *Plan and Section of the Fire Place for warming the Chapel at Fort Clarence*, dated February 1846



Work/31/321 *Plan and Section of Chapel showing in Yellow the Proposed alteration and Fort Clarence, Chapel*, not dated

Work/31/322 Original title *Fort Clarence* with pencil addition *General Plan of Fort Clarence showing the alterations and additions up to December 1846*

Work/31/323 *Sketch of the Cisterns for the Pump House Fort Clarence*, dated 30th May 1853

Work/31/324 *Chatham, Fort Clarence Item 6 F & MSB Est 1870-1 Remove Archway and Widen Roadway*, signed 11th December 1869

Work/31/325 *Fort Clarence: Forcing Pump* undated but a note on the plan dated 30th July 1896 records that the pump had been removed

Work/14/2624 Paper file of correspondence dated 1955-8 relating to the acquisition of Fort Clarence by the General Post Office. Includes a report on the history of the fort by DW King from sources in the War Office Library and two plans:

Survey of underground workings at Fort Clarence, dated 14th October 1955

Plan of Accommodation, dated 27th May 1943

B) The National Monuments Record Centre, Swindon (NMR)

Black-and-white photographs taken in 1961:

AA61/2536 The Maidstone Road Guard House, from the south-west

AA61/2537 The Maidstone Road Guard House, from the south

AA61/2538-51 Various photographs of the main prison block, chapel and ancillary buildings (exteriors and interiors)

AA61/2552 Clarence Tower, from the north-east

AA61/2553 Clarence Tower, from the north-east

AA61/2554 Clarence Tower, from the north

AA61/2555 Clarence Tower, from the north-west



10. LIST OF PHOTOGRAPHS TAKEN DURING THE SURVEY

- AA020025 Clarence Tower: roof level; detail of No 3 gun floor; view from the NE (B&W)
- AA020026 Clarence Tower: roof level; detail of No 3 gun floor; view from the NE (Colour)
- AA020027 Clarence Tower: roof level; detail of No 2 gun floor, showing racer arc and rebates for securing timbers. View from the NE (B&W)
- AA020028 Clarence Tower: roof level; detail of No 2 gun floor, showing racer arc and rebates for securing timbers. View from the NE (B&W)
- AA020029 Clarence Tower: roof level; steps to east infantry step and NE turret. View from the W (B&W)
- AA020030 Clarence Tower: roof level; steps to east infantry step and NE turret. View from the W (Colour)
- AA020031 Clarence Tower: roof level; general view of porched entrance to ammunition shaft and Nos 2 & 3 gun floors. View from the NE (B&W)
- AA020032 Clarence Tower: roof level; general view of porched entrance to ammunition shaft and Nos 2 & 3 gun floors. View from the NE (Colour)
- AA020033 Clarence Tower: roof level; general view of porched entrance to ammunition shaft and fragments of floor to Nos 2 & 3 gun floors. View from the E (B&W)
- AA020034 Clarence Tower: roof level; general view of porched entrance to ammunition shaft and fragments of floor to Nos 2 & 3 gun floors. View from the E (Colour)
- AA020035 Clarence Tower: roof level; gun floor showing recessed holdfast for gun No 1 & access to west cistern (B&W)
- AA020036 Clarence Tower: roof level; gun floor showing recessed holdfast for gun No 1 & access to west cistern (Colour)
- AA020037 Clarence Tower: roof level; showing east infantry step, gun floor to No 2 gun and access to eastern cistern. View from the SW (B&W)
- AA020038 Clarence Tower: roof level; showing east infantry step, gun floor to No 2 gun and access to eastern cistern. View from the SW (Colour)
- AA020039 Clarence Tower: roof level; detail of No 2 gun floor showing racer arc, holdfast and rebates for securing timbers. View from the SW (B&W)
- AA020040 Clarence Tower: roof level; detail of No 2 gun floor showing racer arc, holdfast and rebates for securing timbers. View from the SW (Colour)
- AA020041 Clarence Tower: roof level; north-east turret, view from the SW (B&W)
- AA020042 Clarence Tower: roof level; north-east turret, view from the SW (Colour)



