The influence of military threats on the design and use of The Royal Naval Hospital Haslar

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The design, modification and usage of the Royal Naval Hospital Haslar has, throughout its history, had to encompass both military and medical requirements. This duality has required compromises to be made and these have changed over the years.

The predominant military requirement has changed from a need to prevent the desertion of patients to a need to protect them from external threats such as bombing. This required a change in the fabric of the buildings and adjacent structures, the evidence of which is still apparent in plans and the extant material culture.

Comparison of Haslar with contemporary prisons and civilian hospitals shows that, as befits its dual role, it shares features with each of them. Spatial analysis access graphs have been used to analyse Haslar and to compare it to other buildings; the strengths and limitations of this technique are discussed.

The design of the hospital in the context of the current debates on the part played by buildings in the control and mediation of relationships between different groups will be discussed.

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Preface

I have known RNH Haslar since 1981 when I joined the Royal Navy as a Medical Cadet and I have always regarded being able to practice medicine in such an historic setting as an enormous privilege. As a senior Naval Medical Officer I have had unlimited access to the grounds and buildings which has been invaluable in determining if historic plans and documentary evidence match the existing structural evidence.

I would like to thank Jane Wickenden of the Institute of Naval Medicine and the staff of the Admiralty Library, Portsmouth for their assistance in locating early plans and documents and Eric Birbeck for generously sharing his extensive knowledge of Haslar with me. Dr Chris King's advice on where to focus the research and his comments on my drafts were extremely useful.

All photographs marked as copyright Ministry of Defence have been obtained from the Photography & Medical Illustration Department, Royal Hospital Haslar; their assistance in scouring their extensive photographic collections is greatly appreciated. Unless otherwise stated all other photographs have been taken by the author. The photographic images have been edited using Gimp, line diagrams have been drawn with Inkscape and the manuscript was typeset using LaTeX.

All of the data in this dissertation was collected directly by me or as acknowledged above and has not been used as part of any previously published or submitted work with the exception of Figure 8.2 on page 52 which comes from my report of an excavation that I supervised in 2005.

1 Introduction

"*We shape our buildings, and afterwards our buildings shape us.*"

Winston Churchill, 28 October 1943

The Royal Naval Hospital Haslar, now known as the Royal Hospital Haslar, is one of the best preserved Georgian hospitals and grounds in the country. Its simple appearance, now much loved, arose not primarily from an æsthetic desire but for pragmatic military and fiscal reasons. The aim of this dissertation is to show that the original design and subsequent modifications to the Royal Naval Hospital Haslar were influenced by the contemporary military threat; that this design had a direct effect on mitigating this threat; and that the changes in the type of threat over time led to identifiable changes in the extant fabric of the buildings and grounds.

The scope of this study will be limited to Haslar but comparisons will be made with contemporary military and civilian hospitals and other institutional buildings to identify common patterns or to demonstrate any features specific to Haslar. These comparisons will be made using standard topological plans, access analysis and planning diagrams. Examination of the existing fabric will be recorded with photographs and drawings.

The typically simple Georgian facade of the main hospital building conceals a complex building layout with numerous lobbies and access routes to the wards and outdoor exercise areas. In order to compare this building with other contemporary institutional buildings, such as hospitals and prisons, techniques must be used to discern the underlying structure of these buildings. Justified access graphs, developed by Hillier and Hanson (Hillier and Hanson 1984 cited by Chapman 1990, 61), are a way of simplifying a building to better understand its layout and to determine its permeability - that is the ease with which people can enter it or move around within it. Comparison of graphs of Haslar and other institutional buildings will help to reveal any similarities or common themes.

In a private building, such as a house, the deepest spaces are normally the private ones such as the bedrooms; it is these spaces that are exclusively occupied by those who 'control' the building i.e. the owners. In these buildings visitors are confined to the shallow spaces, although honoured guests may be permitted to enter the deeper

spaces. By contrast the shallower spaces of institutional buildings, such as prisons or workhouses, are occupied by those who 'control' the building, such as warders, whilst the deep spaces i.e. the cells are occupied by the 'visitor' such as the inmate. A deep space could be seen as either a private space, and therefore desirable, or as a maximally controlled space, and therefore undesirable. How the space is perceived will depend entirely on the context of the building.

Whilst these graphs can produce significant insights their use is not without problems, as has been outlined by Brown (1990) in his critique of their use in Chapman's investigation of Bulgarian tells(Chapman 1990). Taking each of his criticisms in turn it is possible to see how these could be mitigated in the present study.

- *Buildings with very different shapes can produce access graphs which are very similar.* Hospitals however have approximately the same shaped spaces and therefore this criticism does not apply when comparing Haslar to other hospitals but could apply to comparisons with other types of buildings. Comparison of the topological plans would further mitigate this concern.

- *The shape of a building may be forced on the architect as a result of the topography or local geography and not reflect an underlying social meaning.* Haslar, however, was built on an open site with no significant topographical constraints. The design must therefore be the way the architect wanted it and not the way he was forced to build it. Other constraints however, such as a restricted budget, could have affected the building's design.

- *The central premise of spatial theory is that social meaning is encoded in the physical layout of a building but it cannot be proved that this holds true for all buildings.* Like Cutting (2003, 2) I am using these graphs as 'a tool to think with' and to compare various buildings to determine patterns in a limited range of building types. Provided that rules on producing the graphs are consistently applied to the different styles there is no requirement to prove the premise of universally encoded social meaning.

- *Access graphs can produce a distorted understanding of the building.* If used alone this would be true but I will be using planning graphs and original plans as well as access graphs to assess the relative importance and position of the various components of a hospital.

Cutting (2003, 6) identifies further limitations of access analysis graphs in that they are crucially dependent on obtaining a near complete plan of the original building and that, when dealing with data from excavations, the layout of the upper floors is rarely known. Since detailed plans of the hospital from various periods are available

superficially the first criticism would not appear to apply in this case. However some caution must be exercised as some plans (e.g. Figure 2.3 on page 7) were aspirational and do not reflect what was actually built. It is important therefore to compare any plans to historic photographs and the extant structure. The arrangement of the upper floors has undergone various modifications over the years but it is normally possible to confirm the original layout by examining the current structure. As the building is of a symmetrical and modular design it is possible to combine different parts of the hospital to produce a composite visualisation of the earlier structure so that one can 'see through' later modifications.

Access graphs reveal the interconnections and permeability of a site but hide the variations in the size of the spaces. This can lead to a misinterpretation, as the meaning and function of a space is contained not just in its connections but in the relative sizes and spatial organisation. To overcome this an alternative way of visualising the ward blocks is to use a planning diagram which shows the relative sizes of the actual floor area, the connections between them and their spatial organisation. A planning diagram of a typical ward block (Figure 5.5 on page 20) shows, in diagrammatic form, the relative importance of the different spaces and their three dimensional arrangement.

The identification of the various blocks of the main hospital building at Haslar has undergone several changes over the years. To avoid confusion the present-day block letters, as shown in Figure 2.7 on page 10, will be used throughout this paper. The hospital has been variously named as the Royal Hospital at Haslar, the Royal Hospital Haslar; and Royal Naval Hospital (sometimes abbreviated to RNH) Haslar; for consistency this paper will use the latter name or abbreviation throughout.

One of the main areas of study for this dissertation is the way in which the buildings at Haslar controlled and influenced the staff and patients in order to maintain discipline and prevent desertion. It is clear, from conversations with existing staff (Birbeck 2007), that the use of the buildings to impose a hierarchical system and, notionally at least, reinforce discipline, persisted into modern times. For example, the central paths within the inner quadrangle were reserved for officers whilst ratings were required to walk around the edge. When outside military personnel must wear hats, as this is inconvenient in a clinical environment the Commanding Officer has ruled that the central, open air, quadrangle is 'indoors' and therefore a 'hats free' zone.

This paper will outline the historical background to the development of Haslar with particular emphasis on the military and medical requirements. The design, and later modification, of the hospital will be consider in the light of these requirements and it will be compared to other hospitals and institutional buildings. The

modifications to the building will then be considered in the light of changing military threats.

The key research objectives are to show that the structure and utilisation of Haslar has required specific design modifications compared to civilian institutions, that these were a common feature of military hospitals and that they have changed with the changing military threat.

2 Historical background

In common with the civilian practice of the time, naval patients in the early eighteenth century were normally treated in private houses and lodgings or, if sufficiently well, were sent to de-commissioned warship hulks that served as hospital ships. Such practices were far from ideal and on the 15th September 1744 the Navy Board petitioned the King to authorise the building of hospitals for seamen at Portsmouth, Plymouth and Chatham and cited as their main reason that

> "the want of such hospitals is so sensibly felt, and Your Majesty's service suffers so greatly from the loss of seamen, either by death or desertion, who are sent on shore for the cure of their distempers" (Tait 1906)

The dual requirements for the hospital, as a place of healing and incarceration, are evident therefore at its inception. Preventing desertion was not the only security consideration as there was also concern that the seamens' recovery was hampered by drunkenness. The hospital's design would have to impede, therefore, the smuggling of intoxicating liquor.

The Navy Board stated that, if it was not possible for all three hospitals to be built, the one at Portsmouth was the most urgent and estimated that a hospital to house 1,500 patients could be constructed for £38,000. This request coincided with an energetic period of civilian hospital building (Porter 1997, 298) such that, by this time, there was a hospital in most towns in Britain.

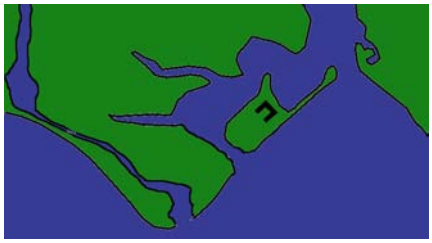
The site selected for the hospital was on a peninsula on the Gosport side of the harbour and Figure 2.1 shows its current appearance. Significant amounts of land reclamation and alterations in the outfall of the local rivers have occurred since the hospital's construction and by combining evidence from early maps (e.g. Figure 5.1 on page 16) and existing topographical features it is possible to reconstruct how the coastline may have looked when the hospital was built (Figure 2.2). This would suggest that the hospital would have been significantly more isolated than its present appearance would indicate.

The original plans were for four ranges completely enclosing a central courtyard (Figure 2.3) which was at variance to the more common 'U' or 'H' shaped civilian hospitals being constructed at the time. For example the London Hospital (1740) was built as a 'U' (Figure 2.4) and the conversion of a London mansion, Lanesborough

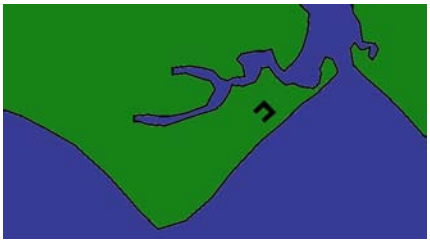
Figure 2.1: Satellite image of RNH Haslar

©GoogleMaps

Figure 2.2: Coastline around Portsmouth Harbour

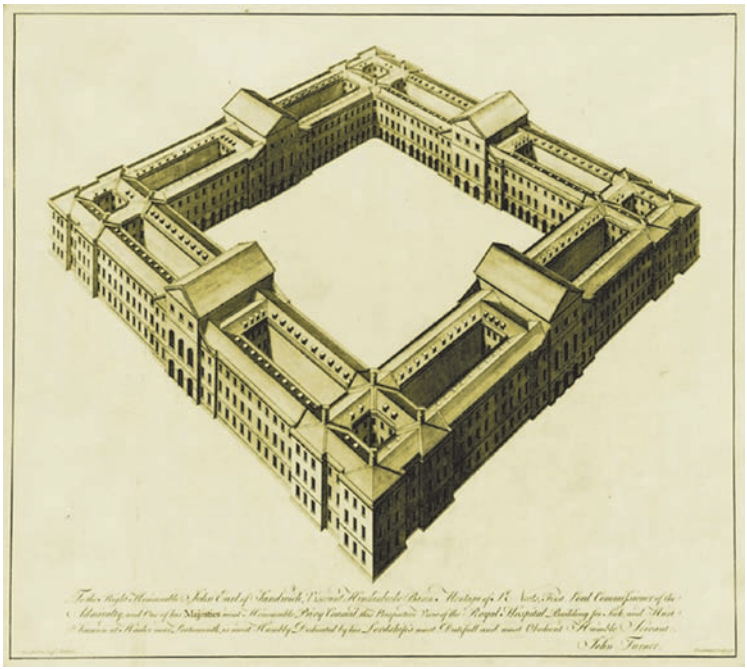


(a) Postulated 18th century coastline



(b) Present day coastline

Figure 2.3: Original design for RNH Haslar



House, to form St George's Hospital, London (1733-39) resulted in an 'H' shape.

Building started on the North-East range in 1746 and patients were moved into it in 1754; work then continued on the two side ranges which were completed by 1762 (Revell 1979). The fourth range was never built and this is usually attributed to a lack of funds as the cost of the building had by then climbed to £100,000 but alternative explanations are possible and are discussed on page 50.

