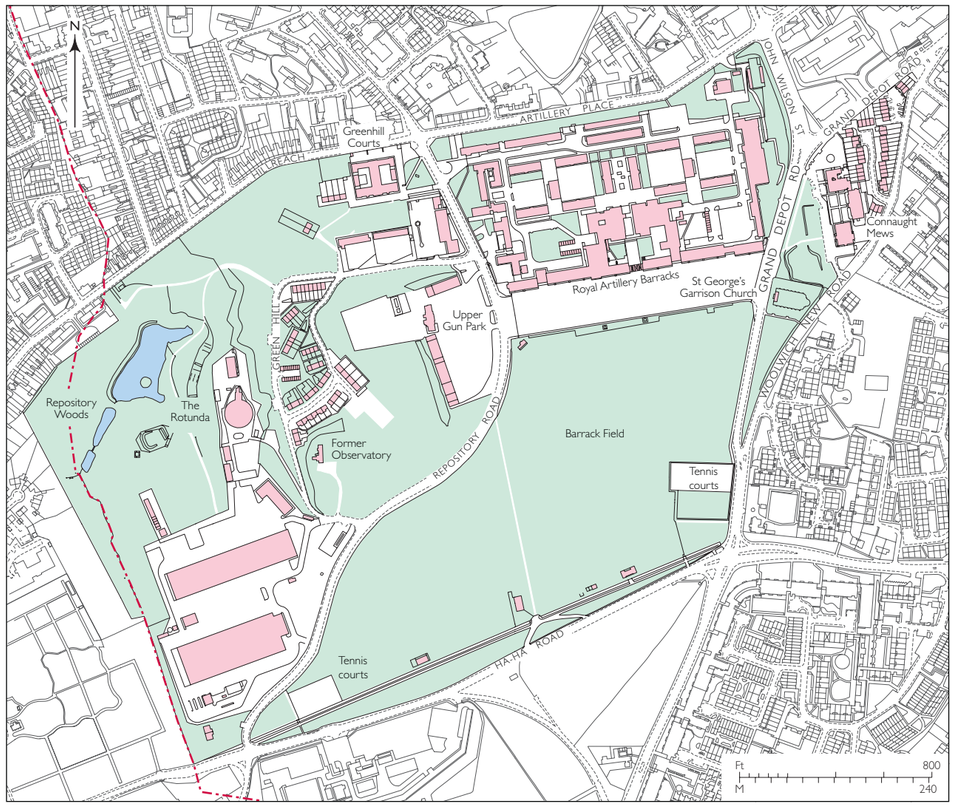


330. Royal Artillery Barracks and Royal Military Repository areas, 2007

CHAPTER 7

Royal Artillery Barracks and Royal Military Repository Areas

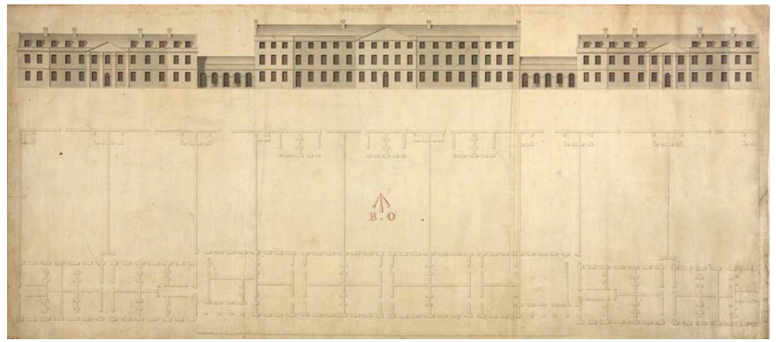
Lands above Woolwich and the Thames valley were taken for military use from 1773, initially for barracks facing Woolwich Common that permitted the Royal Regiment of Artillery to move out of the Warren. These were among Britain's largest barracks and unprecedented in an urban context. The Board of Ordnance soon added a hospital (now Connaught Mews), built in 1778–80 and twice enlarged during the French Wars. Wartime exigencies also saw the Royal Artillery Barracks extended to their present astonishing length of more than a fifth of a mile (0.4km) in 1801–7, in front of a great grid of stables and more barracks, for more than 3,000 soldiers altogether. At the same time more land westwards to the parish boundary was acquired, permitting the Royal Military Repository to move up from the Warren in 1802 and, during the ensuing war, to reshape an irregular natural terrain for an innovative training ground, a significant aspect of military professionalization. The resiting there in 1818–20 of the Rotunda, a temporary royal marquee from the victory celebrations of 1814 at Carlton House recast as a permanent military museum, together with the remaking of adjacent training fortifications, settled the topography of a unique landscape that served training, pleasure-ground and commemorative purposes. There have been additions, such as St George's Garrison Church in the 1860s, and rebuildings, as after bomb damage in the 1940s. More changes have come since the departure of the Royal Artillery in 2007 when the Regiment's headquarters moved to Larkhill in Wiltshire. But the place remains, with an indelible Georgian stamp, the historic home of England's artillery forces (Ill. 330).

The Royal Artillery Barracks are dealt with here first, the site's development handled broadly chronologically before consideration of its grounds and two major satellites, the former Royal Artillery Hospital and St George's Garrison Church. The more open lands to the west, largely the former Royal Military Repository, have a complex and fragmental history. The Repository is presented chronologically, setting the Rotunda, its most important historic building, into topographical and temporal contexts.

Royal Artillery Barracks

Artillery 'trains' were ad hoc formations until 1716 when the Duke of Marlborough, then Master-General of the Ordnance, saw to the formation of two permanent field artillery companies (each of 100 men), headquartered with their guns in Woolwich Warren. There they assisted with Ordnance work, from fuse-filling to proof supervising, and also provided a guard. What became the Royal Regiment of Artillery in 1722 grew, prospered and spread. By 1748 there were thirteen companies, and further wartime augmentations more than doubled this number by the end of the 1750s. There were substantial post-war reductions in the 1760s, and in 1771 the Regiment, now 2,464 men, was reorganized into four battalions each of eight companies, twelve of which, around 900 men, were stationed in Woolwich. Unlike the army, the Board of Ordnance required its officers (Artillery and Engineers) to obtain a formal military education. For this reason, above all others, Woolwich was an elite place.[1]

The Regiment's primary role in eighteenth-century Woolwich was to work in and protect the Ordnance facilities in the Warren. But Woolwich had wider strategic import. There was the dockyard, where from the 1720s onwards troops had to be called in from time to time to deal with an unruly workforce, and the town was nicely situated between the Thames and the main London–Dover road. To protect the capital these arteries needed to be guarded against invasion from the Continent. The Royal Regiment of Artillery had the biggest military garrison anywhere in the vicinity of the metropolis, but it was not part of the army. The separation of the army and the Board of Ordnance was one legacy of suspicions about a unified standing army that were rooted in the upheavals of the seventeenth century. Such apprehensions helped keep it usual in England to accommodate soldiers in temporary camps or in billets, as in public houses. There troops could not lose contact with the population they served. While the rank and file were generally regarded as rabble, adjustments had to be made for the gentility of the officer class, a social novelty. Permanent barracks remained something alien and inherently risky. Those that did exist in the first half of the eighteenth century were generally small, to do with the royal court or on coasts or borders.[2] Garrisons were quartered near other naval dockyards from the late 1750s, but modestly, if not discreetly, as with the artillerymen of Woolwich. They were not mere troopers, but they were housed and hidden away from the people of Woolwich in the Warren's barrack blocks of 1719 and 1739–40 (see page 145). The building of the Royal Artillery Barracks in the 1770s was an early and remarkable instance in England of the soldiery establishing a prominent presence as a cohesive force near a large population with whom there were inherent tensions.



331. Royal Artillery Barracks, 1774–7. Board of Ordnance ground plan and elevation of 1774

The move uphill

The break-out move was prompted by increasing numbers, cramped and insalubrious conditions in the Warren, and difficulties with road communications – to the dockyard, to London and, perhaps principally, to Woolwich Common for artillery practice. Cholic Lane (Woolwich New Road) had been improved in 1765–6 at the Board of Ordnance's behest (see page 396).

In what has the smell of a political rearguard action, on 28 September 1772 the Board authorized its long-established Surveyor-General, Sir Charles Frederick, to see to the preparation of plans and estimates for building barracks for one Royal Artillery battalion and its officers, upwards of 600 men, somewhere in Woolwich outside the Warren. Since the death of John Manners, Marquess of Granby, in 1770 the post of Master-General of the Ordnance had lain vacant, the role filled by Gen. Henry Seymour Conway, a senior Whig politician who continued as Lieutenant-General of the Ordnance in the Tory North ministry but drifted out of the cabinet and into opposition. In October 1772 George, 4th Viscount (later 1st Marquess) Townshend, took over as Master-General and Conway resigned. Townshend was not, it seems, properly briefed about the Woolwich project until March 1773 when funds had been secured from Parliament and a site found.

An approach had been made to the elderly Edward Bowater, the principal landholder in the parish, then being pursued for debts incurred by his son that landed them both in prison (see page 7). A 99-year lease, renewable forever, was readily agreed, giving the Board a large swathe of land south of the town and west of Cholic Lane, fifty-three acres in seven fields and on the northernmost part of the common (Ill. 7). First intentions were that the new holding would be enclosed within walls. The only buildings on it were by the common, at the Jolly Shipwrights, a substantial inn on what is now the east side of Barrack Field near the convergence of Woolwich New Road and Grand Depot Road. William Perry, the innkeeper, was paid £500 to give up the remainder of a 60-year lease that had been taken in 1748 by William Holiday, a Woolwich brickmaker, who appears to have established the inn at that time as the Duke of Cumberland; the later name probably derived from the proximity of the co-operative windmill that dockyard shipwrights built in the 1750s.[3]

Frederick, though 'a keen antiquary and a man of taste',[4] is not known to have functioned as an architect. When he was again instructed to give directions for the plans and elevations for the new barrack building in July 1773 he probably turned to the Board of Ordnance's Corps of Engineers; the Chief Engineer, Lt. Gen. William Skinner, is likely, at least, to have been consulted. At the same time the Board told its 'principal artificers', two eminent civilian building tradesmen, James Morris, long the Board's master carpenter, and John Groves, master bricklayer, to make preparations. The latter took possession of the Jolly Shipwrights and quickly began making bricks on the newly acquired fields, the southernmost of which was chosen for the building.[5]

William Latimer, a Board of Works clerk who claimed to have been 'regularly bred in the business of a Surveyor and builder', was appointed Chief Overseer for the building of the barracks in June 1774. He may have had some role in their design, but it was only three weeks after his appointment that worked-up plans were approved. At this point the preferred site was moved 600ft (183m) further south for the sake of better foundations. Others involved in planning and supervising included Capt. Lt. Alexander Jardine and a Mr Collier (there were civilians in the Corps of Engineers). Jardine was a reformer who had founded the Military Society of Woolwich in 1772, to unify mathematical and experimental knowledge in artillery and reform military education and training on liberal principles. He later became a spy and a freethinking radical, author and friend of William Godwin and Francisco Miranda.[6] Morris, Groves and other contractors, including William Tyler and George Mercer, both master masons, appear to have completed the main building works in 1776. The

barracks were essentially finished and occupied in 1777, though ancillary works trickled on for a few more years.[7]

The barracks built to the designs of 1774 were the eastern half of the present south range, fifty-seven bays, three linked double-pile stock-brick blocks under Westmorland slate roofs (Ill. 331). Hugely substantial as barracks for soldiers in England, they were, however, smaller than what had been erected in Dublin and Fort George earlier in the century. In architectural terms this was a pedestrian sub-Palladian composition, each of the three blocks sporting a central pediment. The outer blocks, for officers, since altered and rebuilt, had central stucco pilasters, plinths for which survive to the west. A clock made by Ainsworth Thwaites of Clerkenwell was placed in the central pediment, above which there stood a bellcote and a weathervane.[8]

Soldiers were quartered in the central block in forty-eight 25ft-by-20ft (7.6m-by-6.1m) rooms in three full storeys and a basement, for which heating was an afterthought. There were fixed bedsteads for around twelve soldiers in each room at the outset, so providing about 375 cubic feet of space per man, rather less than was usual in earlier and smaller barrack blocks (Ill. 15). The earlier blocks in the Warren had placed barracks between officers' houses and that basic arrangement was repeated here on a grander scale. Both outer blocks housed only officers, ten per floor between basement kitchens and attic servants' quarters. Many officers' apartments were single 17ft(5.2m)-square rooms. Higher-ranking men had two rooms each in the outermost sections, away from the rank and file.[9] Single-storey arcades linked the blocks, screening rooms that were inaccessible from the soldiers' quarters. That to the east housed the officers' mess and was an early example of a room built for this purpose, just 37ft (11.3m) square and seemingly unheated; it acquired a Buzaglo stove in 1784. The western link block was for the Officers' Guard, with rooms that probably accommodated courts martial and disciplinary confinement. The ground behind the soldiers' block was not laid out as was intended in 1774, but rather as a single yard across the back of which there were eight Purbeck-paved kitchens, one for each company, to prevent soldiers cooking in their rooms. Behind these was the Barrack Master's house, put up in 1778–80. Kitchen gardens lay to the north-east on what later became the Grand Depot site.[10]

With war in America from 1775 there was an early eye to possible enlargement, and a reference in 1778 to the desirability of 'the other Half Barracks' suggests that there was already then an intention to build as much again, as in due course did come to pass. If so, the idea was not yet developed. By 1779 the size of a Royal Artillery battalion had grown to more than 1,000 men, and in 1783 the Woolwich officers represented that their own numbers were so increased that they needed a wine cellar for their mess. A canteen was established in 1787, possibly behind the officers' mess, initially just for the sale of spirits to the soldiers, on the basis that this was better done within than without. At least three soldiers' rooms were altered in 1790, seemingly to fit twenty-four in a room with new iron bedsteads, possibly via the insertion of upper tiers. In addition, by 1792 many 'improper Persons had occupied almost every Kitchen and Garret in the Barracks' – nuisances thus caused included a window broken by 'a stone flung by a poor Girl'.[11] Despite discouragements, some soldiers were married. It is likely that, as in other barracks, a few were permitted to live with their wives and children in curtained-off corners of barrack rooms.

As the French Wars began in 1793 the Regiment grew anew. The Royal Horse Artillery was formed as two fully equipped six-gun troops to provide mobile support for the cavalry, in keeping with Continental military fashion. A year later there followed the Corps of Captain Commissaries and Drivers (known from 1801 as the Corps of Royal Artillery Drivers). In the meantime the management of Board of Ordnance building works had changed (see page 148). When a range was built for the Royal Horse Artillery to the rear of the main barracks in 1793–4 it was to plans by the Board's architect, James Wyatt, and its execution would have been overseen by Capt. Charles Holloway, RE, in charge of the locally based workforce of Royal Military Artificers. In two storeys there were stables below soldiers' rooms, a traditional layout for cavalry barracks.[12]

Enlargement, 1801–8

The contexts of urban military forces and barracks had also changed dramatically. The French Revolution, riots at home in 1792 and concerns about the reliability of soldiers led to the construction of cavalry barracks in a number of towns, with further barrack building once war with France threatened invasion. By June 1801, when John Pitt, the 2nd Earl of Chatham, was appointed Master-General, the Regiment at Woolwich comprised 1,474 men in marching battalions, as well as six troops of horse artillery, comprising another 337 men and 344 horses. This was a presence that was thought vital to the defence of the capital, but it had outgrown its facilities. Horses had to be accommodated in the town, but shortage of space there made stabling the most pressing requirement. In late 1801 Col. William Twiss, Commanding Royal Engineer for the Southern District and Lieutenant Governor of the Royal Military Academy, gained Pitt's approval for the building of more stables at the Royal Artillery Barracks with a riding house for training. Twiss and Wyatt decided to enhance the existing rear stable range with new blocks to east, west and north to form a 'horse artillery square', the quadrangle being a standard layout for both stables and barracks. Wyatt also prepared variant designs for the riding house, and Pitt, closely engaged, suggested alterations after a site visit in October 1802. Under Lt. Gen. Robert Morse, the Inspector-General of Fortifications, Capt. George Hayter, the Commanding Royal Engineer in Woolwich since November 1801, prosecuted the works with the Royal Military Artificers, and the horse-artillery square was built in 1802–3, along with the riding house

332. Royal Artillery Barracks, 1774–7 and 1802–6. From the south-east in 2007

and an adjacent farriery near what later became the north-east corner of the barracks site (Ill. 334).[13]

Before these works had progressed far the clear need for more accommodation for men had been addressed. By February 1802 plans for a whole new range of artillery barracks were under contemplation. The acquisition in 1801 of more Bowater land to the west had provided breathing room for a linear doubling of the accommodation. This was a big project and, with even bigger works also under way in the Warren, Hayter's department was substantially enlarged in early 1802.[14] Pitt wanted even greater enlargement of the Regiment, but recognized in a letter to the Duke of York in July 1803 that 'in a profession, scientific as is that of Artillery, the increase can only be to a certain degree gradual.'[15]

No architect would have been needed for the simple westwards replication of the 1770s range and Hayter took the works in hand in 1802. Wyatt did, however, prepare plans for a new officers' mess or 'Dining Hall' behind the eastern of the new link blocks in 1802–3, and was drawn into wider architectural recasting.[16] When work began on the eastern of the three new blocks it was intended that it should repeat the pilastered centre of the earlier outer blocks, as extant plinths betray. But Wyatt must quickly have realized that a row of six almost equivalent pedimented blocks would look absurd, and so initiated alterations to both the existing and the intended buildings to generate a less monotonous elevation. The existing outer (officers') blocks were stripped of their central pediments and pilasters, a curiously negative undertaking so finely executed as to leave scarcely a trace, and given a new rhythm through raising the outer bays to full attic storeys under stuccoed balustrades (Ills 332, 345, 346, 347, 349, 350).

