

**Infectious Disease in Cambridge:
The Cambridge Isolation Hospital and its Evolution.**



A Scarlet Fever Block at Brookfield's Hospital, built in 1893

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Infectious Disease in Cambridge: The Cambridge Isolation Hospital and its Evolution.

This essay will explore the background to the development of the 'Isolation Hospital' in the late nineteenth century and will show that such hospitals, established before the evolution of germ theory, were built on sanitarian lines to meet the needs of the medical profession, in particular, those of the Medical Officers of Health at the time who aimed to provide specialist centres for the study of infectious disease 'en masse' complementing Sir John Simon's ideas of reforming health care, based on Coleridgean lines for the provision of state directed health care¹.

The Background to the Concept of Isolation Hospitals

The form and construction of isolation hospitals dates from the early days of the Sanitary movement promoted by Edwin Chadwick aided by Florence Nightingale, based on miasmatic theories of infection. On the origins of disease, especially infectious disease, the following appeared in the *Lancet* of 1853².

All is darkness and confusion, vague theory and vague speculation . . .
What is cholera? Is it a fungus, an insect, a miasm, an electrical disturbance, a deficiency of ozone, a morbid off scouring from the intestinal canal? We know nothing, we are at sea in a whirlpool of conjecture.

Three principal currents of aetiological thought prevailed at the time to explain the phenomena of infectious disease and their transmission. Firstly, that of its spontaneous generation, (a chemical notion), occurring within the blood. Denying contagion, it received negligible support in England. Secondly, the atmospheric theory where the atmosphere was believed to be charged with an 'epidemic influence' which became malignant when combined with the "exhalations of organic decomposition from the earth". The resulting gases, ferments or miasms were believed to produce diseases capable of infinite variations. Lambert³ says the theory "served to explain the partiality of epidemic disease for the undrained, unclean and stinking areas of the towns inhabited by the poor."

Thirdly, the germ theory of infection formulated by Henle in 1840, stressed the contagiousness of disease. Although it was supported by the empirical observations of Snow and Budd, Lambert⁴ says the theory lacked conclusive experimental proof and gained little credence in England until the 1860s.

Several centuries earlier, provision had been made for the isolation and 'lodgement' of persons affected with leprosy under which name Hirsch⁵ considers were probably included other affections "more readily communicable from person to person than the disease to which the name of leprosy is now restricted." Such establishments were founded by the Sovereign, ecclesiastical bodies or by private benefactors, prompted, says Parsons⁶, "not by Christian charity but by a belief in the contagious nature of this terrible disease as well as by the idea of spiritual defilement associated with it, and the desire to remove the loathsome sight of its victims from the public view."

The establishment of the 'Fever Hospital' was the outcome of the typhus epidemic of the 1790s. The first hospital opened at Chester. Writing of attempts to control such outbreaks and the failure to do so, Murchison⁷ says:

It was soon clear that typhus fever and relapsing fever were not to be got rid of by improvements in drainage and water and no preventive or palliative in the nature of vaccination existed in their case (typhus). In large towns under conditions of crowding and filth, these diseases would from time to time become epidemic in the houses of the poor and now, in the interests of the community, the need for making infectious hospital provision became freshly apparent.

The Rise of the Medical Officer of Health

Such provision came at the end of the nineteenth century within the sphere of the Medical Officer of Health. Hardy writes that in the years after 1855 the MOHs became active participants in the revolution in government, as their expertise was applied to law making and the regulation of public health.⁸

Under the 1875 Public Health Act England was divided up into sanitary districts and Medical Officers of Health were established. They became the "medical authority". A "clerisy", says Stokes, was "established in the widest sense to care for the physical necessities of human life to regulate among other things, public health, vaccination, ...".⁹ The Local Government Act of 1884 led to the establishment of urban and rural, district councils who were bound to appoint MOHs.¹⁰ The MOHs responsibilities were enormous. Under the LGB, the MOH was directed to "inform himself of all influences affecting or threatening to affect injuriously the public health within the district and to advise the local sanitary committee on all matters affecting the health of the district." This meant effectively responsibility for all things sanitary. Annual reports were required from the MOHs by the LGB on nuisances, slaughter houses, butchers shops, drains, milk analysis, births, deaths and diseases of paupers. In addition, information was required on the condition of bake houses, canal boats, factories

and workshops. The MOH was bound to submit an annual report to the LGB. Failure to do so resulted in half his salary being forfeited to the crown. But importantly these officers aided by the LGB were able to make large scale provision of state isolation hospitals.