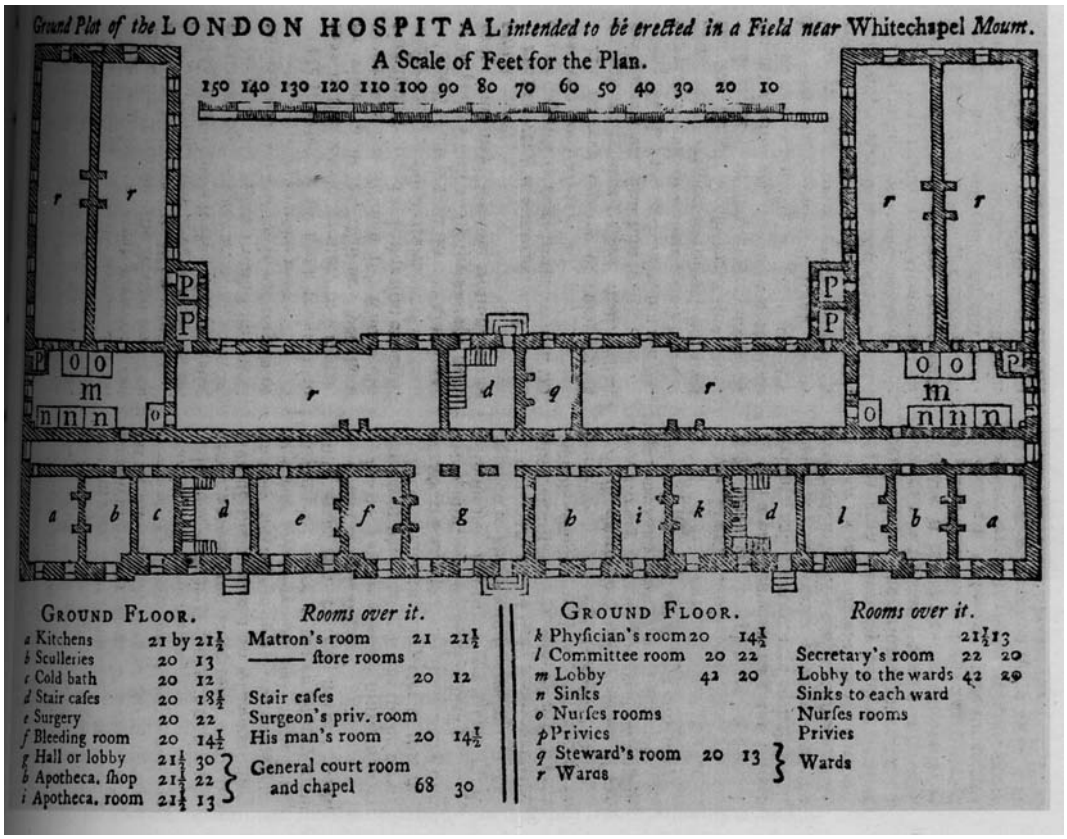
The final form of the hospital therefore took a conventional 'U' form (Figure 2.5) and Tait (1906) considered that this had 'much advantage, as it allows free access of both sun and air'. The influence of the medical requirements on the design of Haslar will be further discussed in chapter 4.

The hospital was not, however, particularly secure, Admiral Keppel, in a letter from HMS Victory in 1778 (NRS 1933, 72), to the First Lord of the Admiralty wrote that

> "The insufficiency of the invalid guard at the hospital [Haslar] has allowed of more desertion from it than before..."

In 1796, to improve security, railings were installed to complete the square and close off the inner quadrangle. Although the use of impressment declined at the end of the Napoleonic wars the railings were not removed until 1906.

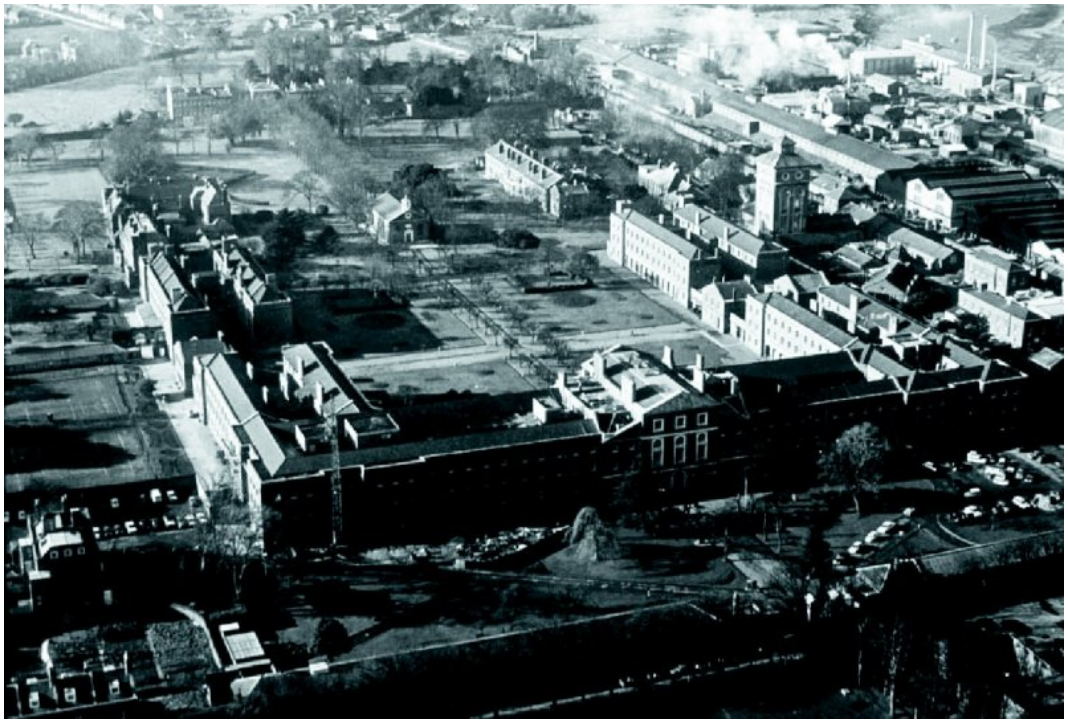
Figure 2.4: Plan for The London Hospital



From Markus (1993), 109

Figure 2.5: Haslar from the South-West circa 1770

Figure 2.6: Ærial view of RNH Haslar circa 1970

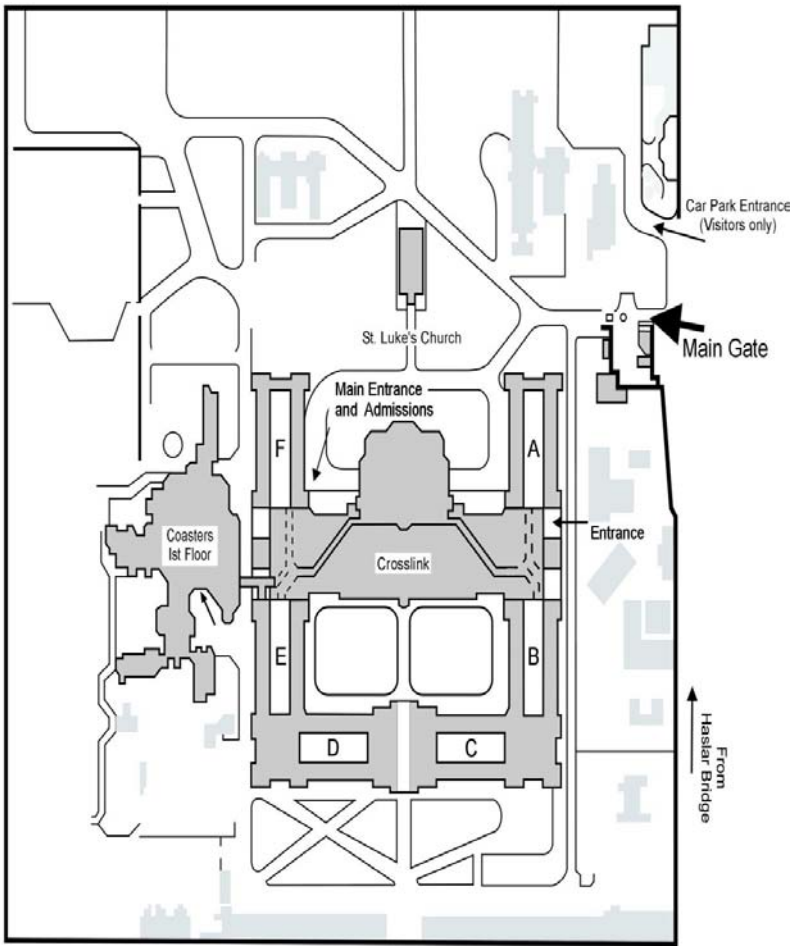


An outer perimeter wall was constructed in the mid eighteenth century and was extended to encompass the paddock, to the south-west of the site, in 1857 (Conservation & Design Dept., Gosport Borough Council 2006).

Although there was significant military activity in the nineteenth and early twentieth centuries there was no direct threat to the hospital. The changes on the site during this time, such as the building of the Zymotic Block (for infectious cases) and the Sick Officers Block were all, therefore, medically related. Separate staff accommodation was also built so that they no longer needed to live within the main hospital building. An ærial photograph shows the arrangements of the buildings prior to the modern building phase (Figure 2.6). The final major addition was the construction of the Cross-Link in 1980 (Figure 2.7) as this was purely related to the medical requirement it will not be discussed further.

On becoming a tri-service military establishment in 1996 the hospital, which was by then the last military hospital in the UK, changed its name to The Royal Hospital Haslar. On 31st March 2007 it ceased to be a military hospital but it will continue, as a civilian run hospital, until about 2010 when it will close completely.

Figure 2.7: Map of RNH Haslar - current appearance



3 Military threat analysis

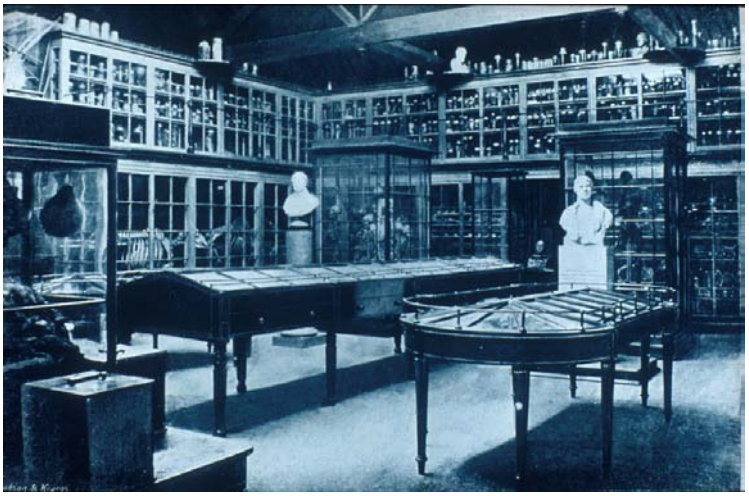
Desertion was clearly a problem in the early history of the hospital; the Hospital Instructions for Haslar and Plymouth state (1808, 20) "Centinels [sic] are to be sited around the hospital to prevent desertion or damage to walls". Even though impressment was effectively discontinued in 1815 this much criticised practice was still an option for the naval authorities (Times Editorial 6 Mar 1834); the last parliamentary impressment bill was passed in 1835 . Loss of personnel from the Royal Navy must have remained a problem as the hospital police instructions (1854, 31) instructed that "... the utmost diligence is to be used to prevent the Desertion of Patients...". Whilst the risk of desertion lessened and today is not an issue, the hospital still remains a 'place of duty' for the patients and they can be compelled to remain in the hospital (although treatment is voluntary).

Hospitals are, by tradition and latterly by international treaty, protected from direct military attack. Haslar occupies land which, together with the adjacent Fort Blockhouse site, commands the narrow entrance to Portsmouth harbour. Therefore, whilst it would have been unlikely that the hospital would have been attacked during the nineteenth century for its own sake, it could have been threatened because of its strategic position. As the effective range of artillery increased the defensive value of the forts and land close to the harbour became ineffective and, in 1859, a Royal Commission advocated the construction of an outer defensive ring of forts around the harbour (Royal Engineers Museum, 2005). As Haslar lay within this defensive ring it was thus protected from military attack.

With the development of ærial bombardment in the Second World war the hospital was no longer safe. Although the hospital was never targeted directly its proximity to the military dockyard made it vulnerable. Several bombs dropped on the site, one of which destroyed the pavilion between 'E' and 'F' Block - this housed the museum (Figure 3.1) and resulted in the loss of the botanic and other specimens collected during the voyages of, amongst others, HMS Beagle.

The possibility of an attack continued into the Cold War where again the proximity of Haslar to Portsmouth Naval dockyard, a prime target for a nuclear or conventional bomb, made it liable to collateral damage. In reality, had the former been used, the hospital would have been within the zone of complete destruction. The Cold War also saw the possible use of attack from biological and chemical weapons - had these

Figure 3.1: Museum at RNH Haslar



been used on the adjacent Naval base Haslar would have been affected. As the hospital lay next to HMS DOLPHIN the hospital could have been involved in attacks by Spetsnaz (Russian Special Forces) on this strategically important submarine base; such a possibility formed part of routine exercises in the 1980s (author's personal recollection). Defences against this are similar to those used to counter terrorism and are described below.

