

HISTORY OF MEDICINE

Henry Currey FRIBA (1820–1900): leading Victorian hospital architect, and early exponent of the “pavilion principle”

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Postgrad Med J 2002;**78**:352–359

The “pavilion plan” for hospital design originated in France in the 18th century and was popularised in England by John Roberton and George Godwin in the mid-19th century; the underlying rationale was that with improved *ventilation* the mortality rate (at that time exceedingly high) was significantly reduced. Among the enthusiasts for this *new style*, was Florence Nightingale (herself a miasmatisist)—who had experienced astronomically high death rates in the hospital at Scutari during the Crimean War (1854–6). One of the leading exponents of this style of hospital architecture was Henry Currey (1820–1900) whose greatest achievement was undoubtedly the design for the *new St Thomas’s Hospital* on the Lambeth Palace Road.

was a greater degree of separation and segregation, than was provided by earlier designs, together with greatly improved “ventilation”.

BIOGRAPHICAL NOTES

Henry Currey was born in October 1820³⁻⁵; he was the third son of Benjamin Currey, a solicitor of Old Palace Yard, Westminster, who had for “many years [been] one of the Clerks of the Table” in the House of Lords.⁷ Educated at Dr Pinckney’s School at East Sheen, and later at Eton, he held the distinction of having rowed in the school eight against Westminster. For five years, he was articled to Decimus Burton (1800–81)⁹ who had himself designed the *new* Charing Cross Hospital, built in 1831–4; following this he “went into the office of . . . William Cubitt [1791–1863] & Co, Gray’s Inn Road”, for nine months.^{6,7} He then travelled in Germany and Italy, and following his return began practice as an architect (from his residence in Brook Street, Grosvenor Square) in 1843. He “obtained the first premium” in competitions for “the erection of houses and terraces in Toxteth Park, Liverpool”, and also “the enlargement of the Surrey County Lunatic Asylum”.^{6,7}

In 1847, Currey was appointed architect and surveyor to the Governors of St Thomas’s Hospital (a post which he held until his death) and moved to offices at 4 Lancaster Place, Strand; when that

The Architect and Contract Reporter for 30 November 1900, recorded¹:

“The profession of architecture in London has been deprived of a prominent representative by the death of Mr HENRY CURREY (fig 1). His St. Thomas’s Hospital [built in 1868–71] is an enduring evidence of his skill, for, as it was one of the first to exemplify the advantages of the pavilion principle, it continues to be, after a quarter of a century, referred to as *the* [my italics] type of a modern hospital. Numerous as were the buildings Mr CURREY designed, they represented only a part of his activity. He was recognised as a sound adviser on all questions relating to property in building, and as an arbitrator his experience was of much value. Mr CURREY was indisposed to seek after prominence outside the professional limits he had fixed for himself, but as an architect he won the respect of all who consulted him or were associated with him in business”.

The “pavilion principle” (which was introduced into England in the mid-19th century—before the “germ theory” of disease was accepted—and continued, without serious challenge well into the 20th) had been advocated by, among others, Florence Nightingale (1820–1910) (who was essentially a “miasmatisist”) following her nursing experiences in the Crimean War (1854–6).² This form of construction significantly improved the patients’ chance(s) of survival (which had hitherto been depressingly poor in hospitals throughout Britain). The “pavilion plan” was both sanitary for the patient, and convenient for the nurse.² It was dependent on the fact that there



Figure 1 Henry Currey FRIBA, 1820–1900 (*The Building News* 1890;**58**:169).

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Submitted
3 December 2001
Accepted
20 February 2002

In 1845, Currey married the youngest daughter of Sir Charles Price Bt (1800–72).^{6,7} Percivall Currey (1851–1918),⁸ one of his sons, also became an architect. Currey died at his home, The Chestnuts, Lawrie Park, Sydenham on 23 November 1900.^{4–6}

Although it is widely assumed that architects and members of the medical profession have always worked closely together, satisfactory examples of close cooperation are few and far between²; Currey was an excellent example!

