6

The Infectious Diseases or 'Fevers' of Childhood

As anticipated, controlling the spread of fevers in paediatric hospitals proved an ever recurring headache. In the early decades deciding how to prevent outbreaks was complicated by lack of consensus as to how the common fevers of childhood were acquired. Until the germ theory of disease became generally accepted towards the very end of the century, the possibility of contagion could be doubted for even such highly infectious fevers as measles and chicken pox. Unimpressed by current evidence that certain illnesses, most dramatically smallpox, could be transmitted via particulate or fluid matter, non-contagionists adhered to a non-specific theory of disease causation. In their opinion, fever was due to miasmic conditions, that is air polluted by foul emanations from human or animal bodies and from decomposing matter. Given such conditions, disease would appear but its precise type was unpredictable depending on the peculiarities of the locality and of its inhabitants. Right until the end of the century, non-contagionists would argue that any reduction in incidence of smallpox brought about by vaccination was accompanied by an increased incidence of other illness, such as measles and whooping cough, demonstrating that fevers were interchangeable and would persist so long as overcrowding and insanitary conditions prevailed, whether in homes, factories, hospitals or prisons.[1]

Before the introduction of germ theory, however, anticontagionist concepts of the origins of fevers were not usually strikingly different from those of contagionists. The latter group was being forced to compromise since, as has been pointed out by many historians, simple rules of contagion did not apply to fevers such as cholera and enteric fever.[2] Ideally, to be declared contagious, a disease should obviously spread from person to person and the infective agent or 'virus', whether fluid or particulate, should be identifiable and capable of reproducing the illness when inoculated into another person or animal, as had been established for smallpox, syphilis, and rabies. But with most fevers, and with scrofula and consumption, attempts to transmit the illness via inoculation of sputum, pus, or other discharge, either failed or were unconvincing. The most memorable rejection of apparently decisive evidence of contagion applied to the investigations of the French surgeon, Jean A. Villemin, during the 1860s. He had conducted a series of experiments in which fragments of tuberculous material were inoculated into healthy rabbits. When the animals either died or were killed some months later, tubercles were found in their bodies, whereas uninoculated litter mates kept in similar conditions, and killed at the same time, showed no evidence of the disease. Villemin concluded that

[1] W. Scott Tebb, *A Century of Vaccination* (London: Swan Sonnenschein, 1899), pp. 84–6.

[2] For example, Erwin H. Ackerknecht, 'Anticontagionism between 1821 and 1867', *Bulletin of the History of Medicine*, **22** (1948): 562–93; Margaret Pelling, *Cholera, Fever and English Medicine 1825–1865* (Oxford: University Press, 1978); John M. Eyler, *Victorian Social Medicine: The Ideas and Methods of William Farr* (Baltimore: Johns Hopkins University Press, 1979), pp. 97–122, and Charles E. Rosenberg, *The Care of Strangers: The Rise of America's Hospital System* (New York: Basic Books, 1987), pp. 124–6.

tuberculosis was the consequence of a specific virus which, when introduced into a susceptible body, 'may reproduce itself, and at the same time reproduce the disease of which it is the essential principle'.[3] As F. B. Smith points out, Villemin must have been an unusually gifted investigator to demonstrate transmission of infection with the tubercle bacillus, a notoriously slow acting organism.[4] Attempts to reproduce his results were usually inconclusive, possibly because other investigators killed their experimental animals too soon after inoculation and, as a consequence, Villemin's work was finally ignored. Physicians continued to regard tuberculosis as a peculiar reaction to external stress, or mild illness such as a cold, of persons constitutionally so predisposed. The pathology of tubercular lesions remained an open question, but the disease was broadly conceived as due to the gradual degeneration of tissue into pus which, if it entered the bloodstream, could spread anywhere in the body to form characteristic lesions. Persons who had inherited the tubercular constitution, or diathesis, were considered at risk of incurring active disease at the mildest provocation. As indicated by Smith, 'the reaction to Villemin revived the old idea that phthisis was the ultimate result of other lung inflammations, pneumonia, pleurisy and bronchitis, producing phlegm which degenerated into pus'.[5] Again this interpretation involved the assumption of disease interchangeability as opposed to the concept of specific illness due to a specific cause.

Even the childhood fevers, measles, chickenpox, whooping cough, and scarlet fever, could not conclusively be established as propagated through contact or through fomites, such as infected bedding or clothing. But spread they did, so they were frequently termed infectious rather than contagious, meaning that they were propagated through the atmosphere by miasma generated by the sick individual. The critical factor then became the distance the infected air could travel leading to interminable discussions as to the space that should separate beds in fever and other hospitals.

By the middle of the nineteenth century the distinctions between contagious and miasmatic explanations were indefinite. For example, Robley Dunglison, in the 1852 edition of his *Medical Lexicon*, could state that: 'Contagious diseases are produced either by a virus, capable of causing them by inoculation, as in small-pox, cow-pox, hydrophobia, syphilis, etc., or by miasmata, proceeding from a sick individual, as in plague, typhus gravior, and in measles and scarlatina'.[6] Further on, in the same entry on 'Contagion', Dunglison reported that physicians were 'by no means unanimous in deciding what diseases [were] contagious and what not. . . . It seems probable, that a disease may be contagious under certain circumstances and not under others'. More clear cut was the contention between proponents of disease specificity, who held that each disease had its own particular virus, and those who believed that the general poison in miasmic exhalations could produce a variety of fevers depending on atmospheric, local and individual circumstances.

[3] 'Tuberculosis', in Mr. H. Power, Dr. Anstie, Mr. Holmes, Mr Thomas Windsor, Dr. Barnes, and Dr. C. Hilton Fagge (eds), *Biennial Retrospect of Medicine, Surgery, and their Allied Sciences for 1865–6* (London: New Sydenham Society, 1867), pp. 81–3.

[4] F. B. Smith, *The Retreat of Tuberculosis 1850–1950* (London: Croom Helm, 1988), pp. 34–6.

[5] Ibid., p. 35.

[6] Entry on 'Contagion', in Robley Dunglison, *Medical Lexicon* (Philadelphia: Blanchard and Lea, 1852), p. 233.

Advocates of disease specificity were not necessarily narrow contagionists. One more moderate thinker was William Farr, as has been discussed by John Eyler.[7] In the appendix to the *Fourth Annual Report of the Registrar-General* (1842), William Farr introduced a new classification of epidemic, endemic and contagious diseases on the principal that they were caused by specific poisons 'of organic origin, either derived from without, or generated within the body'.[8] Since these diseases seemed to involve reaction akin to fermentation in the bloodstream, he proposed calling them 'zymotic', from the Greek word 'zyma', meaning ferment. Under this heading Farr had a long list of disorders, including the eruptive diseases of childhood, whooping cough, malaria, scurvy, diarrhoea, cholera, rheumatic fever, syphilis and erysipelas. Some, like malaria, were not contagious; others, like scurvy, were due to lack of vegetable food, but Farr thought they could all be explained as due to a specific organic ferment that produced symptoms when it reached the bloodstream. Yet, even Farr could not reconcile all the known facts to unequivocally simple theory. Thus he undermined the concept of absolute specificity by suggesting that the miasma that induced malaria might, under certain circumstances, become modified to cause remittent fever or yellow fever.