The possibility of a direct terrorist attack on the hospital developed from the early 1970s to the present - initially from the Irish Republican threat and latterly from other international terrorists. The attack on the military wing of Musgrave Park Hospital, Belfast in November 1991, which killed 2 members of the Royal Army Medical Corps and injured 7 others, showed that this was a very real threat. Although it was assumed that any such attack would be against the military living accommodation rather than the clinical areas their close proximity at Haslar meant that the whole site had to be protected.

Over the life the hospital therefore the predominant military threat has changed from a largely 'internal' one requiring control of the patients to one that required the patients and staff to be protected from an 'external' threat.

4 Medical requirements of a military hospital

Haslar was built at a time of widespread hospital construction when the effect of hospital location and design on the healing process was being actively debated. The prime *medical* requirement for a military hospital, as with a civilian hospital, was that it should promote the rapid and effective cure of the sick whilst protecting the rest of the population from the dangers of the 'contagion' held within it. Since it was believed that disease was caused by breathing foul smelling air favoured sites were those that provided fresh air. Further, some Naval physicians believed that ailments peculiar to seamen (such as scurvy) were the result of breathing 'sea air' and that they could be cured by the provision of 'land air'; which apparently the site at Haslar provided. Surrounded as it is on three sides by water it is difficult to see how this was so.

The geographical isolation of the hospital from the urban centre of population was a common feature of hospitals of this era. In the case of Haslar however such isolation had the dual benefit of protecting the general population from disease and also making desertion more difficult.

There was a requirement to segregate patients with different types of disease and by sex; the latter did not apply at Haslar as all the patients were male. The segregation of patients by rank certainly occurred at Haslar following the construction of the Sick Officers' Block (1904) and may have occurred from the hospital's earliest period. Unlike civilian hospitals, some of which refused to admit infectious cases, Haslar was obliged to admit all naval patients whatever their disease. Since it was believed that 'contagious air' ascended the most infectious patients were placed on the top floor so that no patients had to reside above them. There was also a recognition that it was important to restrict access to the infectious wards and to minimise the traffic passing through them.

When Haslar was built, medical education was essentially an apprenticeship with teaching taking place exclusively at the bedside and medical research required no special facilities. There was, therefore no particular requirement for the building design to accommodate these activities. Over the years changes in medical education and research requirements have required the construction of lecture theatres,

Figure 4.1: Teaching laboratory at RNH Haslar

classrooms and laboratories (Figure 4.1).

Changing requirements for medical equipment and patient privacy drove substantial internal changes to D Block which have filled in the central courtyard so that the layout of the wards could be modernised. As these changes have had no impact on the design or usage of the hospital with respect to the military threats they will not be discussed further.

5 Influence of desertion

In their petition to the King shown on page 5 the Navy Board clearly recognised the need to treat sailors in a secure location. In building Haslar the threat of desertion was countered in three ways: its location, the design of the building itself and the perimeter wall.

Hospital location

The location for Haslar was chosen to offer a significant degree of isolation. As one of the original plans shows (Figure 5.1) the hospital would have been surrounded on three sides by water. The only land connection is to the south-west of the site where the map appears to show a creek and ponds which would have been difficult to cross and would have further isolated the site. The modern-day boundaries of the site are all straight with the exception of the south-west boundary of 'The Paddock' (Figure 5.2) which appears to preserve the line of the creek shown on Figure 5.1. The land surface within the site, adjacent to the south-west boundary, has been built up in the recent past from soil dumping during the construction of the Cross-Link. The original land surface, which is visible just inside the boundary wall, is lower than the rest of the site and this adds further evidence that there was originally low lying land and a creek as shown on the map.

At the time of Haslar's construction the Alver river flowed into the sea considerably further east than its present outfall; the combination of this and the creek described above have been combined to show a possible reconstruction of the coastline in the mid eighteenth century (Figure 2.2 on page 6). This shows that Haslar was effectively on an island surrounded by mudflats and tidal marshland; despite its proximity to Gosport and Portsmouth it was physically isolated from them.

This isolated land mass is the 'root node' on the access graphs (discussed below) and so any patient escaping the hospital confines would still not be in unfettered public access space.

Figure 5.1: Early map of Haslar circa 1740

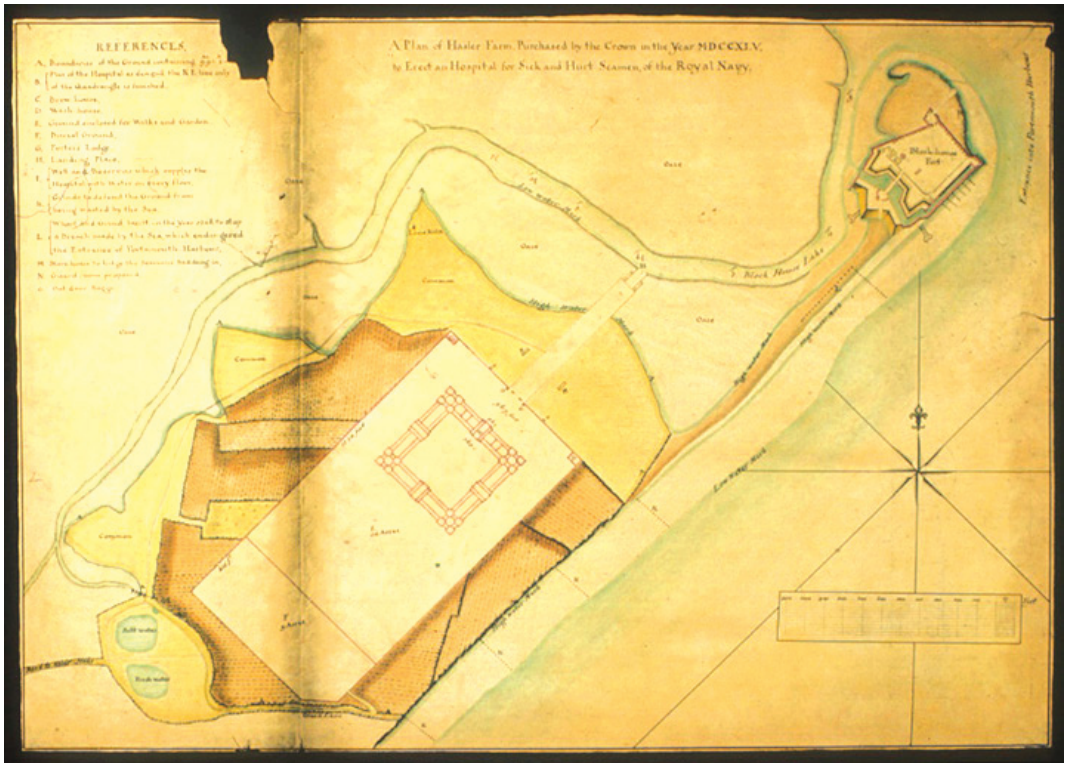


Figure 5.2: Ærial view of The Paddock

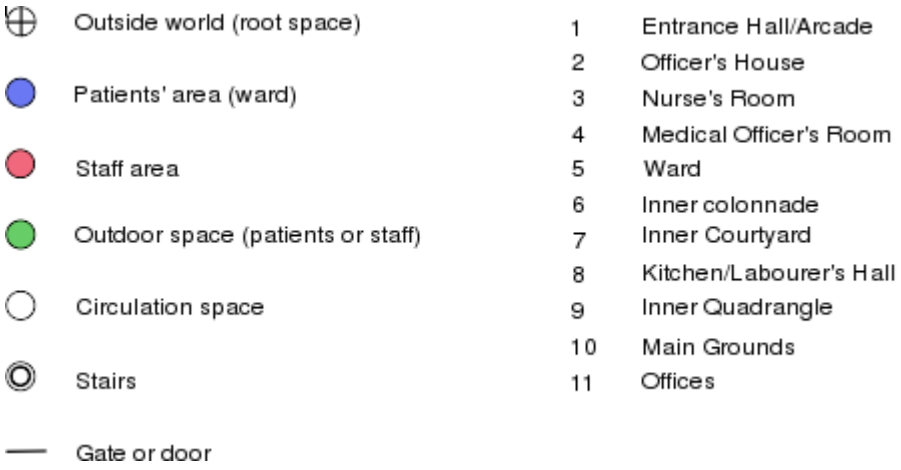
©GoogleMaps

Hospital design

In order to better understand the building, access graphs have been produced by identifying spaces on the topology map and assigning a 'node' to each space which are then connected to each other based on the access routes between them. These nodes are convex spaces which are defined as a space where no line between any two of its points crosses the perimeter (Klarqvist, 1993). The validity of the internal connections of these nodes is difficult to confirm; plans may only show what was intended to be built and not necessarily what was actually built and the modernisation changes over the years have obscured the original internal configuration. In places however it is possible to discern the original design from physical remains and, where relevant, these will be discussed.

The nodes have been assigned colour based on whether they are the domain of the staff - red, the domain of the patients (i.e. wards) - blue, or are shared spaces - green. The staff areas have been further sub-divided into those occupied by 'officers' and those for 'ratings'; a similar distinction has been made for non-military sites by equating staff such as Matron to officers and nurses to ratings. The graphs have been justified in order to show the depth of any space based on a root node immediately

Figure 5.3: Access Analysis Key



outside the perimeter wall.

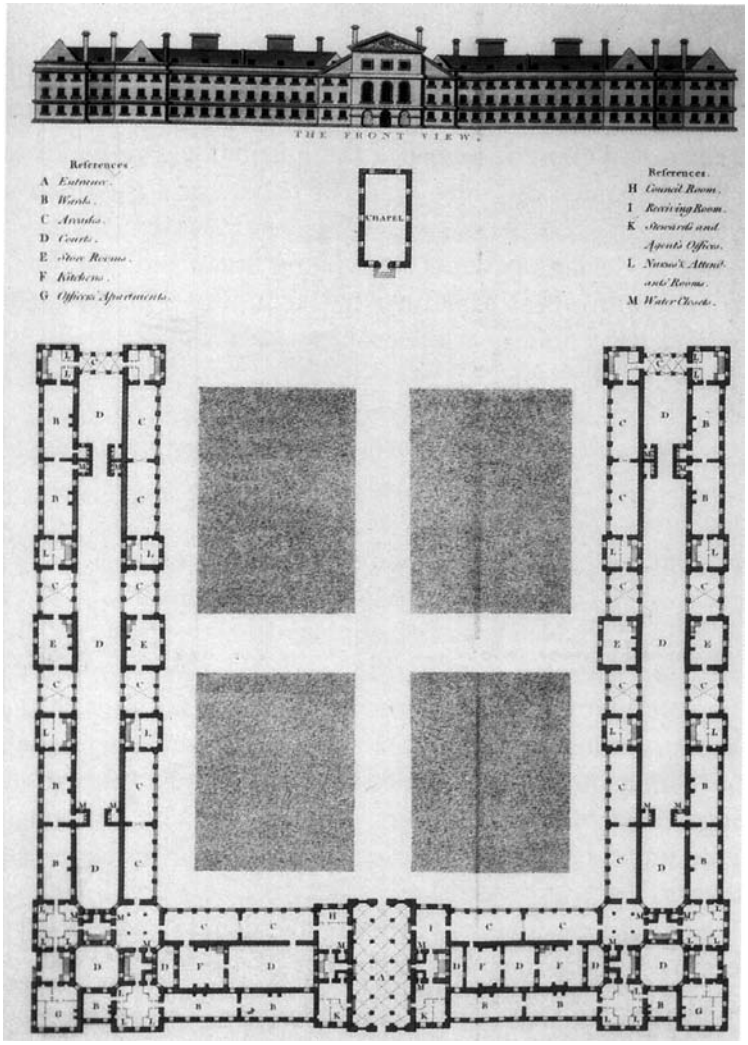
For simplicity the external spaces within the site, whatever their size or shape, have been treated as a single space divided into areas that would be used by the patients and those from which they would routinely be excluded. The root node of the graph represents the space immediately outside any enclosing perimeter walls. All the access analysis graphs will use a standard key (Figure 5.3).

In order to clarify these graphs, whilst retaining their utility, some simplifications have been employed. As each block at Haslar is essentially similar (Figure 5.4) the access pattern can be determined from the examination of two adjoining blocks ('D' & 'E' Block) whilst retaining the basic information. Only the ground floor has been shown on the graphs as the upper floors are of an identical pattern but are simply one level 'deeper'. The graphs have been further simplified by omitting the 'water-closets' marked on the plan as these are judged irrelevant in determining the permeability of the wards. Graphs of other buildings which have been used for comparison include the upper floors where these are not identical to the ground floor in order to fully understand their layout.

