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The Built Response to ‘Hospitalism’: Complexity in Practice

In the nineteenth century diseases such as erysipelas (a skin disease), pyaemia (blood infection) and puerperal fever (fever after childbirth) were so often associated with hospitals that they were referred to collectively as ‘hospitalism’. Although not exclusive to hospitals, people often developed these diseases in hospital. They were understood to result from a putrefaction process that produced a poison. The poison could be absorbed into the body of another person, the walls of the hospital or into items of clothing, remaining dormant but potentially active over a period of time, and be communicable from one person to another. The poison was believed to intensify in crowded places, and to be transmissible through the air as miasma.

The period has been characterised as one in which a broad shift from general sanitary theories about diseases to the acceptance that many diseases were caused by specific germs occurred. Whilst the germ theory of disease gained acceptance, built responses continued to incorporate sanitary ideas. Using architectural historical methods this paper considers the built responses to hospitalism in Victoria, Australia, during the period between the mid-nineteenth and the early twentieth century. The examination includes hospital designs and materials and also the spatial arrangements of wards and the special buildings erected for patients with hospitalism.

The built responses to hospitalism reveal multiple overlapping and sometimes contradictory motives informing the building process, reflecting the complexity of change in institutions. The particular design features of hospitals that were responses to the poison of hospitalism persisted into the twentieth century refigured as responses to germs. This persistence, revealed in the built form, suggests reciprocity between buildings and the practices that occur within them. It may also be that although the conception of disease transmission changed, the reality of combating disease did not.

In Victoria in the nineteenth century many hospital rules restricted the admission of patients with infectious or contagious diseases. However, diseases such as erysipelas (a skin disease), pyaemia (blood infection) and puerperal fever (fever after childbirth) were so often associated with hospitals that they were referred to collectively as 'hospitalism'. This group of diseases was acknowledged as potentially transmissible from one person to another and, because people often developed erysipelas or puerperal fever in hospital, the disease presented management committees with responsibilities that they were able to avoid for other infectious or contagious diseases.

Hospitalism was considered to be the result of zymotic processes that situated disease in places, materials and bodies. The word zymotic derives from the Greek words for ferment and pollute. It was believed that a poison produced through putrefaction caused zymotic diseases, although they manifested differently. The poison caused the physical manifestations of disease and could be transmitted from one person to another, or linger in a place. Damp and poorly ventilated places that favoured putrefaction were thought to contribute to the generation of zymotic disease. It was believed that the poison became more potent and spread more readily in crowded places, in times of atmospheric instability or in locations characterised by privation. The poison of the zymotic process, when present in the air, was referred to as *miasma*.

Ideas about disease and the built form

The designs and materials used in the construction of hospitals wards and lying in (maternity) hospitals and the overcrowding within them implicated hospitals as places where hospitalism could be generated and transmitted.¹ In 1867 the Edinburgh physician James Young Simpson criticised the practice of crowding people into hospitals as it allowed "contamination of the air" and "impregnation of the materials of the building with morbid substances".² Simpson suggested hospitals should be smaller, less crowded and designed to ensure adequate ventilation.³ The pavilion was the architectural response to the concerns expressed by Simpson and his contemporaries. Most commonly associated with Florence Nightingale and the social and medical influences of the sanitary movement the pavilion was first introduced in the late eighteenth century but was increasingly seen as a design that would solve the problems of diseases occurring in hospitals. Figure 1 depicts a pavilion ward at the Alfred Hospital in Melbourne; photographed in 1901, and built between 1880 and 1885. The pavilion design aimed at ensuring the provision of fresh air to patients and the removal of air poisoned by the products of respiration and putrefaction. Specified distances separated individual wards and cross-ventilated, semi open corridors separated sanitary facilities from wards. Overcrowding was prevented by the allocation of a minimum cubic and area space for each patient. Within wards hopper windows, fireplaces and ventilation shafts were arranged to ensure fresh air without draughts. Impermeable and washable materials were selected for construction. Practices such as fumigation and periodically resting wards were directed at preventing the concentration of zymotic poison in both materials and the air.



Fig. 1 Ward in Alfred Hospital, Melbourne. Photograph by N. J. Caire, 1901. State Library of Victoria, H2005.86/5.

