The mortality of hospitals, general and special, in the United Kingdom, in times past and present.

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The MORTALITY *of* HOSPITALS, GENERAL *and* SPECIAL, *in the* UNITED KINGDOM, *in* TIMES PAST *and* PRESENT.*

CONTENTS:

IN selecting the subject of the mortality of hospitals during past and present times, for the Howard Prize Essay of 1876, the Council of the Statistical Society were probably influenced by the fact of erroneous conclusions having been too often drawn from comparisons made betwixt the results of medical treatment in various hospitals at different periods of their history, and which in the majority of instances may be traced to inaccurate and insufficient data employed as a basis of comparison. From the small amount of information we are able to gather with respect to the practice of our forefathers, it is clear that during the past and greater part of the present century, variations in hospital mortality, or, indeed, pathological statistics of any kind relating to hospitals, were not looked upon in the light we should be disposed to regard them. At the same time, it must not be overlooked that in reasoning from the death-rate alone, we are far from solving the problem involving the health of hospitals and the efficacy of medical treatment. Estimates drawn from mere mortality returns cannot be otherwise than misleading, unless they are accompanied with the

* Dr. Steele has been good enough to supply for the *Journal* the following abstract of his essay, to which the Howard Prize Medal for 1876 was awarded.

numerous collateral data bearing on their origin and descriptive of the administrative and other peculiarities of the establishment from which they have been separately obtained. Bearing these things in mind, it will be my object in the following pages to attempt an investigation of the causes which from time to time have modified the death-rate in different hospitals in the past, and which will probably continue to influence their relative mortality in the future. In pursuing this inquiry, it is primarily necessary that I should deal only with facts and figures obtained from sources of undoubted veracity, and discard all such as have had their origin in the records of ill-methodised experience, notwithstanding their popular acceptance.

As the task is associated with the early history and growth of asylums for the sick throughout the country, not less as health resorts than as schools of medical instruction, it is desirable that it should be prefaced by a short sketch of the origin and development of these institutions. From the scanty information we possess of such, and their non-existence, with two notable exceptions, at the commencement of the eighteenth century, it has been customary to consider that this country was a great way behind its neighbours in providing for the sick and afflicted; but there is every reason to believe that long prior to the suppression of the monasteries, our ancestors were not unmindful of the paramount claims of the sick and needy. We learn from works like the "Monasticon Anglicanum" and "Monasticon Hibernicum," as well as from numerous historical records,* that there were hospitals for the sick, lying-in hospitals, asylums for the aged, the impotent and the insane, and that the charities of the middle ages were neither few nor small. These establishments, which in the works referred to are calculated by hundreds, were for the most part separate foundations, the gifts of pious persons, and usually, though not always, in close relation to religious establishments, and under the exclusive jurisdiction of the monks. They were generally constituted in the departments of the monasteries set aside for the sick brethren, and were placed under the charge of an officer, or "infirmarius," who was supposed to possess a better knowledge of the healing art than the rest of his order. Even prior to the introduction of Christianity, we have a faint glimmer of the existence of a primeval hospital in the "Broin Bearg, "or, Home of Sorrow," in the legendary lore of Ireland, where the sick and wounded were provided with an asylum near to the royal residence, and there can be little doubt that refuges of a corresponding character have existed in all ages. The most authentic informa-

* See especially "Historical Collections of a Citizen of London in the Fifteenth "Century," printed for the Camden Society.

tion we possess of a hospital in England dates as far back in the Saxon chronicle as the year 1080, and relates how Lanfranc, the celebrated Bishop of Canterbury, founded during his lifetime two hospitals in Canterbury, one for various descriptions of disease and another for leprosy, a disease which was the curse of the population of every European country during the middle ages. So numerous were the asylums devoted to lepers, that one is inclined to believe that they were frequently confounded with the lazar houses intended for the most needy of the population, and though the suppression of the monasteries in this country also put a stop to the infirmaries connected with them, the leper houses continued their operations till the disease itself gradually disappeared from the kingdom. We have records of leprosy and of asylums for its reception in Scotland to the year 1693, and facts of its existence in Shetland in the years 1736 and 1740, after it had been banished from the mainland. There were two if not three leper establishments affiliated with St. Bartholomew's Hospital so late as the seventeenth century, one in Kingsland, known by the name of the Kingsland Spital, and another in Kent Street, Southwark, both houses having been converted from their original uses to the reception of venereal, or as they were then called fluxing cases. With the exception of the two hospitals of St. Bartholomew and St. Thomas, surrendered to the citizens of London in the years 1547 and 1558 respectively, there were no recognised separate foundations for the relief of the sick poor in this country from the period of the Reformation till the commencement of the last century. Very little information relating to the vital statistics of the two hospitals named is afforded us of their early career as asylums for the "sick and lame."* It is probable that for the first century after their surrender, they were employed for much the same purposes as they had been for centuries before, namely as species of almshouses "for the sick, poor, aged, "and impotent," and it was only after some stringent regulations were introduced concerning the admission of patients in the course of the seventeenth century, and when the profession of medicine was becoming a power in the State, that the two hospitals began to fulfil the conditions of curative establishments in the modern sense of the word. The history of Bartholomew's has the good fortune to be associated with the name of Harvey, the discoverer of the circulation, and from some minutes of the governing body of the time, communicated by Sir James Paget, we may form some idea, though necessarily an imperfect one, of the usages of the hospital

* The annual returns formerly submitted at Easter to the custodians of the royal hospitals, purporting to give the numbers cured and dead, are vague and untrustworthy.

at the commencement of the seventeenth century.* Harvey was appointed physician in the year 1609, and continued in that capacity for thirty-four years. From a series of recommendations he submitted to the governors in 1633, and which were subsequently approved of, it would appear that the medical staff had to contend with difficulties not unknown in our own day, and which refer to the admission of large numbers of persons suffering from hopeless disease as well as to an equally disproportionate number who were received for trivial ailments. This problem had to be solved in a similar manner to that adopted in every general hospital of modern growth, namely by a limited number only of incurable cases being admitted, and by slighter maladies not being admitted at all. Other recommendations of Harvey bearing on the duties of his surgical colleagues are mainly suggestive of the inferior position which the surgical department held at the time, when contrasted with the more dignified nature of the duties of the physician, and yet there are numerous reasons for believing that about the same period, surgery was becoming to be recognised as a progressive art of little less importance than its sister branch. The names of Vicary, Clowes, and Woodall, are handed down to us as zealous and intelligent surgeons in connection with Bartholomew's at this early date, and although their published works assist but little in the present inquiry, we have a description from Woodall of his success after amputations. In his treatise on gangrene and sphacelus, Woodall states that during the twenty-four years he had been surgeon to the hospital (he was appointed about the year 1612), he had amputated more than a hundred limbs, exclusive of fingers and toes, and that four-fifths of the patients went out alive. This result he ascribes to the superiority of his mode of operation, which may possibly have been in advance of that of his colleagues, but which has found but small favour with his successors. For all practical purposes of relief to the sick poor, St. Thomas's must have undergone a similar experience to the older foundation. Prior to the introduction of any legal provision for the poor, both hospitals were to some extent used to repress mendicity, as well as asylums for "blind, maimed, sick and helpless objects;" for we are informed, that after patients recovered, they were employed at work in Bridewell till they could prove their capacity to earn an honest livelihood. The authority of the governing bodies went even further than this. From the records of St. Thomas's Hospital it would appear that they possessed the power of inflicting corporal punishment, and that a whipping post and stocks were erected in the hospital, where patients guilty of irregularities were occasionally punished. At the same time a remedy for idleness was