On the other hand, advocates of miasma as the source of all fevers were definitely anti-contagionists. Florence Nightingale, a prominent example of this type of thinking, could become quite outraged while merely contemplating the doctrine of contagion, as in the following extract from *Notes on Hospitals*:

> And now, what does 'contagion' mean? It implies the communication of disease from person to person by *contact*. It pre-supposes the existence of certain germs like the sporules of fungi, which can be bottled up and conveyed any distance attached to clothing, to merchandise, especially to woolen stuffs, for which it is supposed to have a particular affection. . . . There is no end of the absurdities connected with this doctrine.[9]

To a large extent the doctrine of contagious particles or fluids was anathema because of the implied inevitability of transmission. Nightingale admitted the existence in smallpox and cowpox of a specific virus, which could be propagated by inoculation but not, strictly speaking, by contact, so obviating the need to accept the doctrine of contagion. Infection was another matter. If the air was polluted by decomposing matter then infection could occur among susceptible people. But Nightingale was quite certain that absolute cleanliness would eliminate the generation of miasmata and that a constant supply of fresh air plus individual good health would prevent infections from manifesting themselves even when, by some mischance, miasmata were produced. All fevers, including those of childhood, were avoidable. 'Why', Nightingale asked, 'must children have measles'?

> If you believed in and observed the laws for preserving the health of houses which inculcate cleanliness, ventilation, white-washing, and other means, and which, by the way, *are laws*, as implicitly as you believe in the popular opinion, for it is nothing more than an

[7] Eyler, *Victorian Social Medicine*, pp. 97–122.

[8] William Farr, *Appendix to Fourth Annual Report of the Registrar-General* (London: H.M.S.O., 1842), p. 93.

[9] Florence Nightingale, *Notes on Hospitals* (London: Longman, 1863), p. 9. For a discussion of Florence Nightingales's conception of disease transmission in hospitals and its prevention see, Charles E. Rosenberg, 'Florence Nightingale on Contagion: The Hospital as Moral Universe', in Charles E. Rosenberg (ed.), *Healing and History, Essays for George Rosen* (New York: Science History Publications, 1979), pp. 116–36.

> opinion, that your child must have children's epidemics, don't you think that upon the whole your child would be more likely to escape altogether.[10]

To minimize the risk of infection, according to Nightingale and other sanitarians, children's hospitals should be well ventilated and, to ensure the purest air, sited in rural rather than in urban areas. An obvious difficulty was that most patients lived in cities and that, apart from the hazards of transporting sick children some distance into the countryside, parents would object to having their offspring far from home. Nevertheless, Manchester took the risk and, in 1873, a new Children's Hospital built on the pavilion plan, which came into favour at about mid-century, was opened out in the country at Pendlebury.[11] The outpatient department, or dispensary, remained in Manchester and, as indicated by Pickstone, Pendlebury Hospital continued to be the main children's hospital for the city, in spite of its rural site.[12] It had no trouble attracting patients, parents apparently adapting easily enough to the increased travelling time involved, while the medical staff received the then unusual inducement of a respectable salary on condition they did not have honorary appointments at any other hospital.

Particularly in London, however, physicians were not keen on the idea of rural hospitals. Nightingale herself had anticipated resistance to this somewhat drastic solution and compromised, in *Notes on Hospitals*, with the dictum 'that *every* child's hospital ought to have *a convalescent* branch at a distance, in the most healthy spot that can be found—probably by the sea, or at a watering place'. And she added, 'this, however munificently the hospital itself may be furnished with air and exercise'.[13] Funds would always be a problem but otherwise the convalescent hospital concept met with general approval. Land could be bought more cheaply in the country than in the city so, with more spacious grounds available, children would recover from acute illness or surgery with plenty of opportunity for exercise and fresh air. Physicians also liked this method of freeing the parent hospital beds for more acute cases. During the 1860s and 1870s convalescent homes proliferated, some as independent institutions contracting beds out to city hospitals while others were offshoots of, and belonged to, the urban paediatric hospitals. Great Ormond Street began by using cots at Hornsey and Tottenham then, in 1869, leased its own convalescent home, Cromwell House, at Highgate. But at Cromwell House infectious disease was often even more rife than at the London hospital, a disappointing situation for which the age of the house was held responsible.[14]

Hospital committees tried to avoid cross infection through a variety of manoeuvres. The simplest way, used by Liverpool Children's Hospital at its inception, was to exclude feverish children altogether and fill the few beds available with mild surgical cases or chronic orthopaedic ones. Even this method was not foolproof since children had a

[10] Florence Nightingale, *Notes on Nursing: What it Is, and What it Is not* (London: Harrison, 1859), p. 20.

[11] For discussions of the origins of the pavilion form of hospital see, Rosenberg, *The Care of Strangers*, p. 128; and John D. Thompson and Grace Goldin, *The Hospital: A Social and Architectural History* (New Haven: Yale University Press, 1975), pp. 118–69. For a description of the new hospital at Pendlebury see Marjorie Cruickshank, *Children and Industry: Child Health and Welfare in North-West Textile Towns during the Nineteenth Century* (Manchester: University Press, 1981), pp. 126–7.

[12] John V. Pickstone, *Medicine and Industrial Society: A History of Hospital Development in Manchester and its Region, 1752–1946* (Manchester: University Press, 1985), p. 122.

[13] Nightingale, *Notes on Hospitals*, p. 129.

[14] Thomas Twistington Higgins, *'Great Ormond Street', 1852–1952* (London: Odhams Press, 1952), p. 33.

disconcerting habit of developing fevers, such as measles, scarlet fever and whooping cough, while on the wards. Furthermore, the hospital medical staff was not always co-operative. In October 1869, the house surgeon at Liverpool Children's Hospital was called to account by the general committee for having admitted two children suffering from scarlatina.[15] Most hospitals, however, began with a policy of admitting some fever cases, with the notable exception of smallpox whose contagiousness and liability to kill were not in doubt. One or more fever wards, or rooms, were set apart for infectious cases, but often these arrangements were insufficient to cope with all the admissions of uncertain diagnosis or with unexpected outbreaks on the medical or surgical wards. Also, administrators and physicians might not agree as to the types of fever cases that warranted admission. During 1853 and 1854, the management committee at Great Ormond Street kept reiterating a demand to exclude cases of whooping cough and measles from the wards. The medical committee balked at accepting such a strict ruling on the principle that both diseases could have life threatening complications which required special care and treatment, 'such as no place but a hospital can afford, in order to give children affected by them, any chance of recovery'.[16] Also the physicians were sometimes quite casual about isolating fever cases. As indicated by Twistington Higgins, when a visiting governor complained about finding two children with whooping cough on the general wards, the medical committee tried to placate him by intimating that whooping cough was far less contagious than most other fevers.[17] In the 1865 edition of his textbook on diseases of children, West discussed whooping cough at length (two chapters) without ever mentioning that the disease might be contagious or infectious. But he did point out that pertussis ranked fourth among the leading causes of death in children under five years of age in London, thus explaining the medical desire to admit cases where complications had occurred.[18] As may be seen from the tables, the overwhelming majority of children with whooping cough were outpatients, with admission to the wards a rarity except at the Evelina.