- AA020043 Clarence Tower: detail of brick with Board of Ordnance stamp (B&W)
- AA020044 Clarence Tower: detail of brick with Board of Ordnance stamp (Colour)
- AA020045 Clarence Tower: detail of brick with Board of Ordnance stamp (B&W)
- AA020046 Clarence Tower: detail of brick with Board of Ordnance stamp (Colour)
- AA020047 Clarence Tower: roof level; north-east turret, view from the W (B&W)
- AA020048 Clarence Tower: roof level; north-east turret, view from the W (Colour)
- AA020049 Clarence Tower: roof level; north-east turret, view from the W (B&W)
- AA020050 Clarence Tower: roof level; north-east turret, view from the W (Colour)
- AA021095 Clarence Tower: roof level, north-east turret, detail of doorway to newel stair. View from the W (B&W)
- AA021096 Clarence Tower: roof level; north-east turret, detail of doorway to newel stair. View from the W (Colour)
- AA021097 Clarence Tower: roof level; north-west turret, detail of secondary hoist, from the SW (B&W)
- AA021098 Clarence Tower: roof level; north-west turret, detail of secondary hoist, from the SW (Colour)
- AA021099 Clarence Tower: roof level; north-west turret, detail of Portland cordons on both turrets, from the E (B&W)
- AA021100 Clarence Tower: roof level; north-west turret, detail of Portland cordons on both turrets, from the E (B&W)
- AA021101 Clarence Tower: roof level; detail of secondary hoist on north-west turret. View from the E (B&W)
- AA021102 Clarence Tower: roof level; detail of secondary hoist on north-west turret. View from the E (Colour)
- AA021103 Clarence Tower: roof level; chimney stack from the E (B&W)
- AA021104 Clarence Tower: roof level; chimney stack from the E (B&W)
- AA021105 Clarence Tower: roof level; view from the S showing cover to ammunition hoist (foreground) and both turrets (B&W)
- AA021106 Clarence Tower: roof level; view from the S showing cover to ammunition hoist (foreground) and both turrets (Colour)
- AA021107 Clarence Tower: roof level; north-west turret and entrances to newel stair and equipment store. View from the E (B&W)



- AA021108 Clarence Tower: roof level; north-west turret and entrances to newel stair and equipment store. View from the E (Colour)
- AA021109 Clarence Tower: roof level; detail of north-west turret and entrances to newel stair and equipment store. View from the E (B&W)
- AA021110 Clarence Tower: roof level; detail of north-west turret and entrances to newel stair and equipment store. View from the E (Colour)
- AA021111 Clarence Tower: roof level; north-east turret from the W (B&W)
- AA021112 Clarence Tower: roof level; north-east turret from the W (Colour)
- AA021113 Clarence Tower: basement; brick setting in base of ammunition shaft, from the N (B&W)
- AA021114 Clarence Tower: basement; brick setting in base of ammunition shaft, from the N (Colour)
- AA021115 Clarence Tower: basement; blocked carronade embrasure in east casemate, from the W (B&W)
- AA021116 Clarence Tower: basement; blocked carronade embrasure in east casemate, from the W (Colour)
- AA021117 Clarence Tower: basement; blocked carronade embrasure in east casemate, from the W (B&W)
- AA021118 Clarence Tower: basement; blocked carronade embrasure in east casemate, from the W (Colour)
- AA021119 Clarence Tower: basement; ammunition shaft, looking up (B&W)
- AA021120 Clarence Tower: basement; ammunition shaft, looking up (Colour)
- AA021121 Clarence Tower: roof level; detail of brickwork to sloping parapet at SE. View from above (B&W)
- AA021122 Clarence Tower: roof level; detail of brickwork to sloping parapet at SE. View from above (Colour)
- AA021123 Clarence Tower: roof level; north-west turret and western infantry step with relieving arches. View from the S (B&W)
- AA021124 Clarence Tower: roof level; north-west turret and western infantry step with relieving arches. View from the S (Colour)
- AA021125 Clarence Tower: roof level; detail of western infantry step from the E (B&W)
- AA021126 Clarence Tower: roof level; detail of western infantry step from the E (Colour)
- AA021127 Clarence Tower: roof level; detail of western entrance to porch of ammunition shaft. View from the W (B&W)