Samuel Hardin, senior and junior, farmers who held leases on much adjoining land, supplied the Board with brown stock bricks made close to the site (see pages 420 and 423). Hayter's foreman of bricklayers and overseer was John Burkitt, who was rewarded for his diligence in 1802, but dismissed in 1805 and succeeded by William Lunn. Hayter was being pressed in early 1803 to see to completion of the new officers' quarters (the two outer of the three new blocks), but some of his civilian artisans decided to leave Woolwich in May, when invasion from France became a real fear, to avoid impressment. Hayter gained Pitt's approval for the formation of a corps of Volunteer Pioneers, making it safe for them to stay put without taking up arms except 'in case of *actual* invasion'.[17] With the invasion panic on, the numbers of soldiers in Woolwich was further increasing and a barn at Bowater Farm had to be used as temporary barracks. Hayter, under great pressure, was unable to get any parts of the new buildings covered in until 1804, but he was then awarded for his zeal in seeing through these and other works in Woolwich with 'unprecedented rapidity'.[18] Even so, the officers' quarters were not complete until 1805. Thwaites then supplied a wind-dial clock for the new central pediment. To the rear, on land that sat astride the line of Love Lane, a second (western) quadrangle of horse barracks, urged by Dep. Adj. Gen. John Macleod and Hayter, was also built in 1804–5. Behind both horse squares further stable ranges with accommodation for drivers were added, as were

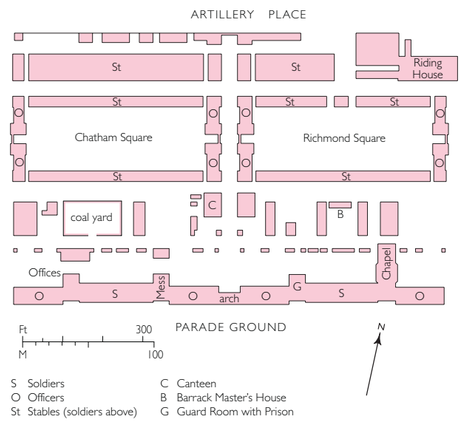
cooking houses, a canteen and a big coal store between the west foot barracks and horse artillery square, and the north-western boundary wall, all built in 1807 to complete the project.[19]

It was only around the time when the main building works were complete in 1805 that James Wyatt, now assisted by his nephew Lewis Wyatt, supplied drawings for the compositional enrichment and unification of the now enormous south front. A central 'gateway', a triumphal arch and four colonnaded link blocks, all faced in white stucco, were up by 1806, as were a northern entrance arch and lodges, also part of this phase. To carry out the stucco work, Wyatt evidently brought in his frequent associate, Francis Bernasconi, who was also working at the Royal Military Academy and who probably used James Parker's patent Roman cement. Decoration included a central circle in a swagged panel over the entrance arch (Ill. 333); this gained a bronze medallion of Queen Victoria in 1858 as part of the Crimean War Memorial scheme. Four carved-stone trophies of arms flanking Royal Arms (now gilded) atop the arch were supplied by Richard Westmacott junior, who had close family links with the Wyatts; this commission for architectural sculpture, 'performed' in July 1805, came early in the younger Westmacott's career.[20]

The triumphal arch has obvious iconographical congeniality in this military context, all the more in relation to contemporary fears of invasion – facing the south-coast front line it was a defiant statement. Unusually for what is a Roman architectural form, Wyatt's Doric Order here is essentially Greek, though impure in that there are Roman bases. These may have been a concession to Pitt, who in April 1806, in a peculiarly specific intervention, suggested the addition of bases to columns on a guard house (see 1 Repository Road). The link blocks were made two storeys behind single-storey colonnades in 1805, those already extant raised and refronted. Wyatt had initially intended that the columns should be fluted timber above unfluted stone, and Greek Doric, but as executed they were all stone, with bases like those on the central arch and Tuscan entablatures, and so closer to the grander columnar links at Brompton Artillery Barracks, Chatham, for which Wyatt was also responsible in 1804–6. Stuccoed porches on the east and west return ends were added around 1830.[21]

Judged as a single conception, this extraordinarily long façade (1080ft or 329m; Ill. 347), matched by Dublin Barracks in extent but not in linearity, lacks neo-classical grace. However, given his assignment, to lift the appearance of a pre-existing and stolid row of six brick blocks, Wyatt succeeded in both unifying and embellishing the façade with some finesse. A master of scenography, he had a knack for grand composition, proportion and scale. Indeed, his promiscuous flair was the other side of his notorious inefficiency. The central triumphal arch is rather small for such a long façade, but Wyatt had little option – the interval into which he had to place it was set, and, as he did care about classical proportions, he would not have contemplated stretching the arch upwards. It nonetheless has sufficient heft to anchor the symmetry of the whole with a central focal point, giving the barracks a presence that is unique for this building type in England, but one that pulls up short of the grandiose. That might have been received as militaristic.

333. Royal Artillery Barracks, central arch, 1805–6. From the south, *c.*1910



334. Royal Artillery Barracks, layout of site in 1811

The complex was laid out on a grid with internal roads, like a Roman military town (Ills 334, 345). To the south were two soldiers' barracks, both with flanking officers' quarters. Behind the links there stood, from east to west, a military chapel, a regimental library and reading room above the guard room and prison cells, an officers' mess, and battalion and senior commanders' offices. Cooking houses and privies were ranged to the rear. Then there was another rank of ancillary buildings that included the barrack-master's house, offices and stores to the east, and the canteen and engineers' yard to the west. Beyond were

335. Royal Artillery Barracks, view showing the Chatham Square entrance (right), 1804–5. Watercolour of 1825 by George Scharf

the two horse artillery squares (stables and barracks), with further officers' apartments in the eight blocks at their east and west short ends. The stables and barracks for the drivers lay further north, with the riding house to their east. Archways terminated both ends of the camp's middle road.[22]

The horse-artillery squares were named after the Duke of Richmond, formerly Master-General (east), and Earl of Chatham (west), and bore their arms above the outer gates. Wyatt's public elevations for the officers' quarters here, mirrored on the inner sides of the quads, were shorter echoes of the south front's outer ranges (Ill. 335). Between, there stretched two-storey ranges, stabling under barrack rooms of comparable dimensions to those at the front, nineteen men in each room of 30ft by 24ft (9.1m by 7.3m), that is 446 cubic feet each (Ill. 15). The bulkier three-storey ranges further north for the drivers also had stables under somewhat larger barrack rooms. The 136ft(41.5m)-long riding house had a pilastered exterior said to resemble a Greek temple. The northern gateway to Artillery Place was a pierced triumphal arch flanked by three-storey guard-room lodges (Ill. 336).[23]

336. Royal Artillery Barracks, Artillery Place, north gateway and guard-room lodges, 1805–6. Photographed 1957. *Demolished*

All this made up the biggest barracks complex in Britain, and among the largest in Europe. It provided almost a quarter of the total capacity of all Ordnance barracks in the country and was more than twice as big as Brompton Barracks, the next largest. In 1806 there were 1,152 soldiers and 86 officers in the foot barracks, roughly the same density as in the 1770s (12 soldiers in a front-range room), and 1,926 soldiers and 46 officers in the horse-artillery and drivers' barracks. Altogether, 3,210 men and about 1,200 horses were housed, a population that stayed more or less constant into the 1820s. This suggests rather better living conditions than the two-tier four-man wooden sleeping berths that were the norm in army barracks at the time. However, around 1,000 to 1,200 soldiers were married, some permitted to bring in their families, others forced to pay 'exorbitant rents for miserable lodgings'.[24] A school was built in 1808–10. The proximity of civilian life in Woolwich, 'alehouses and houses of resort' brought 'serious inconveniences' to the management of the barracks, as Macleod and Hayter complained in 1806.[25]

Royal Artillery Mess

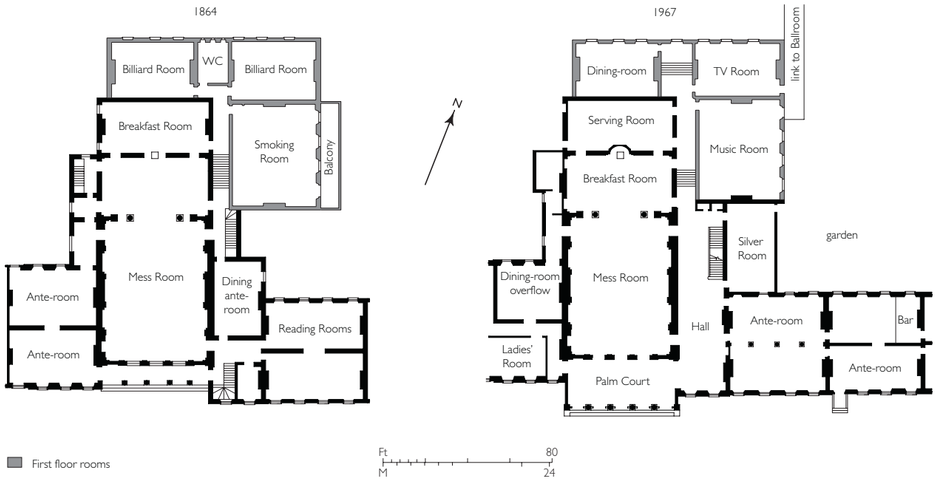
The Royal Artillery Mess in the Woolwich barracks, one of the country's most distinguished military dining halls, has a complex history of accretive growth (Ill. 337). Behind the link colonnade west of the central gateway, it was built in 1802–3 to designs by James Wyatt, to replace the first mess of the 1770s. It was a larger room than its predecessor to the east, no wider at 37ft (11.3m) but about 52ft (16m)

337. Royal Artillery Mess, 1802–3, remodelled and enlarged in 1842–5, with *Armed Science*, statue of 1855–7, to the rear. From the south-west in 2007

deep. There was an ante-room with a small staircase to the south-east and, away to the north, a freestanding kitchen or mess house.[26] Wyatt recorded his designing of the room in his list of works for the Board, but the nature of the original mess-room interior is obscure. It probably had a flat neo-classically ornamented ceiling. Two long tables, to seat about seventy officers and said to have been made in 1803, remained *in situ* until they were moved to Larkhill in 2007. Five Regency-style tent-shaped chandeliers, one large and four smaller, were also moved at that time. Their origins are complex. There is a hint at early opulence in that Wyatt was paid a small sum in 1804 on account of 'Chandaliers', fittings that appear not to have lasted. Two more chandeliers were acquired from Hancock & Shepherd in 1817 for a substantial sum raised by subscription among officers; another pair are said to have been bought to match these in 1877, apparently making up the four outer fittings. It has been suggested that the larger central chandelier came from Carlton House in 1829, but this has not been corroborated and the timing seems not to align well with the attribution to 1817 of one of the smaller pairs that are so closely analogous in form. However, tent-shaped chandeliers were made for the Prince Regent's temporary celebratory buildings of 1814 at Carlton House that included the Rotunda. These, made by Parker and Perry, London's leading suppliers, may have been sold at auction in 1815. It is plausible that one could then have been transferred to Woolwich, providing a prototype for Hancock & Shepherd in 1817.[27]

A bow window with a music gallery on the mess room's north side was an early addition, perhaps of 1816. In 1818, when force reductions meant that barrack rooms were falling empty, the mess establishment spread westwards to gain two large ante-rooms (Ill. 338). It was noted after one dinner in 1827 that wine consumption averaged two and a quarter bottles per officer. Cellarage arrangements are unclear, though by the early 1830s there was a covered link to the kitchen. A courts-martial room behind the original south-east ante-room had been taken in, along with a committee room above. The former was sometimes used as a supplementary dining-room, as no more than about 120 could be seated in the mess room. The Bull Inn on Shooters Hill was also used to billet and feed the overflow of officers.[28]

Substantial improvements in 1842–5 rendered the officers' mess more the kind of interior then fashionable in a

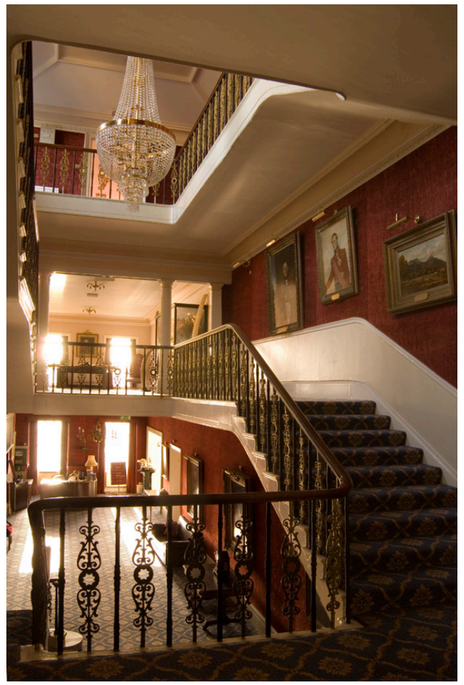


338. Royal Artillery Mess, layout of principal rooms in 1864 and 1967 on the ground floor except to the north where upper-storey rooms are shown

gentlemen's club. Capt. Edward Warde, the Mess Secretary (later Gen. Sir Edward Warde and the Commandant at Woolwich in 1864–9[29]), spearheaded this project, in large measure using funds raised by subscription among officers, though not without securing substantial expenditure by the Board. Phased works were supervised and seemingly designed by Col. Sir George Hoste, CRE; the Board no longer had its own architect. First the mess room, Doric with five bays of full-height pilasters to a continuous entablature, was refinished below a higher coved and coffered ceiling (Ill. 337). Four sideboard tables were topped with bronzed Coade stone lions, ordered in 1842 and among the last products of the Coade factory. At the same time, and perhaps from the same source, ornamental reliefs were placed in the metopes of the frieze: coats of arms of Queen Victoria, the Board of Ordnance and Gen. Sir George Murray, then Master-General; shields with faces of Thor (Th'Ordnance) over a thunderbolt from the Board's crest, and two opposed bees (bomb is from the Greek 'bombos' for humming). On the side walls arch-headed recessed mirrors that helped create an impression of greater space flanked new marble fireplaces. Beginning in 1843 the room was enlarged by the replacement of the bow to the north with a full-width 21ft(6.4m)-deep top-lit room behind a screen of scagliola-faced columns. Beyond this a breakfast room was added. These transformations made the Royal Artillery Mess Room, where royal dignitaries and foreign heads of state were frequent visitors, 'perhaps the most magnificent of its kind in the kingdom'.[30]

But this was not yet quite the club that was wanted. Associated plans to move the officers' reading room and library from the equivalent eastern link block to rooms adjoining the mess had to be deferred. In 1848 Thomas Henry Wyatt was brought in to design an ambitious scheme to bring together the mess room, library, reading room and even the Royal Artillery Institute, proposing substantial new premises to the rear, extending back to a site occupied by the officers' open-air fives courts. Officers, among whom Capt. Frederick Marow Eardley-Wilmot was a leader, set about raising subscriptions and hoped for support from the Board, as these further improvements would free space for barracks. However, Lord Anglesey, Master-General, thwarted the project. Royal Engineers drew up a reduced plan for library and reading-room spaces on the west side of the mess, but the layout had again to be rejigged and the library and reading rooms were placed to the east in 1849–51, with minimal alteration, in work paid for by the Board, the subscription funds going to the furnishings.[31] This decade of enhancement in the arrangements of the mess corresponded to and arguably reflected a period of 'torpor and weakness' in the Regiment.[32]