In order to more fully understand the relative importance of the spaces and their connections in three dimensions a planning diagram (Figure 5.5) has been constructed for all three floors of E Block with the inner range 'unfolded' to show both sides. The diagram has been produced from an examination of the original plans and the extant structure. The sizes are proportional to the actual floor areas with the exception of the hospital grounds, shown as '10' on the diagram, which are much larger than shown. The colour coding and numbering for this diagram is the same as for the access graphs.

The initial phase of building was of the main, north-east frontage (Blocks C & D)

Figure 5.4: Plan of Haslar dated 1789



Howard 1789b shown in Stevenson 2000, 181

Figure 5.5: E Block RNH Haslar - Planning diagram

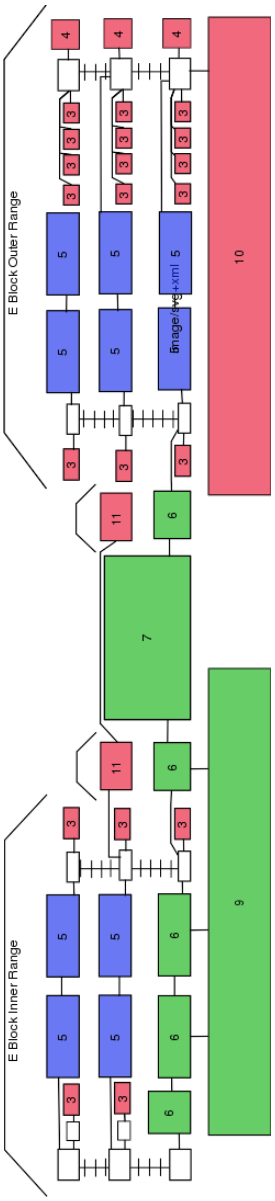
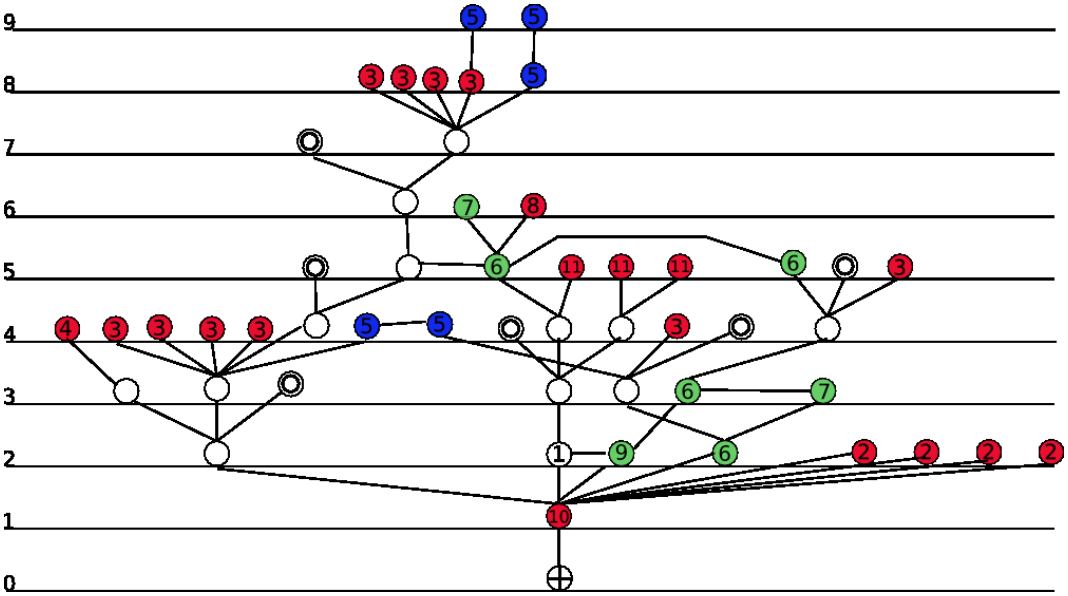


Figure 5.6: RNH Haslar before quadrangle enclosed - access graph



and patients were moved in as soon as it was completed. Its permeability is shown in Figure 5.6. This permeability was unaltered by the construction of the two side wings (Blocks A & B, E & F) which is shown in Figure 5.7.

As discussed in chapter 2, desertion remained a problem and a fence was built in 1796 (Revell 1979) to enclose the inner quadrangle with the intent of improving security. This fence on its own would have been insufficient as the topographical plan (Figure 5.7) clearly shows that patients would have direct access to the main hospital grounds through the arcades adjacent to the pavilions situated between 'A' & 'B' and 'E' & 'F' blocks (marked as Store Rooms 'E' on Figure 5.4). There is good photographic and documentary evidence for the construction of the fence (Figure 5.8) but there is no documentary or historic photographic evidence of any changes to the area between the pavilions.

Examination of the walls around the pavilions however, strongly suggests that changes were made to block off these passages. The walls of the arches between 'A' & 'B' blocks (Figure 5.9) clearly shows evidence of scarring on the brickwork suggestive of a metal grill in the upper portion, and stone inserts in the base (not shown) could indicate a repair of the plinth following the later removal of a solid wall. There remains, between the inner and outer ranges of 'F' Block, a wall and upper grill whose dimensions match the scars on the wall between 'A' & 'B' block (Figure 5.10). In addition there is a hole in the stone work at the apex of the arch in the 'F' Block range (Figure 5.11). This is interpreted as the site of a bolt hole that would have secured a central gate.

Figure 5.7: RNH Haslar following construction of all blocks and fence

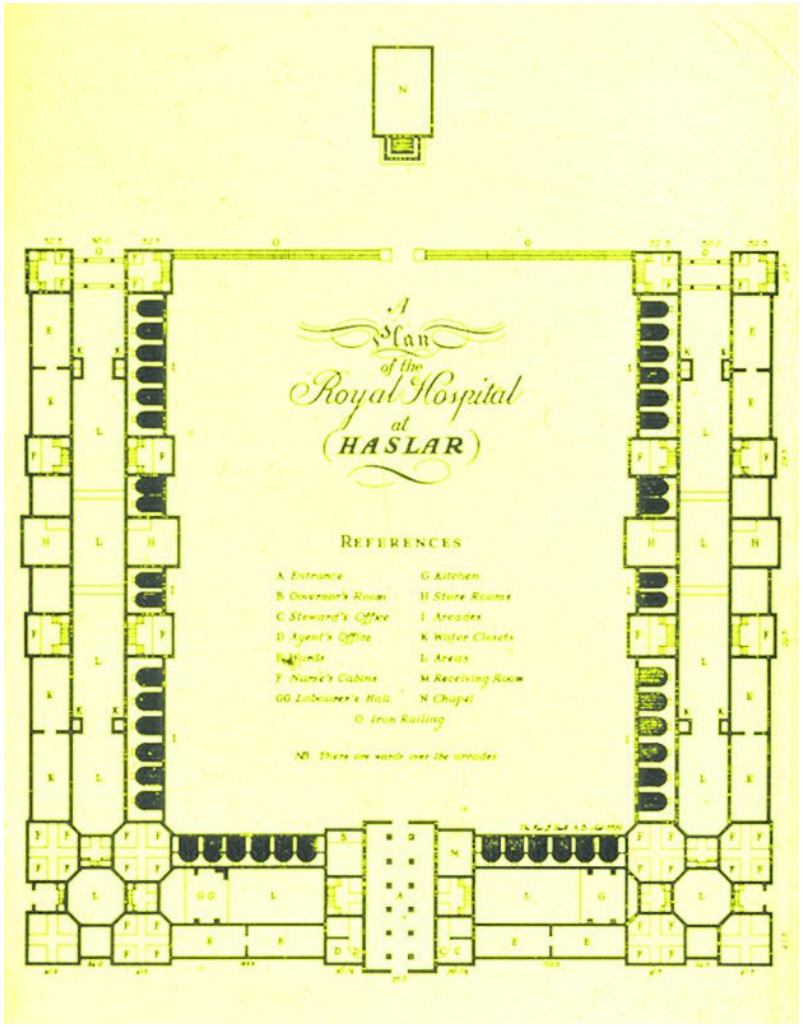
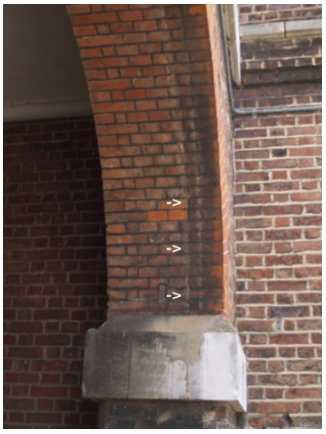


Figure 5.8: View towards St Luke's showing the railings enclosing the central quadrangle

Figure 5.9: Scarring on brickwork between 'A' and 'B' block

(a) Arches between 'A' & 'B' block

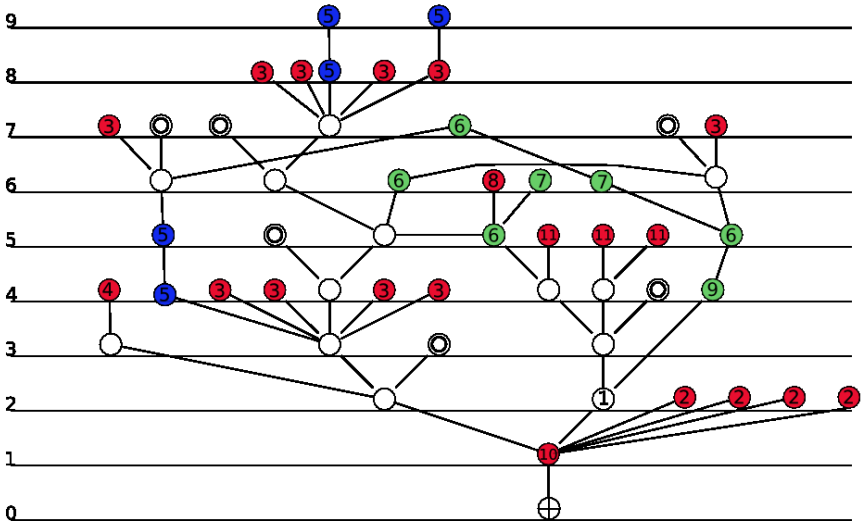


(b) Brickwork 'scarring'

Figure 5.10: Extant wall and grill 'F' Block

Figure 5.11: Probable bolt hole in 'F' Block arch

Figure 5.12: RNH Haslar after quadrangle enclosed - access graph



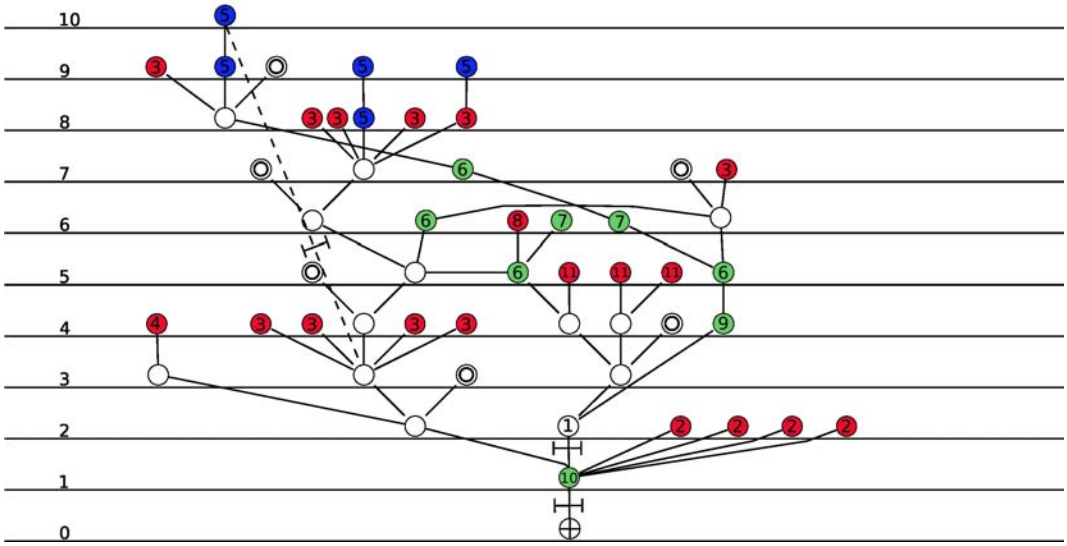
The overall interpretation therefore is that, at the time the fence across the fourth side of the quadrangle was built, the connections between inner courtyards ('D' on Figure 5.4) and the main hospital grounds were secured with a stone wall and upper grill with a central gate at at least one site.

Assuming that the arcades were secured as described above, the permeability of the building following this change is shown in Figure 5.12. This shows that the inner courtyards and quadrangle have become deeper compared to Figure 5.6 but there has only been a slight change in the depth of the wards. As discussed on page 1 in an institutional building such as Haslar the deeper spaces are associated with increasing security. As the fence and other building works described above did not markedly increase the security (depth) of the wards it would seem unlikely that such extensive work would be done for such a minimal gain in security without additional measures being taken.

Examination of the topological plans and access graph shows that the doors at the ends of the front range, which led directly to the hospital grounds, were a security weakness. If these doors were locked or guarded the depth of the wards increases dramatically as shown in Figure 5.13. I would suggest therefore that these doors must have been locked or guarded once the fence was erected in order to render the security provided by the fence effective.