At the centre of this movement was John Simon. Simon had "emphasized pathology as the scientific basis of medical practice"¹¹. As Medical Officer of Health to the Board, Simon was able to organize a multipronged campaign aimed at gaining control of all areas of public health through the administrations of the Local Government Board. Acts were brought in during Simon's time to prevent, control, contain, cleanse and disposal of persons. All these acts were rooted in miasmatic theory and utilized the new sciences of epidemiology based on statistics, and the new sanitary engineering.

During Simon's time, the Local Government Board, through the Acts of Parliament it promoted, enforced all local authorities to become subject to control and supervision by departments of central government. The Health Board, through its sanitary administration, set about to control and regulate health through its MOHs at a local level.

So despite newly emerging germ theories, Simon set about bringing in Acts that would prevent, control and notify infectious diseases and result in the establishment of isolation hospitals designed and built on miasmatic lines amongst other things as a means of controlling infectious disease.

The LGB acting on the advice of its medical officers lost no opportunity of pressing on Local Sanitary Authorities the importance of making use of their annual reports and powers under the new Acts. Sanction for the borrowing of money for the erection of isolation hospitals was freely given and the services of the architects and medical departments at the Board were placed at the disposal of authorities "desirous of carrying out their important branch of their sanitary duties". The Commissioners to the Privy Council in 1882 found attempts to impose isolation hospitals to be

hindered by lack of experience, by apprehension of difficulty and by the real difficulty of landowners to sell land for the purposes of an infectious hospital, and from the objection of house holders to have an infectious hospital for their neighbour.¹²

The commissioners also noted that, due to the unpopularity of the hospitals,

the name by which a hospital becomes locally known is at times a matter of some importance. All designations referring to disease i.e. smallpox, fever, infectious hospital should be avoided, they have in several instances hindered isolation. Other names should be used based on names of people or localities.

It remained unclear whether isolation hospitals provided any decrease in the amount of spread of infectious disease. Parsons¹³, a doctor and First Assistant Medical Officer on the LGB, claimed that infectious patients were removed from the community "to obviate the disabilities, inconveniences, and pecuniary losses which the presence of sickness might entail".

Belief in the miasmatic theory of disease, borne out of the MOH reports of the time, appears to be a more legitimate reason for establishing isolation hospitals at a time of rapid industrial growth and commerce. Parsons also regarded such hospitals as places which should provide clinical research. He wrote:

In the interests of the community, the State and the training of the future practitioner of medicine, a time should come when the isolation hospital will become an institute of research for the elucidation of the unsolved problems relating to the various kinds of communicable diseases.¹⁴

By 1900, it was becoming clear that the system of treating infectious diseases by isolation was failing to provide a reduction in the morbidity rates. In particular, concern for the welfare of children was expressed in the BMJ¹⁵ especially "the danger to which they were exposed in isolation hospitals of catching other diseases, together with the injury inflicted on them by removing them from their homes . . ." There was also a fear that demoralization followed in the train of these rate supported 'free' hospitals and fear of interference by the Sanitary Authorities led to concealment of illness in a number of cases leading to an "utter and complete failure to control epidemics, as evidenced by the annual returns of notification cases"¹⁶, and Dr Mariott, the dissident MOH for Nottingham, wrote:

Isolation Hospitals have played no part in the diminution of Zymotic mortality rates. The saving of life commenced long before compulsory notification or hospital isolation were dreamed of . . . We are able to discern that the various notification Acts were passed at a time when more legitimate methods were accomplishing great results, which results have been laid claim to by sanitarians as the triumph of those un-english compulsory enactments¹⁷.