Many physicians became convinced, and attempted to persuade management committees, that a significant proportion of infectious diseases was introduced into the wards by visiting relatives and friends. Early in 1854 the medical staff at Great Ormond Street held visitors responsible for a recent outbreak of measles and scarlet fever. This hazard could be reduced, in the opinion of the medical committee, by diminishing the number of visiting days from four to two per week.[19] Although unjustifiable to the modern mind, this step seemed quite reasonable to the committee members especially since permission for daily visiting was always given when children were deemed dangerously ill. The medical committee further advised that fever patients should be visited on different days to the children on the open wards to obviate the risk of a person visiting both kinds of patients or of the two types of visitors mingling in any way. In most children's hospitals quite complicated manoeuvres were undertaken physically to separate

[15] Archives of the Liverpool Infirmary for Children, Myrtle Street, Minutes of the Medical Board, 7 October, 1869.
[16] Great Ormond Street Archives (G.O.S.), Report of Medical Committee Meeting, 17 May, 1854.
[17] Twistington Higgins, *'Great Ormond Street'*, p. 26.
[18] Charles West, *Lectures on the Diseases of Infancy and Childhood* (Philadelphia: Henry C. Lea, 1866, from the 1865 London ed.), p. 360.
[19] G.O.S. Archives, Medical Committe Minutes, 20 April, 1854.

fever ward traffic from that of the rest of the hospital rather as foreign transit passengers at airports today are kept apart from the rest of the throng. At Great Ormond Street a special entrance was devised, while at the Birmingham Children's Hospital parents were allowed to see their children through a window only, unless the fever patient was desperately ill.[20] Special nurses were allocated to fever wards, as were special utensils and the children provided with washable hospital clothing. But arrangements completely to isolate infective cases from the outside world were difficult to maintain consistently.

As the century wore on and the extreme contagiousness of most childhood fevers became generally recognized, the rules were made more stringent and the policy of exclusion more thorough at least in theory. This became essential since an outbreak entailed closing the affected ward, isolating the children or sending them home (often difficult or impossible), and then undertaking time and labour consuming disinfection of the ward. Members of the management committee would also have the embarrassing task of placating angry parents, including the parents of nurses who had contracted an infectious disease on the wards, sometimes with fatal consequences. In 1893 William Wallis Ord, physician to outpatients at the Victoria Hospital for Children in Chelsea, told an international audience that serious outbreaks of infectious disease remained the main bugbear of special hospitals for children. He too believed that relatives and friends of patients were the main source of infection and that visiting should be restricted even to the extent of being permitted solely if a child's life was in danger, as was then the rule for the children's ward at 'one of our largest London hospitals' (probably the London Hospital).[21] None of the paediatric hospitals took such extreme general measures during the nineteenth century although, as mentioned above, they did seek to restrict the visiting of fever patients. Also, during periods when infectious disease was rife, the Evelina for example excluded all visitors from the wards, unless they had special permission from the house surgeon.[22]

A tougher policy of exclusion was facilitated by the increasing availability of beds in fever hospitals. In London a new era began with the establishment of the Metropolitan Asylums' Board (MAB) in 1867.[23] One of the Board's responsibilities was to provide accommodation for needy people suffering from serious fever and smallpox, with the result that three infectious disease hospitals, at Hampstead, Homerton, and Stockwell, were opened by 1871. In 1877, two more MAB fever hospitals were opened at Fulham and Deptford. Intended as Poor Law institutions, these hospitals were soon admitting non-paupers particularly under the stress of smallpox epidemics when dangerously ill and highly infective patients could hardly be turned away. The 1871 census revealed that 82 per cent of the male patients at the Hampstead fever hospital were in gainful employment and during the smallpox epidemic of 1876–78, about 90 per cent of MAB hospital patients

[20] Edinburgh Medical Archives, LHB 5/22/23, Letter to the Secretary of the Edinburgh Hospital for Sick Children from the Secretary of the Birmingham Hospital for Sick Children, 1884.

[21] William Wallis Ord, 'The Utility, Peculiarities, and Special Needs of Hospitals for Children', in John S. Billings and Henry M. Hurd (eds), *Hospitals, Dispensaries and Nursing: Papers and Discussions in the International Congress of Charities, Correction and Philanthropy, Section III, Chicago, June 12th to 17th, 1893* (Baltimore: Johns Hopkins Press, 1894), pp. 363–79.

[22] Greater London Record Office (hereafter G.L.R.O.), H9/EV/A2/3, Minutes of Committee of Management 1887–1898, 4 November, 1887 and 27 September, 1889.

[23] The fullest source of information about the MAB hospitals is Gwendoline M. Ayers, *England's First State Hospitals and the Metropolitan Asylums Board 1867–1930* (London: Wellcome Institute, 1971).

stated that they had never before been on relief.[24] During the 1880s the Asylums Board sought legal recognition to divorce the services of its fever hospitals from Poor Law involvement. Finally the 1891 Public Health (London) Act entitled all citizens to admission to MAB hospitals, regardless of ability to pay, on presentation of a medical certificate. By then the MAB institutions were geared to receive cases of scarlet fever, typhus, enteric or typhoid fever, smallpox and diphtheria (first admitted in 1888), so that children suffering from these diseases could be transferred there directly from the outpatient departments of paediatric and general hospitals.[25] The 1891 Act also required cases of infectious disease in London hospitals to be notified to local Medical Officers of Health.

In the meantime provincial sanitary authorities were also providing isolation facilities again originally under the pressure of fear of smallpox and cholera epidemics. In the Manchester region, as indicated by Pickstone, most of the larger towns organized accommodation for infectious diseases between 1870 and 1900.[26] Mainly due to agitation by the surgeon John Leigh, Manchester Corporation's first Medical Officer of Health, who insisted that children in particular would be more likely to survive infectious diseases if better accommodation was provided, an estate was purchased north of the city and Monsall 'House of Recovery' opened in 1871. Officially, the new fever hospital was an extension of the Manchester Royal Infirmary and the Corporation paid for the maintenance of patients there until 1896 when Monsall was transferred to the Corporation itself. At first parents were reluctant to send their children to the isolation hospital but by 1880 children constituted about one-third of the patients at Monsall.[27] In the meantime Pendlebury was actually admitting more infectious cases than the original children's hospital in Manchester had, because not only did Manchester Corporation continue to send patients but now it was joined in so doing by the Corporation of Salford, the district in which the new children's hospital lay (see Table 8). In 1874 this corporation agreed to pay for all fever cases admitted to Pendlebury for one year and the contract was renegotiated in succeeding years.[28] In 1879 Salford Corporation ceased subscribing as it had made other arrangements at Wilton Hospital for its fever patients.[29] Nevertheless, the number of children admitted to Pendlebury with typhoid fever, and with scarlet fever in particular, continued to expand in the 1880s (in spite of Wilton and Monsall) and began to decline only in the 1890s. Then, in 1896, Manchester Corporation purchased Monsall Fever Hospital and arranged to send all its cases of scarlet fever there, so enabling Pendlebury to close its fever ward. Rapidly growing was the principle that patients with serious infectious diseases should be nursed away from home in specialized institutions, and other towns followed the Manchester example with isolation facilities varying from 'wooden sheds' to 'model hospitals'. By 1891 in England and Wales, according to Abel-

[24] Ibid., p. 62.