* Memorials of Harvey.

found for such patients as were not confined to bed by employing them to grind the corn used in the establishment, in dressing flax and in numerous other light occupations to which none that were able could with reason object.* At the beginning of the eighteenth century the penal discipline was gradually being abandoned, and a stronger sympathy for the sick poor was becoming manifest in every part of the country, a sympathy which found expression in the people's desire to relieve at their own cost the necessities of their suffering brethren by instituting hospitals for their maintenance and cure. Nearly every town of any importance considered it a duty to follow in the wake of its neighbour, and probably at no period in the history of civilisation in this or in any other country, has there been witnessed such an outcome of public benevolence as was exhibited in the United Kingdom in the course of the century. The following table gives the dates of origin of most of these foundations. It will be observed that the cathedral towns lead the van in this beneficent work :—†

London.	Date of Foundation.	Provincial.	Date of Foundation.	Irish.	Date of Foundation.
Westminster	1719	Cambridge	1719	Jervis Street	1726
		Salisbury	'16		
Guy's	'23	Bristol	'35	Steevens	'33
		York	'10		
St. George's	'33	Edinburgh	'36	Mercers	'34
		Windsor	'36		
The London	'40	Aberdeen	'39	The Meath	'56
		Northampton	'43		
Middlesex	'45	Exeter	'45	House of Industry	'74
		Manchester	'53		
Special Hospitals—		Chester	'55		
		Newcastle	'51		
The British Lying-in	1749	Glasgow	'94	*Special in Dublin—*	
		Norwich	'71		
		Stafford	'69	The Rotunda Lying-in	1745
City of London Lying-in	'50	Worcester	'45		
		Leeds	'67		
		Oxford	'70	The Lock	'54
		Leicester	'71		
Queen Charlotte's Lying-in	'52	Dumfries	'75	The Westmorland Lock	'55
		Hereford	'76		
		Birmingham	'78		
Small pox	'46	Montrose	'80	Cork	1720–2
		Nottingham	'82		
Lock, female	'45	Canterbury	'93	Limerick	1759
		Dundee	'95		
„ male	'47	Stafford	'97	Belfast	'97

* Golding's History of St. Thomas's Hospital.

† Mainly compiled from "Walker's Statistics of Hospitals," and "Wilde's "Report on the Status of Disease in Ireland; Census of Ireland, 1851."

In the course of the present century the greater number of these establishments have been enlarged or rebuilt, and an enormous accession has been made to the list, in harmony with the wealth and growth of the population. In the sixth report of the medical officer of the Privy Council, the reporters refer to ninety-nine curative institutions, which they had visited in 1863, but the total number up to the present time cannot fall short of two hundred, if it does not materially exceed it. In London alone, the number of curative charities, independent of dispensaries, convalescent homes, and incurable hospitals, amounted last year to eighty-four, and comprised eighteen general hospitals, ten consumptive, five ophthalmic, three orthopœdic, four skin, seventeen hospitals for women and children, five lying-in hospitals, and twenty-two for special and miscellaneous purposes. It may be interesting to know that in the aggregate the medical charities of the metropolis absorb less than half-a-million of the six or seven millions that are spent annually for the many miscellaneous objects of public benevolence in London alone.*

With these preliminary remarks, I will now refer to the subject of the death-rate, and the causes affecting it in times past and present. It will probably assist these inquiries if I submit at the outset the following returns, which give the mean of the numbers treated annually in the more important London hospitals, along with the death-rate in each institution for a specified term of years, 1872 to 1875. The figures are obtained from the returns made to the council of the Hospital Sunday Fund, with the exception of the deaths, which were supplied separately by the secretaries of the different hospitals:—

London Hospitals, General and Special.

	Date of Foundation.	Available Beds.	Average Number Treated each Year.	Days in Hospital.	Average Annual Mortality.
					Per cnt.
Bartholomew's	1547	650	5,548	33	9·3
St. Thomas's	'58	573	3,167	36·3	11·73
Guy's	1723	650	5,725	38·7	10·26
Westminster	'19	190	1,874	25·5	8·59
St. George's	'33	353	3,263	25	8·82
The London	'40	602	5,566	33·7	11·34
„ Middlesex	'45	300	2,293	31·7	12·32
Charing Cross	1818	150	1,387	32·6	10·93
Royal Free	'28	104	1,337	26	7·20
University College	'33	154	1,756	27·5	11·46
King's College	'39	172	1,768	28	12·72
St. Mary's	'51	157	1,800	29	10·92
German	'45	100	1,220	23·5	7·24
Seamen's	'21	250	2,161	29	4·68

* "The Classified Directory to the Metropolitan Charities, 1877."

London Hospitals, General and Special—Contd.

	Date of Foundation.	Available Beds.	Average Number Treated each Year.	Days in Hospital.	Average Annual Mortality.
Special Hospitals—					Per cnt.
Male Lock	1747	20	143	30	0·46
Female „	'45	185	579	56	0·97
British Lying-in	'49	24	171	21	1·11
City of London Lying-in	'50	45	425	20	0·86
Queen Charlotte's „	'52	41	443	20	2·85
General Lying-in	'65	30	301	19	0·70
Hospital for Consumption	1842	246	1,027	75·5	9·9
Hospital for Chest Complaints	'48	120	762	39	9·49
Cancer	'51	66	316	32	13·60
Fever	'02	200	245	30·7	11·89
Royal Ophthalmic	'04	70	1,250	17	0·05
Sick Children's	'52	117	884	47	5·46
Homœopathic	'49	70	1,338	46	1·28

The great disparity observed in the mortality of the above establishments would be quite incomprehensible were we ignorant of the laws which govern the admission and discharge of patients in each, and especially of the particular forms of disease which are thought most worthy of selection. The fact that a consumptive hospital, like that at Brompton, intended for the treatment of a disease usually adjudged incurable, should indicate a death-rate considerably less than that which obtains at the chief general hospitals, might appear a fallacy, but it is not difficult of explanation when regard is had to the rules in force at the institution. The same remark applies, though with less force, to the relative differences in the death-rates of the hospitals intended for general diseases, which range from a little over 4 per cent. at the Seamen's Hospital to above 12 per cent. at King's College. I have placed the Homœopathic Hospital among such as are intended for special objects, though it is ostensibly employed for medical and surgical purposes of all kinds, but its excessive small death-rate would rather indicate its being used as a species of health resort for a robust fraction of the community, than as an asylum for the diseases ordinarily met with in London. It has been repeatedly shown by series of statistical data, by annual hospital reports, and is, in fact, now universally admitted as a hospital constant, that the mortality of medical cases, or such as affect the organic functions and fall under the care of the physician, is greatly in excess of that larger class which comes within the more immediate province of the surgeon. In addition to this it is also proved that in both departments, disease in hospitals is more fatal among males than among females. Whether the same causes operated in the early history of