The fact remains, as Abel-Smith¹⁸ says, that these hospitals were founded and controlled by doctors under the umbrella of Local Sanitary Authorities "to provide clinical material and resources for the development of skill unhampered by the obstruction and surveillance of the great men (charitable laymen)."

The Cambridge Isolation Hospital

The Cambridge Isolation Hospital and its development under Dr Bushell Anningson, the first Medical Officer of Health for Cambridge will be used to illustrate Government Board policies at a local level. Appointed in 1875, Anningson, a contemporary of Simon and council member with him of the Society of Medical Officers of Health, believed in Chadwick's ideas that man's environment determined the influence and incidence of disease. He was a founder member of the British Institute of Public Health through which he and others conducted Parliament to recognise diplomas in public health as registerable qualifications, thereby constituting public health one of the four great professional subjects "in



Dr Bushell Anningson¹⁹

connection with which registerable diplomas are granted by licensing bodies."²⁰ The Society also ensured that only medical men with sanitary diplomas were appointed MOHs of the larger towns. The MOHs, therefore, carried out the work of the Medical Society by promoting exchange of ideas aiding theoretical and practical investigation of all branches of Public Health Medicine. Anningson thought that infectious disease, like poor sanitation, was, like other forces in nature, injurious to man. He saw, in the rapid growth and development of Cambridge at the time, "a dangerous condition for health"²¹.

As a sanitarian, Anningson did not establish his hospital with germ theory in mind; like Simon, he was slow to be convinced by germ theory and wrote: "here, facts are too few as yet to justify more than a provisional hypothesis"²², but concluded that, despite this, "treatment has to go in advance of medical knowledge". Having served in the army as a surgeon in the mid 1860s, he would have experienced the impact of Florence Nightingale's sanitary reforms in the army and their impact on hospital design. Anningson was part of the group of MOHs at the time who were aided by enabling Acts on infectious disease in the

1880s, and was able to set about cleaning up and controlling the sanitary condition of Cambridge. The Isolation Hospital was Anningson's solution to the problem of overcrowding and insanitary conditions thought at the time to cause infectious disease.

The Sanitary Committee for the town of Cambridge was appointed by the town council in 1887

to be a committee of the Council for the purpose of considering and reporting upon all matters relating to the sanitary condition of the borough and that such a committee be empowered to exercise and execute the powers, authority and duties of the Corporation under the Public Health Act of 1875²³.

The Act had stated that

any local authority may provide for the use of the inhabitants of their district hospitals or temporary places for the reception of the sick and for that purpose may themselves build such hospitals or places of reception²⁴.

By 1878, the population of Cambridge had reached 33,558 and Anningson noted his concern about the less than satisfactory state of Cambridge health. In his report to the Sanitary Committee that year, he wrote

The willingness of Addenbrooke's (the voluntary hospital) to admit cases is a great benefit . . . It were well if a fever hospital existed for the reception of cases of the other more infectious cases. Few can know the misery not to name the danger entailed when virulent disease appears in a poor house with ill and well, living and dead must be huddled together in the same apartment.²⁵

Anningson's anxiety had been aroused by the unwitting admission to Addenbrooke's of two cases of smallpox (imported from London). These had subsequently been removed to the workhouse fever ward, but were non-pauper and were not therefore eligible for that kind of provision.

By 1880, the death rate in Cambridge from diarrhoea amongst infants was rising, smallpox occurred again and a University student died from the disease, and Anningson wrote "diseases are difficult to manage in colleges and we must once more recommend a sanatorium for students sick of infectious diseases".²⁶ By 1882, Anningson had succeeded in appointing a subcommittee to assess the proposal to build a new hospital. This came at a time when tramps and vagrants were seen to pose an increasing threat to the health of the town. Inspection of tramps in common lodging houses and at fairs became a particular interest of Anningson's, in his attempt to stamp out "nuisances and disease".