After the chastening experience of the Crimean War, the Royal Artillery's valued link between education and militarism was symbolically reaffirmed by the addition of a significant allegorical statue, *Armed Science*, a heroic and spike-helmeted female figure in thoughtful pose. This was presented and allegedly also designed by Col. Robert A. Shafto Adair (later Lord Waveney), who had served in the Regiment in the Crimea and wished to commemorate his



339. Royal Artillery Mess, staircase, 1870–1, from the north in 2007

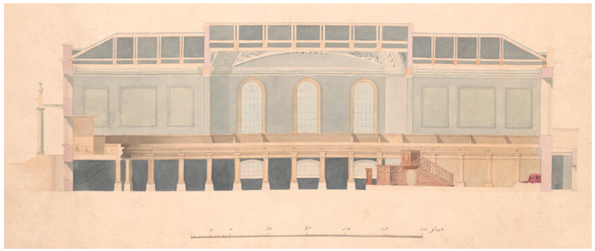
education at Woolwich. The marble statue was made in South Kensington by John Bell in 1855 and placed at the north end of the mess room in 1857, originally on its plinth in an open archway, later in front of a mirror and finally, from the middle of the twentieth century up to 2007, in a niche. *Armed Science* was then moved to Larkhill.[33]

There were further extensions of the mess establishment in the early 1860s. Again T. H. Wyatt prepared plans, this time with more success, and work was carried out by Holland & Hannen, contractors, and J. G. Crace & Son, interior decorators. It comprised a rebuilding of the breakfast room, and additions beyond to the north and east (Ill. 338). Above service spaces there were two billiard rooms and a large smoking room, later a music room, with a steeply coved and coffered ceiling and, originally, a balustraded eastern balcony. Further improvements came in 1870–1, again through Wyatt, Holland & Hannen, and Crace. Circulation was improved by the insertion of a spacious open-well staircase that displaced the former courts-martial and committee rooms on the east side of the mess room. This has ornamental iron balustrading and a columnar screen to the first-floor landing (Ill. 339). On the first floor the library was extended eastwards and opened up with an arcade on cast-iron Doric columns. The mess room was redecorated with its door architraves reconfigured, and in 1891 the two ground-floor reading rooms were thrown together to make a single eastern ante-room divided by another row of Doric columns.[34]

The external colonnade onto the parade ground was pushed forward in 1920–1 to form a palm court, spoiling the symmetry of the south façade, in work by Holland, Hannen & Cubitts. The library had been transferred to the Royal Artillery Institution in 1910–11, so its former first-floor spaces were now reconverted to nine bedrooms (called cubicles) for visiting officers, the columns remaining in place. To the rear the breakfast room became a serving room. There was minor bomb damage in 1940, yet the number of officers using the mess rose to a peak of 650 in 1944. Another round of alterations occurred in 1965–7 to plans drawn up in the Ministry of Public Building and Works, with Alec Scott as chief architect and G. A. Saville as job architect, in association with Manning and Clamp, architects, and Kirk & Kirk, building contractors. East of the staircase a silver room, designed by Tony Dick, architect, was formed for the display of an impressive array of regimental silver. Entrance and service spaces were substantially altered and further ante-rooms were formed to the east on the ground floor. These incorporated a finely carved mid-eighteenth-century wooden chimneypiece bearing Royal Arms and, above a bar, a historical mural by Geraldine Knight. At the same time a walled garden, laid out for croquet, was formed to the north. The Royal Artillery's move from Woolwich in 2007 saw the transfer of much movable fabric to Larkhill. Even so, these rooms continue in use as an officers' mess.[35]

Royal Artillery Chapel and Theatre

The first officers' mess room of the 1770s, between the two easternmost blocks of the south range, was extended to create a large military chapel in 1806–8. The only parallel for a barracks' chapel was that which the Ordnance had built slightly earlier at Brompton Barracks. The Woolwich chapel was designed by James and Lewis Wyatt, and built through Capt. Hayter, with William Adam and the Robertson brothers responsible for internal joinery that included a triple-decker pulpit placed centrally in front of the north-end altar (Ills 340, 342). Lewis Wyatt's first scheme for fitting out the interior was simplified to save time and money, and painted windows by Richard Hand were abandoned. The finished chapel, 'large and handsome',[36] had seats for 1,000 on the main floor and for another 455, including officers, in galleries. It was broadest (56ft/17.1m) in the middle and had a shallow central dome; full-width tie beams to shallow trusses had cracked and sunk by 1819, necessitating a more steeply pitched roof. An upper gallery was added at the south end in 1816 for the Royal Artillery Band and replaced in 1847, when



340. Royal Artillery Chapel, 1806–8, cross section looking west, 1816

the garrison's numbers increased, with an iron-framed structure that increased capacity to 1,788.[37]

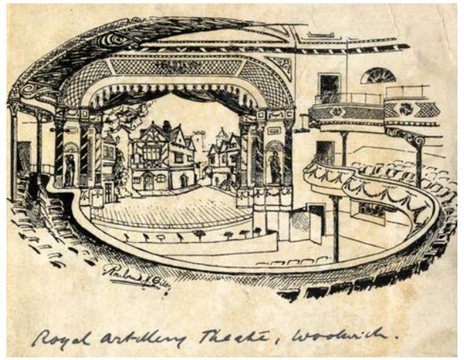
The chapel fell redundant when St George's Garrison Church opened in 1863. It was promptly converted through a local architect, Mr Noble, for a lecture or recreation hall, with a stage fitted at the former altar end and seating in the wider central section. The south end was divided off for coffee, reading and bagatelle rooms. Regimental band concerts were transferred from the officers' mess, and the hall was soon adapted for theatrical entertainments, put on by the Royal Artillery Dramatic Society, which had previously used the riding school, 'to answer the purpose of keeping the men in barracks, thereby preventing some of the more refractory from indulging in the vice of drunkenness'.[38] The auditorium was rebuilt in 1867, to designs perhaps by T. H. Wyatt, with a horseshoe-plan circle and gallery on iron columns facing a full classical proscenium with statues in niches (Ill. 341). The place filled with soldiers and was known by the 1880s as the Garrison Theatre.[39]

Fire gutted this theatre in November 1903. Funding for another rebuilding was raised under the auspices of Field Marshal Frederick Roberts, 1st Earl Roberts, the War Office matching subscriptions from the Regiment's officers, and work within the surviving shell was carried out in 1905 to plans by W. G. R. Sprague, a leading architect of West End theatres, for a capacity of about 1,100 (Ill. 342). The new interior was no less rich than its predecessor, with the circle and gallery now cantilevered on structural steel. But the hiatus had caused on-site commitment to fade, so the premises were leased for use by the general public. They were long managed by Agnes Mary Littler, whose relative, George Robey, as well as Tommy Trinder and other music-hall stars passed through. After a period of closure the theatre reopened in 1926, altered for cinema use. There was minor bomb damage in 1945, but use thereafter, including for boxing, continued up to closure in 1956. The theatre was demolished in 1962 to make way for wider redevelopment.[40]

Additions and alterations to 1944

There were few significant changes to the fabric of the Royal Artillery Barracks in the peaceful decades after 1815. Eighteen companies, about a quarter of the reduced Regiment as a whole, were stationed in Woolwich and in 1833 there were only 1,875 men and 419 horses resident, though regular troop movements did mean fluctuations. Alterations and conversions became necessary to accommodate more officers, to reduce amounts spent on lodging them outside. For the ranks, and in keeping with provision elsewhere, wash-houses were built, each with eight-seat communal privies, seven basins and one bath. By 1841 the establishment's nominal capacity had been reduced to 2,558. The census indicates that there were actually 2,862 people living in the barracks, but 759 of these were women and children in 229 families, suggesting that slightly more than one in ten of the barracked soldiers lived with his family. Outwardly there was ceremonial, as in 'the grand and imposing spectacle of from 1,000 to 1,200 men in full military costume, and with the exception of the guard, without arms, as they appear on a fine Sunday morning, previous to going to church'.[41]

Regimental augmentations ensued and further improvements were carried out in 1846–8 – a gas supply, tailors' workshops, staff-sergeants' quarters, a prison behind the riding school, a number of iron sheds, and iron access balconies for the upper-storey barracks in the horse-artillery squares, where fireplaces had been inserted. Of the Regiment's units that were based at home in 1848, half of the horse artillery and forty per cent of the foot artillery were at Woolwich. The growing numbers of both men and horses were directly connected to the expansion and works of the Royal Arsenal.[42] In 1851 there was accommodation for fifty-four officers in their four south-range blocks and for 1,082 soldiers in seventy-nine rooms in the two intermediate blocks. Round the horse-artillery squares and beyond, another 2,668 soldiers were expected to squeeze in, the augmentations having increased pressure on space. The actual population, as recorded in the census, was 3,528, again including families, about 180 wives and 370 children, proportionally many fewer than ten years earlier. This suggests adherence to a regulation whereby only six per cent of soldiers in barracks were permitted to marry 'on the strength', that is to have their families housed. But in 1852 the regulation was not being openly applied in Woolwich because, it was claimed, the barracks were fully

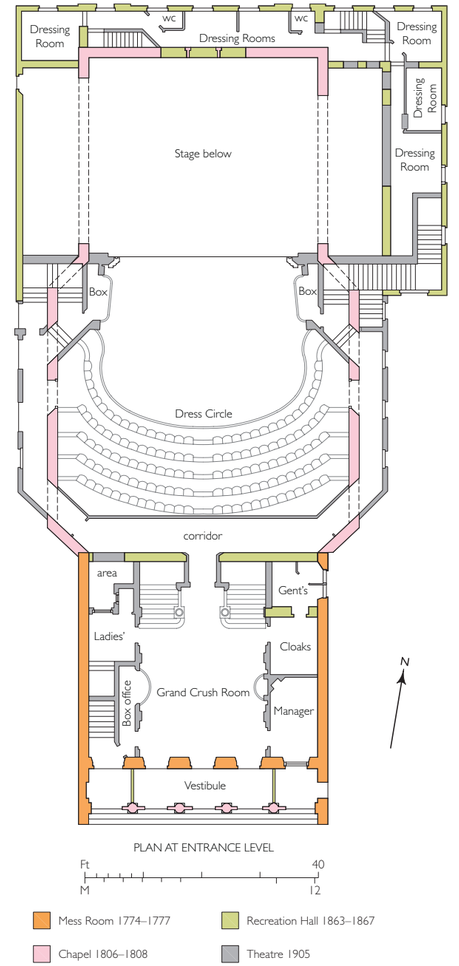


341. Royal Artillery Theatre, the 'recreation hall' interior of 1867 from the south. Ink sketch of *c.*1900 by Rowland H. Gilby

occupied by single men. Whatever the tolerance of families, those married without permission ('off the strength') certainly had to find and pay for lodgings in the town. This shift in the 1840s had ramifications on nearby streets (see pages 384–5). In 1852 there were 1,050 soldiers in private lodgings, and in 1861, when about twenty per cent of all artillerymen were married, there were, excluding officers' families, 894 soldiers' wives with 1,330 children in all Woolwich. There were still then scarcely any official separate married quarters.[43]

Early on officers had taken initiatives to claim spaces for their sports. In 1833–4 a committee of three Royal Artillery and two Royal Engineer officers saw to the building of a covered court for playing rackets at the north-east corner of the barracks' site, near Wellington Street along what became St John's Passage (Ill. 241). This blank-walled brick building, about 90ft by 40ft (27m by 12m), was an early, possibly the earliest, covered hall for this sport, which had developed from eighteenth-century origins as open-air play against walls. It was given a glazed roof in the 1870s, converted to three squash courts in 1928 and demolished in 1963–4. There were also two open-air fives courts to the rear of the officers' mess from 1836 into the twentieth century.[44] Together these courts lay behind the establishment in Woolwich of a racket-making industry.

When the officers' library moved in 1851, the centre-east link-block guard room was refitted with prison cells, to supplement existing 'black holes' (windowless detention cells) there and at the north-eastern prison of the 1840s. The first floor of the same link block was adapted for non-commissioned officers' and gunners' libraries. These, previously housed in the horse-artillery squares, had come into being in the late 1830s as a result of Lord Howick's reforms towards educating ordinary soldiers. By 1860 a



342. Royal Artillery Theatre, 1905. Plan showing retention of fabric from earlier uses of the site

kitchen had superseded the cookhouses (one converted to provide more baths), forage stores had been built to the north-west (at the site of the current entrance), a gymnasium inserted between the fives courts and the canteen, and an iron riding school and manège built to the north-east. The last was replaced and converted for another riding school in 1878–9.[45]

After the Crimean War, for the first time, the home army was concentrated into garrison stations of which, with the demise of the Board of Ordnance in 1855, Woolwich was one. It continued as the Royal Artillery's headquarters, with the barracks having become among the most overcrowded in England. A celebrated Royal Commission exposé of squalor in British barracks showed that their mortality rate was about double that outside. The Barracks and Hospitals Improvement Commission (Sidney Herbert, Sir John Sutherland, W. H. Burrell and Capt. Douglas Galton) suggested reforms in 1858 to allow 600 cubic feet per man (the minimum in prisons). This obtained scarcely anywhere at Woolwich. It was calculated that 758 fewer men should be housed in the existing buildings, the deficiencies of which were summarized as 'overcrowding, defective ventilation, defective state of the privies, urinals, and ash-pits, want of sufficient means of varying the cooking in most of the kitchens, want of baths, defects in the lavatories, and unnecessary retention of stable dung in the squares and ranges'.[46] Some reappropriations did follow. Use of the front-range basements as barracks stopped, and spaces were opened out through the use of slender cast-iron columns in lieu of partitions at the west end of the east soldiers' block (now adjoining the Sergeants' Mess). However, there was little far-reaching change. The army in the 1860s remained a 'refuge for a variety of inadequates, misfits and rascals: drunkards, adulterers, bigamists, debtors, criminals'.[47] Marriage continued to be broadly discouraged and prostitution was regarded as an inevitable if unfortunate necessity. It was costly; about a quarter of all the garrison's hospital admissions were for venereal disease, of which there were annual returns of around 1,000 cases in the late 1860s, about one for every five soldiers.[48] The place did not get much less crowded, housing around 3,000 soldiers, 1,000 horses and 60 to 200 resident officers into the 1930s. A visit for Booth's 'Life and Labour' survey in 1896 recorded bare cheerless rooms, libraries little used, buckets as urinals, and general discontent; 'the public houses scarcely need the red jerseyed barmaids that one Woolwich publican has obtained.'[49]

343. Church of England Soldiers' Institute, Wellington Street, 1893–4 and 1899. From the north-east, *c.*1900. *Demolished*

The **Church of England Soldiers' Institute** was squeezed in at the north-east corner of the barracks site in 1893–4, hard by the riding school and rackets' court on what is now an empty site at the west end of Wellington Street, opposite Elliston House. This followed earlier soldiers' institutes in Woolwich but was larger and more imposing, rising on a hillside to four storeys in a long and multi-gabled red-brick Flemish-Renaissance block that was opened by the Prince of Wales (Ill. 343). It was designed by Newman and Newman, architects, and funded by subscription through an appeal spearheaded by Lt. Col. Barrington Foote and the Rev. W. Statham, Chaplain General of the Forces. Intended as, in effect, a club, it comprised a large concert hall, a library and reading room, a devotional room, a music room, games and billiard rooms, and a temperance bar, also offering hot baths, 'cubicles', bedrooms and a private dining-room. There were weekly entertainments, and religious instruction and worship were entirely optional and not meant to be offered on the premises. The Institute was enlarged to the west in 1899 with a second concert hall. It was demolished in 1963–4.[50]

Even before 1900 there were discussions about moving the Royal Artillery from Woolwich to Aldershot. The question was hotly debated, but the First World War reinforced the usefulness of Woolwich as a mobilization centre. It was a target in Zeppelin raids and there was damage in 1916 to the east horse-artillery square and the front parade. From 1922 the Woolwich establishment continued as what was now called the Royal Artillery Depot. The canteen was replaced with the Regimental Institute and Restaurant in 1926–7, a plain neo-Georgian block behind the south range and west of the middle road (Ills 346, 347), built to designs by Frederick Morfee Walsh, architect and once an artillery officer, with Holland, Hannen & Cubitts as contractors. This came about through a wartime trust fund and the initiative of Lt. Col. Freddie Windrum, Secretary to both the canteen and the officers' mess, who had fought off a takeover by the newly formed NAAFI (Navy Army and Air Force Institutes) in 1921–2. Above the canteen it housed a ballroom and, on top, a library and billiard room.[51]