SANITATION, VENTILATION, AND THE “PAVILION PRINCIPLE”

Nightingale was anxious to incorporate *sanitary reforms* (especially improved *ventilation*) into hospitals (earlier advocated by Southwood Smith¹¹), probably largely as a result of the very high mortality rate (due principally to poor hygiene—as first suggested by the statistician William Farr FRS [1807–83]¹²) in her hospital at Scutari. She had initially attributed the fact that the mortality rate at that hospital was up to three times higher than in primitive front line hospitals in the Crimea, to *overcrowding* and/or the advanced state of the cases, rather than to poor sanitation.¹³

Nightingale was by no means the *originator* of the “pavilion principle” however; *in Britain* this must go to the surgeon (appointed to the Manchester Lying-in Hospital in 1827) John Robertson MRCSE (1797–1876)^{14,15} together with the editor of *The Builder*, George Godwin FRS (1815–88)—who publicised the “plan”; both blamed inadequate ventilation and poor planning for the prevailing high mortality in British hospitals. Robertson began his first paper¹⁴:

“the air we breathe is called in the Scriptures ‘the breath of life’; when we cease to respire it, we die. If we should inhale some other kind of air, or atmospheric air much contaminated, this would prove to us, not ‘the breath of life’, but that of sickness or of death. How significant the words! The atmosphere is God’s common gift, as free to the peasant as to the prince; and yet, strange to say, in a large proportion of human dwellings, and of vessels as they navigate the sea, the admission and circulation of the air are unduly limited and impeded; and not seldom, the supply, such as it is, is allowed to become so impure as actually to generate disease”.

Plentiful fresh air and separation would (in Robertson’s view) “rid the hospital environment of the fatal miasmas responsible for disease”.² The inspiration behind this plan, in England, had been provided by the Royal Naval Hospital, Plymouth (1758–62)—the design of which was published by John Howard (1726–90) in 1784. This “principle” had developed in France; when fire destroyed much of the Hôtel Dieu in Paris (in 1772) the designers for its replacement were Jacques Tenon (a medical practitioner) and Bernard Poyet (an architect).² Rebuilding was delayed by several decades however, by the French Revolution. In the period 1820–50, that is, before the Hôtel Dieu could be completed, several French hospitals—including the Lariboisière (the best known example)—had been built on these lines (fig 2). The essential prerequisites were: sufficient space between the pavilions to provide good light, coupled with a *free* circulation of air.

Nightingale’s *Notes on Hospitals* (1859) (fig 3),¹⁶ much of which can be attributed to her disastrous experience(s) at Scutari, included as an “appendix”, three articles reproduced from *The Builder*—which advocated this *revolutionary* principle. It was, she wrote, then acknowledged by careful observers that “the origin and spread of fever in a hospital, or the appearance and spread of hospital gangrene, erysipelas and pyaemia generally, are much better tests of the defective state of a hospital than its *mortality returns* [my italics]”. The four basic defects in hospital design were, in her opinion: (i) the “agglomeration of a large number of sick under the same roof”, (ii) a deficiency of space (which correlated closely with deficiency of ventilation), (iii) deficiency of ventilation, and (iv) inadequate

NOTES ON HOSPITALS:

BEING
TWO PAPERS READ BEFORE THE NATIONAL ASSOCIATION
FOR THE PROMOTION OF SOCIAL SCIENCE.
AT LIVERPOOL, IN OCTOBER, 1856.
AND
EVIDENCE GIVEN TO THE ROYAL COMMISSIONERS
ON THE STATE OF THE ARMY IN 1857.

BY
FLORENCE NIGHTINGALE.

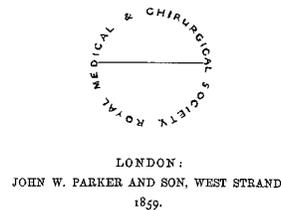


Figure 3 Title page of Florence Nightingale’s *Notes on Hospitals* published in 1859.¹⁶

light. In part II of this book, Nightingale departed from general principles, and focused on many details of hospital design—most of which were taken into account by Currey in his design(s) for the *new* St Thomas’s Hospital (see below).

In 1858, the first two pavilion plan hospitals in England were begun: Blackburn Infirmary (architect: James Turnbull¹⁵) and the Royal Marine Barracks Hospital, Woolwich. Very rapidly, the new concept was adapted to accommodate various categories of patient. The key was *separation*; cross ventilation became the watchword of hospital architects!² The two most important examples of early pavilion plan hospitals (both of which were of substantial size) were: the (Royal) Herbert Hospital, Woolwich (begun in 1861), and the *new* St Thomas’s Hospital (begun in 1868) (see below); at the outer ends of the pavilions were twin towers—which housed the *sanitary* facilities (and in the latter years of the 19th century were considered to provide the *key to public health*). Very rapidly, use of the “pavilion plan” spread throughout the country, and was also incorporated into numerous hospitals throughout Britain’s colonies; it could be either grand (Italianate or Gothic) or “cheaply functional” in style; the latter option apparently appealed to parsimonious Poor Law guardians.² Initially, beds were placed in pairs between the windows (as recommended by Tenon and Poyet); however, later only *one* bed occupied the window pier, and the sanitary facilities (bath, sinks, and lavatories) became increasingly separated from the ward itself. Introduction of the principle failed, however, to abort the relentless flow of articles, pamphlets, and books on: *ventilation*, *sanitation*, and *heating*. By judicious use of fires, it was considered possible to produce air drafts which would remove “noxious vapours” or miasmas from the ward(s). Cleanliness and fire prevention were also high on the agenda of hospital design.