I have little doubt (he wrote) that scarlatina especially is kept active amongst us by the migration of the persons attending these fairs. Scarlatina exists chiefly in the more over crowded parts of the district where the house accommodation is bad. It gets conveyed to the better parts of the town through the agency of soup kitchens in private houses, day servants and district visitors. The near prospect of getting a sanatorium which I have been urging since my first report of 1875 will ease the hardship entailed by college servants as well as lodging house keepers by temporary loss of profitable employment when infectious disease appears in the house.²⁷

The Building of the Isolation Hospital

Building on the Cambridge Isolation Hospital commenced in 1885, sited at the north eastern corner of Cambridge to avoid the 'miasma' being blown back across the town by the prevailing wind. By now notification of infectious disease and the need to admit to hospital such cases as a matter of central policy was placing pressure on local authorities, and Anningson's role was instrumental in effecting this policy.

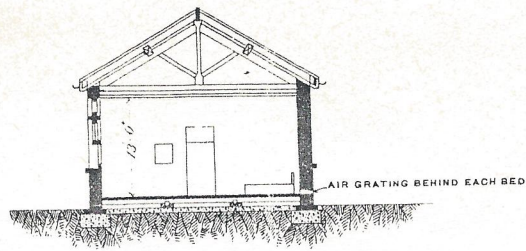
Anningson noted in his report of that year that "the experience of this year has proved the need of additional accommodation and I doubt not that this need will soon be made apparent."²⁸

By 1888 Anningson was effectively in control of the Isolation Hospital. In 1890 when the Notification of Diseases Act was adopted in Cambridge, he wrote

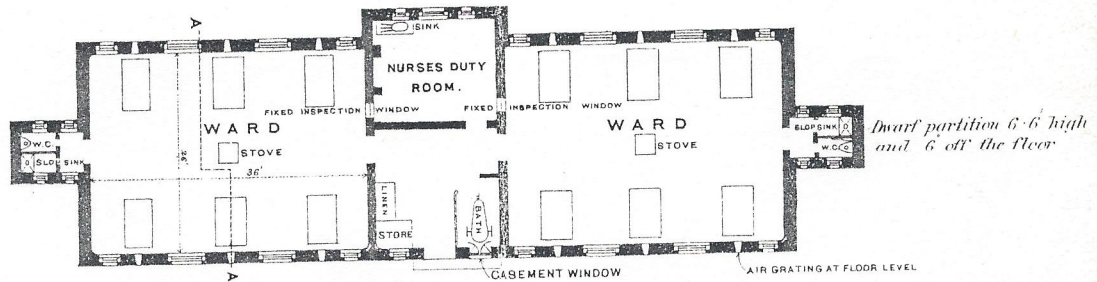
My knowledge of disease incidence will in future be derived from the returns made under this act, as well as the returns furnished from the district medical officers books, the work house and Addenbrooke's.²⁹

Under Local Government Acts, Anningson's power increased. He acted as a vital link with the central Public Health legislators, providing more authority for local MOHs backed up by their returns to provide facilities to limit the spread of infectious disease. At this stage, the statistics were showing that the number of notified cases indicated isolation was the solution to the control of infection. The isolation hospital had become a 'model' Local Government Board Hospital comprising separate blocks for scarlet fever, diphtheria, private patients and an ambulance with shed, laundry and mortuary for post mortem examinations and a disinfectors³⁰. The design remained suited to Chadwick's ideas for the control of 'miasmatic' disease aimed at reducing the spread of infection by adequate ventilation and a prescribed amount of air around each bed, and following the Board's regulations, it was surrounded by a high fence and was guarded by the town police during the 1903 smallpox epidemic.

PLAN C.

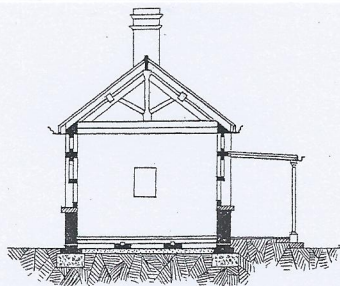


SECTION ON LINE A.A.