- AA021128 Clarence Tower: roof level; detail of western entrance to porch of ammunition shaft. View from the W (Colour)
- AA021129 Clarence Tower: roof level; north-east turret from the W (Colour)
- AA021130 Clarence Tower: roof level; north-east turret from the W (B&W)
- AA021131 Clarence Tower: roof level from the north-east (Colour)
- AA021132 Clarence Tower: roof level from the north-east (B&W)
- AA021133 Clarence Tower: roof level; north-west turret from the E (Colour)
- AA021134 Clarence Tower: roof level; north-west turret from the E (B&W)
- AA021135 Clarence Tower: roof level; detail of No 1 gun floor showing racer arc. View from the SW (Colour)
- AA021136 Clarence Tower: roof level; detail of No 1 gun floor showing racer arc. View from the SW (B&W)
- AA021137 Clarence Tower: roof level; detail of No 2 gun floor showing holdfast, racer arc and rebates for securing timbers. View from the SW (Colour)
- AA021138 Clarence Tower: roof level; detail of No 2 gun floor showing holdfast, racer arc and rebates for securing timbers. View from the SW (B&W)
- AA021139 Clarence Tower: roof level; north-east turret from the SW (Colour)
- AA021140 Clarence Tower: west casemate showing ground and first-floor levels. View from the SW (Colour)
- AA021141 Clarence Tower: basement; brick setting in base of ammunition shaft. View from the SW (Colour)
- AA021142 Clarence Tower: roof level; access to central cistern, from the N (B&W)
- AA021143 Clarence Tower: roof level; access to central cistern, from the N (Colour)
- AA021144 Clarence Tower: roof level; north end of central cistern (B&W)
- AA021145 Clarence Tower: roof level; north end of central cistern (Colour)
- AA021146 Clarence Tower: roof level; central cistern, looking N (B&W)
- AA021147 Clarence Tower: roof level; central cistern, looking N (Colour)
- AA021148 Clarence Tower: roof level; central cistern, looking N (B&W)
- AA021149 Clarence Tower: roof level; central cistern, looking N (Colour)
- AA021150 Clarence Tower: roof level; south end of central cistern (B&W)
- AA021151 Clarence Tower: roof level; south end of central cistern (Colour)



- AA021152 Clarence Tower: roof level; south end of central cistern showing lead lining and drainage gaps in side and end walls (B&W)
- AA021153 Clarence Tower: roof level; south end of central cistern showing lead lining and drainage gaps in side and end walls (Colour)
- AA021154 Clarence Tower: roof level; central cistern, looking N (B&W)
- AA021155 Clarence Tower: roof level; central cistern, looking N (Colour)
- AA031462 Clarence Tower: basement; artillery recess in the east casemate (B&W)
- AA031463 Clarence Tower: basement; artillery recess and inserted window in the east casemate (B&W)
- AA031464 Clarence Tower: basement; east casemate general view from the S (B&W)
- AA031465 Clarence Tower: basement; east casemate showing doorways to the north-west turret (at left) and magazine, from the S (B&W)
- AA020006 West Casemates: first floor; vault and blocked door/windows (Colour)
- AA020007 West Casemates: first floor; entrance to tunnel, storage cupboard and fireplace (Colour)
- AA020008 West Casemates: first floor; entrance to tunnel (Colour)
- AA020009 Clarence Tower: first floor; detail of timber floor and gun positions overlooking the east ditch (Colour)
- AA020010 Clarence Tower: Main Magazine; magazine and entrance to tunnel leading to sally port. View from the S (Colour)
- AA020011 Clarence Tower: main magazine; magazine from the NE (Colour)
- AA020012 Tunnel to West Casemates; view up airshaft/light well at base of steps from Clarence Tower (Colour)
- AA020013 Clarence Tower: ground floor; entrance to north-east turret, and gun positions overlooking the east ditch (Colour)
- AA020014 Clarence Tower: ground floor; entrance to north-east turret, and gun positions overlooking the east ditch (Colour)
- AA020015 Clarence Tower: ground floor; detail of floor structure to first floor (Colour)
- AA020016 Tunnel to West Casemates; stair to Clarence Tower (Colour)
- AA020017 Tunnel to West Casemates; view upwards from the W (Colour)
- AA020018 West Casemates; ground floor; alcove, probably an expense magazine (Colour)
- AA020019 Clarence Tower: first floor; detail of gates to central entrance (Colour)