Zymotic diseases were considered to be general diseases and the strategies directed at managing them reflected this conception. The idea that diseases were caused by specific organisms developed in the nineteenth century from an accumulation of knowledge about the behaviour and management of the diseases of plants, animals and humans as well as from the practices of microscopy and observational science. Many people contributed to the eventual articulation of the germ theory of disease. Louis Pasteur identified the microscopic organisms as responsible for both fermentation and putrefaction. His most significant conclusions were that specific organisms, that did not spontaneously generate, caused specific diseases.⁴ Joseph Lister accepted the existence of disease causing microorganisms and developed surgical techniques intended to prevent air from entering wounds. He later developed the concept of aseptic surgery using disinfectants on instruments, hands and materials used in surgery to prevent wound infections. Robert Koch demonstrated the techniques for culturing and studying bacteria that between 1876 and 1882 led to the proof of the link between individual microorganisms and specific diseases.⁵

It is commonly assumed that once the ideas about the germ theory were articulated that they were readily adopted in a moment often described as a turning point in history.⁶ Historians have recently questioned the idea that such turning points occur in practice. Medical historian Michael Worboys has suggested that examining practices, or “performance”, as well as “programmatic statements” about science and medicine will reveal the complex and sometimes conflicting character of what have been seen in the past as turning points of historical change.⁷ One such programmatic statement is that the discoveries of the germ theory of disease and asepsis made the pavilion hospital redundant.⁸ The pavilion, described as a “sanitary code reflected in a building”,⁹ became the accepted hospital plan between 1860 and 1930.¹⁰ That it did not become redundant implies a more complex explanation and perhaps, that the acceptance of the germ theory of disease was not a decisive moment in history. This is not to suggest that change did not occur. The germ theory of disease did eventually lead to changes in medical and surgical practice and it would seem reasonable to expect changes in the built response to diseases such as hospitalism.

Explanations for the persistence of the pavilion include that it has been linked with the professionalisation of medicine, the organisation of the nursing profession and the

emergence of specialised hospital architects.¹¹ Architectural historians have suggested that the ventilation strategies of the design allowed the germ theory of disease to coexist and merge with the *miasma* theory rather than usurp it.¹² Suggesting a more gradual change but still a relationship between ideas of disease and buildings Jeanne Kisacky has recently argued that that construction practices at the City of New York Lying-in Hospital of 1897 were influenced by Lister's ideas about asepsis. Implicating contact with dust, objects and air these ideas prompted strategies directed at the isolation of people and spaces.¹³

This paper considers the built responses to hospitalism in Victoria, Australia, during the period when the germ theory of disease was being developed and debated. The medical profession and health authorities in Victoria looked to England, Europe and to a lesser extent North America both receiving and contributing to the debates about the new disease theories. Whilst acknowledging the centrality of ventilation strategies in built responses to hospitalism this examination focuses on materials, practices and isolation strategies around hospitals built in Victoria. Particular attention is directed at strategies designed to mitigate the effect of the zymotic poison and how they were reframed as responses to germs.

Places – the building as a source of disease

The idea that the zymotic poison could be absorbed into materials led to practices implicating buildings as potential sources of disease. This is reflected in statements about buildings and also in the practice of separating wards and buildings, especially those where patients with identified hospitalism were accommodated. In 1870 the medical staff of the Melbourne Hospital complained that one of the wards within the hospital was being used as an erysipelas ward. They were concerned that the disease “lurked around the wards”, and suggested that a “small detached ward” be built outside the main building.¹⁴

Sometimes wards or hospitals were considered to be so dangerous that they were closed. In 1875 at the Wangaratta Hospital erysipelas was described as being “in the walls”. All of the patients at the hospital were placed in tents and the recently built hospital was temporarily closed.¹⁵ In 1875 Dr Williams, the resident medical officer of Bendigo Hospital, outlined a plan to move all patients into a newly built wing in order to disinfect the rest of the hospital in response to an outbreak of erysipelas.¹⁶ In the same year the Melbourne Lying-in Hospital and Dispensary for the Diseases of Women was closed because of an outbreak of scarlet fever and erysipelas.¹⁷ This removal of the patients from what was considered to be the source of disease allowed time for cleaning and disinfection and, it can be assumed, for the disease poison to dissipate.