If the arcades between the pavilions were blocked off as postulated above, then the inner courtyards (marked as 7 on the plans) would be within the space occupied by the patients and could have been used as an outdoor exercise area, in addition to the inner quadrangle and arcades. In Figure 5.14 the small projecting wings are

Figure 5.13: RNH Haslar with postulated locked doors - access graph



described as 'water-closets' on the plans (Figure 5.4). Access to the inner ones on the ground floor would have been from the inner courtyard doorway which can be seen as a bricked up doorway in Figure 5.14; examination of the brickwork on all other sides shows no other entrances. This finding adds weight to the suggestion that the inner courtyards were used by the patients as part of their outdoor exercise. It is a narrow confined space which, from personal experience of visiting prisoners, is reminiscent of the confined spaces and exercise yards found in prisons.

The general pattern at Haslar is that the shallowest spaces are those occupied exclusively by the staff (coloured red on the graphs). Conversely the deepest structures (coloured blue) are the wards where the patients would be confined at night. Between these the middle group (coloured green) represents spaces that would be used both by staff and patients; as outdoor exercise spaces that the patients would have used during the day and the staff would have used to move around the hospital. Logic would dictate that it would be easiest to escape in the dark and the Hospital Instructions (Ref 1808, 215 and 1854,31) directed that patients were to be confined to the wards at night and the external doors locked. Thus at a time when they would be most likely to escape, the patients were in the deepest part of the structure. The pattern is not entirely pure however as the ward staff had to be located close to the wards in order to carry out their nursing function. Particularly in the earlier arrangements, this meant that some staff accommodation was deeper than the wards.

Figure 5.14: Inner courtyard

Figure 5.15: Main Hospital Sewer

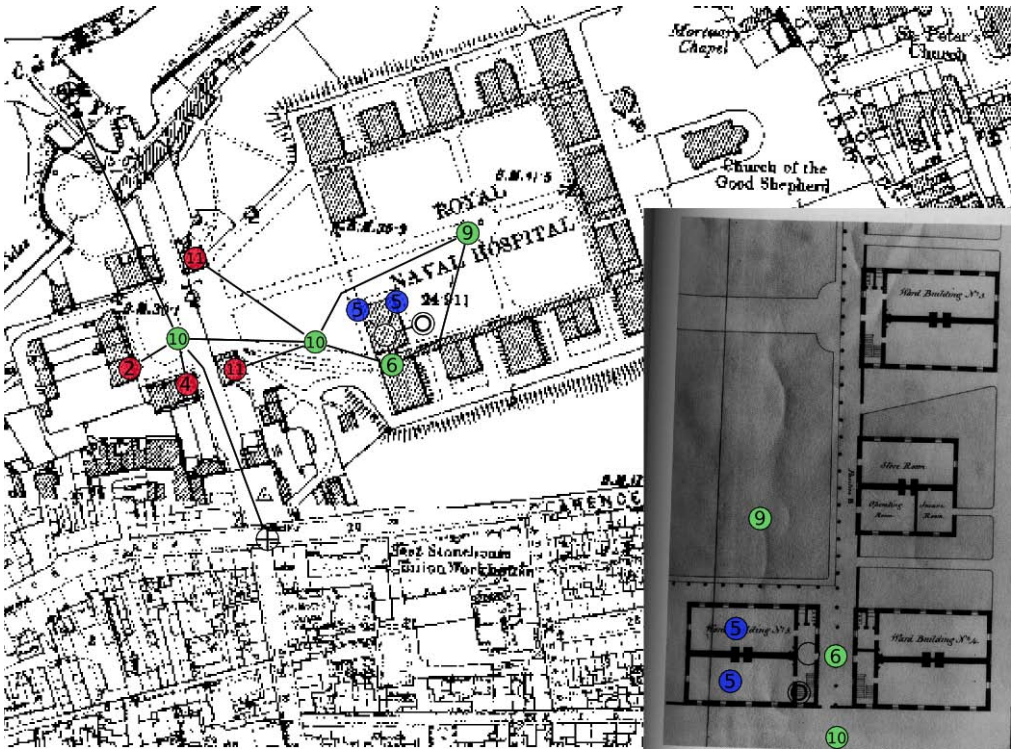
Histories of Haslar (Revell 1979) report that intoxicating liquor would be smuggled into them through the sewers and that they would also use the sewer as an escape route. The most logical point of access would be through the water-closets in the inner quadrangle. Although there are reports that Royal Marine guards were placed at the sewers outfall as a deterrent, no official instructions within the official instructions can be found. A photograph (Figure 5.15) of the main sewer clearly demonstrates that the sewers were large enough for an escape to be made through them.

Comparison with other military hospitals

The Royal Naval Hospital Stonehouse, Plymouth (Figure 5.16) was completed in 1762 but to a completely different design to Haslar. It has been described as the first 'pavilion hospital' (Stevenson 2000, 184) where individual ward blocks were built to minimise the risk of cross infection. Comparing the topographic plans and access graphs of Haslar and Stonehouse it would appear that the latter was designed primarily to accommodate medical requirements with a lesser emphasis on the control of patients. However there are some features that are common, both hospitals were built on land that, at the time, was comparatively isolated with patients arriving by boat; the whole site was surrounded by a substantial perimeter wall; and the grounds were subdivided to restrict access to certain areas.

Figure 5.16: RNH Stonehouse looking north-east

Figure 5.17: RNH Stonehouse



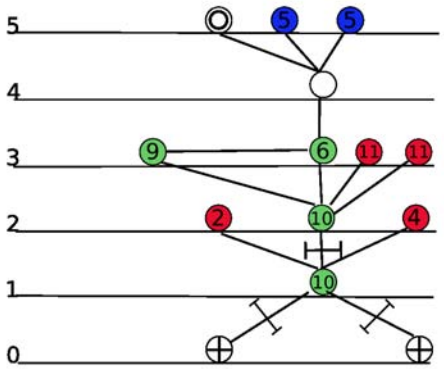
Modified from 1879 OS Map & Stevenson 2000, 183

An access graph of Stonehouse (Figures 5.17 and 5.18) shows that, as at Haslar, the wards are the deepest structure with the staff areas lying more superficially. However the wards at Stonehouse are at a much shallower level compared to those at Haslar and the topographical map shows that the whole structure is much less complex. Although the two naval hospitals are nearly contemporary and were built to the same design brief i.e. the Admiralty's memorandum (page 5) their designs are radically different. Stonehouse is a much more open and airy place and from personal experience of both hospitals there is no part of Stonehouse that feels like a prison.

The architect for RNH Plymouth was Alexander Rovehead (Gordon-Pugh 1972) and it would appear that considerable latitude was allowed in the designs of naval hospitals since Stonehouse seems to be more orientated to the medical aspects and is less with the security requirements. However this could be a superficial interpretation as, without further research into actual numbers of desertions, it is unclear whether Stonehouse was any less secure than Haslar.

The Army built a hospital in Plymouth, on the opposite side of Stoke creek to the Naval hospital, in 1797 (Morrison 1996); like Stonehouse its separate ward blocks

Figure 5.18: RNH Stonehouse - access graph



were connected by a colonnade but there is no central quadrangle (Figure 5.19). The arrangement, at least in medical terms, would seem similar to Haslar and Stonehouse but, in the absence of original plans, access graphs cannot be produced to compare its military effectiveness. Since there was no impressment of men into the Army the risk of desertion was less and therefore the military requirements of this hospital would not be the same as their Naval counterparts.

The Royal Naval Hospital at Great Yarmouth (1809 - 1811) (Figure 5.20) was originally built as an asylum but later became a general hospital (English Heritage 2001). Morrison (1996) argues that it took its inspiration from the Royal Hospital at Kilmainham, Ireland but in my opinion its colonnaded quadrangle closely resembles Haslar and I believe this would have been a more likely influence. Again it is not possible to produce an access graph for the hospital but the overall pattern, of an enclosed colonnaded quadrangle, seems to be consistent for military hospitals of this period with their requirement for security. This was additionally required as the hospital housed patients who were mentally ill.

The Royal Herbert Hospital (Figure 5.21), an army hospital built in 1859, demonstrates a different pattern with a central spine with wards projecting from it. This was one of the first true pavilion style hospitals and this design of military hospital persists to the present day where it is the standard design for a Field Hospital (Figure 5.22). This design, having no enclosing quadrangle, would provide less security for confining patients but does provide a better medical environment with a reduced

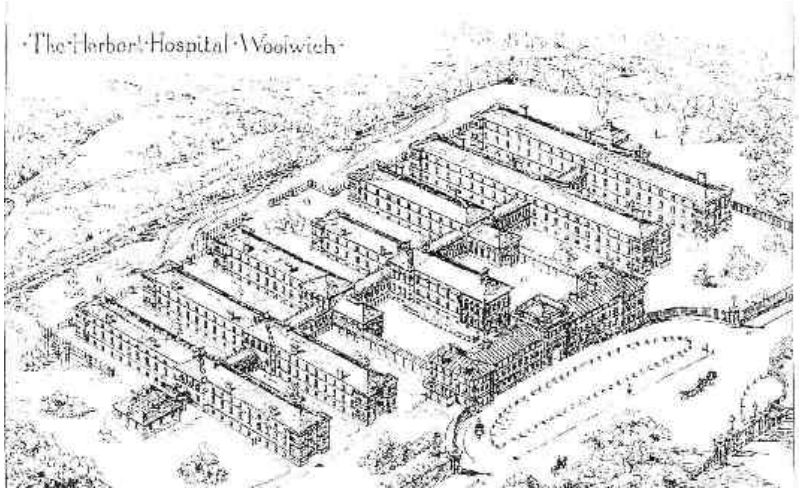
Figure 5.19: Army Hospital, Plymouth

©RCHME from Morrison 1996

Figure 5.20: Royal Naval Hospital, Great Yarmouth

English Heritage 2001

Figure 5.21: Royal Herbert Hospital



From 'The Builder 1866' cited Royal Herbert Freehold Ltd 2007

risk of cross-infection. Its introduction is presumably a reflection of the abandonment of impressment around this time with a consequent reduction in the risk of patients deserting.

Comparison with civilian institutions

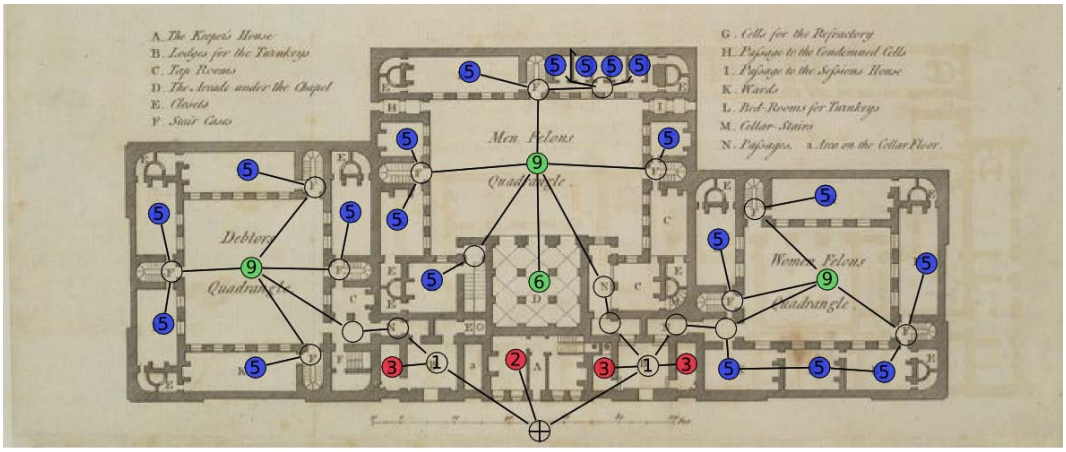
The design of Newgate Prison (1767) (Figure 5.23) shows a very clear stratification of inmates, who are held in the deepest spaces and the warders who are in the most superficial spaces. In addition there is a clear spatial segregation by types of inmates; by sex and by reason for incarceration, debtors being held separately to felons. This is similar to the inmates i.e. patients at Haslar who were held in the deepest spaces and who were segregated into wards depending on the severity and type of their disease.