our hospitals to produce like results is not so certain, but judging backward from analogy, there is every reason to suppose they did. The characteristic terms, medical, surgical, and special, however much they may facilitate our present knowledge of hospital mortality, throw little light on the past, as it was the practice in the old hospitals to mix the patients of the various classes in the same wards, a custom which obtains to the present time in many small provincial hospitals. Another conflicting element may be traced to the practice of considering numerous diseases as the common property of physician and surgeon alike, while in most hospitals the line of demarcation between the two departments is very different in its limitations. But apart from these distinctions, and taking note only of the general mass of patients admitted during the seventeenth and early part of the eighteenth century, especially into the two royal hospitals, Bartholomew's and St. Thomas's, the mortality, judging from the few records we possess, must have been exceedingly high. We learn from a passage in Petty's "Political Arithmetic," that the deaths in the two hospitals in the year 1685 amounted to 12·5 per cent. of the admissions, and that the death-rate at St. Thomas's in the year 1689 amounted to 10 per cent. of the same. The printed report for 1688, submitted to the civic authorities, and now in possession of St. Thomas's Hospital, gives the mortality of that year at 15·3 per cent. for Bartholomew's, and 12·2 for St. Thomas's, so that there is every reason to believe that the death-rate in the city hospital was considerably above that situated in Southwark, during the latter part of this century at least. The numbers admitted respectively to the two institutions during the year mentioned were 1,690 for Bartholomew's and 1,654 for St. Thomas's. It may be assumed that in these, as well as in other hospitals which were founded in London and other large towns in the early part of the following century, the governing bodies were actuated by similar motives in providing for the sick, and that the deaths in the separate asylums would be influenced by causes, such as local circumstances of population and recurrent epidemics, which would operate very much alike in all cases, yet we find at times remarkable differences in the death-rate of separate hospitals. From a report of St. Bartholomew's for the year 1704, it would appear that the deaths had fallen very considerably from their previous high rate, for out of 2,429 patients admitted in that year, only 165 died, and it is curious to note that towards the end of the same century, from 1783 to 1790, when the statistical data in the table referring to this hospital commence, the mortality exhibits an equally small proportion. We are able to submit a more sustained and earlier record of the only other hospitals established on a corresponding scale to Bartholomew's, namely

Guy's and St. Thomas's, from which it might be inferred that the death-rate in these establishments was considerably higher than in the former institution, but in the absence of a continuous table of results, it is unfair to draw any comparison at this period. The differences in results betwixt St. Thomas's and Guy's from the period when reliance may be placed on the returns are remarkable, and require some explanation. I will take the first complete series of years which I have been able to obtain of the practice of the two hospitals, namely, the seven years 1734-40 :—

Years.	St. Thomas's Hospital.			Guy's Hospital.		
	Total Cases.	Deaths.	Mortality per Cent.	Total Cases.	Deaths.	Mortality per Cent.
1734	2,647	307	11·6	1,781	257	14·4
'35	3,025	355	11·7	1,889	258	13·6
'36	2,656	316	11·8	2.007	264	13·1
'37	2 860	321	11·2	1,760	258	14·6
'38	3,027	318	10·5	1,798	250	13·9
'39	2,747	261	9·5	1,745	277	15·8
'40	2,593	296	11·4	1,895	308	16·2

The mean rate of St. Thomas's being 11·1, while at Guy's the corresponding mortality over the period amounted to 14·5. Guy's continued to maintain its high rate till the middle of the century when it began to improve, and continued a diminishing mortality through successive decades till the end of the century, when it stood at 10·2 per cent. St. Thomas's showed signs of improvement at an earlier date, namely from 1740, after which it gradually diminished through successive decades, till it reached a minimum in the ten years 1770-80, of 6·7, and then rose again gradually till the end of the century, when it reached the figure of 7·9 for the ten years 1790-1800, being exactly the same rate as that given for Bartholomew's Hospital for the corresponding period. The high mortality at Guy's during the earlier period, and in fact throughout the century, may have arisen from the fact of the hospital being still looked upon as an asylum for incurables, although as early as 1730 the governors, in a document intended for the public, repudiated the obligation of receiving such cases, and gave reasons for maintaining the hospital for general purposes. Still some concession must have been made to the principle, from the larger number of wards which were devoted to medical than to surgical cases, and from the greater facilities of admission allowed to the patients. The causes of death at Guy's have been carefully recorded during the past century, and we gather, from a total of 1,970 deaths embraced in the septennial period, 1733-40, the proportional mortality of the more important diseases :—

	Number.	Per Cent. Proportion to Gross Mortality.	Deaths in each 1,000 Admissions.
Deaths from—			
Fever	298	15·12	21
Small pox	54	2·74	4
Consumption	557	28·27	40
Dropsy	329	16·70	24
Injuries	32	1·60	2
Mortification	68	3·41	5
Venereal	82	4·16	6
Other diseases	550	27·91	39

If the returns are examined from year to year in the table relating to them in the appendix, it will be noticed that consumption was then, as it still continues to be, the main factor of the hospital death-rate, and although causes of a more acute and variable character, such as intercurrent epidemics of fever and small pox, occasionally disturbed the mean annual rate, they had barely an appreciable influence on it when the returns are extended over a period of more than five years. We have seen how the mortality in the three hospitals referred to diminished materially in the last half of the century. The charities were situated in the heart of a redundant population, and must have received a very large number of the worst cases of disease, but a corresponding complement of fatal affections also found their way into St. George's and the London Hospitals, which at that time may have been said to have been placed in the country. A report of the latter, purporting to give an account of it in 1766, describes it as situated in an airy situation in the Mile End Road, near the Mount, an eminence now levelled and known by a less respectful designation in the previous century, when the famous highway was sprinkled with the mansions of the nobility and rich city merchants. The London Hospital contained at that time 190 beds, and had accommodated during the year mentioned 1,685 patients, of which 158 died, making a death-rate of 9·3 per cent. In a manuscript record preserved at St. George's Hospital, the mortality of that institution in the first years after its opening, namely 1735-36, was as high as at Guy's at the same period, marking 16·4 per cent. of the cases admitted, but it soon diminished to a more favourable standard, and at the time when the record ceases, in the year 1766, it had reached a proportion of 12·1 per cent. It is curious to observe that when entries of the annual deaths were recommenced again at this hospital, after more than half a century's suspension, the death-rate had undergone little apparent change, as we learn from the record comprising the period 1822-30, which gives a death-rate of 12·8 per cent. Since

1830, contrary to what has been observed in the large general hospitals, the mean annual mortality at St. George's has sensibly and progressively diminished, until it has reached the comparatively low figure of 8·8 per cent., at which it has stood during the last three years. From the scattered information obtainable from other sources, there can be no doubt, as far as London was concerned, that there was a material diminution in the hospital mortality in the latter half of the eighteenth century in comparison with the first half, and in that of the century preceding it. The following table, condensed from two in the appendix, proves that such was the case in two of the most important establishments in which statistics of mortality have been preserved, and though deaths in hospitals are not now viewed as indicative of the extent of disease among the population at large, the facts agree with the great decrease in the bills of mortality which occurred at the periods referred to:—

	Guy's Hospital. Death-Rate per Cent.	St. Thomas's Hospital. Death-Rate per Cent.
From—		
1730–40	13·8	11·1
'41–50	14·8	9·8
'51–60	12·6	8·7
'61–70	11·1	8·8
'71–80	10·2	6·7
'81–90	10·4	7·1
'91–1800	10·2	7·9