The establishment of army training camps at Tidworth, Catterick and Larkhill, where the School of Artillery was based from 1920, increased rationalizing pressures to shift the Regiment from Woolwich. In 1938 it was proposed that the whole Depot should move away for good. Many officers disliked Woolwich because most of the accommodation was thought bad, because the place was considered too much a town, and because it was a 'bad hunting centre'.[52] Mechanization had permitted the stabling to be adapted to house more men, but that was scant improvement. Under the threat of air attack the Depot was largely evacuated in 1939, but within a year as many as 15,000

Dunkirk evacuees poured into Woolwich and in 1944 the strength of the garrison was still 8,470. Bombs did hit the south-east part of the complex twice, in 1940 and 1944, destroying the east block of the south range and buildings to its rear.[53]

Post-war rebuilding

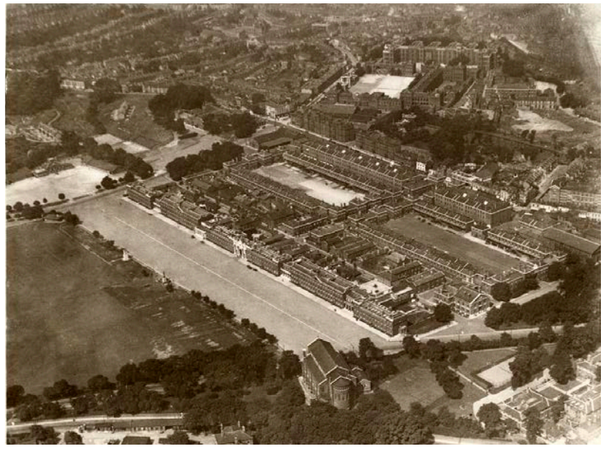
The proposal to close the Woolwich Depot had been countered in 1938 by the invocation of tradition. The same arguments were rehearsed in 1949–50, the Regiment wishing to stay in Woolwich provided there could be some modernization. The Holland Committee on the Concentration of War Department Buildings and Land accepted reconstruction rather than closure. With 4,000 and more living in the Royal Artillery Barracks complex, it was acknowledged that living conditions were not just poor, but grossly overcrowded and lacking in sanitary facilities. As slum clearances and 'comprehensive development' unfolded in Woolwich outside the gates, complete replanning within was undertaken in 1953–4 by Royal Engineers. But senior officers in the War Office held to the view that Woolwich was no longer suitable for field force units. Local Commander Maj.-Gen. John Crowley thought the ten-year rebuilding plan would not be money well spent. He insisted that Woolwich was an unsuitable location for a major garrison, vulnerable to air attack and lacking in training facilities, but did acknowledge that this view would 'shake the traditions of the Royal Regiment to their foundations'.[54] Indeed, a rapprochement between civil and military authorities saw the Regiment presented with the Freedom of the Borough of Woolwich in 1954. The view of Sir Cameron Nicholson, Adjutant-General to the Forces as well as Colonel Commandant of the Royal Artillery, was that 'The Royal Artillery own Woolwich and Woolwich owns the Royal Artillery. History and tradition are major factors.'[55] The War Office decided a move would not be 'practicable' and pushed ahead in 1956 with a scheme that planned clearance behind the retained south range and officers' mess, agreeing to scale down nominal capacity from 3,586 to 2,756.[56]

The first phase of what became a ten-year rebuilding project was projected as twelve three-storey barrack blocks for 1,200 men. Designs were prepared in the War Office by the Directorate of Fortifications and Works, and by Royal Engineers' Works Services. The Royal Fine Art Commission, consulted as a matter of courtesy, opposed the use of standard buildings in 1957, requesting something more in harmony with the south front, and urging retention of the north, east and west gateways, all now listed buildings. This advice was rejected, but further reductions to leave a force of only 2,000 in Woolwich meant that the scheme could be revised down to ten standard blocks on the site of the inner ranges of the horse-artillery squares, with the outer Chatham and Richmond gateway ranges retained. This redevelopment went ahead in 1958–9 with Rice & Sons of Stockwell as building contractors. Ten new brown-brick barracks blocks, each for

344. Royal Artillery Barracks, block of 1958–9 in 2007

108 men with an average of six in each dormitory room, were all occupied by early 1961, when, following the abolition of National Service, the strength of the Depot was just 1,536. The buildings were praised for being well lit and centrally heated; each had a rest room with a television (Ills 344, 346). Spare detailing and landscaping that followed gave the precinct something of the air of a post-war New Town.[57]

The next stage in what had come to be called a 'comprehensive development' scheme for the whole Woolwich garrison was the replacement of support and ancillary buildings behind the south range and around the new barrack blocks. First plans prepared in-house in 1958–9 were for separate buildings to be dedicated to: headquarters' administration for the Royal Artillery's 17 Training Regiment (set to move to Woolwich from Oswestry); the Royal Artillery Band; a gymnasium; a lecture room, model room and equipment room with six classrooms; and other workshops and stores. It was decided in 1960 that a consultant architect should be engaged and that the project should include rank-and-file mess accommodation. In this and what followed Donald Gibson, appointed architect to the War Office in 1958, may have had some role. Robert Atkinson & Partners prepared a scheme in 1961, but within a year Birkin Haward of Johns, Slater & Haward had been given responsibility for a masterplan of the whole garrison redevelopment. This was devised and modified up to 1966, schemes shuffling low modernist buildings around the site. Manning and Clamp, architects, were then engaged on detailed designs. Refurbishment of the retained south range was handled from 1962 in the new Army Works Department of the Ministry of Public Building and Works, to which Gibson had moved. Alec Scott was the project architect and there was conservation guidance from the Ancient Monuments' Division. Other ground was cleared in 1962, but there were delays with funding and the new building work was not undertaken until 1964–8, with Kirk & Kirk as contractors. It used the SEAC (South East Architects' Collaboration) lightweight steel-frame building system, developed in school buildings



345. *c.*1925

346. 1963

347. 2011

Royal Artillery Barracks, from the south-east

and characterized by continuous bands of windows above brick walling and under flat roofs (Ill. 347).[58]

The south range was much rebuilt internally for improved upper-storey barracks' accommodation. In the centre-east block thirty-two individual 'cubicles' were formed on the first floor, where there had been dormitory rooms for 144 soldiers in the 1770s (Ill. 15). Rear walls were rebuilt with aluminium-framed sashes. A courts-martial centre was placed to the west of the enlarged and improved officers' mess. From this a new bridge linked to the ballroom over the former canteen, now a Junior Ranks' Club, itself extended to the west. On the other side of the centre road a sergeants' mess had been formed, with a large neo-Georgian open-well staircase inserted into the centre-east link block. Single-storey buildings behind led through to a large mess hall for the ranks. This faced and had a canopy link to the Junior Ranks' Club. On the bomb-site to the east there rose a replica rebuild of the lost block of the 1770s to accommodate the Women's Royal Army Corps, which had its own parade ground and netball pitch to the rear, latterly built over with garages.

Reconsiderations of the overall layout caused the Chatham and Richmond gates to be demolished in 1965, making way for a gymnasium to the east and a computer building to the west. The latter was the Royal Electrical and Mechanical Engineers' (REME) Group headquarters, a three-storey office block of 1966–7 that permitted a long-intended move from the Repository for REME Technical Services. The sole computer in this 'automatic data processing' centre was placed in a dust-free air-conditioned room (Ill. 348).

Space along the northern perimeter was sacrificed for a widening of Artillery Place. The North Gate was to have been re-erected, but, dismantled in 1968, it never was. Instead there is a continuous railing on a dwarf wall. Further east, along Wellington Street, a section of nineteenth-century boundary wall survives; a scheme to cut a new stretch of road across this corner came to nothing. The north-west site entrance was formed off Repository Road behind a circular platform on which a Thunderbird missile was mounted. A two-storey range of offices on the inner side of the guard room became the new regimental headquarters. Further east were low workshop and stores ranges. The building for the Royal Artillery Band was placed to the east, just north of the gymnasium.[59]

Redeployments and rebuilding, 2007–12

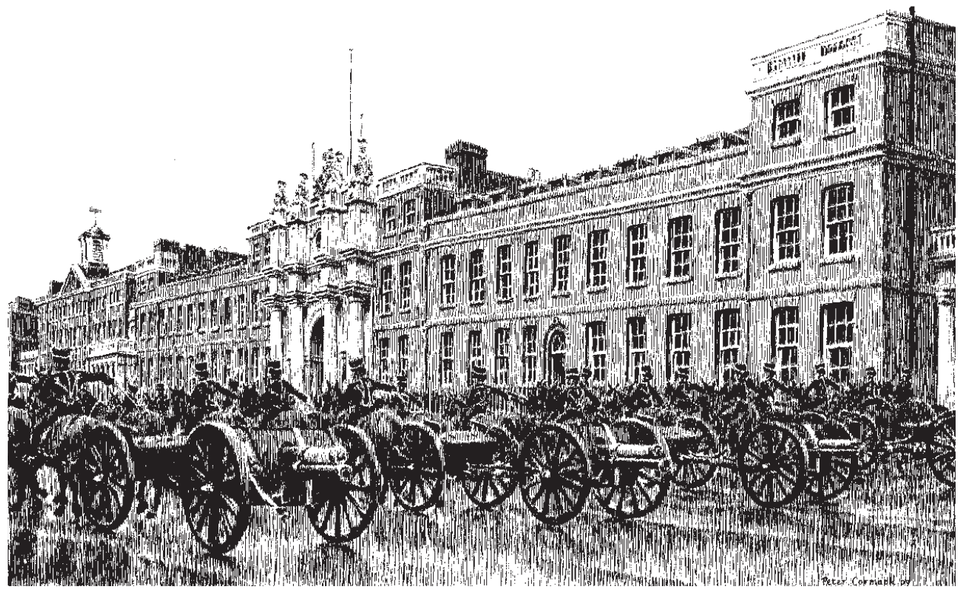
These facilities had reanchored the Royal Artillery in Woolwich, but redeployment of forces away from Woolwich was again under consideration by the 1980s and into the 1990s as post-Cold War defence cuts began. There was one more reprieve in 1995 when the 16th Air Defence Regiment Royal Artillery (London and Kent Gunners) moved from Germany to Woolwich. With them there appeared a Rapier Dome, an air-defence training facility of the late 1960s relocated to the north-east part of the site

348. Royal Artillery Barracks, Royal Electrical and Mechanical Engineers' Group headquarters, computer room, 1967

(Ill. 347). This geodesic fibreglass structure had a central turntable for simulators for training in the use of Rapier anti-aircraft missiles. Since 2007 it has been used merely as a store.[60]

The pressures to move the Royal Artillery away from Woolwich finally proved irresistible in the shape of a Defence Estates Review by the Ministry of Defence, announced in 2003. The Regiment's long residence in Woolwich came to an end on 26 May 2007, with the move to Larkhill (Ill. 349). The argument that the barracks should continue to be used for army accommodation had not, however, been lost. Public Duty Incremental Companies (Grenadier Guards and Coldstream Guards), needed in London for ceremonial duties but displaced from Chelsea Barracks, came first. Then the Second Battalion The Princess of Wales's Royal Regiment was posted to Woolwich from Cyprus, and the King's Troop Royal Horse Artillery, the antecedents of which had begun in Woolwich, moved from St John's Wood to the Royal Artillery Barracks in 2012.

This period saw another major rebuilding. The principal works were the replacement of seven of the dormitory barrack blocks of 1958–9, leaving three to the west with a denser array of eight new buildings to provide 523 individual en-suite rooms, now the army's standard (Ill. 347). This was part of a wider Ministry of Defence initiative begun in 2001 and known as Project SLAM (Single Living Accommodation Modernisation) 'to provide servicemen and women with the living environment needed to make them feel valued'.[61] Project SLAM was brought about through Defence Estates and Debut Services, a consortium led by Bovis Lend Lease and Babcock Support Services and the principal contractor responsible for design and construction. In Woolwich responsibility devolved to PriDE, a joint venture between Interserve Defence and Southern Electric Contracting, to which Defence Estates had contracted its estate management and construction



349. Royal Artillery Barracks, ceremonial departure of the Royal Regiment of Artillery, 26 May 2007.
Pen and ink drawing by Peter Cormack

services in south-east England. First plans were drawn up by Capita Percy Thomas, architects. HLM Architects took the project further with Hulley and Kirkwood, consulting engineers. Interserve Project Services was the building contractor.

The barracks were rebuilt from east to west in 2008–11. The four- and five-storey brick-clad buildings, mostly T- or L-shaped blocks that resemble university-student accommodation, are made up of stacked prefabricated modules or pods, each typically containing eight bedrooms and two common rooms along a central corridor (Ill. 15). For this and other energy-related reasons these buildings are less amply fenestrated than their predecessors. There was tree planting and other associated works included conversion of the former Junior Ranks' Club mess buildings to locker changing rooms and a new outer canopied 'entry control point' or gatehouse at the site entrance. The south range's eastern blocks were refurbished in 2010–11 to provide more en-suite bedrooms.[62]

Parade ground, ha-ha and Barrack Field

The Royal Artillery Barracks shaped their immediate environs as soon as they were occupied. Grand Depot Road was formed in 1777 to give access to the barracks without cutting across the ground in front. In the same year hedgerows to the south were cleared to open up Barrack Field so that artillery practice could be extended back from the common. To separate the field from the common (and livestock) without compromising this purpose, William Latimer was directed to build a retaining wall in 1778. This, the first ha-ha, extended from the Jolly Shipwrights (where Grand Depot Road and Woolwich New Road meet) to the south-west on a line that followed the road then existing. During the Gordon Riots in June 1780 Gen. William Belford placed twelve guns in front of the barracks, 'should those riotous rascals choose to come here or oblige us to come to them',[63] but the parade ground for close-order drill in front of the barracks was not laid level and gravelled until 1784.[64] Maj.-Gen. Joseph Brome, Commandant of the Garrison, complained of Barrack Field in 1791 that 'its various inequalities made it extremely unfavourable to the appearance of the Regiment on a Field Day or Review.'[65] The Duke of Richmond, Master-General, disagreed and nothing was done.

With the acquisition of more lands to the west in 1802 Capt. Hayter, at the suggestion of Lt. Gen. Morse, extended the ha-ha westwards on a more directly east–west

line as far as the parish and property boundary, where a stone marker and, a more recent arrival, a K6 telephone kiosk can be found. A convenience for artillery practice, the ha-ha also served to unify the landscape between the barracks and the Royal Military Academy as if it were a country estate. In 1806–8 the earlier eastern ha-ha was replaced, shifted to the south with the road, to create the crossroads that still exists at the east end of Ha-Ha Road. At the same time gravel pits were levelled and a north–south footpath was formed across the middle of Barrack Field, with what became known as the Blue Gate at its south end.[66] These adjustments were followed by the placing of brass guns and lengths of iron *chevaux de frise* along the parade ground in front of the central arch. Another footpath ran diagonally across the field from where the Jolly Shipwrights had stood, a location that became the White Gate (Ill. 350); this existed up to the 1950s. By 1813 both Barrack Field and the common were being used by the regiment for exercises, or manoeuvres, as well as for the grazing of cows that belonged to artillery officers.[67]

Barrack Field has in more recent times been used for sports and special events. There were pitches for the Royal Artillery Cricket Club, which had eighteenth-century origins and admitted only officers until after the Second World War, and it was set out for a great feast to celebrate Victoria's coronation. The field remained off limits to the public except from 1892 to 1923 when it accommodated a children's playground (see page 440). By then two pavilions had been built along its south side, up against the ha-ha, and tennis courts formed to the east. There were 200 tents on the field during the First World War, and a barrage-balloon mooring site and allotments during the Second. The pavilions were rebuilt around 1950 and between them near the Blue Gate a groundsman's store was added around 1980. Another larger pavilion was built in 1995–6, near the tennis courts. Barrack Field was used for shooting events in the Olympic Games of 2012.[68]

Central on the south side of the parade ground is the Royal Regiment of Artillery's **Crimean War Memorial** (Ills cover, 351). Subscriptions to a memorial fund that initially aimed to establish a Woolwich institution for soldiers' widows and orphans were overwhelmed by an anonymous donation of £2,000 from 'two ladies'. Plans changed in 1858 and most of this was applied to the Soldiers' Daughters' Home in Hampstead, leaving enough for the erection of a previously unforeseen monument, an arrangement that was approved by Queen Victoria. This early war memorial was commissioned from John Bell, who now had a solid military pedigree. He was the sculptor of *Armed Science* and the Wellington Memorial at the Guildhall (1856), and was also at work from 1859 on the Guards' Crimea Memorial for Waterloo Place. Bell intended the statue, which he made in 1861, to face south from just in front of the central arch and to lay out guns and trophies along the entire front of the parade. But this would have obstructed drill, so in January 1862 the memorial was placed on the far side of the parade ground, facing the other way. Bell and others objected, but the

350. Barrack Field, view to the north-west from the 'White Gate', Grand Depot Road, *c.*1911

Duke of Cambridge ruled that it should stay put. The memorial comprises a nearly 10ft(3m)-tall bronze figure of a woman, which was cast by Coalbrookdale from Russian cannon captured at Sebastopol in 1855 and represents Honour distributing laurel wreaths. The upper part of the tall granite plinth has bronze wreathed inscriptions and cartouches bearing regimental arms. The whole stands in an enclosure with twelve cannon-bollards. It was preceded in this position by the Bhurtpore gun, which was made for Aurangzeb, Mughal emperor, in 1677, captured in the siege of the Indian fort at Bharatpur in 1826, presented to the soldiers of Woolwich in 1828 and mounted on a cast-iron carriage with orientalist ornament made by John Hall & Sons, of Dartford, iron founders (Ill. 352). This remained by the parade ground until 2007, along with several other historic guns, all then moved to Larkhill.[69]

The central section of the parade ground was extended to the south in 2008, to provide a parade area of the same dimensions as that at Horse Guards to enable drill for the infantry battalion and companies of Guards that moved to Woolwich (Ill. 347). The Crimean War Memorial was moved back and security was increased with dwarf walls and iron railings to enclose the parade ground to south, east and west. This work for Defence Estates was carried out to designs by Capita Percy Thomas, architects, by Interserve Project Services.[70]

East of Grand Depot Road

Former Royal Artillery Hospital

The gated apartment complex between Grand Depot Road and Woolwich New Road that is known as Connaught Mews is a conversion of three late eighteenth-century buildings that originally formed the Royal Artillery Hospital (Ill. 353). Once more extensive, it was used as barracks after 1865 and converted to private flats in 1991–2.