The “pavilion plan” therefore became (in the latter half of the 19th century) the universally accepted design for hospitals throughout the country, and “inevitably produced a similarity in contemporary [hospital] appearance”.² An enormous national campaign—involving medical (including Robertson) and architectural authorities—was mounted in 1856 in opposition to the plans for the new army hospital at Netley (on

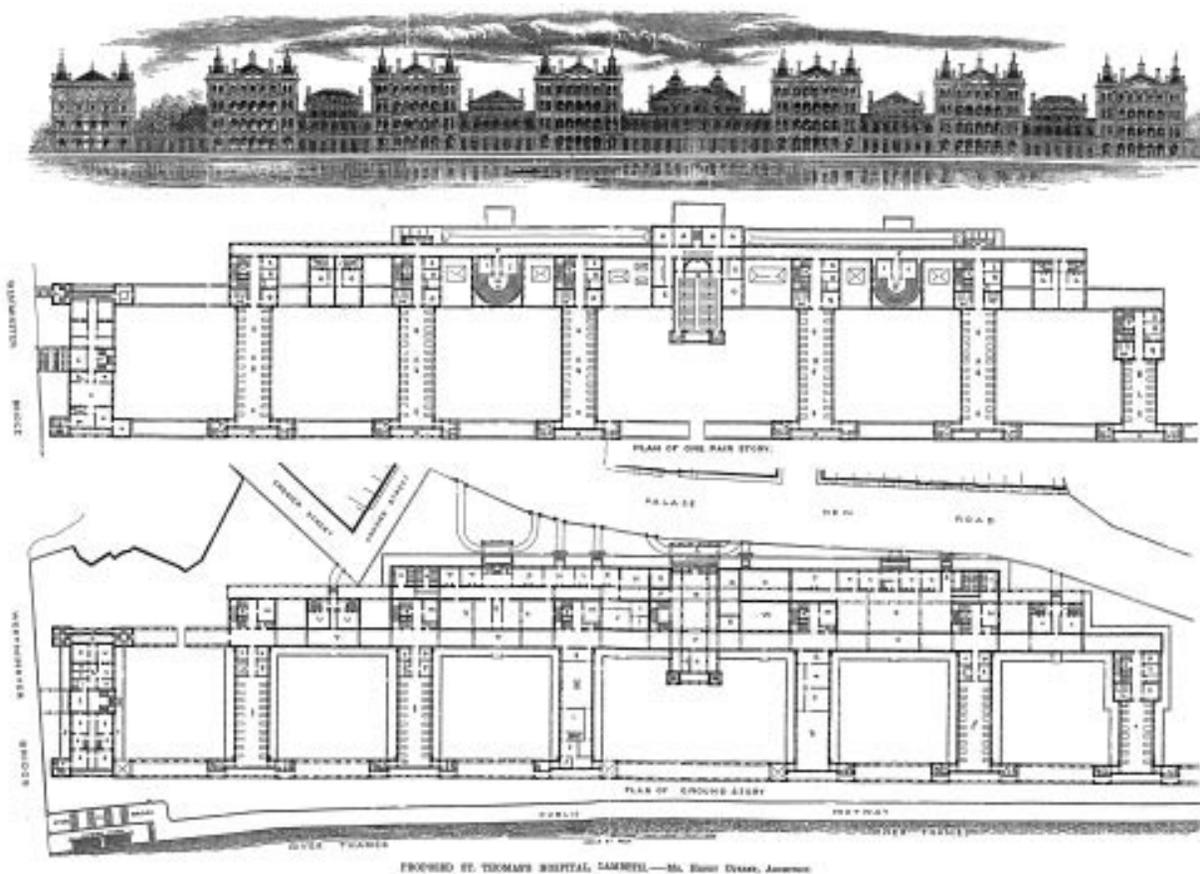


Figure 4 Currey's plan for the new St Thomas's Hospital (*The Builder* 1865;23:556).