[25] For a table showing the principal diseases treated in the MAB isolation hospitals from 1871 to 1900, see: ibid., Appendix II, Table F.

[26] Pickstone, *Medicine and Industrial Society*, p. 160; also Cruickshank, *Children and Industry*, pp. 136–40.

[27] Pickstone, *Medicine and Industrial Society*, p. 162.

[28] Salford City Archives, G/HRM/AM2/2, Minutes of Board, 25 April, 1874; also 2 January, 1875, and 27 January, 1876.

[29] *Fifty-First Annual Report of the General Hospital and Dispensary for Sick Children* (Manchester, 1880), p. 9.

Smith, 'about 400 of the 1,600 sanitary authorities had provided some form of hospital'.[30] In 1885 Edinburgh established a City Fever Hospital and, the same year, the Children's Hospital stopped admitting fever cases to its wards.

By this time (the mid-eighties) most paediatric hospitals in Great Britain were becoming very selective about admitting children with zymotic diseases, while continuing to provide isolation facilities for those developing illness while on the wards. However, because of the serious nature of complications in whooping cough, diphtheria and scarlet fever, these diseases sometimes formed an exception. For example, the Evelina Hospital in London established a special isolation ward for the observation and treatment of children with whooping cough in 1877. Cases of other infectious diseases, apart from diphtheria, were not admitted, but a ward in a separate building was maintained for the reception of children who developed infective fevers while in the Evelina Hospital.[31] Great Ormond Street had a somewhat variable policy, largely dependent on the space and funds available (see Table 7). During 1875 and 1876 few fever cases were admitted as surgery now claimed an increased number of beds. However, a new hospital was under construction providing a special wing with 16 beds for patients requiring to be isolated and, by 1878, sufficient money was available to use these facilities. For the first few years the isolation beds were mainly occupied by children with measles and scarlet fever, frequently acquired while in the hospital wards. Beginning in 1880, however, preference was given to children

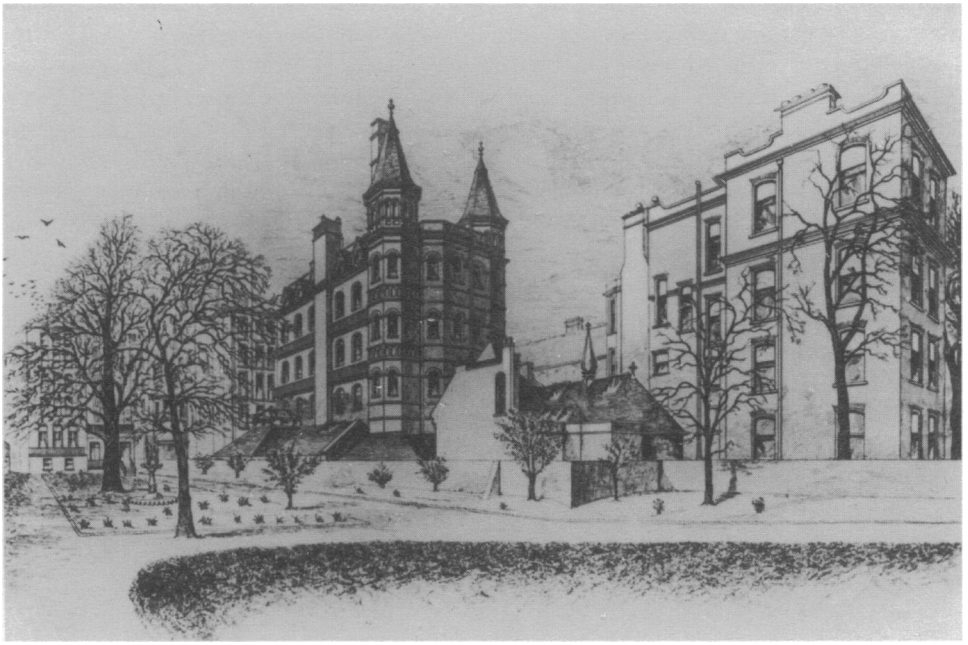

Figure 6: 'The Children's Garden', drawing by John Gascoine showing the fever block of the Hospital for Sick Children, Great Ormond Street, opened in 1878. This picture of it first appeared in the 1901 Annual Report of the Hospital. (By kind permission of the Hospital for Sick Children, Great Ormond Street.)

[30] Brian Abel-Smith, *The Hospitals, 1800–1948* (London: Heinemann, 1964), p. 127.
[31] *8th Annual Report of the Evelina Hospital for Sick Children* (1877), G.L.R.O., H9/EV/A24/8.

suffering from diphtheria because of the skilled care, including possibly urgent tracheotomy, such children required. By 1887 the management committee had agreed that a larger ward was required for the treatment of diphtheria and that a special ward for whooping cough should also be provided since: 'amongst the children of the poor whooping-cough is one of the most fatal of diseases, and the facilities for its treatment in London are most inadequate'.[32] The latter part of the plan came to nothing, probably because an acute shortage of funds developed once again, and not until 1900 did Great Ormond Street acquire a ward dedicated to the treatment of whooping cough. Manchester Children's Hospital admitted patients with whooping cough only under very exceptional circumstances but was more lenient with diphtheria, although there was rarely more than one case of diphtheria in the hospital at the same time.[33] Beds in the fever ward were usually occupied by children with scarlet fever, 187 such cases being admitted in 1888, but only 101 in 1896 since the fever ward was closed towards the end of that year. Other children's hospitals, including Liverpool, Birkenhead, Aberdeen and the East London, continued to make provisions for the reception of patients with laryngeal diphtheria in the event that tracheotomy should be required urgently to save the child from suffocation.