- AA020020 Clarence Tower: ground floor; entrance to north-west tunnel(Colour)
- AA020021 Clarence Tower: ground and first floors; detail showing original (first floor) and secondary (ground floor) entrances (colour)
- AA020022 Clarence Tower: ground and first floors; general view from the S (colour)
- AA020023 Clarence Tower: first floor; detail of entrance to ammunition shaft (Colour)
- AA020024 West Casemates; ground floor, from the ditch (Colour)
- AA031468 Clarence Tower: detail of Board of Ordnance mark (here doubled) branded onto joist of the first floor (Colour)
- AA031469 Clarence Tower: detail of Board of Ordnance mark (here doubled) branded onto joist of the first floor (Colour)
- AA031470 Clarence Tower: roof level; trial trench showing vault of cistern with arches of west infantry step built over (Colour)
- AA031471 Clarence Tower: roof level; west infantry step showing construction over chalk rubble (Colour)
- AA043892 West Casemates: first floor; blocked door and windows, from the E (B&W)
- AA043894 West Casemates: first floor; entrances to tunnels from the SW (B&W)
- AA043895 West Casemates: first floor; entrance, store cupboard and fireplace from the E (B&W)
- AA043896 Clarence Tower: ground floor; entrance to north-west turret, showing newel (B&W)
- AA043897 Clarence Tower: ground and first floor west casemate showing original (first floor) and secondary (ground floor) entrances (B&W)
- AA043898 Clarence Tower: detail of original fireplace after removal of secondary surround (B&W)
- AA043899 Clarence Tower: ground and first floor west casemate from the S (B&W)
- AA043900 West Casemates: first floor; general view from the ditch of the Line (B&W)
- AA043901 Picquet House: general view from the W (B&W)
- AA043902 Clarence Tower: ground and first east casemate showing detail of the ceiling (B&W)
- AA043903 Clarence Tower: ground and first floor west casemate from the S (B&W)
- AA043904 Clarence Tower: first floor; east casemate showing detail of timber floor and gun positions overlooking the east ditch (B&W)
- AA043905 Clarence Tower: first floor; east casemate showing detail of entrance to ammunition shaft, from the NE (B&W)



- AA043906 Clarence Tower: first floor; detail of gates to main entrance (B&W)
- AA043907 Clarence Tower: detail of window frame on newel stair of north-west turret (B&W)
- AA043908 Tunnel to West Casemates: view upwards from the W (B&W)
- AA043909 Tunnel to West Casemates: stair to Clarence Tower, from the S (B&W)
- AA043910 Tunnel to West Casemates: view up air shaft/light well at base of steps from Clarence Tower (B&W)
- AA043911 Clarence Tower: main magazine; entrance to gallery leading to sally port, from the W (B&W)
- AA043912 Clarence Tower: main magazine from the SE (B&W)
- AA043913 Clarence Tower: detail of fireplace (B&W)
- AA043914 Clarence Tower: first floor; detail of stone plug for cistern, in the north elevation (B&W)
- AA043915 Clarence Tower: roof level; general view of porched entrance to ammunition shaft. View from the E (B&W)
- AA043916 Clarence Tower: roof level; general view of western entrance of porch to ammunition shaft. View from the W (B&W)
- AA043917 Clarence Tower: roof level; store room from the E (B&W)
- AA043918 Clarence Tower: roof level; detail of north-west turret, from the SE (B&W)
- AA043919 Clarence Tower: roof level; detail of north-west turret, from the E (B&W)
- AA043920 Clarence Tower: first floor; east casemate from the N (B&W)
- AA043921 Clarence Tower: first floor; east casemate from the N (B&W)
- AA043922 Clarence Tower: ground and first floors; west casemate from the N (B&W)
- AA043923 Clarence Tower: first floor; west casemate; detail of embrasure and window (B&W)
- AA043924 Clarence Tower: basement; west casemate from the SE showing doors to stair (at left) and main magazine (B&W)
- AA043925 Clarence Tower: basement; west casemate; detail of artillery recess (B&W)
- AA043926 Clarence Tower: basement; west casemate; detail of artillery recess (B&W)
- AA043927 Clarence Tower: roof level; view to the W over the River Medway (B&W)
- AA043928 Clarence Tower: roof level; view to the SW over the River Medway (B&W)
- AA043929 Clarence Tower: roof level; view to the NW over the River Medway, with the CO's house at bottom right (B&W)



AA043930 Clarence Tower: roof level; view to the NE towards Chatham Dockyard (B&W)

AA043931 Clarence Tower: roof level; view to the NE over the former parade area (B&W)