With regard to the sanitary arrangements considered necessary for the hospital sick throughout the kingdom during the past century, we are almost entirely indebted for information to Howard, who made his celebrated pilgrimage through the hospitals towards the close of the century, and whose impressions and suggestions are to be found in his "Notes on Lazarettos." From an analysis of these it does not appear that the construction of the buildings was so much at fault as the disposition to overcrowd them with patients, but they were wanting in those numerous domestic requirements which, since Howard's time, have been looked on as essential. Buildings constructed in the seventeenth and early part of the eighteenth century were frequently without means of drainage and suitable water supply, nor were facilities provided in the majority of them for fulfilling the ordinary requirements of nature, till nearly the end of the century. Howard, writing in 1788, continually refers to the absence of water closets, as well as to the want of facilities for the ordinary purposes of ablution, and it is very probable that in these respects hospitals fared no worse than

the majority of private houses of the better class. It is satisfactory to see that at this time the governing bodies in most English hospitals were busily employed in introducing numerous improvements, although in transforming the practice of the establishments they had serious difficulties to contend with. The buildings, however well adapted they might have been for the treatment of the sick, and in this respect many were superior to those of a later date, were ill contrived for additions being made to them in the shape of necessary sanitary appliances. As a rule sinks and water closets, and frequently baths, were placed inside the four walls of the wards, with only a slight partition intervening between them and the sick, in which position they were afterwards found to be a source of unmitigated evil, and have now been removed wherever practicable, to additions or projections made to the buildings so as to cut off direct communication with the ward atmosphere. The ward construction in some of the oldest hospitals, as at Guy's, the old St. Thomas's, and the Royal Infirmary at Edinburgh, consisted in the arrangement so much in vogue at the present day, of having two rows of beds placed within the long axis of the building, with windows on both sides, each ward providing accommodation for from ten to thirty patients. For some cause, probably for convenience of administration, and the necessity for extending accommodation on limited sites, this simple plan was afterwards departed from, and corridors, partitions, and supplementary additions, abutting on the original buildings, have been introduced, all tending materially to interfere with the natural currents of air.

Again, late in the past and during the first half of the present century, many new foundations were originated in which, apparently, no regard was had to sanitary requirements, so far as the internal construction of the hospital was concerned. In some rare instances four rows of beds were accommodated within the foundation walls, a central or spinal wall being placed in the long axis of the ward so as to divide it into two separate compartments, and thereby precluding cross ventilation. But a more objectional plan than any noticed, was that in which the wards were lighted by windows at one extremity only, access being had either from the side or from the opposite extremity by doors communicating with a staircase or corridor, a principle of construction which may yet be seen in numerous hospitals throughout the country. In all cases commented on by Howard, ventilation was conducted by means of windows, doors, and fire places, and to prevent downward currents from open windows, it was not uncommon to have the framework of the upper sash fitted with a movable board sloping at an angle towards the ceiling, a plan which commended itself by its sim-

plicity, and which is still in frequent use. In one or two rare instances the sashes were hung on pivots in one or more divisions, so that they might open outwards and inwards, and when open to the fullest extent "they represented planes at right angles with "the sash frames, admitting air equal to the whole opening of the "windows excepting the materials of the frames." The ward furniture was in every case of the most meagre description, being usually confined to the wooden bedstead with tester and curtains and the wooden box, which usually served the double purpose of a clothes cupboard and seat. In Howard's time the wooden bedsteads were in many hospitals being replaced by iron ones, while the curtains were retained till far on in the present century, and are not yet entirely discarded.

The regulations relating to hospital dietaries would not commend themselves to our favour at the present day as applicable for sick people, though they may have been in advance of the ordinary requirements by which the food of the populations was regulated. The comparatively low price of butcher's meat and the frequently high cost of bread, account for the larger ration of the former and the smaller issue of the latter when contrasted with modern usage. From Howard's notes we learn that the full diet allowance at Bartholomew's and the London Hospital consisted of 8 ozs. of dressed meat and 12 ozs. of bread, while for middle diet 4 ozs. of meat and 8 ozs. of bread were allowed; to this was added in each case a pint of broth, which was simply the liquor in which the meat was boiled, and an equivalent amount of milk pottage or water gruel for breakfast or supper, while milk, butter, and cheese were allowed for special diets. An old table of the diets at St. Thomas's Hospital in use long before Howard's time, gives the following allowances for the most generous diet of the period for each day of the week. It may be premised that the convalescent patients had three meals daily—breakfast, dinner, and supper; that the breakfast consisted of a diurnal allowance of a pint of water gruel, and the supper of a pint of broth, while each person was entitled besides to a daily ration of 12 ozs. of bread and 2 pints of beer:—

Sunday	Half-a-pound of meat when dressed.
Monday	" "
Tuesday	4 ozs. of butter or 6 ozs. of cheese.
Wednesday	Half-a-pound of mutton when boiled.
Thursday	4 ozs. of butter or 6 ozs. of cheese.
Friday	Half-a-pound of mutton when boiled.
Saturday	4 ozs. of butter or 6 ozs. of cheese.

Tea as a meal did not come into general use till the present

century was considerably advanced, its place having been supplied with gruel and pottage occasionally mixed with milk, and in the Scotch and Irish hospitals with oatmeal porridge. The allowance of beer was remarkable, and from the quantity dealt out to each person (from two to three pints, and in some cases as much as two quarts) it may be charitably assumed that it was less potent than the beverage of modern times; yet the brewery was considered as necessary an adjunct of the hospital as the kitchen or laboratory, and great abuses became associated with it. Next to a patient's summary dismissal, no punishment appears to have been thought so severe as that which deprived the delinquent of this coveted ration, and the old regulations refer frequently to this provision of their penal code. The absence of all vegetables in the dietaries, though their exclusion in the ordinary food of the poor was habitual, may have given rise to occasional instances of scurvy occurring in the midst of hospital practice, but we have no positive information on the subject.