Diphtheria appeared to be on the increase during the final two decades of the nineteenth century in part because before 1884, when the causative bacillus was isolated, many victims were not so diagnosed but instead thought to be suffering from croup. As early as 1826, Pierre Bretonneau had claimed that inflammations of the larynx involving the formation of a false membrane had the same cause and therefore formed a single disease entity which he labelled 'diphtheritis'.[34] But his efforts to unify diseases variously called malignant angina, gangrenous angina, and cynanche laryngea or croup satisfied few physicians in Britain where, mainly on clinical and epidemiological grounds, two disease groups persisted. The name diphtheria was adopted for the form considered contagious, often epidemic, non-recurrent in any individual, characterized by extensive deposit of false membrane and often followed by complications such as muscle paralysis. Croup, on the other hand was not considered contagious, could recur in the same patient, displayed a more localized deposit of pseudo-membrane, and, when not fatal, was followed by complete recovery without complications. Charles West, who adhered to the above distinctions in 1873, considered the diphtheric type to have been rare in the London area until recent years when it had assumed greater frequency and severity.[35] At Great Ormond Street cases of croup became rarer after the 1870s, and the classification was no longer used after 1890. In the meantime the number of cases of diphtheria admitted increased steadily, from 6 in 1876, to 51 in 1886 and 78 in 1896 (see Table 7). Pendlebury admitted fewer cases of diphtheria but there too there was an increased incidence until the fever ward was closed in 1896 (see Table 8). The figures may be revealing not so much an absolute increase in the prevalence of diphtheria as more frequent diagnosis in the

[32] *The Thirty-Fifth Annual Report of the Hospital for Sick Children* (London, 1887), p. 8.
[33] Charles West, *Letter to the Rt. Honble. Lord Aberdare* (London: H. Sotheran, 1887), p. 25.
[34] Pierre F. Bretonneau, *Des inflammations spéciales du tissu muqueux et en particulier de la diphthérite, ou inflammation pelliculaire* (Paris: Crevot, 1826); Zelma L. Dunn, 'Pierre Bretonneau and the History of Diphtheria in France in the Nineteenth Century' (Ph.D. Thesis, Univeristy of California, Berkeley, 1973).
[35] Charles West, *Lectures on the Diseases of Infancy and Childhood* (Philadelphia: Henry C. Lea, 1874, from the 1873 English ed.), pp. 350–1.

presence of fever and septic sore throat, and an increased obligation to hospitalize serious cases for possible tracheotomy.[36]

The death toll among diphtheria patients admitted to hospital was high; at Great Ormond Street over 50 per cent of these children died in 1882, 35 per cent in 1886, and 29 per cent in 1892 (see Table 5). A common cause of death was asphyxia due to the formation of a false membrane in the larynx and even extending down the trachea into the bronchi. The laryngeal obstruction gave rise to a harsh, metallic, croupy cough (hence the original name for the illness) together with great difficulty and distress in breathing. When seen such cases were usually admitted for nursing in a steam tent and for possible tracheotomy. The great problem was to decide whether or not the larynx should be incised and intubated and the dilemma was made no easier by the high mortality accompanying tracheotomy. In 1893 for example, of the 40 patients who underwent this operation at Great Ormond Street no less than 30 died. But this kind of carnage was soon to become outdated thanks to the introduction of antitoxin in 1894.

Following the discovery of diphtheria toxin in 1888, researchers, including Carl Fraenkel, Emil Behring and Shibasaburo Kitasato in Berlin and Emile Roux, Alexandre Yersin and Louis Martin in Paris began searching for an antidote to the toxin presumed responsible for the severe cardiac, neurological and respiratory symptoms of diphtheria.[37] The German group were the first to produce an antitoxin which protected laboratory animals against lethal doses of diphtheria bacilli and, in 1893, Behring conducted human trials with the serum. In the meantime the French group had established the production of horse antitoxic serum which was tried out on patients at the Enfants Malades in Paris in 1894. The mortality rate of the first 300 children with bacteriologically confirmed diphtheria given antitoxin was 25 per cent. as compared to 52 per cent for untreated children at the hospital during previous months. The announcement of these results by Roux at the International Congress of Hygiene and Demography at Budapest in 1894 brought the method to public as well as professional attention and stimulated trials in other countries.[38]

In Britain clinical trials were mainly undertaken at the fever hospitals of the Metropolitan Asylums Board and in the large general hospitals. Early in 1896 the medical superintendents of the MAB hospitals issued a report comparing the mortality statistics for 1895, during the whole of which year antitoxin was used for severe cases of diphtheria, with those for 1894, with the minute number of patients given serum that year excluded. The 3,529 cases, treated and untreated, in 1895 had a mortality of 22.5 per cent as

[36] The difficulties of accurately determining the incidence of diphtheria, and its virulence, in the late nineteenth century, are discussed by Paul Weindling, 'From Medical Research to Clinical Practice: Serum Therapy for Diphtheria in the 1890s', in John V. Pickstone (ed.), *Medical Innovations in Historical Perspective* (New York: St. Martin's Press, 1992), pp. 72–83.

[37] H. J. Parish, *Victory with Vaccines: The Story of Immunization* (Edinburgh and London: E. & S. Livingstone, 1968), pp. 44–51. A detailed recent analysis of the establishment of serum therapy is, Paul Weindling, 'From isolation to therapy: Children's hospitals and diphtheria in *fin de siècle* Paris, London and Berlin', in Roger Cooter (ed.), *In the Name of the Child: Health and Welfare, 1880–1940* (London: Routledge, 1992), pp. 124–45.

[38] Weindling, ibid.; E. W. Goodhall, 'On the Value of the Treatment of Diphtheria by Antitoxin', *British Medical Journal*, **i** (1899): 197–200; Raoul Bayeux, *La Diphtérie depuis Arétée le Cappadocien jusqu'en 1894, avec les résultats statistiques de la sérumthérapie sur deux cent trente mille cas* (Paris: George Carré et C. Naud, 1899), pp. 106–11; G. Ramon, 'Un Siècle et demi de lutte contre la diphtérie', *Biologie Médicale*, **49** (1960): 1–74.

compared to a mortality of 29.6 per cent for the 3,042 untreated patients of 1894.[39] During 1896 the mortality fell further to 20.8 per cent. and was only 17.5 per cent for 1897. Sceptics argued that greater survival was due to milder cases being admitted but, as favourable reports poured in from the London teaching hospitals and from institutions in other countries, fewer doubted the efficacy of the new remedy if administered at an early stage of illness.[40]

The British paediatric hospitals, however, hardly contributed to the initial evaluations of antitoxic serum, in part because they were admitting only relatively small numbers of patients, measured in the tens rather than the hundreds at hand in the Enfants Malades and in the MAB fever hospitals. Also one suspects a reluctance to upset subscribers and parents by using experimental therapy which might prove harmful. As will be seen in the chapter on research, the administrative bodies of paediatric hospitals tended to discourage therapeutic trials, potentially risky investigations, and even novel surgery. Anti-vivisectionists made the injection of anti-toxin, or 'decomposing fluid from a diseased horse', sound like a dangerous and disgusting procedure.[41] Nevertheless, in 1896 a report was published by the house surgeon at the North Eastern Hospital for Children, Hackney, showing that the mortality from diphtheria in 1895, when all cases were treated with antitoxin, was 25 per cent as compared with 66 per cent in 1894. But the relevance of these figures was undermined by uncertain diagnosis, since no bacteriological examination was made in either year.[42] The Committee of the Clinical Society set up early in 1895 to evaluate the merits of antitoxin asked the hospitals for children in London to co-operate in the investigation but none contributed any statistics to the final report published in 1898.[43] Of the 832 cases submitted for analysis the majority, 475, were from the MAB Eastern Hospital, 116 were from University College Hospital, and the remaining 241 were from Guy's, the London, Middlesex, St. Bartholomew's, St. Thomas's and the London fever hospitals. Of the submitted cases, 199 were rejected because the data supplied was unsatisfactory but, of the remaining 633 cases, 590 were children under the age of 15 years. As Paul Weindling has indicated, the MAB hospitals were also conducting their own tests on the efficacy of antitoxin and by 1897 had decided that the treatment should be routine in their institutions.[44] Comparing the introduction of antitoxin serum in London, Berlin and Paris, Weindling concludes that in the British capital 'public attitudes to science were distinctly unenthusiastic', but that public health professionals were able to bypass hostility to research by using the MAB hospitals. However, he indicates that the MAB did receive complaints against diphtheria patients receiving antitoxin treatment

[39] 'Diphtheria Antitoxic Serum in the Hospitals of the Metropolitan Asylums Board', *British Medical Journal*, **i** (1896): 855–6.