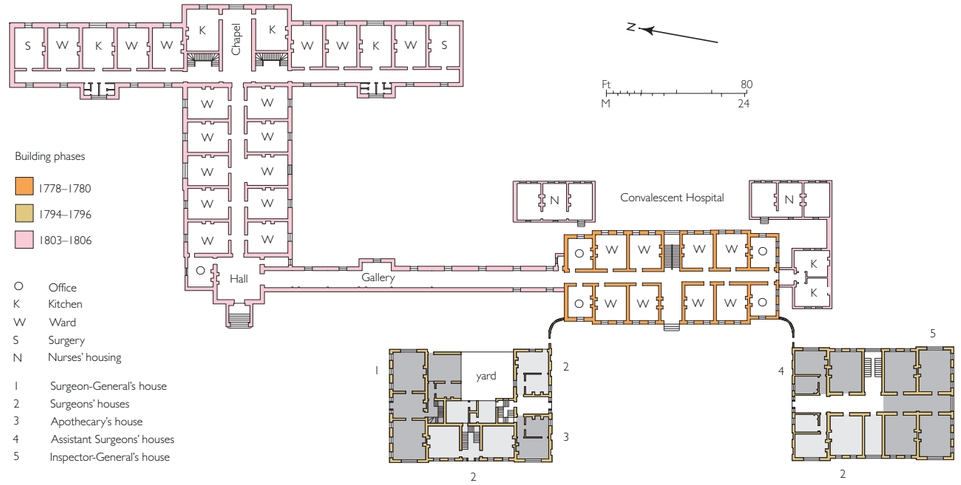
351. Crimean War Memorial, Royal Artillery Barracks parade ground, 1861–2. From the south-west in 2007

352. Bhurtpore (Bharatpur) gun, made 1677 for Aurangzeb, on a carriage of 1828 made for the Board of Ordnance. From the east in 2007. *Relocated*

In October 1777 William Latimer, having seen the first blocks of the Royal Artillery Barracks to completion, was asked to prepare a plan and estimate for a hospital and surgeon's apartment. Woolwich was the station for a growing number of soldiers, and there were also now casualties from North America. Further, the existing infirmary in the Warren was thought by the Regiment's Surgeon-General, James Irwin, to be in an unhealthy location close to marshes. Irwin chose an isolated and pleasantly sloping site on the Board's recently acquired hillside lands, separated from the barracks by a newly formed road (Grand Depot Road). Latimer's plan, principally informed no doubt by Irwin, was approved in 1778 with adjustments for the rooms to be 11ft (3.4m) high, made at the suggestion of Sir James Napier. The hospital, probably built by the same artificer-contractors responsible for the barracks, John Groves, bricklayer, and James Morris, carpenter, opened in April 1780. It had 200 beds, from which, it was directed, the convicts who carried out Ordnance works were to be excluded.[71]

This was among the first purpose-built permanent military, as opposed to naval, hospitals (excluding almshouse 'hospitals') in England.[72] A significant survival, it still stands as Lantern House, at the centre of Connaught Mews, its plain eleven-bay, stock-brick front facing the barracks; the porch was added around 1850. The hospital was laid out on three levels, much as the building still is, with a spacious central cantilevered-stone iron-baluster staircase and wide spine galleries (corridors), off which there were eight small wards on each floor (Ill. 354), each about 18ft by 20ft (5.5m by 6.1m) for around six patients and differentiated as 'for sores, casualties, venereal, pectoral complaints, fevers, including infectious diseases, and miscellaneous diseases'.[73] Separation aimed to minimize contagion. At the ends there were surgeons' quarters, as close residence was seen as medically beneficial. At first there was also a separate small baths block to the north-west, in which there were two warm baths, a vapour bath and two showers. In 1784 Adam Reid installed 'an Electrical Machine' in a main-block ground-floor room, presumably for electrotherapy, which ranged from the stimulation of muscles to treatment of paralysis.

Dr John Rollo was appointed the Regiment's Surgeon-General in 1794 and the building was substantially reorganized. The corridors were extended at their north and south ends and the surgeons' quarters converted to provide, in the basement, a kitchen, laundry, stores, and rooms for nurses and stewards; on the ground floor, dispensaries and an office for Rollo; and on the first floor, matron's apartments, a medical library and an assistant-surgeon's room. The wards were adapted for a ventilation system that had first been introduced at St Thomas's Hospital by John Whitehurst: hinged glazed frames were fixed inside the windows, in which openings were cut to allow air to circulate up to the ceilings, and ward doors were pierced to the same end. Folding iron bedsteads and Thomas Binns's portable water closets were also introduced.[74]



Former Royal Artillery Hospital (Connaught Mews), Woolwich New Road

353 (*above*). Lantern House (centre), 1778–80; Artillery House (left) and Nightingale House (right), 1794–6. From the south in 2010

354 (*below*). Ground plan in 1813

355. Former Royal Artillery Hospital (Connaught Barracks), north-east range of 1805–6, with a ward block of 1854–5 in the foreground. From the south-east in 1952. *Demolished*

This adaptation was possible because in 1794–6, with the country at war again, the premises were also substantially enlarged at Rollo's instigation and to James Wyatt's designs. In a measure of Rollo's energy and success, the Medical Establishment for the Military Department of the Ordnance was formed under his charge in 1797.[75] Capt. Charles Holloway, RE, oversaw these building works using the direct labour of the Royal Military Artificers. The enlargement comprised two new blocks, flanking and forward of the centre block, to which there were linking walls. These seven-by-seven-bay buildings, which survive as Artillery House and Nightingale House, respond to the form of their predecessor, but, thanks to Wyatt, have rather more architectural aplomb. Segmental-headed relieving arches and Portland stone sill bands give the elevations simple relief. The south block (Nightingale House) was a convalescent barrack. Rollo explained the need for this progressive provision: 'when the state of convalescence arrives, a change of situation in manner and place is required, to forward the re-establishment of health', but, if sent back to barracks, a discharged soldier tended to 'feel as a school-boy at his vacation, and enter on enjoyments however imprudent, without the least circumspection; hence a relapse, or an acquisition of new disease'.[76] This building had a similar layout to its predecessor, six somewhat larger (24ft/7.3m by 18ft/5.5m and 30ft/9.2m by 18ft/5.5m) wards per floor, each for eight patients, here with wooden bedsteads specially designed by Holloway. Ancillary spaces to the north included messes, eating not being permitted on these wards. The north block (Artillery House) provided new surgeons' quarters, still close by, thus permitting the reconfiguration of the original hospital. This quarters' building had in fact a U-plan, encasing as it did the earlier baths. It comprised four ample residences, the largest to the north for Rollo, that to the west for a surgeon, initially William Cruickshank, who was also the Royal Military Academy's lecturer in chemistry and the hospital's librarian and treasurer. The two smaller apartments to the south were for another surgeon and an apothecary. Both the buildings of the 1790s, though much altered, still contain early staircases; Nightingale House, originally entered from the north, has gained a west entrance, while Artillery House, originally with three entrances, has lost that to the west. In front of the whole group there were iron railings to a terrace with a central gateway where, on cannon-bollards, a wrought-iron overthrow with a lamp-holder remains; the extended terrace wall is of granite rubble. The immediate grounds were 'regularly planted with rows of poplars, and variegated with green turf, and clumps of evergreen shrubs. To the entering sick, pleasing impressions are conveyed of the comfort they are to enjoy within.'[77] There were problems with water supply, but this was a model hospital, 'considered, with justification, the best in the Kingdom'.[78] In five years from 1796 it admitted 7,526 patients, of whom 3,263 had venereal disease or 'sores'. In all only 133 died.[79]

Further enlargement came during the Napoleonic Wars, with Rollo still in post, though now operating under Sir John MacNamara Hayes, Inspector-General of Ordnance Hospitals. In 1803–4 detached kitchens were added on the south side of the central hospital, and two blocks for nurses went up just to the east. Then a whole large new hospital was added to the north-east in 1805–6, on lower-lying land where there had been gardens and outbuildings (now occupied by Claydown Mews). This was designed under James Wyatt by his nephew, Lewis Wyatt, with interventions from Gen. Morse, and went up under the direction of Capt. Hayter, despite objections from Rollo that the building would be too large, with too many windows and poor ventilation.[80] This hospital was a large T on plan, linked to the earliest building by a long enclosed gallery that was used for bad-weather exercise. It was entered from the west, via an unassuming frontispiece, architecturally reminiscent of the Grand Store, into a domed hall opposite which to the east there was a chapel where the hospital bulked up to four and five storeys (Ill. 355). Its three wings, for the separation of infections, housed sixty-eight wards. The hospital could now accommodate 500 patients (700 in an emergency) and had eleven surgery staff. It was by far the biggest Ordnance hospital in Britain, with half the department's total bed capacity. Water supply was improved by a pumped communication with Mulgrave Pond, formed at Hayes's suggestion, and the original bath-house was cleared; its site was later used for kitchen and then wash-house blocks.[81]

Rollo's final contribution in 1808–9 was to see, via Hayter, to the rebuilding of the site's perimeter walls, parts of which still stand, though much remade above their lower courses; a pair of wrought-iron gates to the north-west may be of this time. Rollo and Hayes both died in 1809. The latter was succeeded by John Webb, who was (the only holder of the title) Director General of the Ordnance Medical Department from 1813 to 1853. At Webb's request the original convalescent hospital to the south (Nightingale House) was converted in 1810 to provide more quarters, the largest southern section for himself, and the earliest building (Lantern House) was allocated to convalescence.[82] Around 1850 the sides of this convalescent hospital gained sanitary annexes, and another site entrance, with red-brick piers, was formed on Grand Depot Road. A south-eastern ward block was added in 1854–5, presumably a response to the Crimean War, and within the decade a guard house had gone up on the east side of the new entrance; its traces remain in the perimeter wall. Most of the south building had come to be used as the Garrison Commandant's house.[83]

The Barracks and Hospitals Improvement Commission examined what had become the Royal Ordnance Hospital and reported in 1858 that its site was objectionable and that with 529 patients there was great overcrowding. It was calculated that the spaces available should admit no more than 304 beds, nowhere near enough for the garrison, for which a new hospital was already under contemplation anyway. A recommendation that the existing hospital be converted into barracks arose.[84] Conversion ensued once the Royal Herbert Hospital of 1861–5 (south of Woolwich Common in the parish of Eltham) was open. This may have included some rebuilding, dentilled eaves for example. The premises were renamed the Connaught Barracks, after Prince Arthur, the Duke of Connaught and Strathearn, who had strong Woolwich connections, and allocated to the Military Train, which had transport yards across Woolwich New Road. Thirty-three officers took the three eighteenth-century buildings, with the commanding officer at the north end and a mess at the south end, and 631 soldiers occupied the hospital of 1805–6. The Military Train became the Army Service Corps in 1870, a restructuring that prompted a violent mutiny in these barracks that was left unpunished.[85]

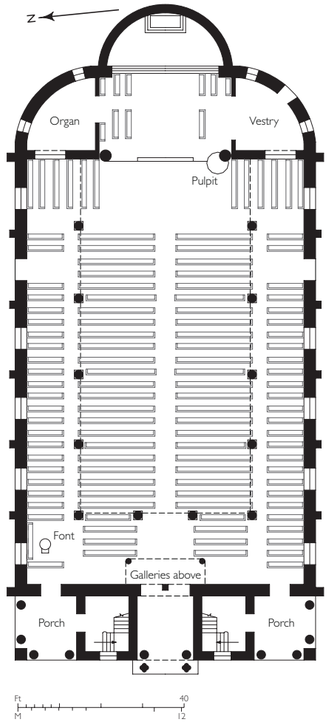
Connaught Barracks were earmarked as surplus in the 1950s, but survived then because they were useful for temporary decants during the rebuilding of the Royal Artillery Barracks. The garrison's redevelopment plan of 1962 envisaged retention of the eighteenth-century buildings as a Royal Artillery Museum and Library, but this came to nothing. The northern building of 1805–6 was demolished in 1969, and its site used for a NAAFI Messing Store from 1972 into the 1990s (Ill. 430). The earlier buildings, listed in 1973 and sold off, were converted by Westcombe Homes in 1991–2 to private flats (twenty-one in Nightingale, twenty-four in Lantern, and sixteen in Artillery). The cul-de-sac that is Claydown Mews was formed in 1994–6, its thirty-three brick houses put up by LAD Construction to designs by Calford Seaden, architects, for the Hyde Housing Association, following on from the nine houses of Slater Close built in 1992–4 to designs by Wealden Architectural Services for Buxton Building Contractors.[86]

North-east of these housing developments, where Grand Depot Road branches from Woolwich New Road and where the garrison met the town, there was a semi-octagonal guard house, built around 1809 when Grand Depot Road was a purely military route (Ill. 241). It was adapted for use as a gymnasium pertaining to Connaught Barracks and then converted to a public lavatory before demolition in 1969. On the corner in front of the site of this guard house there is a tall sewer vent or stench pipe, a hollow steel tube on a cast-iron fluted columnar plinth, made by Frederick Bird & Co. and probably put up around 1900.[87]

St George's Garrison Church

This church, which survives only as a ruin, was built in 1862–3 to the east of the parade ground (Ills 345, 356). Its triangular plot across Grand Depot Road had previously been the Garrison Commandant's garden. Ostensibly put up to meet 'the increasing requirements of the garrison',[88] the church was, in fact, smaller in capacity than its predecessor at the barracks (see above). To some extent it seems to have been a sentimental, even self-memorializing, gesture by Sidney Herbert. Long a holder of political offices of a military nature and Secretary of State for War from 1859, Lord Herbert approved War Office expenditure sufficient to build the church and chose its site in 1861, when his health had broken down and shortly before his death at Wilton House, his family seat in Wiltshire. The externally neo-Romanesque and internally early-Christian or neo-Byzantine designs for the garrison church that he approved were similar to those for the parish church in Wilton that he had rebuilt in the early 1840s, and also not unlike those of 1855 by George Morgan for Chelsea Barracks chapel, built in 1861–3. As at Chelsea, Royal Engineers had been bypassed: in the interest of competition, it was said, though the beneficiary, T. H. Wyatt, had been the architect of the Wilton church (with his then partner David Brandon) as well as repeatedly employed by Royal Artillery officers. Here he was assisted by his younger and more artistically talented brother, Matthew Digby Wyatt. The builders were George Smith and Co. of Pimlico; George Myers, whose tender had been lower, failed to win the contract because his bid was mislaid. The completed building was judged 'the first decent chapel provided for soldiers' use in this country'.[89]