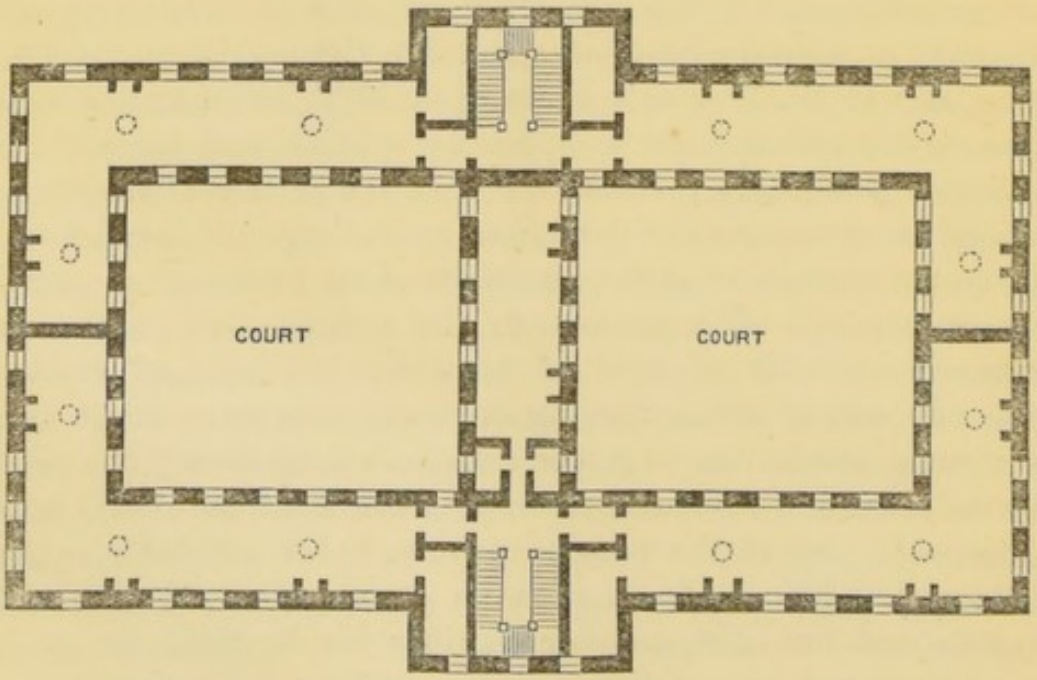
A more likely cause of disease, engendered by maladministration, might be sought for in the neglect of cleanliness, in the filthy habits of the patients and in the absence of all facilities for personal ablution. The frequent references in Howard's notes to the wooden bedsteads, to the occurrence of itch and vermin in the wards, and to annual payments for the periodical destruction of bugs, all indicate a condition which we cannot dissociate from frequent forms of skin disease, or from the spread of such distempers as have their origin in dirt, or find in it a fertile matrix for their development. When we add to this the fact, that diseases of an infectious character, and of a dissimilar origin, were uniformly mixed with others of a non-contagious character, we cannot be wrong in assuming that many must have been annually sacrificed to these unwholesome conditions. Though there is abundant proof in the early records of the older hospitals, that fever and small pox were seldom absent from the wards, it took a very long time to convince the governing bodies of the propriety of isolating these diseases in separate hospitals, or even in separate wards of the same hospital. Apart from the lying-in and lock hospitals, which had a recognised origin apart from and as old as the general hospitals, there does not appear to have been any foundation for diseases of an infectious character prior to the establishment of the London Small Pox Hospital in 1746, and as this asylum was instituted as much for inoculation purposes as for small pox, its influence in diminishing mortality in the general hospitals was barely appreciable during at least the first half century of its existence. The foundation of the London Fever Hospital dates only from 1802, and, judging from our modern knowledge of fevers, there is

every reason to believe that the two most fatal forms of the malady —typhus and enteric—each originating from well defined causes, were never absent from the metropolis prior to this period, yet from the comparatively small number of patients treated in the hospital (averaging only about fifty annually during the first ten years, with a mortality of 16 per cent.), it is not likely that the new institution modified materially the death-rate of the general hospitals. The fatal effects of epidemics were far more felt in large towns out of London, where they taxed to the utmost the limited accommodation of the local hospital, and necessitated the erection of additional buildings for the reception of fever and small pox. In Liverpool and in other large towns in England, hospitals, called by the singular name of houses of recovery, were periodically extemporised for the purpose, and at Edinburgh, Glasgow, Dublin, and Belfast, temporary and in some cases permanent additions were made to the original foundations, until the limited spaces available for airing grounds were well nigh absorbed in attempts to grapple with these visitations. There is no doubt that in these endeavours, sanitary laws were very often lost sight of in the desire to find a temporary refuge for the sick. We have fortunately no records of excessive crowding in English hospitals which can at all compare with the experience of the Hôtel Dieu at Paris, where, in the year 1773, we are told that 5,000 sick were brought together in a building possessing but 1,200 beds (from the law requiring the officials to admit every applicant); but we have ample evidence to show that great dangers arose at home from overcrowding and neglect of cleanliness and ventilation. Sir John Pringle, in his work on the diseases of armies, comments on these evils as causing increased mortality in military hospitals; and Sir Gilbert Blane relates his experience at St. Thomas's Hospital in 1782, when an outbreak of fever carried off many patients, besides officials and servants, from a neglect of sanitary precautions,* and the history of nearly every hospital is interspersed with similar revelations. It is not however easy in the absence of strictly accurate data, to arrive at any definite conclusions with respect to the influence of sanitation or improved methods of medical treatment on hospital mortality. Each advocate of some reigning doctrine takes an optimist view of its virtues, attributing to it powers which were merely the effect of natural laws, and while one attributes the small mortality noticed at the beginning of the present century, to the general adoption of the antiphlogistic regimen with its accompaniments of bleeding, purging, and low diet, another ascribes his hospital success to a stimulating and nourishing regimen, while a third expatiates on the miraculous virtues of cold water in diminishing the fatality of

* "Medico-Chirurgical Transactions," vol. iv.

fevers and acute diseases generally. Even Dr. Blane's estimate of the improvement in the health of St. Thomas's Hospital after some alterations had been effected must be received with a certain reserve, as during virulent epidemics it is not uncommon to find domestics in the best arranged hospitals attacked with the prevailing distemper, while if the quotation referred to be compared with the results a few years afterwards in the mortality table of the same hospital, the death-rate will show that it still had a tendency to increase, notwithstaning the precautions adopted. Rather than attempt to draw inferences from miscellaneous sources, I will content myself by submitting in a series of tables the consecutive death histories of a few of the more important institutions of the country, with special reference to those with which I have been personally connected, and without losing sight of the occasional experience of other establishments.

The first hospital to which I would refer is that founded by Thomas Guy, in Southwark, in the year 1723, and which also happens to be the oldest erection of its kind in the kingdom which has been continuously occupied by patients. As primarily constructed under the supervision of the founder, the hospital consisted of two quadrangles connected by a common centre, with an open colonnade on the ground floor, at each end of which were placed staircases communicating with the male and female divisions respectively. The ground floor of the double building on a level with the colonnade was also open, and was intended to serve, as it did for many years, as a promenade ground, being protected from the weather by the exterior main walls of the hospital, so



that the accommodation for wards commenced on the first floor, which was 14 feet above the ground level. There were three

floors, the first and second containing each four wards, shaped somewhat in the form of the letter L, and the third or attic floor contained two only, each of these however occupying the three sides of the separate quadrangles. The dimensions of the ordinary wards were 22 feet wide by 134 feet in length, those on the first floor being 11 feet, and those on the second 10 feet in height. The central portion common to both squares was also used for patients, and consisted of a first floor oblong room 60 feet by 22 feet, which for many years was used as a chapel, with a ward of the same dimensions on the floor above, as depicted in the drawing. The entire hospital consequently consisted of eleven wards, eight of which were of nearly similar dimensions, one of minor size, and two twice the length of the ordinary wards, placed immediately under the sloping roof, and very inferior to the others in point of width, height, and internal arrangement. All the wards were liberally furnished with windows on both sides, which were hung without the usual appliance of sash frames, but were made to open readily at any angle by means of levers attached to each. The wards were also supplied with fireplaces in the proportion of three to each ordinary ward, being at the rate of one fireplace to every twelve patients. The water supply was obtained from the Thames at London Bridge, being pumped by horse-power to large leaden cisterns, still to be seen in the basement, and from thence it was carried in buckets to the separate wards. With the exception of a few rooms placed to the right and left on entrance, and the basement, now partly used as a coal cellar, very little provision was made for administration, nor were the wards furnished with sanitary appliances of any kind. The building was substantially built of brick, without the slightest attempt at adornment, but as may be gathered from the description there were numerous features in the construction, indicative of a thoughtful care and foresight on the part of the founder and his advisers with regard to its future uses, matters which have too often been lost sight of in planning buildings of a much later date. The entire cost of the erection did not exceed 14,000*l.*, a very small sum for such an extensive foundation, even at this early period, and as it was intended to accommodate 400 patients, the cost of each bed may have been calculated at the incredibly small sum of 35*l.* But at no period during the century was the original design of accommodating the proposed number of patients carried out. Had it been otherwise, the individual space, curtailed as it was with wooden bedsteads and heavy appendages in the shape of testers and curtains, would have barely amounted to 800 cubic feet, but we learn from the consecutive series of returns in the appendix, that although there was a gradual increase in the number of