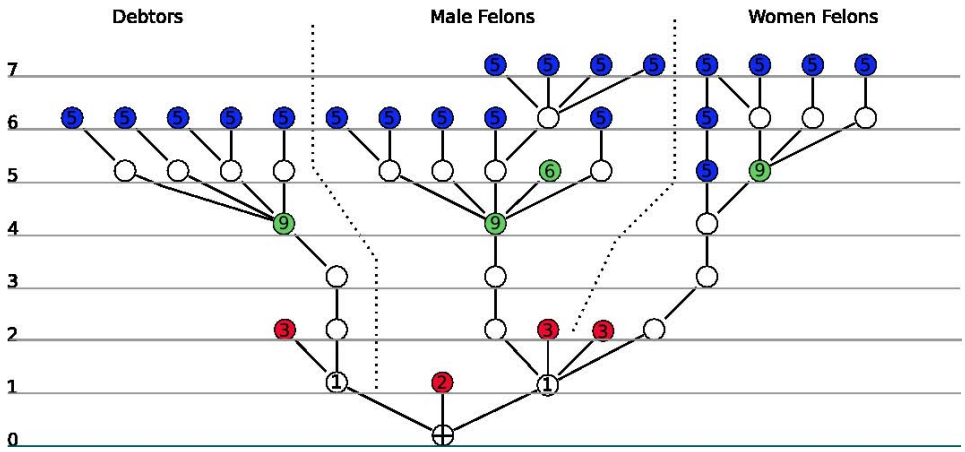
Liverpool Infirmary (1745) (Figure 5.24) again shows that the patients occupy the deepest spaces, the wards and exercise areas, but the picture here is somewhat more mixed with some staff spaces also lying deep in the structure. However these latter spaces need to be adjacent to the wards in order to provide care to the patients. The accommodation, particularly for the upper strata of the hospital such as the matron, are in a shallow space; an arrangement identical to that found at Haslar. As there, is no requirement to restrain the patients the depth of the wards must be interpreted as a desire to offer privacy. In other words, in this civilian hospital the structure controls the ingress of visitors rather than controlling the egress of the patients.

The common factors between each of these sites therefore are:

Figure 5.22: 33 Field Hospital, Iraq conflict, 2003

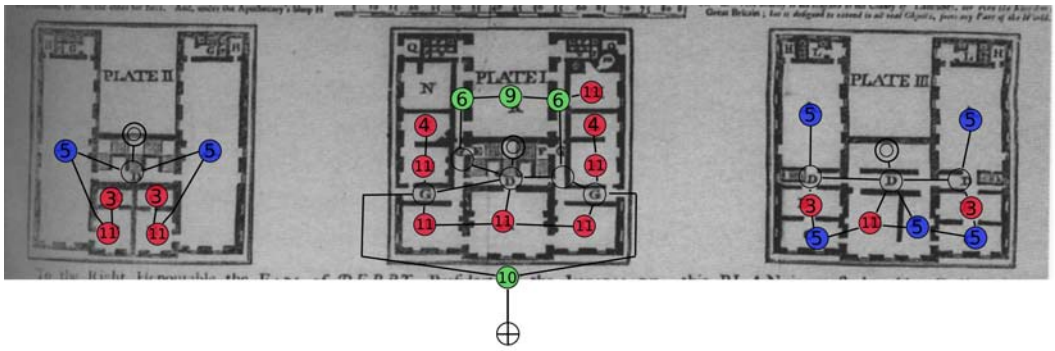
Figure 5.23: Newgate Prison (1800) access graph

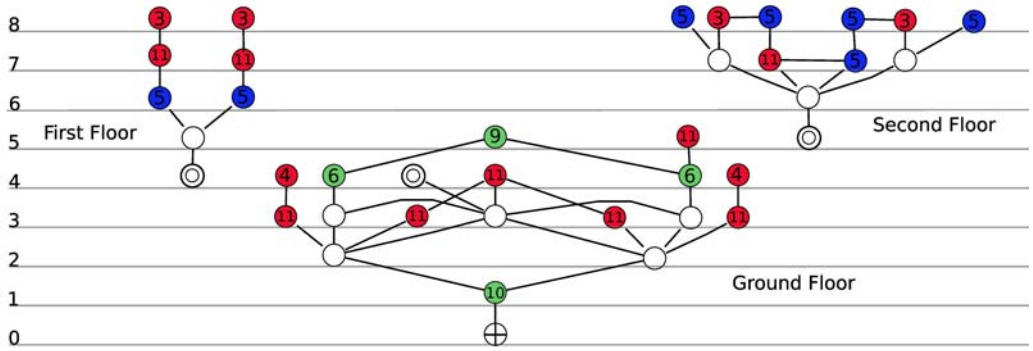




Modified from an image held in the Crace Collection, British Library

Figure 5.24: Liverpool Infirmary access graph





Modified from Stevenson (2000, 139)

- Inmates (patients or prisoners) occupy the deepest spaces.
- Inmates can be spatially segregated by disease type or crime.
- Inmates are restricted to certain areas of the external part of the site.
- Staff occupy the shallower spaces and the upper strata of the staff tend to occupy the shallowest spaces.

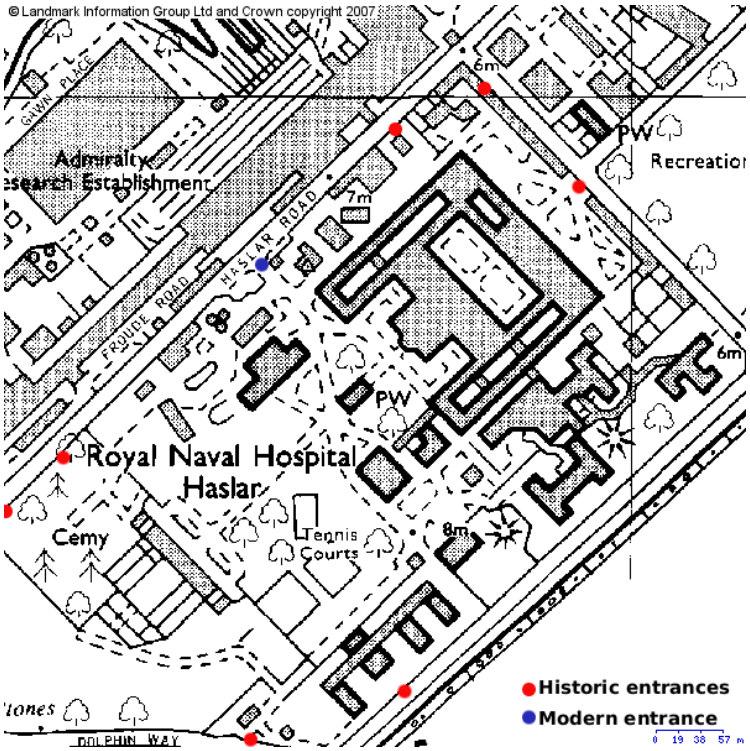
Perimeter Wall

The outer security of the Haslar site is provided by the perimeter wall that is dated to the mid eighteenth century (Conservation & Design Dept., Gosport Borough Council 2006) and is therefore contemporary with the construction of the main part of the hospital. The wall remains largely intact on the north-east and north-west margins of the site; its original form on the south-west margin is difficult to discern due to the later construction of the Officers' Terrace (1796). Its appearance in 1809 is shown in a watercolour sketch (which is on display in Gosport library) by a soldier from the 2nd West Yorkshire Milita, John Durant, who was stationed at Haslar Barracks. This sketch of the north-east aspect of the site shows that the perimeter wall is lower than today; the current appearance of this wall is shown in Figure 5.25. There is a clear change in the colour of the bricks in the upper part of the wall to the left of the picture where there is a building against it. This building is one of a pair of storehouses built in 1853; the change in the brickwork must mean the height of the perimeter wall here was increased to accommodate the building rather than to increase the security as the height of the perimeter wall elsewhere remained unchanged.

By the middle of the nineteenth century plans of the hospital show that several openings had been made in the perimeter wall, for example to the 'Works' area in the north corner of the site (shown as a bricked up gate to the right of Figure 5.25) and in the north-west wall giving access to the cemetery (Figure 5.27). Whilst these entrances could have been either locked or guarded the presumption must be that, at the time they were inserted, the risk from desertion had diminished and there was no significant external threat that would require a strong perimeter defence. The evidence however is somewhat mixed as the wall surrounding the cemetery contains gun loops (Figure 39) which face the paddock. Three of these openings remain and there were probably more but part of the wall has collapsed. There is no 'scarring' in the adjacent brickwork and they are made from the same brick as the rest of the wall. It is my interpretation therefore that they are contemporary with the main construction phase of the wall and are not a later addition. The wall surrounding

Figure 5.25: North East Perimeter wall looking south

Figure 5.26: Access points to site



Modified from 1991 OS map (Digimap)

Figure 5.27: Gate to cemetery

the paddock is securely dated, by an incorporated date stone, to 1857. The wall surrounding the cemetery is harder to date. It must post date the consecration of the cemetery in 1826 but there would be no requirement to incorporate defensive gun loops at this time as there were no significant military threats.

A later date of 1857 for the construction of the cemetery wall would make more sense as there was a real fear at this time that a French army would land to the west of Haslar and seize the peninsula in order to control the harbour entrance. These gun loops would have provided an effective field of fire over the paddock area which would be the logical route of an invading army.

The majority of the gates that were inserted in the wall were later bricked up; the date for this is unknown but presumably reflected a growing concern with an external threat. Haslar is adjacent to a motor-torpedo boat base and a main submarine base and the whole area would, therefore, have continued to have been of significant military importance throughout the twentieth century; this would have required all of the sites to be made secure. The bricks and workmanship used to seal the additional gateways is of a high standard and in my opinion was probably carried out around the period of the First World War rather than later.

Some changes in the perimeter security occurred in modern times and these will be discussed in the section on terrorism on page 44.

Figure 5.28: Gun loop in cemetery wall

6 Influence of ærial bombardment

There are deep cellars extending under all of the main blocks of RNH Haslar but there are no cellars under the outlying blocks such as the Sick Officers Block, Zymotics Block and the staff accommodation areas. In the Second World war the cellars under the main hospital would have provided good protection from all but a direct hit and there is photographic evidence that they were used as emergency operating theatres (Figure 6.1). They were also probably used as temporary wards (Birbeck - personal communication) but no photographic evidence for this has been discovered. In my opinion, from a practical point of view, it is unlikely that patients were accommodated in the cellars permanently but would have been taken there when the air raids were most intense.

Where there were no cellars underground air raid shelters were built; their location is shown in Figure 6.2. A recent personal visit has shown them to be in an excellent state of preservation with sound concrete walls and no significant water ingress; the built-in bunks and seating are in almost perfect condition. The shelters adjacent to Zymotics Block (Figure 6.3) and the accommodation blocks have vertical internal walls made from concrete poured *in situ* and are entered by a steep set of stairs. There is a vertical emergency escape ladder at the far end of each shelter. Each shelter has about 20 bed spaces but could accommodate more if necessary.

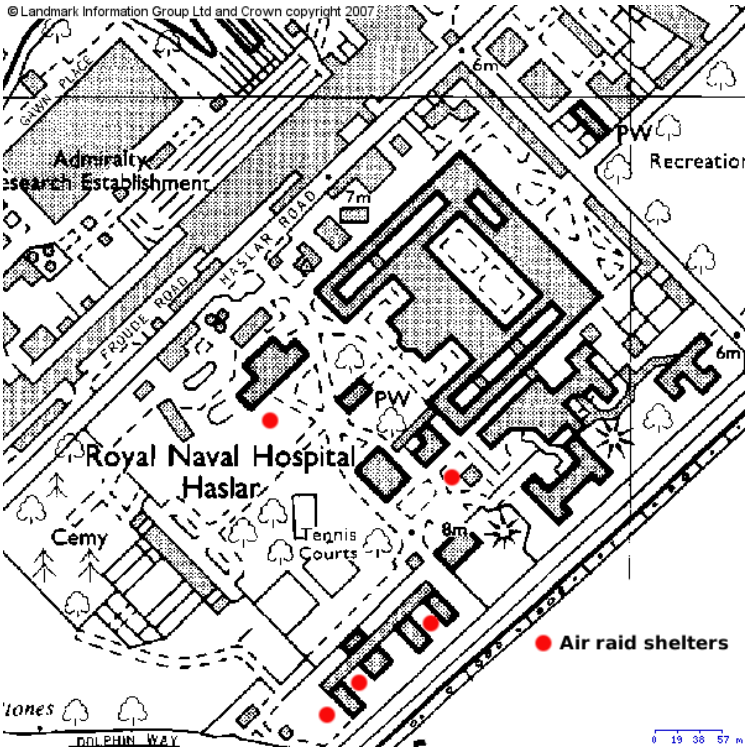
The shelter adjacent to the Sick Officers' Block uses the slope of the ground to provide an alternative entrance arrangement. It is built with about half of its height above ground level and internally it has a circular cross-section with the walls constructed from pre-cast concrete. There is a large mound of earth covering the above ground portion. The shelter is composed of two connected 'wings' with three entrances and one emergency exit (Figure 6.4).

My interpretation of these differences is that the shelters adjacent to the Zymotics Block and accommodation buildings were used by only a small number of people, possibly only staff who were off duty. The shelter next to the Sick Officers' Block however would have to be used by both the patients and staff. This type of shelter however would have taken more resources to construct than the completely underground type used elsewhere. There are no shelters associated with the main blocks of the hospital presumably because the patients and on duty staff would have used the cellars for shelter.