As completed, St George's had a capacity of 1,550 for a garrison of more than double that number, and rising. The sittings were fewer than in its predecessor, but that had been judged insufficiently capacious in terms of cubic volume of air, a preoccupation in this time of barracks reform. The new church was a big polychromatic brick basilica, rather broader and bulkier than Wilton, more so as it lacked the vertical offset of a campanile. It was given what looks like a narthex, a Byzantine element absent from Wilton, in fact three porches separated by two staircases, with Bath stone dressings and a pair of quadripartite Aberdeen-granite columns to the central porch (Ill. 357). The galleried interior, again richly coloured with exposed brickwork, but more delicate, was credited to M. D. Wyatt and praised because 'iron is introduced very elegantly'[90] in 'a legitimate and unconcealed use of the building materials specially appertaining to the present



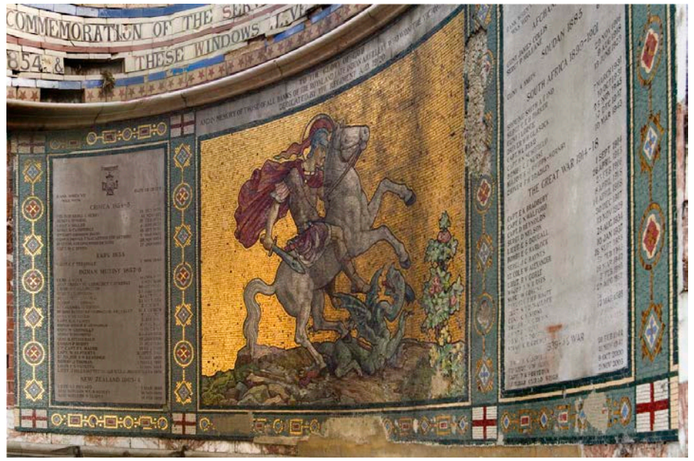
356 and 357. St George's Garrison Church, Grand Depot Road, 1862–3. Photographed and coloured *c.*1905.
Ground plan in 1917. *Largely demolished*

state of industrial art in this country'.[91] There were two tiers of iron columns that rose to arcades supporting lateral iron arches, the flat-plate spandrels of which were perforated with stars and circles (Ill. 358). On these there rested a flat coffered timber ceiling. Of this, just two capitals survive. The shell of the building's eastern parts also retains the outer sections of the original star-pattern polished alabaster reredos and tiled dado, as well as the base of the robustly modelled stone pulpit and, moved slightly forward, an arcaded altar table from which figurative sculpture has been lost. Royal Artillery officers raised funds by subscription for the organ and five tall stained-glass windows in the semi-circular apse, memorials to fallen artillery officers made by Lavers and Barraud. There were other stained-glass windows, including a memorial to Lord Herbert in the western rose, at least one of which was made by William Wailes.[92]

Sittings were soon increased to 1,700 and memorials proliferated along the aisles and elsewhere. The interior was further embellished in 1902–3 by Burke & Co., with enamel-mosaic decorations in the style of Ravenna, made in Venice (Ill. 360). Between the chancel arches, these included peacock and phoenix panels (representing the Resurrection and immortality) and spandrel panels with birds in grape-vine and passion-flower tendrils. Around the same time a church room was built to the north, and an Edwardian, polished pink-granite obelisk memorial to men of the Royal Field Artillery who died in the Second Boer War stands to the south, close to where Grand Depot Road and Woolwich New Road converge.[93]

Amid the carnage of the First World War in 1915 Maj.-Gen. Sir Albert Williams proposed a memorial to men of the Royal Artillery who had received the Victoria Cross. This idea was taken up and Burke & Co. were re-engaged to place a large memorial at the centre of St George's apse, above and behind the altar. Subscriptions were invited in 1916, but as the war dragged on, the project had to be deferred. It was seen through in 1919–20, but, due to rising costs, the scheme was reduced to an enamelled-mosaic panel depicting St George and the Dragon on a gold ground, made in Venice and placed centrally, with inscribed Hopton Wood marble panels above and to either side with mosaic borders (Ill. 361). Adornment of the walls above, long intended, was carried out in 1926–30 to designs overseen by Sir Nevile Rodwell Wilkinson, an army officer, herald and artist who had married into the Herbert family.[94]

On 14 July 1944 a V1 flying bomb landed on the church room and caused a fire that gutted the church. The walls were essentially intact so a temporary roof was erected, but there was no real need to reinstate the interior, as the chapel at the Royal Military Academy proved adequate to the garrison's needs. In 1952 the Army and Woolwich Borough Council agreed that the damaged building was an eyesore. Many memorials were moved into storage and, cleared of debris, the shell was kept in use as an open-air church (Ill. 359). This formed the basis for a rebuilding scheme, designed by Kenneth Lindy, architect. Sums



358 (*above left*). Interior from the west, *c.*1910

359 (*above right*). Open-air service, *c.*1960

360 (*centre right*). Detail of chancel-arch enamel mosaic, 1902–3. Photographed 2007

361 (*below left*). Royal Artillery Victoria Cross Memorial on east wall, 1919–20. Photographed 2007

St George's Garrison Church, 1862–3

were raised and committed Royal Artillery officers promoted the project, though it was never likely to attract Army funding. The widening of Grand Depot Road in the early 1960s finally put paid to hopes for a rebuilding. Demolition of the upper parts of the walls followed in 1970, leaving the remnants to enclose a memorial garden, laid to lawn, with a canopy over the altar.[95] The surviving parts of the building, essentially the 'narthex', with the former staircase spaces used to house memorials, and the lower parts of the walls including the apse with its ornamental mosaics, are vulnerable to weather and vandalism. The Regiment departed for Wiltshire still holding funds for restoration. In 2010 Defence Estates leased the building to Heritage of London Trust Operations, which secured Heritage Lottery Fund backing for a preservation scheme that included a transparent roof over the east end. This was set to be carried through in 2012 employing student mural conservators, for the site to be opened to use as a public garden.[96]

Royal Military Repository area

Land west of Repository Road up to the parish boundary and Hanging Wood pertained to the Bowater family in the eighteenth century. It had been part of a 'coney warren'[97] managed from Bowater Farm just to the north-east. There was a small pond south-west of the farm buildings and there were springs on the nearby combes beyond. Amid these (on land that is now between Green Hill and the Upper Gun Park) a reservoir (the Long Pond) was formed (Ill. 10), probably in the early 1750s, to supply the naval dockyard, in particular the terrace of officers' houses then being built (see also Mulgrave Pond, pages 365–7). An adjacent octagonal brick conduit house with a domical roof survived into the 1950s (Ill. 362).[98]

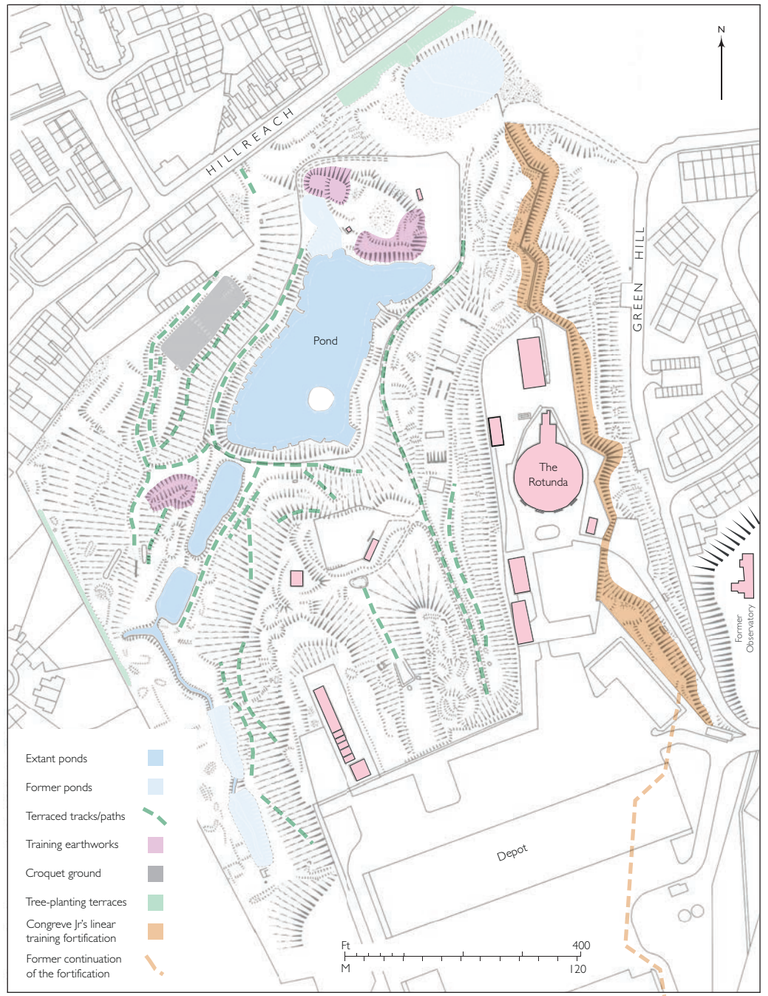
362. Reservoir (Long Pond) on east side of Green Hill. View to north in a coloured lithograph of 1822 by T. M. Baynes

By the end of the 1780s the Royal Artillery was using these lands for reviews and, it appears, the Royal Military Academy's gentlemen cadets were being trained here in surveying. But there was no military ownership until September 1801 when a 99-year lease from John Bowater to the Board of Ordnance of the sixty acres between what is now Hillreach and Woolwich Common as far west as the parish boundary was agreed. Six months later the Board took outright possession of all these and the lands further east leased in 1773 (see above), compulsorily purchasing them all by Act of Parliament. The Long Pond was fenced in and a ravine filled for the sake of 'a correct range'.[99] This, no doubt, relates to the construction of a huge mortar battery for artillery siege practice in 1802–3 between the barracks and the reservoir and just south of what is now the Upper Gun Park. Bowater had let the Long Pond itself to Henry Rideout, a cheesemonger, in 1798, but in 1806 it became the centre of a private garden for the Garrison Commandant, Gen. Vaughan Lloyd. An ice house for the officers' mess was built near its north-east corner in 1809. The reservoir was eventually filled, probably shortly before or during the Second World War, and the ground used for allotment gardens. The ice house was cleared in the 1950s.[100]

Repository ground to 1815

The term 'repository' was used in the early eighteenth century to refer to the Warren as a place where artillery was stored. The Royal Military Repository was more specific and an indirect outgrowth of the Royal Military Academy. Capt. (later Lt. Gen. Sir) William Congreve (1743–1814) established it as a school for training the Ordnance Corps in the handling of heavy equipment at war. At the fore of the emergent discipline of military science, Congreve was motivated by his experiences as an artillery officer, in particular difficulties encountered in Canada during the Seven Years War. From 1774 he devised a programme of exercises that involved manoeuvring 'Field Pieces over Ditches, Ravines, Inclosures or Lines'.[101] These were made compulsory during the American Wars in 1778 when the school was set up in the Warren, with Congreve as its Commandant and Superintendent of Military Machines. What quickly became the Royal Military Repository might have used the ground to the west of the Royal Artillery Barracks in its early years. It may also (or rather) have used the Pattison Estate sandpits to the east, but there are reasons for supposing the western lands might have been preferred for exercises – other occasional military uses, the suitability of its terrain to the Repository's purposes, and the fact that from 1779 Congreve lived in Charlton and would thus have passed close by on a daily basis.[102]

A fire at the Warren in May 1802 effectively destroyed the Repository there (see page 155). The recent land acquisitions made a move possible and within the year Congreve, with backing from the Master-General, John



363. Repository Woods, 2009

Pitt, had secured the western parts of the former Bowater lands for the Repository. Capt. George Hayter oversaw a progression of works. These started towards the south end with the building of a 362ft(110m)-long brick shed, initially proposed for instructive models that had been saved from the fire, but built as open-fronted to the south between two small offices, and probably used to shelter ordnance. Further north field boundaries were removed and what was termed the 'exercising ground' was replanted in 1803. Mature oak, horse and sweet chestnut trees may be surviving remnants of this planting, though some may remain from antecedent woodland. By 1805 three more long sheds, timber-built and to house travelling guns, carriages and stores, had been put up parallel to and south of the first, Pitt demanding that they should not be made any longer, to keep the training grounds

364. Repository Woods from the north in 2011

365. Royal Military Repository from the west showing artillery exercises, with the Rotunda and the Royal Artillery Barracks beyond. Watercolour of 1826 by George Scharf

unencumbered. Within another year a long freestanding wall had been built, extending northwards from the north-west corner of the sheds with short eastwards steps and partially enclosing a wooded area to its west. Map depictions of gun embrasures and artillery pieces indicate that this was less a boundary, more a pseudo-fortification erected during wartime for training purposes.[103]

South of the repository sheds, at the south-west corner of Barrack Field, there was a public road. To provide some security a single-storey guard house, latterly

The Gatehouse (1 Repository Road), was built here in 1806 to plans prepared by Hayter. With strikingly close engagement for a Master-General, Pitt interposed himself to suggest the 'addition of Basis to the four Columns'.[104] Accordingly, the columns of the tetrastyle Tuscan portico to this Wyatt-like building do have bases; perhaps the first designs were Greek Doric, perhaps Pitt had to correct Hayter's Tuscan. The guard house also has a pilastered portico on its west elevation, once visible from the road and now facing Charlton Cemetery. In the late nineteenth century the building was adapted to incorporate staff-sergeants' quarters and then became an infant school. It was subsequently used as married quarters and then refurbished as a private residence in 1986.[105]

Despite a view that it was important to display the artillery exercises to the public as a show of military professionalism, a northern boundary wall was built along Hillreach in 1807–9 to provide further security for the Repository. This extensive stretch of stock brick survives essentially as built, raised somewhat in the early 1840s. Its central section, in front of the lower ground that was not part of the Repository's training area, is more open, with cast-iron railings in lieu of upper parts.[106]

In the meantime the Repository Ground behind the western part of this wall and the training fortification was being vigorously developed for the exercise and training of artillerymen (Ills 363, 364, 365). Landscaping in the woods in 1806–8 created ponds on a stream that ran along and close to the parish boundary, presumably to simulate an aspect of the type of terrain over which heavy ordnance might need to be transported – a need the Peninsular War immediately confirmed. To the north a large pond was formed with an island. It originally had a pair of pontoon-like bridges across its north end and, *inter alia*, was used for 'experiments with gunboats'.[107] A brick tower intended in 1807, but probably not built, would have taught soldiers 'several modes of escalading works'.[108] At the same time the Repository Ground was extended slightly further west into Charlton by the acquisition of a two-acre slip of ground from the Maryon Wilson Estate. The pond was enlarged around 1815, by when a network of paths had been developed, an earth and wood casemate built north of the sheds, and other earthworks for artillery practice formed, including large experimental 'pistes' or rammed-earth trenches north and west of the pond, probably made in 1807–9. These were used for bridge building and other exertions, and that to the west survives. There are also still mounds north-east of the pond that were used for 'parbuckling', the lowering of cannon down a steep slope on to a raft using ropes and pulleys. In 1810 Lt. Col. Robert Pilkington, CRE, assumed supervisory responsibility and a further timber carriage shed went up around 1814 near the south-west guard house.[109]

This systematic adaptation of the natural landscape for military training was an important and novel development. Established at a time of increasing professionalism in the army, the Repository Ground embodied both Congreve's vision of the training needs of the Royal Artillery and an essentially empirical and experimental British approach to military training. It was an object of sufficient pride to be included in the itinerary of the victory celebration visit of allied sovereigns in June 1814. But military victory itself, through the spoils and memories of war and the ephemera of that same June celebration, soon caused the Repository to be conspicuously reshaped.[110]

The Rotunda and training fortification[111]

The Rotunda's Carlton House origins

Following Napoleon's abdication in April 1814, the Prince Regent, besotted with militaria and assuming the mantle of victor, had hosted the visit of the allied sovereigns in June and staged a spectacular fête at Carlton House, his principal residence, to welcome home the Duke of Wellington, the conquering hero, on 21 July. There followed on 1 August the Grand National Jubilee, held in St James's Park, Hyde Park and Green Park, for which fireworks and other technical arrangements were handled by Sir William Congreve (1772–1828), a favourite of the Prince Regent, son of the founder of the Repository and inventor of the eponymous rocket, who had in April succeeded to his father's positions, including that of Comptroller of the Royal Laboratory, even though he was not an artillery officer. The layout and extravagant building works for all these events were undertaken by John Nash for the Office of Works. Occasional architecture was a regular feature of such royal display, but the perceived end of twenty-one years of war called for especially lavish expenditure. In the gardens south of Carlton House there arose a quadrangle of temporary buildings. On the arm nearest the house the principal feature was a large 110ft(34m)-diameter ballroom in the form of a military bell tent, a type introduced in the 1790s to house commanders in the field and prominent in Wellington's Peninsular campaigns.[112] It was designed in May and hurriedly erected, though it was not ready in time for the foreign dignitaries. In contexts such as this, elaborate tents had a long lineage, especially in association with medieval and Tudor military encounters and triumphs, and ornamental tents had in the late eighteenth century enjoyed a fashionable revival that favoured orientalist exoticism. The Carlton House tent was an enormous and hugely ambitious essay in this genre. It was termed the 'Rotunda' from the outset, evoking well-known buildings of the same name at Vauxhall and Ranelagh pleasure gardens, though it was also known as the 'tent room' and the 'polygon building'.