admissions through successive decades, there could have been little attempt at overcrowding until nearly the end of the century, when it was deemed advisable to utilise the open airing space on the ground level betwixt the main walls of the building for ward purposes. At the same time, in order to meet the requirements of the time, numerous windows formerly made to open were built up, making more head room for beds, while additional wings for administrative and other purposes were joined on to the original structure, obstructing both light and air, and materially interfering with the simplicity of the primitive design. No really permanent addition was made for the accommodation of an increased number of patients till the year 1831, when in consequence of a new bequest requiring the trustees of the charity to find room for an additional hundred patients to the four hundred provided for by the original testator, means were taken to utilise a number of old houses in the immediate vicinity until such time as a new hospital could be built. One half of the new hospital, on which much care and money were expended, was opened in 1854, and the remaining wing was completed in the year 1871, at which periods it may be noticed there were considerable accessions to the usual number of patients, the available beds at the disposal of the governors on the occasion of the last addition, being not less than 650. It is necessary to mention these details, as they are not only significant of the progress of other hospitals, but tend also to throw light on the question of fluctuating mortality as it has presented itself from time to time at Guy's. The deaths at the hospital, as was noticed in a previous table, showed a high rate till the middle of the last century, after which time, notwithstanding a growing addition to the relative number of patients, they exhibited a tendency to diminish, and during the closing decade, 1790-1800, the percentage mortality amounted to 10·2 on the total admissions. Howard visited the hospital in the year 1788, and observes in his notes that the governors were then making extensive alterations with the view of improving its sanitary condition. There were at that time 304 patients in the wards, and among other improvements then in hand, he refers to the substitution of iron bedsteads for the wooden ones, which had been in use for the previous seventy years, and to the introduction of waterclosets, "which were on the *best* construction and *not* in the "least offensive." Besides the windows already referred to, opening outwards and inwards by means of lever adjustments, Howard writes in commendable terms of a system of ventilation he noticed, by which the foul air from one ward was drawn out into the chimney of the ward above through circular openings of considerable width in the ceilings. This ingenious method of extraction, which anticipated that afterwards introduced by the

late Dr. Arnott, appears to have been discontinued from some cause, probably from the inconveniences arising from returning smoke, which have proved so fatal to the employment of similar contrivances. While commenting on the whole rather favourably than otherwise on the hospital arrangements, Howard condemns the wooden bedsteads, the low height of the ceilings of the upper wards, and exposes numerous abuses which had crept into the domestic management, and which were common to the London hospitals of the time. By the end of the century most of the improvements mentioned were completed, and although there is no evidence to show that there was any diminution of the mortality in consequence, it is reasonable to infer that they must have been attended with much benefit to the sick. In the course of the first decade of the nineteenth century, the deaths after diminishing gradually from the year 1750, again showed some signs of increase, apparently from the admission of a large number of persons suffering from fatal chest complaints and from numerous accidents, the deaths from the latter cause having risen from 2 to 5 per cent. of the relative proportion from all causes. After 1810, the death-rate again diminished to a fraction below 10 per cent., where it remained till greatly increased accommodation was provided about the year 1854, when it fell to some extent, but afterwards rose gradually till it reached the high figure characteristic of the experience of the last few years. The accompanying abstract will best illustrate these changes :—

	Mortality per 100.		Mortality per 100.
From 1800 to 1810.....	11·6	From 1840 to 1850.....	9·7
„ '10 „ '20.....	9·9	„ '50 „ '60.....	9·1
„ '20 „ '30.....	9·9	„ '60 „ '70.....	9·7
„ '30 „ '40.....	9·8	„ '70 „ '76.....	10·6

It is interesting to note how the two main factors which had influenced the death-rate since the foundation of the hospital, fever and consumption, still continued at the beginning of the present century to tell on the gross mortality. Deaths from injury were also becoming more common, and as the century advanced they increased from 5 per cent. of the total deaths in the term referred to, till they reached 16 per cent. in the septennial period 1853-60, and 18 per cent. during the subsequent interval of twelve years to 1872, at which point they have continued to remain. The deaths from accidental causes are however partly neutralised by the almost total disappearance from the death register of small pox and syphilis. In the first half of the last century, judging from the interval from 1732 to 1745, deaths from small pox averaged eight a-year; towards the latter part of the century, from 1770 to 1780, they had fallen to

three a-year, and during the decennial period from 1800 to 1810, there appears to have been only one death recorded from this cause. That syphilis was a far more formidable disease in the hospitals of the past than it is at present, is evident from the prominent position it took in the bills of mortality, in the early establishment of lock hospitals, and in the extensive provision made for its treatment in the general hospitals. Notwithstanding this, the disease itself does not appear to have had any very appreciable influence on the hospital death-rate, which at all times has been mainly influenced by those organic diseases involving the vital organs, which have continued to the present day to decimate the hospital as well as the general population. Apart from consumption and its allies, there was, however, another cause at work, increasing periodically the death-rate of this as well as of every large hospital intended for general purposes. This was fever, which, in an endemic or epidemic form was never absent from large towns, and which contributed more largely to the ordinary death-rate than any other group of diseases, with the exception of those comprised under chest affections and dropsies, while in epidemic years it greatly outstripped them. Judged by the standard of the London Fever Hospital, where the admissions have been registered with but little intermission since 1805, the death-rate from the group of diseases comprised under the general term of fever, has fluctuated from 9 to $25\frac{1}{2}$ per cent. according to the type of the epidemic, and the experience of most large hospitals will confirm the truth of these remarkable extremes. From the annual death register of the more important causes of death at Guy's, it would appear that the years 1741-42 contributed a larger number of fatal cases of fever than any others in the series, although later on in the century the deaths from the same cause spread over any given number of years maintained even a higher relative proportion than they did in the first half. The year 1741 was a season when typhus fever, after having first devastated Ireland, spread with great virulence in London, and continued to prevail extensively till the close of the following year.* Again, nearing the end of the century, we have records of another fatal epidemic also imported from Ireland, leaving its mark on the mortality returns of the first decade of the present century, and which was probably one of the main causes that gave rise to the establishment of the London Fever Hospital. As new hospitals came to be founded, and better provision made for the poor in the workhouse infirmaries, the annual complement of fever cases in the London hospitals diminished, while from the growth of the population in other large towns, which,

* "Dr. Murchison on Fevers."