Figure 6.1: Operating theatre in the hospital cellars

©Ministry of Defence

Figure 6.2: Extant air raid shelters



Modified from 1991 OS map (Digimap)

Figure 6.3: Air-raid shelter, Zymotic Block

Figure 6.4: Air-raid shelter, Sick Officers' Block

Figure 6.5: Shelter sign B Block

The plans to use the cellars as shelters continued into the Cold War period and there were instructions to staff (author's personal recollection) about the use of the cellars in the event of a Soviet attack. As the cellars are not hermetically sealed their use would only have been of any benefit in the event of a conventional attack. They would not have provided any defence against a nuclear, biological or chemical attack. The only remaining visible reminder of their use is a sign at the end of B Block (Figure 6.5).

7 Influence of terrorism

Terrorist activity is known as an 'asymmetric threat' whereby a small, relatively ill equipped, force can produce a military effect substantially greater than its size and this requires a disproportionate defensive effort on the part of the conventional force - in this case RNH Haslar. As the main terrorist weapon is the improvised explosive device (IED), which requires to be placed in close proximity to the target, the principal defence against such a threat is in preventing the terrorist from gaining access to the site. Since Haslar also acted as the local civilian hospital restricting access was, and is, difficult. Although this threat is relatively recent the threat of direct assault has been present since the middle of the nineteenth century as has already been discussed on page 36 with respect to the gun loops in the external wall (Figure 5.28 on page 39).

Access control was effected by securing the perimeter of the site against unauthorised entry and so the limitation on the number of access routes into the site persisted. Although a new main gate was created in 1980, on the north-west perimeter as part of the Cross-Link construction, the old main entrance (Figure 5.25 on page 37) was closed and only used for ceremonial purposes. The earlier closure of entrances created in the nineteenth century ensured that there continued to only be one route into the hospital which was, and is, permanently guarded. At times of heightened threat in the 1980's, sandbag revetments were added to the gate defences to provide cover for the armed sentries (personal recollection). The threat on the mainland was never, however, considered severe enough to construct permanent pill-boxes such as those found at the Army hospital at Musgrave Park, Belfast (Figure 7.1).

The original perimeter walls around the main part of the site are of sufficient height to prevent unauthorised access, however the sections along the south-east, adjacent to the sea wall had been lost or reduced in height and those built around the paddock in the south-west part of the site were too low to provide an adequate defence. These weak spots were reinforced with the construction of a wire fence topped with rolls of barbed wire. The gap between this fence and the original wall was kept clear of obstructions and is illuminated at night in order to provide a further deterrent to unauthorised access (Figure 7.2). Other security measures, such as random armed patrols, were also instituted but none of these involved any

Figure 7.1: Guard House, Musgrave Park Hospital, Belfast

changes to the buildings or grounds (personal recollection).

In 1991 the IRA attacked Downing Street with mortars. The change of tactics to these 'indirect fire' weapons meant that the perimeter defences at Haslar were inadequate to protect against this new threat. Those parts of the perimeter close to the accommodation areas, which were considered to be at highest risk, were strengthened with the additional fencing to increase the height of the perimeter as a defence against mortars (Figure 5.25 on page 37). At the same time additional gates (Figure 7.3) were placed at the main entrance which could be closed at times of heightened security in order to completely seal the site.

The threat from IEDs remained and precautions were taken to reduce the places where these weapons could be hidden. The ground level vents which led to the basement of the main hospital blocks were sealed with additional, surface level, gratings to prevent IEDs being placed next to this building (Figure 7.4).

Figure 7.2: Modern security fencing and lighting

Figure 7.3: Modern security gates and fencing

Figure 7.4: Ground level vents, 'B' Block

8 Influence of medical requirements

In the eighteenth and early nineteenth centuries hospitals were considered dangerous places for both the patients and the healthy population outside. The accepted causation of diseases, particularly fevers, was miasma, and contagion and the concentration of patients was considered to be a potent source of these. Writing in 1799 Sir Gilbert Blane, the first Medical Director General of the Royal Navy, stated that

> 'One of the most striking proofs of the value of pure air is the great difference in the success of treatment ... in private houses , from what it is in an hospital' (Stevenson 2000, 155)

His meaning here is that hospitals, by gathering the sick together, creates an unnatural environment which hinders treatment. Dispensaries, that is hospitals without in-patients or beds, were a logical solution and many were built around this period. When stating his preference for treatment in private houses he cannot, however, have had in mind the earlier system of nursing sailors in private lodgings under contract since the Navy Board reported in 1744 that it was 'a method liable to such abuses as are often fatal to the health of seamen' (Tait 1906, 27) as the conditions were squalid and the men liable to severe intoxication.

Miasma was thought to arise from decaying organic material and contagion from diseased individuals and both were recognised as being associated with foul and obnoxious smells. It is important to recognise that the air was not considered as a vector of the disease (in the way that we would understand that air could transport bacteria) rather the foul air itself was the causation of disease (Porter 1997, 259). It was well known that warm air rose and, by association, it was thought that miasma and contagion would do likewise and become more concentrated on the upper floors. To reduce the risk the sickest patients were nursed on the upper floors so that no other patients would need to reside in the dangerous location above these patients. In 1792 Tenon and Lavoisier, on the committee advising on the rebuilding of the Hôtel-Dieu in Paris, advised that hospitals should never be more than three stories high to prevent excessive concentration of contagious air (Stevenson 2000, 162). It is not clear if this advice was formulated from seeing Haslar and Stonehouse (both of which have three stories) but, for more than twenty years, it had been stated (Foster 1768 cited in Stevenson 2000, 162) that 'Vapours and Exhalations' grew

more concentrated as they ascended. This accepted wisdom could have influenced the design of Haslar. Tenon and Lavoisier were also concerned with recommending the amount of air required by each patient, and thus the height and bed occupancy of each ward.

Such was the fear in which contagion was held that most civilian hospitals refused to admit patients with a fever. This was not an option for the doctors at Haslar who were obliged to admit all naval patients regardless of diagnosis.

Civilian hospitals in the mid eighteenth century were normally built in rural area adjacent to the town in order to provide a suitable healing environment. Since hospitals, even those that did not admit fever patients, were regarded as inherently dangerous places, this isolation provided a measure of protection for the general public. Examples of this can be seen in contemporary engravings such as that of the London Hospital (Stevenson 2000, 134), which, even after discounting the artistic license which depicts rocky outcrops, shows the rural isolation of these hospitals.

Since the presence of 'foul' air was the seen as the cause of disease, the provision of clean air was a vital necessity for a hospital. The contribution of the architecture was noted by Sir Gilbert Blane (Stevenson 2000, 193) who attributed the increased mortality rate at Haslar compared to the naval hospital at Plymouth to the lack of free circulation of air at the former because the wards were too close together. There must have been many confounding factors in this data and it is impossible to determine if the different architecture was the true cause of the observed increased mortality. Whatever the case it shows that the design of a hospital to promote the circulation of fresh air was considered a key element at this time.

The proposed colonnaded quadrangle at Haslar had both military and civilian precursors. The British naval hospitals at both Gibraltar and Port Royal were built as colonnaded quadrangles but it is not known if these influenced Jacobsen's design for Haslar. His earlier design for the Foundling Hospital in London is widely regarded (Stevenson 2000, 176) as a significant influence on the design of Haslar; here the inner aspects of the ward blocks consist of colonnaded walkways identical to those at Haslar. The ward blocks at the Foundling Hospital are separated at the corners, a feature found in many contemporary hospitals, to promote the free movement of air across the quadrangle. At Haslar the wards are joined at the corners, improving security but reducing the free passage of air.

At Haslar the inner courtyards act as light wells for the windows on the inner faces of the wards and allow for air circulation. Original plans show that there were to be kitchens and labourers halls within these courtyards which would have obstructed the free passage of air. Although shown on the earliest illustrations and plans (Howard 1789b cited by Stevenson 2000, 181) they are not shown on later

ones; it is not clear if they were initially built and then removed to improve air circulation or if the initial plans were purely aspirational. There are no scars on the current brickwork to indicate any earlier structures. The absence of buildings within the courtyards allowed them to form part of the patients' exercise area as has already been noted on page 26. The inner courtyard also allowed the wards to have pairs of windows opposite each other so that a cross current of air could be promoted, something that was not possible in the double pile ward blocks at Plymouth (Figure 5.17 on page 30).

In the early eighteenth century there was a vogue for providing assisted ventilation, using various mechanical devices, in ships, hospitals and prisons. Various designs were advocated and there is evidence that the Admiralty carried out trials of Hales ventilators in ships (Stevenson 2000, 163-167). By the second half of the eighteenth century they had fallen out of favour and there is no evidence that they were ever installed at Haslar. Indeed Sir James Lind, the first physician appointed to Haslar, opposed mechanical methods of ventilation (Stevenson, 2000, 153) preferring to rely on natural methods such as open windows. He overcame the sailors' propensity to close them to prevent drafts by the simple expedient of nailing the windows open (Howard 1789a, 7).

The medical requirement to have open windows clearly causes a reduction in security and for this reason all the ground floor windows had bars fitted in 1796 when the fence across the quadrangle was erected (as discussed on page 21). Although the failure to build the fourth range is normally attributed to spiralling costs (Revell 1979), it had the advantage of allowing a greater circulation of air in the quadrangle and thus medical considerations could have influenced the decision, although there is no evidence for this. Tait (1906) certainly regarded the final arrangement as advantageous in this regard and it mirrored many other civilian hospitals of the time being of a 'U' shape.

This preoccupation with ventilation and air extends into the early twentieth century when Tait (1906) devotes large parts of his guide to Haslar to praising the generous volumes of air per patient and the new designs of ventilator that have been installed. One such device was the Shoreland stove which drew fresh air in from outside, heated it and then passed it into the ward. Stale air passed from the ward into vents in the chimney breast. For best effect it was recommended that these stoves were placed in the centre of the ward as can be seen on the right of Figure 8.1.

Exercise was an important component of rehabilitation and, with the ending of impressment, the necessity to confine the patients had passed they could be permitted to use more of the grounds for exercise. Ordnance Survey maps from 1854

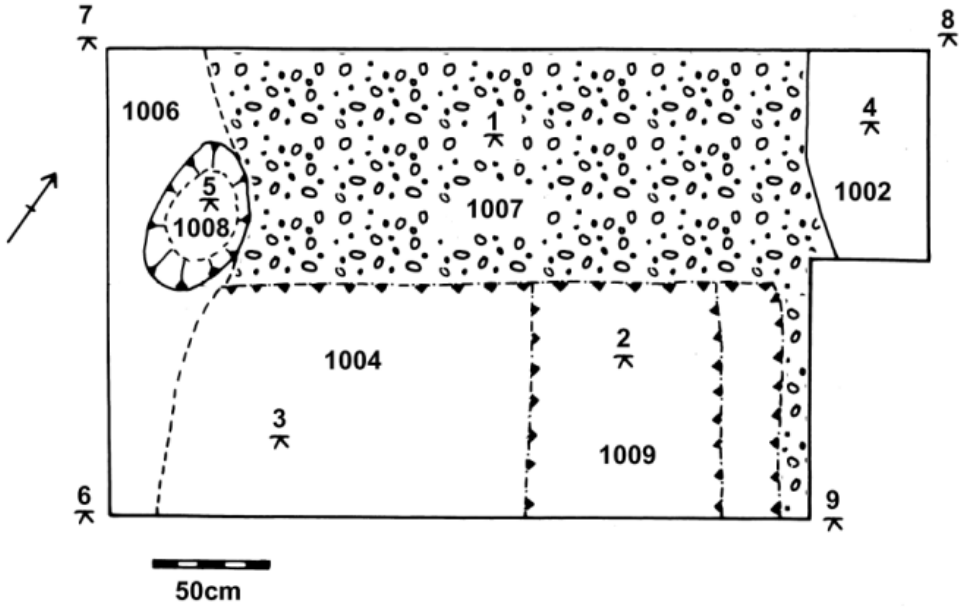
Figure 8.1: Shoreland stove

show a 'U' shaped path passing in front of the Admiral's Residence and connecting 'A' and 'F' Block. Excavations (Buxton 2005) have shown that this path (context 1007 in Figure 8.2) was made of hoggin (compacted clay and gravel) and tree lined. Two hospital uniform buttons, dated to the early nineteenth century, were found adjacent to the path confirming that it was used by patients.

The maintenance of the wholesome air within the hospital also required that sewage was disposed of efficiently. Modern thinking would clearly attribute the health aspects of this policy to the prevention of waterborne infections, rather than foul air or smells but, the practical effect on the prevention of the spread of disease of this excellent piece of civil engineering is the same. The original design for the hospital (Figure 5.4 on page 19) shows a dedicated 'water-closet' for each ward which were connected to the large central drain which ran along the main axis of the hospital, and emptied into the sea close to the hospital jetty. Howard (1789a, 7) stated that the 'inside sewers were offensive' but improvements must have been made as they are still in use today with the only change being the installation of an intercepting sewer outside the establishment to divert sewage from its outfall in the sea to the main local sewer.

The provision of clean water was also a requirement. Initially at Haslar numerous shallow wells were dug which produced rather brackish water. On local advice a

Figure 8.2: Excavation plan of patients' path



deeper well was sunk which produced good quality water (Tait 1906). In 1858 the water tower, adjacent to the modern entrance, was built to improve the distribution of this water throughout the hospital. As with the sewage system, the efficacy of this system is apparent from the fact that the hospital still takes the majority of its water from this well with only a small supplementary supply from the local civilian water main.