The practice of periodically closing wards, described as resting, also implies a role for the building in the generation and transmission of disease. In 1893 Dan Astley Gresswell, Chairman of the Victorian Board of Public Health, recommended allowing hospital wards to “lie fallow” for a period of time.¹⁸ In 1901 the medical staff of the Alfred Hospital recommend that the Linay Pavilion be rested and cleaned and in 1905 approved the emptying of the infectious diseases ward for the “necessary resting and renovation”.¹⁹

Bodies – isolation of patients and segregation of staff

Isolation practices further reveal the motives that framed responses to hospitalism, in particular the idea that the poison of the zymotic process could be present and active in materials or bodies and that disease could be transmitted from one person to another. Single patient wards were not common but the design of the midwifery section of the first purpose built Melbourne Lying-in Hospital in 1858 included 13 single patient wards that opened on to a verandah via individual doors. The rooms were used for women who were giving birth and the strategy was intended to isolate and thus protect the women at a time when the risk from puerperal fever was considered to be high.²⁰

These isolation rooms were developed before the articulation of the germ theory of disease and presuppose the idea that puerperal fever was transmissible from person to person. Women around the time of childbirth were considered not only to be at risk of zymotic disease but also to be a potential source and this strategy may also have been designed to reduce the risk to others.²¹ Somewhat paradoxically, women who came to the hospital already suffering from puerperal fever were accommodated in the infirmary wards with other patients.²² Isolation practices sometimes changed over time suggesting a change in ideas or perhaps a pragmatic response to demand. In 1881 the small isolation rooms at the Lying-in Hospital were each accommodating two women.²³

It was common practice for nurses to sleep in wards or corridors before special accommodation was built for them in the early twentieth century. Nurses caring for patients with infectious diseases were isolated with their patients. The erysipelas ward designed in 1882 at the Melbourne Hospital included a set of rooms to accommodate nurses, intended to ensure their isolation from other staff and the rest of the hospital.²⁴ In 1885 the Homeopathic Hospital fever wards were provided with a room for the nurse and a separate lift so that the nurse would not have contact with other patients and staff.²⁵

Materials – permeability and disposability

Materials were as central to the pavilion hospital programme as ventilation. In 1875 Dr John Day, an honorary medical doctor from Geelong, read a paper at the Medical Society of Victoria's November meeting entitled "An attempt to show that the walls and flooring of ordinary hospitals are largely concerned in the production of those septic poisons which give rise to pyaemia, erysipelas, and puerperal fever; with suggestions for remedying the evil." His main suggestion was that hospitals should be constructed from wood because it had inherent antiseptic properties and resisted the absorption of zymotic poisons generated by hospital patients. He also suggested that silicate paint or a varnish of turpentine mixed with paraffin applied to the wood would increase its resistive properties.²⁶ Silicate paint is a mineral based paint developed in the nineteenth century, which was considered to be harder than lime based paints.

Materials that could be disposed of or replaced regularly were also used, suggesting the temporary nature of some outbreaks of hospitalism but also the idea that the zymotic poison

absorbed into the materials of the hospital would eventually make the building unhealthy. Canvas and iron were often used because they were disposable and some buildings were constructed using panels, which could be removed for storage or disposal.²⁷

An illustration of an erysipelas ward at the Melbourne Hospital appeared in the *Australian Sketcher* in 1882 (Figure 2). A timber floor is raised above the ground on brick footings and a timber frame supports a canvas roof and walls.



Fig. 2 Erysipelas ward at the Melbourne Hospital. *Australasian Sketcher* March 11, 1882. State Library of Victoria, A/S11/03/82/68.

The illustration appeared in the newspaper because of a controversy about the sanitary state of the Melbourne Hospital. In 1882 Dr Richard Youl, the Coroner for Melbourne, commented in the newspapers about two deaths from erysipelas that had occurred at the hospital. One case involved a man who had been hit on the head with a rock by his daughter; he had died in hospital from erysipelas. The second case involved a man who had been stabbed in the knee by a woman and later died in hospital from erysipelas. In both cases Youl brought in findings that exonerated the women and condemned the hospital for its role in the men's deaths, stating at the inquest of one that the "entire building is saturated with erysipelas – every nook and cranny is full of the poison, and the entire fabric should come down".²⁸

In response to the controversy in the press, the Committee of Management of the Melbourne Hospital planned to remove the wooden ceilings and provide an impermeable surface of Keene's cement to the walls and ceilings and improve the ventilation of the old buildings.²⁹ In addition, Melbourne architect Francis M. White was commissioned to design a new female erysipelas ward. White described his intention to make the walls, ceilings and partitions "impervious to moisture" by painting them with silica paint.³⁰

These strategies imply a role for materials and finishes in the healthiness of the buildings.