as a rule, were limited to but one hospital, the fever cases, especially in such as were liable to recurrent epidemics, greatly increased. This accounts partly for the increase of mortality during the present century in such hospitals as those situated in Manchester, Edinburgh, and Glasgow, and other towns where fever was treated either in the general wards or in separate wards of the respective hospitals. I give in illustration of this fact, the returns, during two intervals of ten years, at the commencement and latter half of the present century, of the Edinburgh and Glasgow hospitals, institutions conducted on much the same principles and subject to very similar influences. The first part of the table comprises the decade 1808-17, a period remarkably free from epidemics of fever, and is taken from Dr. Bisset Hawkin's "Medical Statistics" and "Buchanan's History of the Glasgow Hospital," while the second includes the term 1866-75, and is extracted from the official reports:—

Year.	Edinburgh Royal Infirmary.			Glasgow Royal Infirmary.		
	Admissions.	Deaths.	Mortality per Cent.	Admissions.	Deaths.	Mortality per Cent.
1808	1,787	121	6·7	840	59	7·0
'09	1,646	109	6·6	886	43	4·8
'10	1,854	108	5·8	936	52	5·5
'11	2,146	121	5·6	826	45	5·4
'12	2,018	88	4·3	877	47	5·4
'13	1,774	96	5·4	1,022	83	8·1
'14	1,884	108	5·7	1,135	102	8·9
'15	1,628	111	6·8	1,340	96	7·1
'16	1,798	123	6·8	1,511	124	8·2
'17	2,250	142	6·3	1,886	136	7·2
1866	4,971	590	12·0	5,619	661	11·7
'67	4,431	497	11·2	5,101	542	10·6
'68	4,330	494	11·4	5,314	517	9·7
'69	4,342	434	10·0	6,119	595	9·7
'70	4,385	478	10·8	6,262	556	8·9
'71	4,653	486	10·4	6,540	592	9·0
'72	4,410	499	11·3	5,452	641	11·7
'73	4,383	444	10·1	5,377	601	11·1
'74	4,695	427	9·1	5,269	605	11·4
'75	4,661	430	9·2	5,172	611	11·8

Note.—The mean death-rate during the first period was consequently 5·9 for the Edinburgh, and 6·9 for the Glasgow Hospital, while in the more recent decade, it has preserved an average of 10·5 per cent. in both institutions. But apart from fever, there were other agencies to account for a fluctuating death-rate.

It was stated in a previous page that this somewhat fitful mortality was to be explained partly by the relative proportions

which the medical bore to the surgical patients. Until the commencement of the present century it was not customary to make any special classification of diseases, as both classes were treated in common in the same wards, but from the records in my possession, I have been able to compile a table which gives the annual number of patients discharged and who died in the separate departments in Guy's Hospital from the year 1814 to the present time, from which the following conclusions are obtained :—During the first term from 1814 to 1820, the proportion of surgical cases was nearly twice that of medical, a disparity which would lead us to expect a smaller general death-rate than actually existed; but this again is explained by the very high mortality which obtained among the medical cases at the period, reaching as it did to 17·3 per cent., a proportion nearly as high as any average that it has attained since. From 1820 to 1830 the medical patients increased a little, but not to a very appreciable extent, while the death-rate on the surgical side became more marked from an increasing number of surgical injuries received into the wards. A corresponding fatality continued on the surgical side throughout the two subsequent decades, when it was checked by an extension of the ophthalmic department, which was instrumental in reducing it from an average of 6·5 to 5·3 per cent. in the course of the decennium terminating 1860. In the next interval of ten years it rose slightly in consequence of a diminished accommodation for syphilitic cases, and from 1870 till the present time it has maintained the high figure formerly quoted as the average death-rate prior to 1850. The high and increasing hospital mortality of recent years which has been felt in the chief metropolitan institutions, will no doubt be attributed to the graver character of the maladies received, but it is gradually assuming proportions which deserve the most serious consideration. It is proverbially remarked that the hospital which confers the largest amount of benefit on the community is that in which the death-rate is found to be the highest, but such an admission, if true, and if acted upon to the extent of admitting none but critical and incurable affections, would rob the hospital of half its value, and paralyse all efforts of medical skill in the shape of prevention. On the other hand, if the most pressing claims of the sick in an advanced stage of disease are disregarded, and preference is given to such as are recommended by supporters of the particular institution, who for the most part are strangers to the more urgent needs of the many, much injury may be inflicted on the sick poor, and on the objects which the hospital was purposed to fulfil. That a more generous spirit prevails among the hospital supporting community than was formerly the case, is I think evident, in London especially, from the graver character of the cases

admitted to the general hospitals, and which for the most part are left to the selection of the resident medical staff. The accompanying abstract from the mortality tables, will illustrate the growing death-rate of four of the chief hospitals from the middle of the present century :—

	Mortality per Cent.			
	Bartholomew's.	Guy's.	St. Thomas's.	The London.
1850 to 1860.....	8·5	9·1	7·5	7·9
'60 „ '70.....	10·7	9·7	10·8	10·3
'70 „ '76.....	9·9	10·6	12·15	11·6

Had there been any material alteration in the complement of beds allotted to medical in contradistinction to surgical purposes in the three hospitals first on the list, the increasing mortality might have been readily explained, but there is no reason to suppose that such has been the case. The London Hospital occupies a more exceptional position. For very many years it had the character, and to some extent still retains it, of being the greatest surgical hospital of the metropolis, and placed alone in the east of London, it was soon surrounded by a rapidly growing population of a necessitous character, whose wants it felt bound to supply. Within the last twenty years its mortality was remarkably low, ranging from 5 to 7 per cent. of the cases admitted, and attributable mainly to the accidents and surgical operations. I have not been able to trace back the distinction betwixt medical and surgical cases at this hospital further than 1863, but at this time the proportion of the former to the latter was as one to three, while in the last few years the numbers approximate the proportions observed at the other hospitals named, while the mortality has risen from 7 to 12 per cent. In all large hospitals we find that from one-half to three-fourths of the deaths in the surgical department are due to accidents, and as such are freely admitted, since no provision is made by legislative enactment to treat them elsewhere; they are likely to become a growing source of hospital mortality. The ordinary death-rate of surgical cases as deduced from the tables, ranges from 5 to 7 per cent., with a tendency to increase, though the increase is not very decided, and occasionally circumstances intervene to raise it higher in one year or series of years. If we deduct the deaths from accident from the total derived from surgical cases, we find invariably but a small percentage left for other surgical maladies. In the Glasgow Hospital, for example, during the past five years, the deaths in the surgical wards amounted to 1,057,