[40] R. W. Marsden, 'Diphtheria and its Treatment by Antitoxin', *British Medical Journal*, **ii** (1900): 658–62; Louis Cobbett, 'The Result of the Treatment of Diphtheria by Antitoxin in London Compared with that in Paris and Berlin', *Lancet*, **ii** (1898): 1457–61. Weindling, 'From Medical Research to Clinical Practice', in Pickstone (ed.), *Medical Innovations in Historical Perspective*, discusses the reasons for criticism of the therapy, including occasional fatalities from use of the serum.

[41] Arguments used by anti-vivisectionists against diphtheria antitoxin are discussed in Stephen Paget, *Experiments on Animals* (London: James Nisbet, 1906), pp. 338–45.

[42] 'North Eastern Hospital for Children, Hackney. Statistics', *British Medical Journal*, **i** (1896): 416.

[43] 'Report of the Committee on the Antitoxin of Diphtheria', *Transactions of the Clinical Society of London*, **31** (1898): Appendix 2.

[44] Ibid.; Weindling, 'From Isolation to Therapy', in Cooter (ed.), *In the Name of the Child*, p. 138.

without their consent, or that of their parents. One might add that the large voluntary hospitals were less well equipped to ignore complaints (since they were reliant on direct contributions while the MAB hospitals were more indirectly funded through rates), yet they also showed initiative in their willingness to test the new product. That this initiative was lacking in the voluntary paediatric hospitals was a reflection of their relative insecurity as new institutions that still had to play safe with their subscribers. As will be seen, this same caution was displayed in the introduction of surgery for the treatment of acute abdominal conditions. Here again, new methods were first tested in the large established general hospitals.

By the 1880s the MAB fever hospitals were relieving the voluntary hospitals of responsibility for cases of scarlet fever, typhus, typhoid and smallpox and after 1888 the list also included diphtheria. Nevertheless, according to evidence given to the Select Committee on Metropolitan Hospitals, 1890–1893, transference of cases often involved the serious risk of spreading infection. One general practitioner, Frederick Henry Corbyn, considered the outpatient departments of paediatric hospitals as 'hotbeds of infection, existing as an antidote to the Act for the Notification of Infectious Diseases'.[45] There, he explained, the children had to wait crowded together for several hours before they could receive medical attention. Many, he thought, would be sporting diseases such as scarlet fever, since, when the case seemed mild, the child would be kept at home without medical attention 'till the peeling comes on, and then they are in the most infectious stage; then they get some disease which is one of the sequelae of scarlet fever, and go and consult the outpatient department of a hospital. . . . Taking their peel with them'.[46] (It was then believed that the desquamative scales were infectious, which meant long isolation since shedding could last for weeks. This view is no longer held).

These illnesses represented only the more serious of the infectious diseases to which children were prone. At the time, almost every child in the country could be expected to fall prey to measles, mumps, and chickenpox. Probably rubella (German measles) was equally widespread but this milder illness was so frequently missed, or misdiagnosed as measles or scarlet fever, that records of its incidence are entirely unreliable. Mumps and chickenpox were rarely fatal so neither parent nor physician (if the child was ever seen by a doctor) took much notice of such infections. In 1882, only 29 children with chickenpox and 34 with mumps were considered sufficiently ill, or at risk of complications because of inadequate home care, to be admitted as dispensary patients at Gartside Street, Manchester (see Table 8). All these children recovered. In contrast, the staff of this outpatient department supervised the treatment of no less than 329 cases of measles (an unspecified number were domiciliary patients), of which 29 died. The situation with whooping cough was even worse; of 388 children admitted to the dispensary rolls with this diagnosis, 54 died.

Apart from killing children, both measles and whooping cough could leave those that survived with permanent disability. The most common lethal complication of measles was inflammation of the lungs, in the generalized form of bronchopneumonia, while otitis, or inflammation of the middle ear, and ophthalmia, or infection of the cornea, frequently

[45] *Select Committee on Metropolitan Hospitals 1890–1893*, First Report, B.P.P., 1890, XVI, para. 3644.
[46] Ibid., para. 3661–2. See also John M. Eyler, 'Scarlet Fever and Confinement: The Edwardian Debate over Isolation Hospitals', *Bulletin of the History of Medicine*, **61** (1987): 1–24.

occurred during convalescence. Both the latter conditions could cause permanent damage to hearing and vision. Again with whooping cough, bronchopneumonia was the most frequent early complication. In some children, particularly babies, obstruction of the bronchi led to collapse of the corresponding lobe of the lung with long-term residual disability. But even without complications, whooping cough was a highly debilitating illness involving paroxysms of coughing several times a day, often for four to six weeks without remission. As explained by Henry Ashby:

> To a weakly child the disease is necessarily a formidable one; the exhaustion produced by the constant muscular efforts, the frequent vomiting which prevents a proper amount of food from being assimilated, together with the intestinal catarrh which in a greater or lesser degree accompanies it, often reduce the child to a feeble and emaciated condition. It can easily be imagined that forty or fifty attacks of coughing every twenty-four hours produce great muscular exhaustion, and affect the child's vital powers.[47]

Furthermore whooping cough, and also measles, seemed to render children vulnerable to tuberculosis. In their report for 1882, the medical officers of the Manchester Hospital and Dispensary for Sick Children warned that 'it must not be forgotten that hooping cough frequently leaves behind it a perhaps fatal legacy of deformed chests, damaged lungs, and above all a tendency to the production of tuberculosis in some of its forms—results which our records this year abundantly affirm'.[48]

Since the attending and consulting hospital physicians also practised privately, they were aware of how much fitter and apparently resistant to serious manifestations of illness children from more prosperous families usually were. Doctors therefore often assumed that much of the morbidity and mortality threatening their working-class patients was due not so much to the disease itself as to the poor physique of the children and the defective environments in which they were reared. Again according to Ashby:

> The mortality [of measles] differs enormously according to the circumstances under which the attacks develop and also in different epidemics. In healthy children among the well-to-do class the mortality is small: in the tubercular and wasted children to be found in workhouses, hospitals, and among the lower classes the mortality is enormous, no disease being more certainly attended with a fatal result. . . . Among dispensary patients the mortality generally amounts to 9 or 10 percent. In our own dispensary, during the six years 1880–1885, 1,395 cases were treated, with 128 deaths, making a mortality of 9 per cent. Of the fatal cases 73 per cent were under two years of age, and 9 per cent under six months of age.[49]

An analysis of 211 cases of whooping cough seen in 1858 as outpatients at the Clinical Hospital, Manchester (later to become the Northern Hospital), was provided by James Whitehead. Thirty-two deaths were recorded (15 per cent mortality) only one of which was in a previously fit and healthy child.