Southampton Water) which was based on the prevailing (early 19th century) hospital architectural design, and consisted of numerous small wards which opened off corridors (the "corridor plan").¹⁷ This led to the appointment of a Sanitary Commission to "inquire into the Regulations affecting the Sanitary Condition of the Army, the Organisation of Military Hospitals, and the Treatment of the Sick and Wounded"; it reported in 1858¹⁸—and severely criticised the plans for the *new* Netley Hospital; it also gave official sanction to the "pavilion principle".²

The advent of the "pavilion principle", which coincided with a sharp decline in hospital mortality rates, led to a major influx of inpatients (many of whom had of necessity to be excluded from admission); this gave rise to the establishment of *specialist* hospitals—which proliferated in the late 19th century. "General" hospitals, were at this time, also forced to open their own *specialist* departments.

Although John Bristowe FRCP, FRS (1827–95) (Physician to St Thomas's Hospital) and Timothy Holmes FRCS (1825–1907) (Surgeon to St George's Hospital) had already written a report for the Privy Council (1864) on the hospitals of Britain, a far more thorough text, *Hospitals and Asylums of the World*, was published in four volumes by (Sir) Henry Burdett (1847–1920)¹⁹ in 1891–3; this work was accompanied by a portfolio of plans compiled by the architects Keith Young FRIBA (1848–1929) and Henry Hall FRIBA (1826–1909).

THE NEW ST THOMAS'S PROJECT

Currey's *magnum opus* was undoubtedly the *new* St Thomas's Hospital (built in the Italianate style) established on the Albert Embankment "of which the long range of pavilions [to this day], constitutes a prominent feature of the riverside view as seen from Westminster Bridge, and forms a striking

contrast to the opposite Houses of Parliament".⁵ The long narrow site (much of it reclaimed land) of course ruled out a *courtyard arrangement* (as exemplified by the Lariboisière hospital, fig 2), and instead Currey was to set six ward pavilions side-by-side at right angles to the river—each with "paired sanitary towers facing the seat of government".² The axial corridor, services, theatres, outpatient department, and staff accommodation were arranged on the eastern side of the site—on either side of a huge entrance hall, above which was the chapel. The main administrative offices (governors' hall and committee room included) were to be in a separate block to the north. The medical school (with all of its facilities, including the museum) would be built on the southern wedge of the site.

In June 1865, Currey presented an overview of his intended design (accompanied by a great deal of detail) in a memorandum addressed to the "Grand Committee" of St Thomas's Hospital²⁰; "The prominent defect of the Lariboisière Hospital—the too close proximity of the blocks with reference to their height—is however avoided", wrote Currey in his opening remarks. The Governors (who had already decided on the "detached pavilion" style) had already bought the site (8½ acres), half of it having been "reclaimed from the foreshore at Stangate . . . for 90,000 l [£]" from the "late Metropolitan Board of Works".⁵ The total frontage of the hospital was to be 900 ft; the blocks were to stand 125 ft apart; and the central space 200 ft in length. It was "designed for 600 beds in wards measuring 28 ft. by 120 ft., and 15 ft. high, for twenty-eight beds apiece, allowing each patient a space of 1,800 cubic feet".¹⁹ "At the south end [were to be the medical] schools and a museum [the dimensions of which were to be] 85. ft by 30 ft. and 34 ft. high, with two galleries". At the footbridge there would be "offices and separate residences for the treasurer and four resident officers".⁵

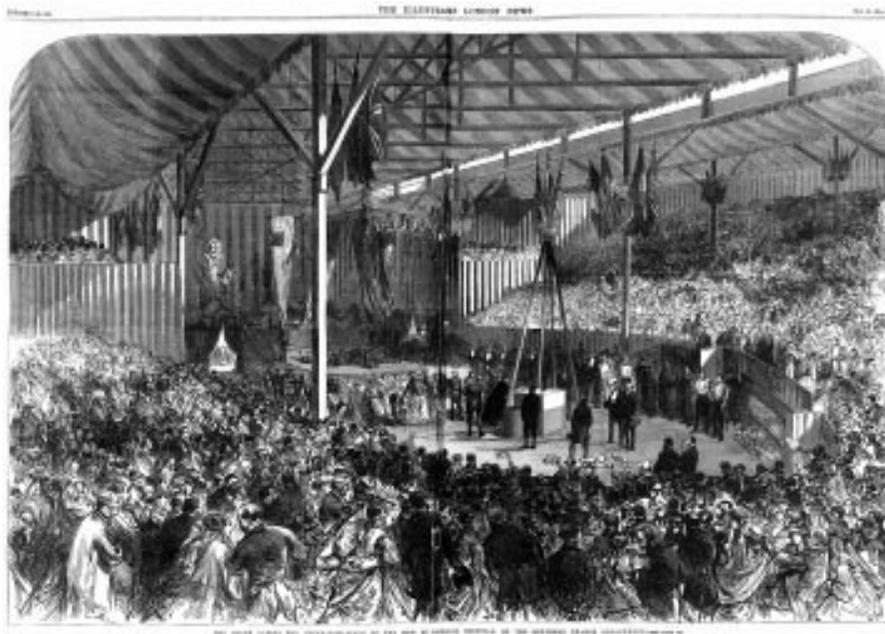


Figure 5 Laying the Foundation Stone of the new St Thomas's Hospital by Queen Victoria, 13 May 1868 (*Illustrated London News* 1868;52:508–9).