Wards should provide as much isolation as possible both as a social requirement to provide privacy and a medical one to reduce the chances of cross infection. On the access and planning graphs (Figs 5.5 to 5.13) this would manifest as showing the wards to be the deepest space and for them to lie at the end of a branch and not form part of a ring. In access analysis terms the latter is a feature of a space that acts as a thoroughfare whereas the former is a destination and not used to reach other spaces. RNH Stonehouse (Figure 5.17) demonstrates this in its purest form whilst Liverpool Infirmary (Figure 5.24) shows that some of the wards are on a ring, although the wards are some of the deepest structures. The 'rings' at Liverpool however only connect 'medical' spaces such as nurses' rooms and offices and do not represent a public through route.

At Haslar, by contrast, the early plans (Fig 5.6 on page 21) show that two of the four main wards are shallow (level 4) and are on a ring, one of the main wards (level 8) is a through route to the remaining main ward which is the only one to be both deep and at the end of a branch. In medical terms Haslar is therefore less well

designed than Stonehouse.

The remaining ward (level 9) is very small and is accessed through a nurse's room. My interpretation of this is that this would have been used for patients, such as officers, who required greater privacy. An alternative explanation would be that it was used for a particularly sick patient who required additional nursing but I believe that this is less likely given the state of medicine at this time.

Once the quadrangle was enclosed (Fig 5.12) the wards became slightly deeper but their relationships were otherwise unaltered. Figure 5.13 postulates the locking of a particular door, this makes the wards even deeper and removes the presence of a ring which has beneficial military and medical effects. This shows the weakness of access graphs which show the possible connections between spaces but do not indicate how these spaces were used and a small change, such as the locking of a door can have a profound effect which cannot be determined from the original topographical plans or the derived access graphs. From personal experience, whilst a ward may appear to be on a ring the disapproval of a ward sister to the use of a ward as a short cut can significantly alter the likelihood of it being so used.

As can be seen from the planning graph of 'E' Block access around the hospital, other than at ground level, takes place through the wards. The alternative of returning to the ground floor to move between wards would not have been easily enforceable and it is unlikely to have always occurred even if they were so directed. The risk of cross infection is increased by the use of wards as access routes but since the most infectious patients were placed in the top floor wards this was minimised because, as the central pavilions are only two stories, these upper wards are 'dead ends' and thus not subject to through traffic.

The problems associated with the wards on the first floor acting as through routes was not resolved until the 1970s when there was a complete internal rebuilding of 'D' Block. This filled in the central courtyard to provide wards running parallel to a separate central corridor. In the other blocks the central courtyards were retained but one set of wards on each floor was converted to a corridor with sets of offices partitioned out of the original ward space. This removed the wards from a ring but reduced the number of beds available and this solution would not have been possible earlier when all of the beds were required.

9 Balancing medical and military requirements

The previous sections have described the various military and medical requirements and the various design and utilisation strategies adopted to meet them. Not all of these requirements were mutually compatible and this section will discuss how they were reconciled.

Some of the requirements were either mutually compatible or neutral and these will be discussed first. Haslar's isolated location, which was initially only accessible by boat, provided both military security to prevent desertion and helped to isolate the contagions it contained from the healthy general public. This isolation and the surrounding perimeter wall thus provided what, in modern parlance, would be called effective bio-security and military security without compromise to either objective.

As the hospital developed the wards became deeper and most moved from being on a ring to being at the end of a branch. These changes were advantageous for military security, improved patient privacy and reduced the risk of cross-infection and they were achieved without compromise.

If patients were allowed to become drunk there would clearly be an increased likelihood of military disorder; in addition such intoxication was felt to hinder their clinical recovery. The prevention of the smuggling of liquor to the patients was therefore both a medical and a military requirement.

The medical requirement to provide potable water for the patients was achieved through the use of on-site wells which were not detrimental to the military requirements. This medical necessity could, therefore, be met without compromise.

Not all of the requirements however could be met without some compromises having to be made. As has been previously described foul air was considered the principle cause of disease and the provision of fresh air, both within the wards themselves and around the buildings as a whole was considered an important medical requirement. Open windows and widely spaced buildings however could just as easily let sailors escape as they could let in fresh air; certain compromises had, therefore to be made.

Ground floor windows were barred and patients were only allowed to exercise within the confines of the inner courtyard and colonnades. As the risk of deser-

tion decreased however these restrictions on movement were relaxed and they were allowed to range more freely within the whole of the grounds. It is impossible to determine whether this initial restriction on their movement had any actual effect on their physical recovery; it would be reasonable to postulate however that it could have been detrimental to their psychological recovery. Whether or not there was any *actual* effect, the medical opinion at the time was that access to fresh air was essential. It is likely therefore that such restrictions of movement were regarded as a compromise *at the time* and by these contemporary standards the medical requirements were subjugated to the over-riding requirement for security.

The closure of the quadrangle with iron railings rather than a wall allowed a better circulation of air which was regarded as a medical advantage by Tait (1906) and may have been similarly regarded by the physicians when the fence was originally constructed. It is impossible to determine whether such medical considerations played any part in the decision or whether the perceived medical advantages were purely fortuitous.

The removal of waste via the sewers was essential to preserve sanitary conditions within the hospital but did represent a security weakness. These sewers directly connected the inner courtyards, which were very deep spaces (level 6 on the access graphs), with the outside world (the root node); they were, therefore, an attractive route for escape and for smuggling liquor. To mitigate this risk it is believed (Revell 1979) that guards were placed at the outfall of the sewer where it entered Haslar Creek.

The cellars of the main hospital buildings, being damp, poorly ventilated and unlit, were not an ideal place for either wards or operating theatres however they were a good refuge from ærial bombardment during World War II. Given the dangers of remaining above ground the medical compromises that had to be made were probably regarded as a small price to pay for the security the cellars provided.

Modern medical practice regards visits from friends and relatives as an important contribution to patient well-being. Free access to this military site, when there is a possibility of terrorist attack, is clearly a risk. It is partly mitigated by restricting access to a limited number of guarded entrances and other security measures but this does not completely resolve the issue and compromises have had to be made.

10 Conclusion

The design of RNH Haslar has had to encompass both military and medical requirements which, whilst not wholly incompatible, certainly required compromises to be made. These requirements altered over the subsequent 250 years and the fabric of the hospital, and the way it was used, had to alter to accommodate them. Some of these changes, such as the requirement for guards, are only known because of documentary evidence; some, such as the restrictions on the use of certain paths, are known through oral history; whilst for others the only evidence is in the fabric of the existing buildings.

The most striking military change was that the initial threat was an internal one of desertion and disorder which changed, in the late nineteenth century, to an external threat of bombardment or direct assault. The defences had to change from inward looking to outward facing and this is reflected in the material remains and the documentary evidence.

The defences against the internal threat were not just the perimeter wall but the whole design and use of the hospital; wards were placed deep in the structure and were locked, exercise areas were enclosed and the whole site was guarded. Current academic debate centres around how much a building can control people and influence the power relationships between them. Markus (1993, 12-18) states that social relations explain both society and the buildings they construct such that building design is derived from the societal relations. He further asserts that the purpose of a building is to interface the controllers of a building (i.e. the medical staff) and the visitors (i.e. the patients) whilst excluding strangers.

This dissertation has made extensive use of justified access graphs to identify these social factors and to interpret Haslar in relation to other military and civilian institutions. Richardson (2003), with respect to spatial analysis studies of medieval buildings, says that they "can reveal much about the configuration of space in the social formation of power relationships". Can the same be said for their use in the buildings studied here? At Haslar spatial analysis showed a progressive deepening of the wards as the building evolved to reduce the numbers of desertions but the greatest increase in depth came by locking a particular door (Figure 5.13 on page 26); this was postulated, and supported by some documentary evidence, but was not revealed by the access analysis. This shows that a weakness of this type of analysis is that it

cannot reveal anything about the 'soft landscape' - that is how a building is actually used. A ward may appear to be on a 'ring', implying it is a circulation space, but strong pressure from the ward staff may mean that it is not used as a thoroughfare and thus functions as if it was at the end of a 'branch'. Thus it can be inferred that access analysis must be used in conjunction with documentary evidence to show how the building was actually used and that the pattern revealed in the graph must be set in the context of its actual usage. The minutiæ of day to day usage, however, are unlikely to be recorded; what, to someone like myself who has worked there for many years, is an obvious limitation on usage is by no means obvious to others nor can it be inferred from the plans or access graphs.

The access graphs at Haslar have allowed a very complex building to be seen from another viewpoint which has allowed me to demonstrate that the enclosure of the quadrangle must have been accompanied by other changes, the remnants of which are still visible (page 21); as far as I can tell this was previously unrecognised.

When used to compare different buildings the utility of the access graph is less clear. Haslar and Stonehouse were built at approximately the same time; to the same overall brief, the memorandum from the Navy Board on page 5; and, as they were an identical population with the same rules, the power relations between the staff and the patients must have been the same. Despite these similarities the access graphs are different, Haslar has deeper wards which, at least initially, were on rings whereas at Stonehouse the wards were shallower and on branches. Although the *graphs* are different there are striking similarities in the actual *appearance* of the two hospitals in that both have a basic form of a central quadrangle surrounded by an open colonnade. This form was used at the earlier naval hospitals at Gibraltar and Port Royal and at the later one in Great Yarmouth. It is reasonable to conclude therefore that this basic form was used to balance the competing requirements of security with the need for access to fresh air and exercise.

The central premise of spatial theory, that social meaning is encoded in the physical layout, cannot be supported by the substantially different access graphs that have been developed from the plans of the two naval hospitals, which should have the same social meaning. This may however reflect a weakness of access graph analysis rather than the spatial theory itself since the underlying structure of the two sites (a colonnaded quadrangle) is very similar.

This was an active period of hospital building with much experimentation with various designs; the navy was in the vanguard of this change with Stonehouse being the proto-typical pavilion style hospital. Indeed if one were to straighten the colonnade at Stonehouse into a linear walkway it would have a very similar appearance to that of the later, typically pavilion hospital, Royal Herbert hospital (Figure 5.21).

This active innovation and experimentation with different designs probably explains the differences between Haslar and Stonehouse.

Both Haslar and the civilian hospital examined show that the spaces occupied by the patients are the deepest ones but the respective meanings of this are different. At Haslar this depth is related to a requirement to control the patients and to prevent them escaping. At the civilian hospital there is no requirement to prevent the patients escaping and the depth of the wards is used to control access to the patients and allow them some privacy. It should be recognised, however, that this is an interpretation based upon modern medical practice and that the original power relationships between staff and patients could have been very different. It would be equally valid to recognise that civilian patients *are* controlled by the staff, albeit in a less formal way than the military, and that the design reinforced this control.

Comparing Haslar to Newgate prison shows similarities in that the spaces occupied by the patients or prisoners are deep. At Newgate this depth however is 'hard-wired' into the building plan whereas at Haslar the depth is only achieved by locking or guarding certain doors. This difference may reflect the compromises that had to be made at Haslar between the medical and military requirements. Although it would not have been a consideration at the time the arrangements at Haslar allowed for later flexibility in usage. As the threat of desertion reduced doors were no longer locked or guarded and the wards became shallower and more closely resembled a civilian hospital. Such changes would have been difficult or impossible if the original security had been more formally built in as was found at Newgate prison.

The design of the building did not just affect the patients; there is evidence that the staff were also affected. It is clear from the access graphs that there was stratification of the staff, in both Haslar and the civilian hospital, such that the more junior staff inhabited the deeper spaces. Their space lay between the peripheral space, occupied by the senior staff such as matron, and the deepest space occupied by the patients. According to spatial theory (Markus 1993, 12-18) the deeper spaces in a public building such as a hospital are of a lower status and this would fit with the stratification described above. Caution must be exercised here however as the reason the junior staff were positioned as they were may have had more to do with their requirement to be close to those they were nursing than a reflection on their social status.

In the quote on page 1 Churchill was referring to the re-building of the debating chamber of the House of Commons following its war time damage. He argued that it should not be expanded, to allow all of the members a seat, since this would alter the dynamics of the relationships within the chamber and lessen the quality of the debates. He clearly believed that buildings could have a significant effect on the way

people interacted.

Over the years we, the military, have shaped Haslar to balance the changing and competing military and medical requirements and this 'shaping' continues to the present day as Haslar transitions to a fully civilian hospital. But has Haslar shaped us? By constraining and controlling their movements, the design certainly shaped and reinforced the relationships between the staff and patients in the past. In the present the effect is less obvious but does persist with rules governing the use of certain paths or the wearing of uniform in particular areas, but I also believe it affects us at a more spiritual level. As a naval medical officer walking around the same wards used by James Lind, the father of naval medicine, or crossing flagstones over which the wounded from Trafalgar passed is a profound experience.

Over its more than 250 year history the Royal Naval Hospital Haslar has been shaped to cope with changing requirements and in its turn, over the last 26 years, it has shaped the author.

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