[47] Henry Ashby and G. A. Wright, *The Diseases of Children, Medical and Surgical* (London: Longmans, Green, 1899), p. 314.

[48] *Fifty-Fourth Annual Report of the General Hospital and Dispensary for Sick Children* (Manchester, 1883), p. 12.

[49] Ashby and Wright, *Diseases of Children*, pp. 267–8.

> The other thirty-one deaths occurred from pulmonary, gastro-intestinal, inherited, and various forms of disease, most of them previously existing, and several of which would have proved fatal at no distant period. *Seven* of them sunk under bronchopneumonia, preceded in several by chronic bronchitis, but aggravated into the severer form of pulmonary disease by the spasmodic cough: most of them were associated also with gastric derangement, worms, or atrophy. *Two* died of tuberculosis, both of them the offspring of consumptive mothers, and in two others, not ranged under this head, the existence of tubercles in the lungs was suspected, and almost certain. *Eight* died of atrophy, all associated with checked development, gastric disorder, and some with worms or convulsions. *Eight* died of convulsions with rachitic, atrophic, bronchitic, or gastric complications; *two* were cases of syphilitic wasting, which would probably have been fatal at a not much later date, had the end not been hastened by hooping cough; *two* sank from diarrhoea; *one* from pleurisy; *one* from scarlatina; and *one* from gastric fever.[50]

In his report for 1865 Whitehead again drew attention to the debilitating effects of chronic illness: 'It is almost needless to say that zymotic or acute climatic disease attacking a patient whose frame is already enfeebled by a long-continued chronic affection is very frequently fatal'.[51] As discussed in a later chapter on research, Whitehead and August Schoepf Merei investigated the 'developmental state' of 1,608 children under the age of three years seen at the dispensary of the Clinical Hospital for Children from its inception in 1856 until 1858 because they were convinced that the high infant mortality then prevailing in the Manchester area was related to sub-normal physical development.

Underdevelopment and pre-existing disease were not the only disadvantages affecting urban children. Equally important, in the opinion of medical commentators, was the improbability of their sick patients receiving adequate care at home. Exposure to cold was seen as the usual cause of the pulmonary complications which killed so many youngsters during an epidemic of measles or whooping cough. 'The children are rarely kept in bed, or even indoors, for more than a day or two, and indeed, in many cases, it is impossible for the mothers to nurse them, and thus colds are caught which so often prove fatal'.[52] The same unlikelihood of adequate care prevailed whenever treatment entailed bed rest, warmth, special diet and careful nursing, that is in any but the mildest of illness. Hospital reports frequently stressed the poor home conditions prevailing in the districts served in order to encourage donations for more hospital beds, then frequently seen as the only solution to the problem. But only huge institutions could have met the current need and hospital physicians must have known that their pleas for adequate accommodation would never be met.

More realistically, perhaps, some benefactors and physicians sought to improve the care of sick children in their own homes. From its inception in 1860, the Edinburgh Hospital for Sick Children had been intended not only to provide in- and out patient accommodation and to promote medical science, but also 'to diffuse among all classes of the community, and chiefly among the poor, a better acquaintance with the management of

[50] James Whitehead, *Third Report of the Clinical Hospital, Manchester* (London: John Churchill, 1859), pp. 84–5.

[51] *Clinical Hospital and Dispensary for Children: Report for the Year 1865* (Manchester, 1866), p. 8. For a modern assessment of the reasons for a declining fatality among young children from whooping cough at the turn of the century, see Anne Hardy, 'Rickets and the Rest: Child-Care, Diet and the Infectious Children's Diseases, 1850–1914', *Social History of Medicine*, **5** (1992): 389–412.

[52] *Fifty-Fourth Annual Report of the General Hospital and Dispensary for Sick Children* (Manchester, 1883), pp. 12–13.

infants and children during health and sickness'.[53] The original plan, to get the house surgeon to visit outpatients in their own homes when necessary, soon proved unworkable as the resident physician already had far too much to do at the hospital. So, in 1864, two extra physicians were appointed to take over hospital dispensary and home visiting duties. But they skimped the latter aspect of their work because of conflict of interest in that home visiting interfered with their own private practice. Much debate ensued as to the merits of the plan but, in 1865, a determined set of directors decided to provide the extra physicians with an assistant, in spite of objections from the medical committee and a very outspoken ladies committee, and to continue home visiting. In 1874, for example, 3,171 children were treated in the outpatient department while 664 were attended in their own homes. Of these 664, 262 (39 per cent) were afflicted with 'zymotic' diseases, with scarlet fever, diarrhoea, measles, febricula (simple fever of unresolved type), and whooping cough as the commonest diagnosis. As discussed in a previous chapter, in spite of obvious benefits, home visiting finally proved too expensive, and unpopular with physicians, to be maintained at Edinburgh and in many other hospitals.

By the end of the century very few children with diseases commonly regarded as infectious were to be found in paediatric hospitals since, even if illness was contracted on the wards, the patients would be expedited to city isolation hospitals whenever possible. (The MAB fever hospitals admitted cases of measles and whooping cough after 1911; before that other arrangements were necessary). The beds so gained were often turned over to surgical departments which, by this time, had acquired great influence among management committees. Another use for the space was to convert it into rooms for the nursing staff, as was proposed at the Evelina in 1889.[54]

Pulmonary tuberculosis was the great exception to this exclusionary rule for, in spite of Robert Koch's isolation of the tubercle bacillus in 1882, most people, including physicians, continued to think of phthisis as a mainly hereditary disease or, more precisely, as an infection that caused serious illness only in constitutionally predisposed individuals. Until the very end of the century there were in the paediatric hospital records, in so far as I am aware, no comments as to any need to regard patients suffering from pulmonary or generalized tuberculosis as potentially infective. Research on the infectivity of tubercular sputum and on effective modes of disinfection was mainly undertaken in Germany. In 1888 Dr. Cornet, of Berlin, demonstrated that the dust of rooms and hospital wards in which tubercular patients were treated often contained sufficient infective material to cause the disease when inoculated into guinea pigs.[55] Even before the discovery of the causative bacillus, thoughtful people had also been concerned that the milk and meat of tubercular cows could cause infection in humans.[56] By the late 1880s much experimental evidence existed that the milk of tubercular cows could induce illness in humans when ingested, although there remained uncertainty as to whether the bovine tubercle bacillus could replicate all the ill effects of human tuberculosis. Nevertheless, with regards to

[53] Edinburgh Medical Archives, LHB 5/1/1; 1859–1885 Minute Books, RHSC, 1861, pp. 202–3.
[54] G.L.R.O., H9/EV/A2/3, Committee of Management Minutes 1887–1898, 6 December, 1889.
[55] 'The prevention of tuberculosis', *British Medical Journal*, i (1897): 350–2.
[56] F. B. Smith, *The Retreat of Tuberculosis, 1850–1950* (London: Croom Helm, 1988), p. 175. A very complete discussion of milk as an infective agent in babies may be found in Deborah Dwork, *War is Good for Babies and other Young Children* (London: Tavistock Publications, 1987), pp. 61–90.

children, infected milk was recognized as the most likely cause of *tabes mesenterica* and tubercular peritonitis.