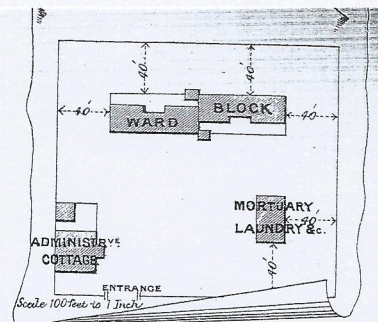


PLAN OF A WARD PAVILION FOR 12 BEDS.

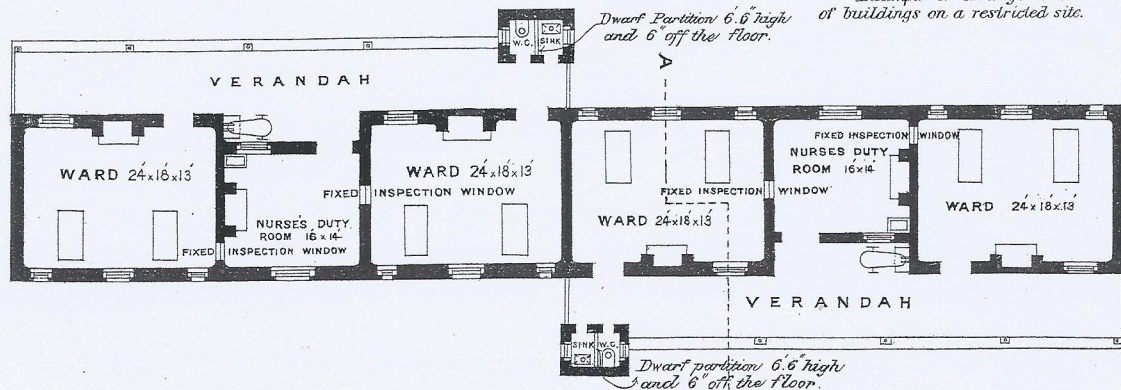
Plan of a ward pavilion for 12 beds³¹



SECTION ON LINE A.A.



Example of arrangement of buildings on a restricted site.



PLAN OF A BLOCK FOR EIGHT BEDS.

Scale. 16 F' to one inch.

The ward blocks built in Cambridge conformed exactly to the plans (see pictures) of the Local Government Board under Dr Buchanan³² who had sent plans and instructions for the work:

It will be found that in all plans proper standards of space are observed viz not less than 2,000 cubic feet of air space, than 144 square feet of floor space and 12 linear feet of wall space to each bed; that means are provided for the adequate ventilation and warming of wards. It will be observed that an interval of 40 feet is everywhere interposed between every building used for the reception of infected persons and things and the boundary of the site.



The Scarlet Fever Block, built in 1893

The plans of an isolation hospital were very different from those of a general hospital, as a separate building apart from others is required for each disease. In Cambridge, there were ultimately seven blocks, each with wards for male and female patients. The last two blocks, built in 1915, were 'modern' and one of them is still abreast of planning for an infectious disease hospital. It is known as a cellular cubicle block and is built in the form of a St. Andrew's cross. The kitchen is in the centre and, in each leg of the cross, there are three cubicles or rooms divided by plate glass partitions. Entrance to each room is from the outside verandah. One nurse can attend several patients, each with a different disease, the ritual requiring the washing of hands and the donning of a particular overall before entering a room.

By now, *after* the establishment of the hospital, germ theory was beginning to gain credence with Anningson. Klein's isolation of the scarlet fever

streptococcus was causing him to be concerned about the possibility of cross infection and the unlikelihood of cleanliness and ventilation alone to provide the answer. Koch's postulates were now known and the Diphtheria bacillus, amongst others, had been isolated. The idea of the miasmatic transmission of infection was losing credibility, particularly following Pasteur's discovery that fermentation and putrefication were not chemical processes but caused by living organisms.³³