Ventilation was thus preoccupying hospital architects at this time, although by the early years of the 20th century the beneficial effects of sunshine and fresh air also entered the equation; open-air treatment of pulmonary tuberculosis was but one example.²¹ It was slowly to become clear that “no amount of cross ventilation could kill germs”²²; with the gradual acceptance of the “germ theory” this was to play a lesser part in 20th century hospital design.

When the new St Thomas's building was nearing completion (on 23 January 1871), Currey outlined his great project, in a paper read to an Ordinary General Meeting of the RIBA.²² He began with an historical overview. The Southwark based hospital (in the Borough) had existed since 1207, and was incorporated by (and received its Charter from) King Edward VI (1537–53) in 1551. In 1859 (that is, three years after the Crimean War had finished) “a certain adventurous railway company, called the Charing Cross Railway, conceived the idea of taking a line from London Bridge to Charing Cross . . .”. This scheme involved destruction of either St Saviours' Church (now Southwark Cathedral) or St Thomas's Hospital. “After a long and arduous struggle, the Committee of both Houses” concluded that “there was a great public necessity [for the railway extension]”, and therefore the hospital had to go! The hospital was ultimately awarded £296 000 for its site (a temporary site housing some 200 beds was found at the Hall of the Surrey Gardens); the company took possession of the premises in 1862. There had (Currey continued) been a good deal of discussion concerning the site for the new (definitive) hospital; many (including Nightingale herself) were in favour of a “suburban hospital” well away from the *environmentally contaminated* metropolis, but “ultimately the surplus land created by the Albert Embankment” was agreed upon as a suitable venue. The “nature of the site did not admit of the pavilions being placed on both sides of a central court or corridor [as with the hospital at Lariboisière (fig 2), or the hospital at Brussels, or even that at the Herbert hospital]”. Currey then analysed his plans (which had been completed in June 1865) in some detail; they “were exhibited to the Governors and others interested in the subject at the London Bridge Hotel for some weeks . . .” (fig 4). By April 1866, the contractor for the Embankment had made “considerable progress” with the river wall. At this point Currey felt that “the foundation of the hospital and the embankment works should proceed simultaneously”. “Scarcely any relicts of antiquity [Currey continued]

were found in the excavations”. The foundation stone had been laid by Queen Victoria (with 3000 spectators present) on 13 May 1868 (fig 5). Great detail was then provided concerning “warming and ventilating arrangements”, which were obviously dominant themes in the minds of his contemporaries:

“It was determined to depend as much as possible on *natural* [my italics] ventilation, avoiding all costly arrangements and fanciful theories, at the same time providing the means of changing the air during cold and boisterous weather and at night.²² . . . The boilers for warming purposes would not [he stressed] be available in the summer, but the furnace for the supply of hot water and baths would be continuous in its operation. In the upper part of [the main extraction] shaft [was] also placed the hot water cistern, and if found necessary, hot water coils [would] be added to assist the rarefaction. Shafts [were] carried from the ends of all the wards, both at the ceiling and floor level . . . To replace the air thus extracted, fresh air [would be] introduced by means of zinc tubes laid between the ‘Dennett’ [concrete] arching²³ and the floor boards communicating with the stoves and hot water coils, thus passing over a cool surface in summer, and tempered in winter by contact with the heated surfaces before entering the wards, the whole admitting of regulation by valves”.

“Each pavilion [would have] its independent means of warming and ventilating, avoiding as much as possible all complication in the arrangement, but the pipes [would be so] arranged that in the event of a break-down in any one block, its neighbour [would] come to its assistance during [the] temporary failure. . . . The wards generally are warmed [he continued] by three open fireplaces, aided in cold weather by an auxiliary system of hot water. The corridors and staircases are also warmed by hot water. The open fireplaces [which stood in the middle of the wards] might have been arranged against the outer walls, but bed space would thus have been sacrificed. The hot metal [of the shafts would] not . . . come in contact with the atmosphere of the wards, but the space between the two tubes [would be] an efficient ventilating shaft, . . . connected as before with the main trunk in [the] roof. . . . A cast iron socket [was] built into each floor, supported on two small bearers running from girder to girder, and the “Dennett” arching²³ . . . made good to the same all round, thus avoiding any communication from floor to floor”.