It is unlikely that Nash acted alone in designing the Rotunda. He later stated that William Nixon, a trusted and in his words 'very intelligent' Clerk of Works, was responsible for erecting the Rotunda 'under my directions'.[113] John William Hiort, another Clerk of Works, may also have been involved, as possibly was Congreve himself. Nash, well versed in both structural carpentry and iron

366. The Rotunda, first built at Carlton House, 1814. Re-erected and reclad in the Royal Military Repository, 1819–20. Seen here from the south in a colour-washed etching of 1820 by R. W. Lucas

construction, was, in John Summerson's words, 'the last English architect to consider himself not only an architect but an engineer'.[114] But his technological boldness often depended on his ability to harness the talents of others, and he would have been extraordinarily busy in May 1814. A claim of 1830 that Nixon was responsible for the design of the Rotunda roof, which had a significant impact on subsequent work at Brighton Pavilion where Nixon was engaged, has the ring of truth.[115]

The Rotunda was indeed polygonal rather than round. It was made as a 24-sided and largely timber structure, for which Jeffry Wyatt was probably the principal carpenter. The huge sweepingly curved roof was covered in painted oil cloth supplied by James Baber, with a small cupola at the apex for ventilation. Inside, a ring of columns, treated as fasces symbolic of power or authority, formed a perimeter arcade, within which seating alcoves alternated with entrance and window bays. An orchestra was placed at the centre of an uninterrupted open floor, with a sofa for Queen Charlotte and Princesses Augusta and Mary, all under an 'elegant umbrella' of an inner painted canvas with gilt cords. In both the Rotunda and rooms adjoining there were numerous chandeliers made by Parker and Perry, many of them tent-shaped, one of which may also have found its way to Woolwich (see above). Two adjacent long supper rooms were decorated with 'regimental silk colours belonging to the ordinance'.[116]

Relocation and commemoration

After the events at Carlton House the Rotunda was allowed to remain standing and was occasionally used up to 1816. Ill-maintained, it was acknowledged that it was redundant, and in August 1818 the Prince authorized the transfer of 'the great circular Room' to Woolwich, 'to be appropriated to the conservation of the trophies obtained in the last war, the artillery models, and other military curiosities usually preserved in the Repository'.[117] This notion stemmed from Congreve, who, given his role in the celebrations of 1814, knew the building well and would have been keenly aware of its associations with the victory over Napoleon. He had access to the Prince and would have been conscious of the need to accommodate the spoils of war that had been added to the Repository's teaching collection in 1816 at Wellington's request. It is notable also that Maj.-Gen. Sir Benjamin Bloomfield, the Prince's private secretary and principal confidant at this time, was an artillery officer who had trained at Woolwich – he finished his career as Commandant of the Garrison in 1838–46. There was, however, the obstacle of the Treasury, which refused to authorize new post-war Ordnance expenditure. Nash got on with dismantling the structure, even though the Woolwich destination was not yet certain; he would have been loath to see such a substantial creation sold for scrap and flirted with the notion of making it a church. But in October 1818 the Prince forced the issue by formally offering the Rotunda gratis to Henry Phipps, the 1st Earl of Mulgrave and Master-General of the Ordnance, for the Repository. Mulgrave accepted and the Board agreed to pay the costs of dismantling. The deconstructed building arrived at Woolwich around the end of November, a special allowance of pay being granted to the artillerymen responsible for the removal on account of 'their fatigue having been very great'.[118] By this time the Duke of Wellington, on his return to England from France, had been installed as Mulgrave's successor as Master-General.[119]

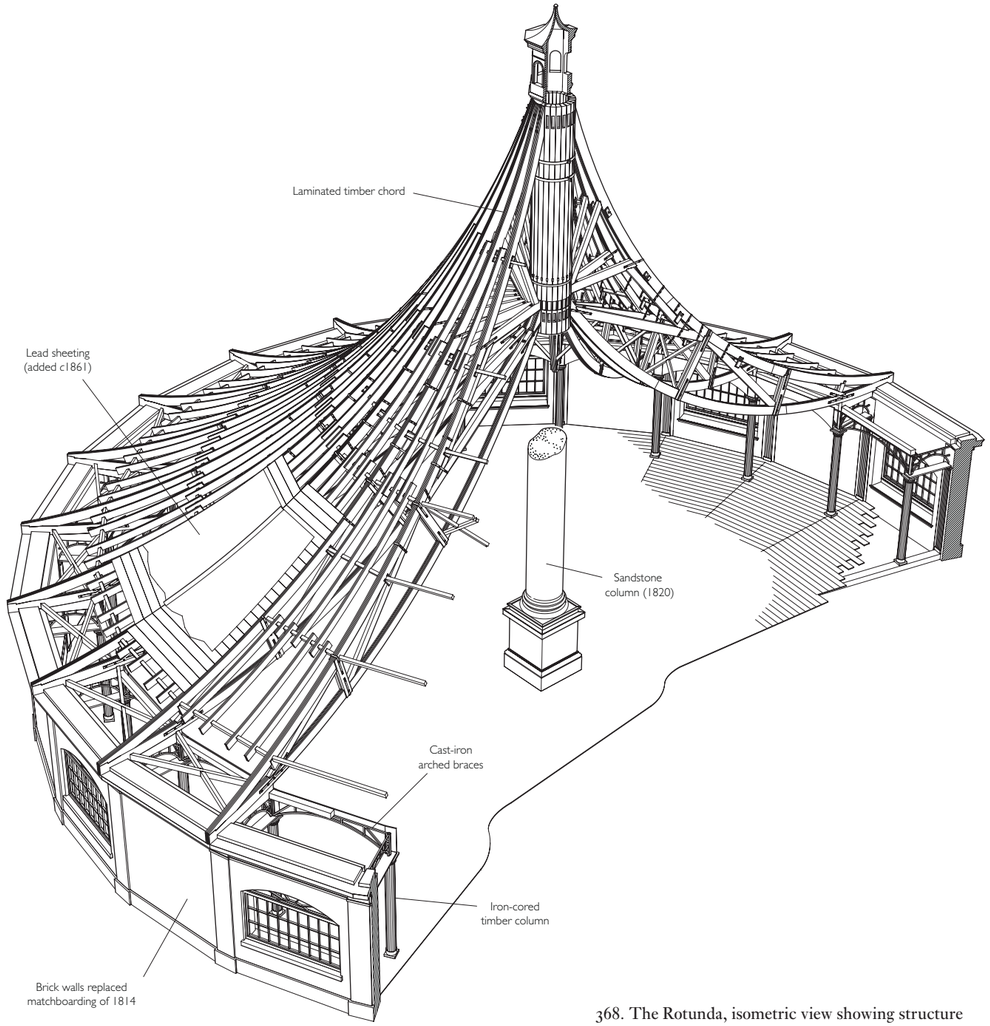
367. The Rotunda interior. Watercolour of 1828 by George Scharf

Congreve chose the brow of the hill on the east side of the Repository Ground as 'the most convenient as well as the most picturesque situation' for the Rotunda and simultaneously urged the formation of an associated new training fortification.[120] The high ground here then offered views north across the ponds of the training ground to the Thames, east to the Royal Artillery Barracks and south to the Royal Military Academy. Brevet Major Rice Jones, acting CRE, was told to carry the works forward. But it is not clear that anything happened before January 1819 when Lt. Col. Sir John Thomas Jones was appointed Commanding Royal Engineer. Jones, who saw the project through, had strong Woolwich links, having reorganized the Royal Military Artificers in 1808. He was also a noted military engineer, who had been a close associate of Wellington's in the Peninsular War, and had just returned from France with the Duke.[121]

In April 1819 Congreve told Jones that he wanted the Rotunda to be 'a permanent receptacle for Models, etc', and urged that the outer walls should be built not of timber but of brick. Jones concurred, explaining to the Board that this would be prudent, taking into account the relatively exposed position, and that he had a substantial stock of bricks in hand. Within a few months it had been decided, again for the sake of permanence and stability, that the heavy trussed ribs of the roof needed stiffening with additional purlins, rafters and deal weatherboarding. The consequent extra weight necessitated, it was felt, the insertion on the vast open floor of a central 50ft(15.3m)-tall Doric sandstone column 'to support the dome'. The roof covering was again canvas, and some daylight may still have filtered through to the interior. The Board had misapprehended Congreve's original estimate, as was perhaps intended, but felt obliged to approve this further extra cost, grumbling about the 'very loose and unsatisfactory manner in which it originated'.[122]

Despite scepticism about its usefulness that extended to Wellington, the Rotunda opened in 1820 as an early and free permanent public museum (Ills 366, 367). Some of the Repository's most precious trophies and weapons were arrayed around the column, with tables and glass cases holding models and other smaller objects, including George III's collection of topographical models of fortifications and dockyards donated by George IV on his accession to the throne that year. Above, there radiated gilded cords, probably those of 1814 reused. Larger pieces of ordnance were displayed outside.

These post-war years had seen ruthless reductions in public expenditure and burgeoning radicalism. The Prince's extravagance had given cause for grave concern, and government retrenchment had one eye on public anger at the costs of a war that had not been universally celebrated. In a climate of austerity public monuments to military victory were avoided. But with the Rotunda senior military figures finessed a way round bureaucratic reluctance to create an unproclaimed or *sotto voce* war memorial. The Rotunda in the Repository Ground, in particular with the adjoining line of earthworks, was, at least for those in the know, an emblematic and commemorative evocation of victory against Napoleon. The former emperor's funeral car was displayed in the Repository until the 1850s.[123]



368. The Rotunda, isometric view showing structure

The Rotunda's structure

The Rotunda was audaciously designed (Ill. 368). The size of the building made it a particularly challenging 'tent' for Nash and Nixon to erect – the overall internal diameter of about 110ft (34m) is close to that of the dome of St Paul's Cathedral. Roofing a twenty-four sided polygon would have been complicated enough, but doing it with a structure that looked convincingly like a military bell tent both inside and out was yet more problematic. Concavity ruled out anything domical. The objective was to produce the natural hanging-chain (catenary) curved profile of a soft tent roof without intermediate support, but at a scale and with a solidity that should have demanded such support. The roof devised for this unusual geometry was remarkable for more than its outward shape. It was an

369. Royal Military Repository Exercises, 1844. View to the Rotunda from the south showing the training fortification (right) and then intended monument (left) to Maj.-Gen. Sir Alexander Dickson. Colour-washed engraving by John Grant

innovative assembly of twenty-four radiating half trusses. Calculated to weigh around 124 tons, these half trusses are partly borne on an inner perimeter of cast iron, slender columns linked by arched braces under timber wall-plates, with smaller arched-brace castings that radiate under the trusses to the outer wall, which was originally timber. This generated a bicycle-wheel like rim, within which there is horizontal timber cross bracing.[124]

Where they meet at the centre of the roof, the uprights of the half trusses are clustered together to form a shared king post, that is a suspended structure, originally unsupported, with the upper curved members of the trusses acting as the principal rafters, the lower as the tie beams. The central upright timbers were bevelled and bound to make a hollow cylinder (like a barrel). This permitted the radial development of the construction, possibly drawing on the precedent of a simpler design for a humbler circular building that Peter Nicholson had published,[125] and also serves as a ventilation flue. Joints were heavily reinforced with wrought-iron straps and bolts, particularly at the king post to ensure that the paired ribs did behave as a truss and contain outward thrust. The curved upper and lower members of the ribs were also notable for being vertically laminated, made up from four layers of planks, assembled with iron connecting plates, clamps and straps. This enabled the required curvature without compromising structural continuity and was perhaps inspired by the dome of the Halle au Blé in Paris, if only indirectly via William Porden's stable block at the Brighton Pavilion of 1803–8.

The reconstruction of the building as a permanent structure in Woolwich in 1819–20 introduced not just the outer brick wall, within which timber posts remained embedded, but also the additional purlins and rafters, as stiffening and to support boards below the outer canvas, as well as the central supporting column. Later nineteenth-century replacement of the canvas with lead and additional ribbing rendered the polygonal roof more conical. Notwithstanding these phases of alteration, the essence of the extraordinary structure of 1814 survives in the massive timber frame of the roof and its supporting cast-iron ring.

Second training fortification

Congreve had intended rebuilding of the training fortification to coincide with re-erection of the Rotunda, proposing both in the same letter to the Board in December 1818. This suggested

> the formation of a section of a regular fortification with Scarp and Counterscarp, Wet Ditch, Glacis and approaches in the Bottom of the Repository Ground, with such additions as might be found necessary to carry on a complete course of Instructions in all that relates to the practice involved in the defence and attack of such a Work passing the Ditch, escalading etc. . . . [This was] the only thing wanting to make this Establishment the most complete school of practical military Instruction, that does exist – or, I believe I may venture to say, that can possibly be devised.[126]

He proposed further, following the trench experiments already carried out, to make the revetments of rammed earth instead of brick to save money. But the accounts for the two parts of the project were separated, its hidden costs came to light, and the fortification was postponed, though some of its predecessor of 1806 was evidently taken down for the relocation of the Rotunda. It was not until the mid-1820s that the new training fortification

was made on a more eastern, longer and highly irregular line of which only the northern parts survive (Ill. 363). Earth, or 'sod-work', was used, but seems to have proved inadequate; the brick revetment is probably original. The east-facing scarp turns through numerous angles for a variety of flanks, salients, spurs and demi-bastions of differing lengths. On the inside and behind the revetted flat-topped earth bank, there was a small berm at the foot of a scarp and then a ditch. The southern parts of the training fortification had a site entrance near the gun sheds between two big bastions, which housed numerous and varied gun embrasures that looked across Barrack Field and the common (Ill. 369). The training fortification was unlike a genuine defence in that there were few divisions between the tightly packed emplacements and no casemates, presumably to allow the instruction of large groups.[127]

Repository and Rotunda since the 1820s

From the 1820s the Repository Grounds (henceforth generally named in the plural and latterly called Woods) were used as both a practical training facility and a pleasure ground that was a picturesque backdrop to the publicly accessible museum in the Rotunda; there was gate access from Hillreach, near Woodhill, where numerous officers were beginning to live, and there was even a rustic-looking summerhouse (Ill. 365). However, in the main and until 1859, the grounds were used as the elder Congreve had intended. His son summarized this use in 1822 as instruction in

> the different modes of passing Rivers, Ravines, Ditches, Narrow Roads, Precipices, Morasses, and other such obstacles, by Field Artillery; with the embarkation and disembarkation, the mounting and dismounting, both Light and Heavy Ordnance; shewing all the various expedients by which the heaviest Guns and Mortars may be landed and moved, where Cranes, Gyns, or other regular mechanical means are not to be obtained. To this also is added the Construction and Laying of Military Bridges, Scaling Ladders, and in short everything that can occur in the most difficult service.[128]

Baron Charles Dupin, the eminent French engineer, visited in that year and expressed his admiration at length, concluding that 'this field of exercise seems to afford every local contingency which warfare usually produces.'[129] Less technically minded visitors, including many invited British and foreign dignitaries, not least the young Queen Victoria in 1838, could admire the manoeuvres on ground that was 'beautifully diversified and unequal in its surface, and interspersed with several pieces of water'.[130] After the Chartist riots of 1848 public visits to the Repository were stopped.[131]

There were minor changes to the physical arrangements. Around 1820 another pond was formed to the north, perhaps anticipating the lengthened training fortification (Ill. 363). This was filled around 1860. South-west of the main pond what were known as the 'summerhouse pond' and 'lower pond' were added by 1826, as was a 'ballistic pendulum' in 1836. Bridges across the main pond came and went, with a pontoon or bridge store added to the north when a croquet lawn was laid out near by around 1860. New entrances were punched through the training fortification in the preceding decade, including that still used for access to the Rotunda, and in 1856 an iron drill shed was inserted between two of the long sheds. These had come to be used for instruction, with their ends adapted by Congreve (without sanction) not just as schoolrooms but also as 'sitting and sleeping rooms which he occasionally occupied and where he entertained distinguished foreigners etc'.[132] They were subsequently refitted as quarters for officers and married soldiers.[133]