The Ward Block, built in 1915

In 1917, following Anningson's death in office and the waning of the pioneering age of Public Health³⁴, the hospital had its own resident Medical Officer and a bacteriologist. Writing at the time, the MOH observed "there has been a tremendous drop in enteric fever and we seldom get a case now. Since I started, there has been an enormous change in the virulence of scarlet fever and it is now exceedingly mild compared to what it was thirty years ago. Diphtheria is as bad or perhaps even worse than it was then. The MO, Dr Laird, said this was due to "Cambridge being a place where catarrh was induced by atmospheric conditions and that was favourable to infection." There was a growth in the town of various sanitary, nuisance, building, bakehouse, and other inspectors, all trained and certificated on courses set up by Anningson. Improved living conditions meant that some illness could be cared for at home. Vaccination and other prophylactic measures, and a natural decrease in the virulence of some diseases were causing the hospitals to be less used from the time. The Hospital was taken over by the military for admission of soldiers and Serbian evacuee children during the First World War and the smallpox huts were suggested as a possible camp for German Prisoners of War, "on the understanding that they are

given up at 24 hours notice for smallpox or any other infectious disease".³⁵ In 1902, a large nurses home and administrative block was built and by 1908 the catchment area of the Hospital increased to cover the whole of Cambridgeshire. In 1932, the MOH reported that he had "inspected the Hospital for grant purposes . . . with a view to any necessary extension. The hospital site has been enlarged by the purchase of 1.93 acres of land . . . The population is estimated by 1931 census as 62,000."³⁶



The Nurses Home and Administration Block, built in 1903

During the period 1939-43 the Hospital was used for the treatment of evacuees suffering from all illnesses. With the 1946 NHS Act the Hospital passed from the Board to the new joint authority. From this time apart from its designation as a centre for the care of patients with paralytic poliomyelitis the Hospital ceased to play a role as an isolation hospital. Infectious diseases were only removed from home at this time if conditions were unsatisfactory as in the case of students, nurses and boarding school children living in communal accommodation or if a complication developed causing a deterioration in the patient's condition. Smallpox cases were transported to a specialist hospital in Ipswich.

In 1956, the Hospital was converted into a medical unit to be used as an overflow for patients at Addenbrooke's without satisfactory convalescent facilities in their own homes³⁷. A block was used periodically for outbreaks of gastrointestinal illness notably a paratyphoid fever outbreak in 1963 originating from cakes baked in a local bakery using contaminated chinese dried eggs. None of

these cases was of a serious nature and could well have received antibiotic treatment and nursing care at home.

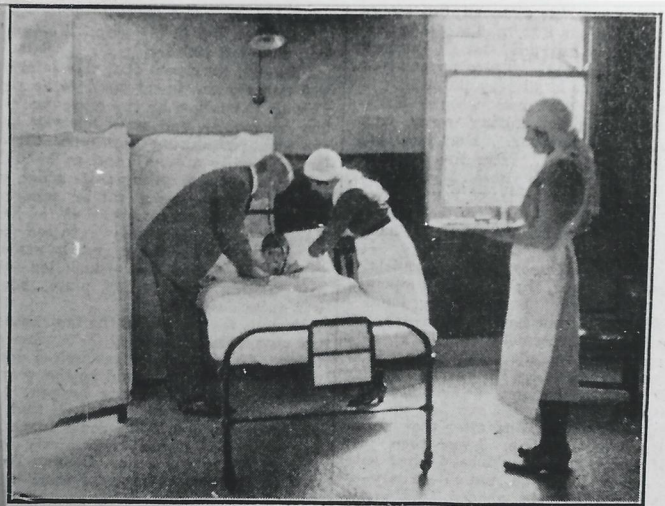
With the emergence of germ theory, the Isolation Hospital became obsolete leading to a change in its function and use more in keeping with current trends in medicine. Some of the original buildings remain and are now used as a geriatric day centre. The administration block still serves the same function and is a reminder in its size alone of the importance placed on the administration and organisation of state health care at the turn of the century.



The Medical Officer (Dr. A. J. Laird) and the Matron (Miss Mitchell) with nurses, outside a ward for diphtheria patients.

The Medical Officer (Dr A.J. Laird) and the Matron (Miss Mitchell) with nurses, outside a ward for diphtheria patients.³⁸

The morning visit of the doctor to a small boy who is fighting a serious attack, and winning.³⁹



The morning visit of the doctor to a small boy who is fighting a serious attack, and winning.