Figure 6 Opening ceremony of the new St Thomas's Hospital by Queen Victoria, 21 June 1871 (*Illustrated London News* 1871;58:640).

"There [was also, Currey continued] one food lift to each block [arranged] upon the rack and piston principle. . . . and these lifts [would be] worked from the same tank as the passenger lifts. [Currey concluded this section of his address:] the whole of the work [is] of the most substantial character, and nothing has been neglected to ensure thorough efficiency, combined with perfect safety".

It is clear from this communication that *ventilation* was of paramount importance; one discussant (a fellow of the RIBA),

for example, considered that even greater emphasis should have been given to this subject and that "Mr Currey did not state the properties of the area of inlet and outlet air apertures". Although the summer ventilation was satisfactory, that in the winter months [would not be] so good. Another fellow of the RIBA was also critical: "I do not see . . . that he has made any special provision [especially in 'summer time'] for carrying off the carbonic acid gas . . . from the lower parts of the building". This discussant desired to know "what

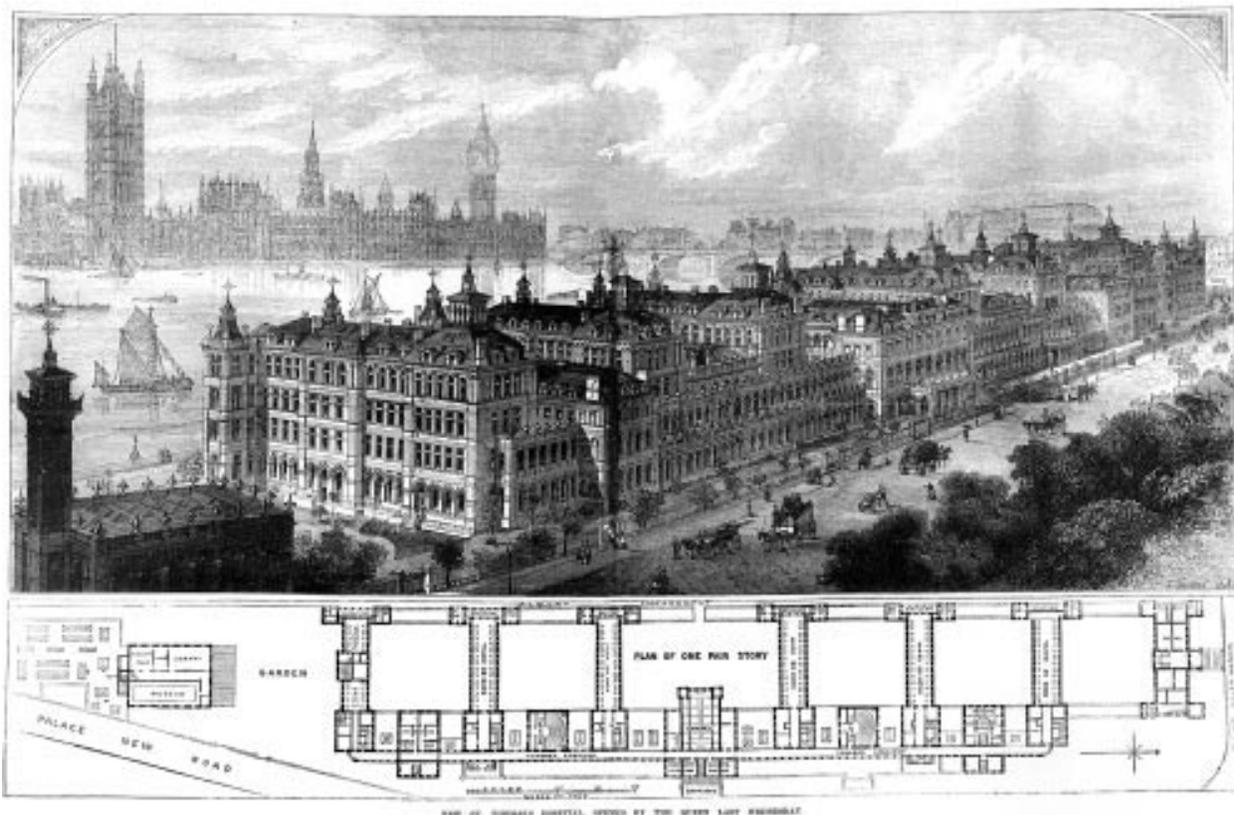


Figure 7 The completed "pavilion planned" St Thomas's Hospital (*Illustrated London News* 1871;58:616-7).