A monument to Maj.-Gen. Sir Alexander Dickson (1777–1840), Wellington's right-hand man during the Peninsular War and Deputy Adjutant General Royal Artillery from 1827 to 1840, was put up behind the north bastion in 1845 (Ill. 369). Paid for by artillery officers, this was designed by Sir Francis Chantrey and made of granite by Grissell & Peto. It incorporated two bronze medallions made in 1847 by Edward Richardson to earlier designs by Sir Augustus Callcott and cast of gun metal captured at battles at which Dickson had been present. Dickson's son, Gen. Sir Collingwood Dickson (1817–1904), also came to be commemorated on the monument. It was moved to the south side of the barracks parade ground to the west of its centre in 1912 (Ill. 345), and again to Larkhill in 2007.[134]

The evolution of ordnance, ever enlarging, tended towards larger practice ranges, and some of the Repository's activities transferred to Plumstead marshes during the 1850s. The Board of Ordnance was abolished in 1855 and in 1859 a School of Gunnery was established at Shoeburyness, Essex. Use of the Repository Grounds as an artillery training facility declined sharply. Later that year responsibility for the Rotunda was transferred from the War Office to the Ordnance Select Committee. The Secretary was Gen. Sir John Henry Lefroy, co-founder of the Royal Artillery Institute and prime mover behind the reforms that led to Shoeburyness. He saw to the continuance of the Rotunda as a museum and teaching collection, and to some additions and alterations in 1861–3 carried out under Col. Charles G. Ford, CRE. A single-storey annexe was added to the rear, or north, to house the small arms collection. This has a shallow curved roof supported on cambered cast-iron I-beams. It was almost certainly at this time that the main roof, repainted annually and noted as still canvas in 1851, was recovered with lead (Ill. 370). Roof-lights were inserted, making up for the loss of filtered daylight, and the displays were revamped with a reinvigorated educational mission that drew greater numbers of visitors.[135]

The Rotunda, overseen directly by the Royal Artillery Institution from 1870, had been separated from the Repository Grounds in terms of access, and was soon enclosed in its own small compound within which corrugated-iron clad sheds came to be built. Recreational use of

the grounds did continue for artillery officers, and there was some access for the public into the twentieth century, though only occasional. In the meantime prosaic military training, such as the digging of practice trenches, also took place. To the south of the Rotunda a large Army Medical Reserve Store, an H-plan brick-faced building that rose to three storeys with an internal steel-frame, went up in 1902–3. At the same time the southern repository shed of 1804–5 was replaced with a much deeper building to provide training workshops for the Ordnance College, another spin-off from the Royal Artillery Institution, accommodating 520 wheelers, fitters, smiths, painters and others. Small sheds proliferated near by in ensuing decades as the southern part of the training fortification was removed, leaving just traces of its earthwork platform. By the 1930s what had become the Military College of Science had supplemented a vehicle-maintenance base in the workshops with a practice driving ground in the Repository, all abandoned on the outbreak of war.[136]

During the Second World War the grounds gained a tented camp, dispersed storage huts and possibly also allotment gardens. South of the main pond a 'miniature range' was formed for small-bore rifles, with a butt at its west end and the post-war addition of a shelter. Above the butt a hip-roofed pavilion, probably built during the war, but of unknown purpose, was later adapted as a respirator training room. To its south, dog kennels replaced the casement battery after the war. Woolwich Borough Council flirted with the possibility of acquiring the Repository Grounds to be 'a really beautiful park' in 1955, but this went no further. The north-west boundary wall was rebuilt in 1956 to accommodate housing being built on Little Heath by Greenwich Borough Council.[137]

The Rotunda's collection had been substantially diminished between 1927 and 1939. Its relevance to the army had waned, but the building was liked. Tellingly, it was said that army recruits, 'when asked what exhibit in the Rotunda had interested them most, frequently reply "the Rotunda itself"'.[138] When closure was proposed in 1932, Woolwich Borough Council was strongly resistant. The building fell into poor repair and the garrison command declared in 1953 that it was 'approaching the end of its useful life' and 'unsuitable for a museum'.[139] However, it found high-ranking defenders and funds were raised for repairs carried through slowly from 1957. As the garrison was otherwise redeveloped in the 1960s, there were revisionist thoughts, including another proposal to move the museum. Instead the Rotunda, first listed in 1973, was extensively restored in 1972–5 by Dove Brothers on behalf of the Property Services Agency. The Victorian roof-lights were removed, the roof was re-covered, the timber posts in the outer wall were replaced with concrete, a new floor was laid and the canvas ceiling, possibly the original, was replaced in a thorough recasting of the interior (Ill. 371). Visitor numbers were once again boosted.[140]

The possibility of relocating the displays from the Rotunda was again in the air by the late 1980s. A museum in the Arsenal was planned from the early 1990s and

370. From the south, 1975

371. Interior, 1975

372. Interior, 2010

The Rotunda

opened as Firepower, the Royal Artillery Museum, in 2001. For this most of the Rotunda's exhibits were moved. The Rotunda closed to the public, but continued to house a reserve collection until 2010, when Defence Estates, working with Capita, began to consider possible future uses (Ill. 372). In the meantime the building became the garrison's boxing centre.

The Repository Grounds have a separate recent history. After the Second World War the newly formed Royal Electrical and Mechanical Engineers (REME) were responsible for the Repository's workshops, employing 92 officers and 1,246 civilians. REME gained a new building on the main barracks site in the late 1960s (see above), by when the remaining three early nineteenth-century Repository sheds had been largely if not entirely replaced. The entire area south of the Rotunda compound and dog kennels up to the guard house was redeveloped in 1995–8 for the 16th Air Defence Regiment with two vast and several smaller red-brick and blue-clad steel-frame sheds to house the large quantity of vehicles and other *matériel* that this regiment brought from Dortmund. There they had been housed in the Napier Barracks, and the facility in Woolwich opened as Napier Lines. A REME presence continued, as did the training function of the rest of the Repository Grounds, latterly for 'command task' training – an assault course was built between the Rotunda and the main pond in 1971 and there are more recent training earthworks and structures to the south.[141] Recreational use also survives through use of the main pond by the Dell Angling Society.

The Napier Lines site was again partially redeveloped in 2011 for the stabling of the 108 horses of the King's Troop, the 'Riding House Department of His Majesty's Ordnance' as prominent badges explain, in a project overseen and built for what had become the Defence Infrastructure Organisation by Morgan Sindall, with Scott Brownrigg, architects, and Reitanlagen-Stiller, equine consultants. The stable range has solar-chimney ventilation and its heat and light are generated by horse dung. Alongside are a riding school, offices, a forge and pharmacy, a gun park with a forming-up area and a manège close to the Rotunda (Ill. 364).[142]

Buildings around Green Hill

The largely open area between Repository Road and the Repository Grounds was long considered part of Barrack Field. It has been put to a range of uses to support the military presence in the barracks. The appellation Green Hill appears not to have come into formal use until the 1860s when the road now bearing that name was formed. Accurate enough as a topographical description, it might have gained favour as felicitously commemorative of the Royal Artillery's role in the attack on Green Hill to the east of Sebastopol in October 1854 during the Crimean War.

Across Repository Road from the parade ground there is a group of buildings at what has become known as the **Upper Gun Park** on land that was immediately north of the mortar battery of 1802–3. At the back to the centre is a five-bay pediment-fronted brick building. This was put up in 1830 under the supervision of Col. J. T. Jones, CRE, to be a 'lobby store', replacing a timber structure as a magazine for the implements and charges used at the mortar battery. Soon after this the land in front was levelled for the parking of guns and carriages, and as a drill ground for field-battery exercise. Around 1840 the store was extended by three bays at either end for an office to the north and a sergeant's quarters to the south. An associated magazine and tool shed, also extant, was added to the north-west in the 1850s. This was adjacent to a hillside north of the old Bowater reservoir, where what was called a ménage, with a cow-house and piggery, was built in 1847 to supply the officers' mess with meat. The mortar battery was used until 1873 and thereafter removed. By the 1860s there was also a saluting battery of six guns beyond it to the south. This, later called the Green Hill Battery, was regularly fired at one o'clock. Its guns were moved to the parade ground in front of the Royal Military Academy in the late twentieth century; their stone platforms remain. It was only soon after 1900 that long gun or 'limber' sheds, for the storage of gun carriages, were added along the north and west sides of the Upper Gun Park, with Thomas & Edge as contractors. Other gun sheds of the early 1860s stood further north. The drill ground has become a car park and the former ménage hillside was used for a time in recent years as a ski-training slope.[143]

Former Royal Artillery Institute Observatory

The Royal Artillery Institute (later Institution) was formed in 1838 as an educational scientific club for artillery officers. The Regiment had always been scientific, but this was also a time when Howick's reforms had put education to the fore. The Institute was founded by two young officers, Lt. (later Gen. Sir) John Lefroy and Lt. (later Maj.-Gen.) Frederick Marow Eardley-Wilmot, the former inspired by the precedent of Charles Hutton's short-lived Military Society of the 1770s. The Institute's first building of 1838–9, erected under the supervision of Lt. Col. George Harding, CRE, was an observatory, on high ground near the Rotunda, for training in magnetic observations to assist in a pioneering global survey of the 1840s with which Lefroy and Eardley-Wilmot were closely involved. For its telescopes it had a transit room, flat roofed with paired tall thin windows due north and south for observations, and, further west, a small round equatorial room with a conical roof. On the other side of its entrance lobby to the east a three-bay single-storey and basement block housed a library and, to the north, a reading and writing room.

By 1847 these spaces were found to be inadequate so a joint Royal Artillery and Royal Engineers committee put forward plans for better premises, initially looking to build behind the officers' mess. The scheme was supported by officers' subscriptions and contacts; Eardley-Wilmot had

373. Former Green Hill School (Greenhill Courts), Hillreach, south range, 1850–1, east range added 1855. From the south-east in 2010

a word with Lord Russell about the Board's reluctance to provide funds – 'if I get a wigging I don't care'.[144] The project bore fruit in 1851–4 when the Institute gained a new home on the east side of the barracks complex, just north-east of the chapel. Its building there, designed by T. H. Wyatt, had a pedimented east front and housed a horseshoe-shape lecture theatre, a museum, a library, a printing office and photographic studio (Ill. 345). Visiting lecturers included Thomas Henry Huxley and John Ruskin, who, in 1869, addressed the Institution on 'The Future of England', calling on his audience to provide leadership – 'It is a crisis, gentlemen.'[145] The building was destroyed in a bombing raid in November 1940.

The observatory was extended in 1852–3 to plans drawn by Lt. Harry G. Teesdale, RE, under Col. Thomas Blanchard, CRE. The old equatorial room was replaced with a larger domed room and a new transit room was added to its south, with instruments made by Ransomes & May of Ipswich and other equipment by Burbidge & Healy, ironmongers. The east range was enlarged to the north with a room for meteorological and magnetic observations, the whole gaining a central pediment on its east front. The premises became known as the Magnetic Office, and the observatory continued in use up to 1926. It was demolished thereafter, but the original transit room and west range survived. They were converted, first to married quarters and later as a Ministry of Defence police station.[146]

Former Green Hill School

A low double quadrangle of yellow-brick buildings south-west of the junction of Hillreach and Repository Road contained the Royal Artillery's regimental schools, built in phases in the 1850s. The first regimental school for the children of the barracks was closer to the main complex of buildings, on the other side of Repository Road and up against the boundary wall to Artillery Place. Built in 1808–10, this 130ft(40m)-long shallow timber shed, 'the wooden academy',[147] had rooms for both boys and girls. In the early 1840s there were plans to enlarge the shed outwards, but these were postponed for want of funds and in 1846–7, with numbers in the barracks on the rise and 400 or more children resident, the scheme was revised under Lt. Col. Frederick English, CRE. An entirely new brick building was projected for the same site, proposing a pedimented and pavilioned Palladian south front. But Board of Ordnance funds were still not forthcoming. At the suggestion of the Garrison Commandant, Gen. Sir Thomas Downman, who wanted to use the old school site for a gun-shed for the Royal Horse Artillery, the project was displaced to the south-west. What is now the south range of the schools complex finally went up in 1850–1, English's successors using his plans and keeping its front to the south; Taylor and Son were the builders (Ill. 373). The two new schoolrooms, for 300 boys and 150 girls, could be opened up to be one open-roofed space capable of accommodating up to 1,000 soldiers in the evenings. At 132ft by 32ft (40.3m by 9.8m), this interior was also comfortably big enough to host regimental balls. The two-storey end pavilions each housed a single classroom and a schoolmaster. The pediment has gone.[148]

Post-Crimean emphasis on the importance of educating the army meant that, when the school was first enlarged in 1855 under Col. Thomas Foster, CRE, with Kirk and Parry of Woolwich as builders, provision was made for non-commissioned officers, many of whom were illiterate, as well as more children. The first extensions enclosed the eastern courtyard. The north-west section followed around 1860, with more space for infants and schoolmasters' quarters. By 1866 the establishment, which had daily attendances of around 1,000 children, had taken the name Green Hill Schools. It had also gained an open-sided play shed in the western quadrangle, with a three-by-four-bay cast-iron frame and wrought-iron roof trusses.[149]

The premises were briefly considered for use as a museum in the late 1960s when the future of the Rotunda was in question, but thereafter the army withdrew. Listed in 1973 and subsequently saved from demolition, the former schools remained without a use until 1987–90 when

374. War memorial, Repository Road, 1882, representing Zulu and Afghan arms. Photographed 2007. *Relocated*

the complex was converted by Parkview Estates, with Sensemove Ltd as builders, to fifty flats since known as Greenhill Court. The iron play shed, roofless and looking like a refugee from the Arsenal, survives as a pergola.[150]

Other structures

From the early 1840s to the early 1960s there was a substantial guard house at the Repository Road corner with Hillreach, at what was known as Long's Gate, after the founder of the King's Arms public house. The gate itself was removed in the late nineteenth century when the parish took over the maintenance of Repository Road. On this ground there now stands one of the two Mallet's mortars of 1857, the largest British mortars ever constructed, designed by Robert Mallet, but never used in war.[151]

For a time a monumental drinking fountain stood at this junction, in the middle of Repository Road at its top end. This was the Army Ordnance Corps South African War Memorial, a neo-Baroque columnar plinth of granite and marble that carried a bronze statue of a soldier, with four mortars at his feet. Erected in 1905, it was designed by C. M. Jordan and sculpted by F. Coomans. The Corps left Woolwich and the monument was moved to Camberley in 1950.[152]

Another war memorial, to men and officers of the Royal Artillery who fell in the Afghan, Zulu and First Boer wars, stood on the west side of Repository Road away to the south, just east of the main repository sheds, from 1882 to 2007, when it was moved to Larkhill (Ill. 374). This was made up of rough-hewn granite, assembled to look like a megalith. Embedded within was a large marble slab inscribed with the names of those remembered, and flanked by bronze trophies of Zulu and Afghan arms. Erected by voluntary subscriptions, this memorial was designed by Prince Victor of Hohenlohe-Langenburg (Count Gleichen), an officer in the Royal Navy, sculptor, and nephew of Queen Victoria.[153]

Green Hill Barracks. Short terraces of married quarters' housing for soldiers began to appear on the south side of Green Hill around 1920 when the sixteen two-storey four-room houses that are now P, Q and T blocks (2–16, 18–24 and 5–11 Green Hill) were built, the last double fronted, along with another row further north. Blocks R and S followed, eight more houses, with stuccoed upper storeys under hipped roofs. Then seven more blocks (U to ZA or 42–64 and 13–35 Green Hill) were built in 1934–5, each of three units except Z which is a row of six, to provide twenty-four more family houses (Ill. 364). Nos 1–4 Green Hill Terrace, just west of Greenhill Court, were added in the 1950s, and 5–6 Green Hill Terrace replaced the northernmost early row in 1960. This pair was extended and supplemented by a new single-storey rear range in 2010–11. The Green Hill Barracks continue to house soldiers.[154]

The north side of Green Hill near Repository Road is known as **Congreve Lines**. There were late nineteenth-century gun sheds here, replaced around 1970 with garaging in four large flat-roofed sheds. Two of these gave way to an Army Medical Centre in 2008–9. This was built for Defence Estates as part of the SLAM project (see pages 341–2) by Interserve Project Services to designs by Capita Percy Thomas, architects. It serves Woolwich Station and also houses a District Community Mental Health Team. The plot to the east up to Repository Road was redeveloped in 2012 to provide a welfare centre and childcare facility for the Army Primary Healthcare Service. This was designed by the Frederick Gibberd Partnership, architects, with building work by Vinci Construction.[155]