Children convalescing from scarlet fever in the sunshine. An active group, with toys and books, photographed with the Matron and nurses, and cot cases beneath the verandah.

Children convalescing from scarlet fever in the sunshine.⁴⁰

Acknowledgements

The photographs of Dr Bushell Anningson on page 5 and of the wards, staff and patients on pages 10 and 13 are reproduced by kind permission of the Cambridgeshire Collection, Cambridgeshire Libraries.

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- ¹ Stokes T.N., A Coleridgean against the medical corporations. J. Simon and the parliamentary campaign for the reform of the medical profession, 1854-8 in *Medical History* 1989, 33, pp 343-359.
 - ² *Lancet* 1853 ii p393.
 - ³ Lambert, R., Sir John Simon, 1816-1904, and English Social Administration, London, 1963.
 - ⁴ see Lambert,R., note 3 above.
 - ⁵ Hirsch, Handbook of Geographical and Historical Pathology, New Sydenham Society, Transl 1881.
 - ⁶ Parsons, H.F., Isolation Hospitals, Cambridge Public Health Series, C.U.P.,1914.
 - ⁷ Murchison, E., A treatise of Continued Fevers in Great Britain, 2nd Ed, 1862.
 - ⁸ Hardy,A. in Ed. MacLeod,R. Government and expertise specialists, administrators and professional, 1860-1919, p128. CUP Cambridge, 1988.
 - ⁹ see Stokes,T.N., note 1 above.
 - ¹⁰ Medical Directory, 1900.
 - ¹¹ see Stokes,T.N., note 1 above.
 - ¹² Reports from commissioners, PP 1882, part ii, C3290.
 - ¹³ see Parsons,H.F., note 6 above.
 - ¹⁴ Parsons,H.F. see note 6, above.
 - ¹⁵ *BMJ*, 24 Mar 1900, p743.
 - ¹⁶ *BMJ*, 14 Apr 1900.
 - ¹⁷ Mariott in *BMJ*, 14, April,1900.
 - ¹⁸ Abel-Smith, B., The Hospitals, 1800-1948, London, 1963.
 - ¹⁹ Photo by Scott and Wilkinson, Cambridge Graphic, 15.12.1900.
 - ²⁰ Alumni Cantabrigienses, Venn,J.A., part 2, 1752-1900, vol 1, 1940.
 - ²¹ Anningson,B.,Evolution of Human Communities in relation to disease, *Public Health*, Aug 1895.
 - ²² Anningson,B., *B.M.J.*, Jun 14, 1879.
 - ²³ Cambridge Town Sanitary Committee Minutes, 1887.
 - ²⁴ Public Health Act, 1875.
 - ²⁵ Cambridge MOH Report to Sanitary Committee,1878.
 - ²⁶ Cambridge MOH Report to Sanitary Committee,1880.
 - ²⁷ Cambridge MOH Report to Sanitary Committee,1882.
 - ²⁸ Anningson,B., Cambridge MOH Report 1885.
 - ²⁹ Anningson,B., Cambridge MOH Report 1888.
 - ³⁰ Borough of Cambridge, Urban Sanitary Authority Report on Disinfector, May 1894.

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- ³¹ Buchanan,G., On the Provision of Isolation Hospitals, Accommodation by Local Sanitary Authorities, HMSO, 1884. 8
- ³² Buchanan,G., see 31 above.
- ³³ Skinner,H.A., The Origin of Medical Terms, London, 1949.
- ³⁴ see Hardy,A., note 8 above, p142.
- ³⁵ Cambridge Public health Committee Minute, 12 Feb 1918.
- ³⁶ Cambridge MOH Report to the Public Health Committee, 2 Feb 1932.
- ³⁷ Addenbrooke's Hospital Annual Report, 1956.
- ³⁸ Cambridge Chronicle and University Journal, September 17, 1930, p.7.
- ³⁹ Cambridge Chronicle and University Journal, September 17, 1930, p.7.
- ⁴⁰ Cambridge Chronicle and University Journal, September 17, 1930, p.7.