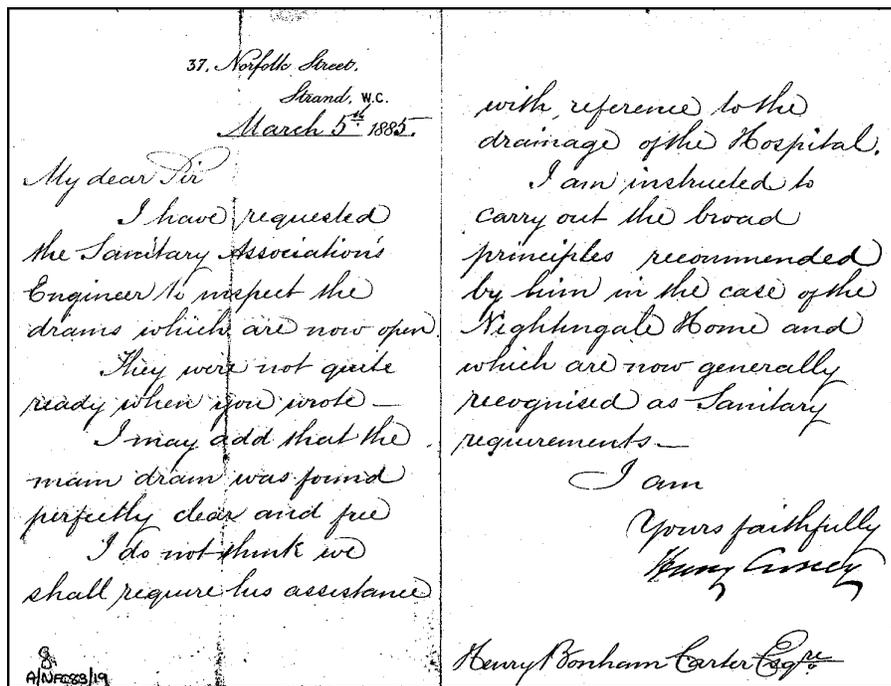


Figure 8 Letter from Currey to Henry Bonham-Carter dated 1885 which refers to on-going sanitation problems at the new St Thomas's Hospital—some 14 years after its official opening (London Metropolitan archive document: A/NFC 83/19, reproduced with permission).

provision is made for carrying [carbonic acid] off when there are no fires". Currey replied that he had "made arrangements for carrying that off, either at the top or bottom of the wards". Thomas Balfour FRCP, FRS (1813–91), a *medical* discussant, was also critical of the "arrangements for ventilation"; there is nothing, he stressed "to prevent the foul air of one ward getting into another, if there happens to be a difference in temperature between the two, or a current of air passing through one of the wards, which might have the effect of drawing part of the supply of air from the tube". This criticism was also countered by Currey: "we do not depend principally upon [the central shafts] for ventilation [which in the main] is at the two ends of the wards at the top and bottom [which] are much larger than those provided at the centre, and the rarefying power in the tower will [always] be operational throughout the year". Balfour again asked if there was "any arrangement to prevent the foul air of one ward getting into another ward through the centre tube". Currey maintained that "the air must go up a considerable distance and come down again, before [such contamination could] take place, and the centre shafts [were, he emphasised] connected with the main extracting shaft". There were also minor criticisms regarding Currey's description of the Lariboisière Hospital; this "visitor" was also sceptical about "coating the walls of wards . . . with Parian cement [recommended by the Royal Commission,¹⁸ which] good as it is, is said to be liable to absorb miasmas". Another discussant considered (although he did not oppose its use) that "Parian cement with polished surface, being non-absorbent, is liable to certain disadvantages with regard to the moisture from condensation". The President of the RIBA (Thomas Wyatt) was, in the light of his experiences at the Middlesex Hospital, in favour of the use of this material; however, the walls should be "thoroughly cleaned down once a year [after the beds had been moved]"; condensation had not proved a problem there! The use of "lime white" was referred to, which had been used in a Hampstead hospital. It was also felt that "The floors of the wards being closely jointed oak, if well waxed and rubbed will be as non-absorbent as the walls". Another *medical* discussant, Robert Brudenell Carter FRCS (1828–1918), was far more damning in his criticism: the late Sir James Young Simpson Bt FRCPE (1811–70) had expressed "fears that hospitals in the course of years became saturated with the miasmas thrown off by the sick [and that] the best

way to construct hospitals [therefore] was to build them in a rough and temporary manner". Despite this, however (and since the new St Thomas's was the first hospital to be "calculated to endure as long as this city [London]"), he considered that "with proper attention to disinfection, and cleanliness and ventilation" this building could be kept perfectly "wholesome". A minor criticism concerned the intensity of light in the operating theatre!