Yet in Britain concerted action to prevent the spread of illness was slow to develop. To some extent returns from the Registrar-General's office showing great diminution in mortality from tuberculosis since mid-century encouraged apathy. Comparison of statistics for 1851–1860 with those for 1891–1895 demonstrated a 36 per cent reduction in deaths from tuberculosis for all ages during the latter period.[57] That recent discoveries allowed for even greater improvement and active prevention was suggested by measures being taken on the Continent and in the United States which were reported in the British medical journals. In 1893 Denmark passed a law requiring all cattle to be tuberculin tested, and all cows with mammary tuberculosis to be destroyed.[58] In England, as stated by F. B. Smith, 'stopping tuberculosis at its source in the cattle was politically impossible'.[59] Too many members of parliament represented rural constituencies for any act effectively controlling the sale of infected carcasses or milk to be passed during the nineteenth century. The best that could be hoped for was voluntary compliance with regulations set by local authorities. As Deborah Dwork has shown in detail, it would take until World War I for national legislative action to control the milk supply, and another ten years for general implementation.[60]

At the turn of the century, voluntary compliance was the best that could be hoped for in any preventive direction. Even if local sanitary authorities advocated, for example, that the rooms occupied by tubercular patients should be adequately disinfected before being used again, they had no power to insist since, in most localities, tuberculosis was not classified as a dangerous infectious disease as were smallpox or scarlet fever. Nevertheless, some medical officers of health attempted persuasion. In January 1899, the following letter was sent by Joseph Priestley, medical officer of health for the parish of Lambeth, to the secretary of the Evelina Hospital:

> Sir,
>
> I am directed by the Vestry of the Parish of Lambeth to inform you that it is now acknowledged by most, if not all, Medical men that Tuberculosis (including Consumption or Phthisis) is a disease that is communicable either directly from person to person, or indirectly through infected food (milk and meat). The disease is due to the entrance into the body from without of a germ or microbe (called the tubercle bacillus), and it becomes of the greatest importance that preventive measures should be taken in all cases, including the systematic disinfection and cleaning of all rooms (and contents) recently occupied by invalids suffering from Tuberculosis, and which have been rendered vacant by the deaths or removals of such invalids.
>
> With this object in view, I am sending you enclosed a copy of the Leaflet that I have drawn up for circulation, and I take the liberty of asking you kindly to peruse the same, extra copies of which will be sent to you on application to me, and to note that the Vestry will disinfect *free of cost all tuberculosis infected rooms, bedding, carpets, curtains etc., if you will kindly inform me of any such rooms or articles that you think require disinfection.* Further, after disinfection by the Vestry, I advise the following extra precautions:- the

[57] 'The Prevention of Tuberculosis', *British Medical Journal*, **ii** (1898): 1458–9. For a recent analysis of the causes of this decline, see Leonard G. Wilson, 'The Historical Decline of Tuberculosis in Europe and America: Its Causes and Significance', *Journal of the History of Medicine*, **45** (1990): 366–96.

[58] 'The Prevention of Tuberculosis', *British Medical Journal*, **ii** (1898): 1775–6.

[59] Smith, *The Retreat of Tuberculosis*, p. 176.

[60] Dwork, *War is Good for Babies*, pp. 61–90.

> cleansing with soap and water of all floors and woodwork, the whitewashing of ceilings, the stripping off (and burning) of the papers from the walls of infected rooms, which must be also thoroughly ventilated.
>
> I need not add how important it is to prevent the disease from spreading amongst the inmates of a Public Institution by the carrying out of the precautions which are mentioned in the Leaflet, and which are well known to your Medical Advisers.
>
> I shall be glad. . . .
>
> Joseph Priestley, M.O.H.[61]

Dr. Priestley sent similar letters to all the physicians in Lambeth, to those in charge of public institutions, and to occupiers of homes where deaths from tuberculosis had been reported.[62]

Medical advisers might well have been aware of the precautions considered necessary to prevent the spread of infectious diseases but many remained resistant to the notion that tuberculosis really belonged to this class of illness. As indicated by F. B. Smith, Dr. Pye-Smith, one of the delegates of the British government to the International Congress on Tuberculosis held in Berlin in May 1899, reported as one important conclusion:

> That infective tuberculosis in general, and phthisis or pulmonary tuberculosis in particular, is not 'catching' in the popular sense of the word. The disease is not conveyed by the breath, nor even by coughing, except as a rare exception, nor is it caught by contact with a consumptive patient, as scarlet fever or measles are caught. . . . In the case of phthisis we may say it is not the patient, but his expectoration which is dangerous.[63]

In the 1902 edition of their paediatric textbook, Goodhart and Still stressed the infrequency of direct contagion from person to person in tuberculosis. But they also indicated that the tendency of the day was setting 'surely towards the adoption of extreme views of the infective power of tubercle'.[64] Members of the Association for the Prevention of Consumption and other Forms of Tuberculosis, initiated in 1898, epitomized a group dedicated to this view and to the dissemination of information about defensive measures. However, during the period covered by this study, the infectivity of tuberculosis was not generally respected nor feared, allowing patients to be nursed on the general wards without any special precautions being taken. The large numbers of patients with some form of the disease, and the uncertainty as to which types might be infectious, mitigated against any decisive action involving isolation. That a child had become infected with the tubercle bacillus while on a hospital ward would not be obvious because of the long latency period before frank disease became manifest. This peculiarity of tuberculosis had inhibited appreciation of its infectivity for centuries, and even Koch's magnificent detective work did not immediately reverse conventional beliefs. This would take until the late 1890s and, as indicated by Michael Worboys, in Britain Koch's emphasis on the contagiousness of tuberculosis was usually moderated by considerations of natural or acquired immunity to the disease.[65]

[61] G.L.R.O., H9/EV/A42/1, Letter from Joseph Priestley to the Secretary of the Evelina Hospital, January, 1899.

[62] 'The Prevention of Tuberculosis', *British Medical Journal*, i (1899): 98.

[63] 'Report of the Delegates of her Majesty's Government on the International Congress on Tuberculosis . . . May, 1899', BPP, XLV, pp. 6–7; Smith, *The Retreat of Tuberculosis*, p. 37.

[64] J. F. Goodhart and G. F. Still, *Diseases of Children* (London: Churchill, 1902), p. 368.

[65] Michael Worboys, 'The Sanatorium Treatment for Consumption in Britain, 1890–1914', in Pickstone (ed.), *Medical Innovations in Historical Perspective*, pp. 47–67.