Keene's cement is a gypsum or sulphated lime based plaster. It was recommended for hospital walls because of its hardness and because it was considered to be less likely to absorb impurities than lime based plasters.³¹ It was used on the internal walls of the Alfred Hospital in 1871 and the new Homeopathic Hospital in 1884 because it was "impervious to the germs of disease".³²

Built responses to germs

The pavilion hospital and the sanitary strategies associated with it were by the late nineteenth century firmly established. Two publications in 1893 describe in detail the current beliefs about hospital buildings. In both of these publications there is a merging and layering of ideas about disease rather than the usurpation of one idea by another.

In Sir Henry Burdett's 1893 survey of hospitals he suggests glazed tiles and Portland cement for internal walls describing them as resisting saturation by "disease germs" and ventilation strategies including coved cornices, which were to prevent air stagnating near the ceiling.³³ Characterising the tendency of practice in Victoria to be contemporaneous with that in other parts of the world Dan Astley Gresswell wrote in 1893 about the importance in hospital construction of preventing conditions that favour the "retention, cultivation, and distribution" of microorganisms.³⁴ The strategies he recommended were sanitary and hygienic but with an overt acceptance of the existence of germs. He cites scientific evidence of microorganisms existing in dirt as necessitating a layer of asphalt or concrete under hospital buildings to prevent damp air rising from the ground. He also recommended strategies that aim to improve the wholesomeness of hospital air focussing on ventilation, perflation (the blowing through of air) and the maintenance of a certain ambient temperature. Wood and canvas were now criticised for permanent buildings as they were thought to absorb noxious exhalations.³⁵ Patient comfort and fire prevention were also significant motives for construction methods and material choices.



Fig. 3 St Vincent's Hospital 1905 building, stairwell with cement render removed. Photograph by Karen Daws, 2015.

Designs, material choices and practices, which were virtually the same as those recommended to reduce the risk from zymotic poison, continued to be used into the early twentieth century in hospital construction. St Vincent's Hospital, a pavilion hospital designed in 1905 by Phillip Kennedy, was described in the opening brochure as embodying the scientific advances in surgery, anaesthetics and bacteriological science. The interior walls were finished with 'American germ proof cement'.³⁶ All of the angles were curved to prevent the lodgement of dust and floors were of wood or glazed tiles. Figure 3 depicts the brickwork required to establish the curve at the wall join in a stairwell exposed as part of an asbestos removal process at St Vincent's Hospital in Melbourne. The new Melbourne Hospital designed by architects J. J. and E. J. Clark, completed in 1913, was built on the pavilion plan and all wall to wall joins, cornices and skirtings in the wards were covered.³⁷

Conclusion

This study has focused on examining materials and practices in the built response to the diseases of hospitalism. It reveals that changes in hospital building practices around prevention and treatment of disease were cumulative. Strategies intended to mitigate the effects of zymotic poison continued to be used implying a model, which neither precluded the acceptance of germ theory nor excluded adherence to ideas about the importance of air, bodies, materials and places in the generation and transmission of disease. New building modes were readily adopted but in many cases approaches directed at preventing germs appear as re-configured poison responses. This is particularly evident in the use of covered skirtings and cornices that were introduced as germ and dirt responses but which were rationalised in ways that echo poison responses.

A certain reciprocity between buildings and the ideas that frame them is suggested by the persistence of poison inspired strategies into the period when the germ theory of disease was accepted. The pavilion hospital and isolation practices were widely believed to have been successful at mitigating hospitalism and perhaps as a result of this the behaviour of germs was modelled on the behaviour of the zymotic poison. It may also be that although the conception of disease causation changed, ideas about prevention, transmission and treatment of disease did not.

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