The overall cost of the project (excluding the site) amounted to about £400 000 in total (or £650 per bed).

Figure 6 shows the opening ceremony, carried out by Queen Victoria on 21 June 1871, and fig 7 the "pavilion style" St Thomas's Hospital shortly after completion.

Despite all Currey's reassurances, a report on the sanitary state of the hospital (in 1878) "revealed that the new building was far from hygienic".²⁴ In this "most expensive-to-run hospital, windows were difficult to open, chutes for soiled linen were not used, buckets were without lids, lifts were not used because they took so long and chamber-pots were left under beds hidden by the pinned-down quilts". Figure 8 shows a letter from Currey to Henry Bonham-Carter (1827–1921), outlining a sanitation problem which had occurred 14 years after the opening of the new St Thomas's Hospital!

INVOLVEMENT WITH THE SEAMEN'S HOSPITAL SOCIETY

In 1867, the Seamen's Hospital Society (SHS) had decided to remove its *clinical* facilities from the third (and last) of the Hospital-ships to dry land²⁵; however, their committee had not yet determined the site for a definitive location. A plot of ground had been purchased (to the east of Trinity Hospital [now Norfolk College], Greenwich, and bounded by Woolwich Old Road and ground belonging to Morden College; fig 9); the following is recorded in an SHS minute dated 8 November 1867²⁶:

"The Secretary reported that he had only this morn[ing] obtained the plan of the Hospital Site . . . It was . . . arranged that Mr. McGrouther would bring with him to the Committee at their next Meeting, the Treasurer or Architect of Saint Thomas's Hospital . . . to give the Committee some advice as to the Course they should pursue".

At the following meeting²⁷:

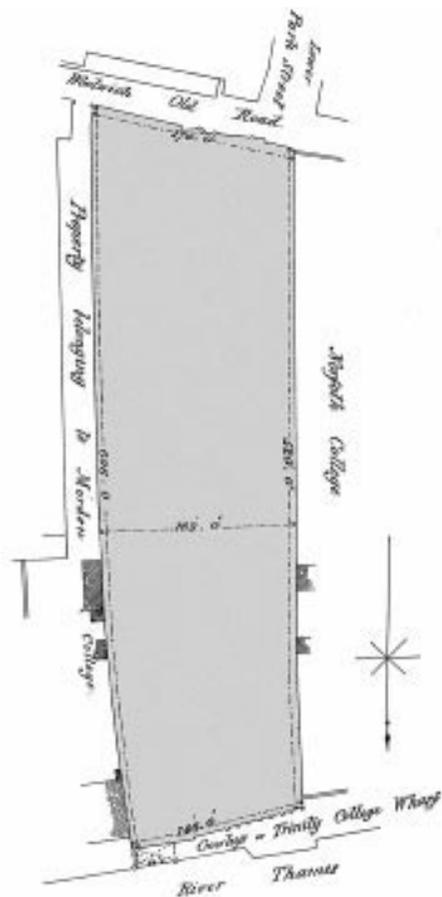


Figure 9 Plan of the Seamen's Hospital Society's site (c 1867) on which it was intended to build a new land based hospital (Seamen's Hospital Society archive, reproduced with permission). This strategy failed to materialise, and the plot of land was sold in 1880.

"The Committee saw Mr [Henry] Currey, the Architect of Saint Thomas's Hospital now building—a plan of the site belonging to this Society was given him and he promised to go over the ground and give the Committee an outline sketch of what he might consider the best mode of arranging a Hospital thereon and an estimate of the probable Expense of its Erection . . ."

Currey again attended at one of the three December meetings²⁸ when he:

"laid before them plans for a hospital on the Society's site and he read a statement explanatory whereof. Ordered that the same [that is, the plans, which seem unfortunately to have been lost] do lie on the table for the Consideration of the Members of the Committee for the next few weeks".

The fact that this (like St Thomas's) was a difficult site on which to build a hospital, coupled with the desires of the SHS Committee for a "pavilion planned" hospital, undoubtedly lay behind the decision to invite Currey (and/or the Treasurer of St Thomas's Hospital) for advice; being of a generous disposition,

he seems to have been pleased to be of assistance to this great charitable foundation—apparently at no charge!

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