of which 686 were due to violence, making the mortality in the department 8 per cent., while that of the non-accident cases averaged little more than 5 per cent. Again, at Guy's, during the past seven years, deaths from accidents amounted to 616 out of a total of 984, thereby reducing the death-rate, if we omit the accidents, from an average of 6·5 to a mean of 4·3 per cent. But irrespective of accidents, there are occasionally causes at work in numerous hospitals which have contributed in times past and present to increase the general surgical mortality. The fame of the hospital, the reputation, individual or collective of its staff, on account of diseases necessitating hazardous operations, however successful these may be in the abstract, all tend to increase the ordinary death-rate. Thus at Guy's, during the last twenty-one years, there has been a growing increase in the mortality from operations, which if measured by septennial periods would be represented by an annual average of thirty-eight deaths for the first period, forty-five for the second, and seventy-two for the third, and it would be easy to trace the fatal results to causes which had but a feeble existence before. Another reason, though not a common one, to account for an increased surgical mortality, arises from some special provision being made for the permanent residence of patients with incurable disease in an advanced stage. Such a condition exists at the Middlesex Hospital, where a ward is appropriated for cancer cases, and which has the effect of raising the surgical mortality from 4·8 to 9·3 per cent.* On the other hand, notwithstanding a preponderance of accidents and surgical operations, supplemented by a contingent of incurables, there may exist in the same hospital special departments in which deaths are so little liable to occur that an otherwise heavy mortality is reduced to a comparatively light one. The exclusion of venereal diseases alone from the returns of the last ten years at Bartholomew's, would have the effect of increasing the small surgical mortality of the hospital from 4·3 to 5·6 per cent., and the rejection of the ophthalmic cases would reduce it still further. At Guy's, where accommodation is provided for fifty ophthalmic and forty venereal cases, the mortality among surgical cases maintains an average latterly of 6 per cent., but if these patients were excluded from the calculation, the death-rate would increase to an average of 8 per cent., which is a singularly high one for surgical patients.

Another circumstance influencing the mortality in all general hospitals, may be sought for in the proportion of beds allotted to the separate sexes. We have the authority of the Registrar-General for stating that double the number of deaths occur among

* Report of the Middlesex Hospital, 1874.

the male sex in hospitals than take place among females, and it is a well-known fact that this disproportion cannot be accounted for by any great difference that exists in the accommodation provided for the separate sexes. There is no doubt, however, that in the surgical department of every large hospital there is a considerable preponderance of beds for men in consequence of their greater liability to accidents, and as has been noticed, deaths from these causes are far more numerous than deaths from other surgical complaints. In the medical division again, though the accommodation for the sexes has been more nearly equalised in recent years, the more serious ailments of the male patients tell with greater force on the death-rate, than the diseases of women. In St. Thomas's Hospital, during the most recent epoch referred to in the tables, male patients treated in the medical wards suffered from a death-rate of 21·5 per cent.; while women suffered in the less proportion of 12 per cent.; and at Guy's, during the same interval, among a corresponding class of patients, the death-rate among the male sex amounted to 20·4, and among females to 11·4. From the records of St. Thomas's Hospital we possess the following data bearing on the question of sexual mortality, and extending back nearly a century :—

	Deaths per 100 Admissions.		
	Male.	Female.	Total.
1786 to 1790	7·54	6·62	7·25
'90 „ 1800	8·45	6·98	7·97
1800 „ '10	6·38	5·65	6·45
'10 „ '20	6·88	5·31	6·36
'30 „ '40	9·31	6·73	8·42
'50 „ '60	8·55	6·64	7·76
'60 „ '70	11·14	10·87	11·36
'70 „ '76	14·30	9·47	12·15

It is noticeable that up to the year 1840 the number of male admissions to St. Thomas's Hospital were twice as many as the female, after which the latter increased by degrees until the relative numbers began to approximate, the mortality at the same time increasing in both sexes. The subject of sexual mortality may be still further illustrated by the experience of Guy's, Bartholomew's, and the Glasgow Hospital, though the figures are

for a more recent period; they, however, distinguish betwixt the medical and surgical cases :—

	Mortality per Cent., Medical.		Mortality per Cent., Surgical.	
	Males.	Females.	Males.	Females.
Bartholomew's—				
1842 to 1852.....	15·6	10·0	5·5	5·8
'70 „ '75.....	19·3	13·6	6·0	4·1
Guy's—				
1854 to 1860.....	15·7	12·1	5·9	4·2
'60 „ '70.....	18·6	12·4	6·5	4·8
'70 „ '76.....	19·4	12·9	7·4	4·8

	Mortality per Cent., Medical.		Mortality per Cent., Surgical.		Mortality per Cent., Fever.		Mortality per Cent., Small Pox.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Glasgow Royal Infirmary—								
1866 to 1871	12·4	10·1	6·8	5·1	15·9	11·3	11·4	8·3
'71 „ '76	14·6	13·7	8·6	6·8	13·3	9·1	15·3	8·6

Though there is an appreciable increase in the mortality during the short periods referred to in the Glasgow returns, there is not that disparity in the death-rate betwixt the sexes we are accustomed to see in the London hospitals. This arises from the graver character of the female complaints received into the Scotch hospital, when compared with such as are admitted freely to London hospitals, and it is only when we come to examine the mortality of the fever cases that we again recognise the difference. This fact, already illustrated by the experience of the last ten years, is more fully borne out by the following returns, embracing an interval of four years, 1844-47, when one of the greatest epidemics of modern times visited Glasgow and decimated the population. At this period there were no special distinctions made in the official reports of the hospital betwixt medical and surgical cases, but the male and female deaths were carefully distinguished, and those caused by fever were kept apart from the ordinary deaths. The mean death-rate from fever, or rather among all the patients received into the fever department, amounted to 14·8, while that of the ordinary medical and surgical cases was 11·2 per cent. of the admissions :—

Years.	Medical and Surgical Cases.		Deaths.		Fever Cases.		Deaths.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1844.....	1,234	776	131	66	769	699	82	61
'45.....	1,556	902	134	100	300	235	47	28
'46.....	1,729	1,018	177	100	933	867	109	98
'47.....	1,561	822	228	114	2,771	2,453	508	296

While the mean mortality among males in the general department amounted to 11·10 per cent., and that of females to 10·8, the death-rate in the fever division among the former class maintained an average of 15·6, and among women 11·3 per cent. The mortality from fever at this hospital has undergone extreme variations, sometimes marking an average as low as 10 per cent., and occasionally rising to 15 per cent., but there is no instance of its approaching the high figure which it attained at the London Fever Hospital, particularly in the years 1837-39, when it had an average range of from 23 to 25 per cent.

The questions whether the segregation of the fever stricken in separate hospitals, their being mixed with others in wards appropriated for ordinary diseases, or their isolation in their own homes, have been frequently discussed in relation to the mortality accompanying the disease. It is now generally recognised that during the prevalence of epidemics in large towns, there is a positive necessity for finding separate accommodation for the disease in hospitals specially set apart for the purpose, but it is still very doubtful whether the concentration of a large number of persons suffering from similar maladies has not an evil influence in intensifying the virulence of the disease. It is held by many, and the practice is not yet abandoned in many hospitals, that by placing one or two patients suffering from fever in a large ward with ordinary diseases, their chances of recovery are strengthened, and that the dangers from contagion are reduced to a minimum. Whether this is capable of proof there can be no doubt of the manifest advantages to be gained by a thorough freedom of ventilation in fever wards, and as the subject is closely connected with the points at issue, I may be allowed to refer to a personal reminiscence in connection with the epidemic in Glasgow already referred to. The fever hospital of the city is a branch of the general hospital, situated within its grounds, and up to the period mentioned it had been found adequate to meet the requirements of the population, but in consequence of the extensive prevalence of this particular epidemic, the hospital autho-

rities found it necessary to erect with great despatch in the airing ground in its immediate vicinity, a couple of wooden sheds capable of holding 200 additional patients. These viewed in the light of modern notions were miserable creations for the reception of the sick. One contained two rows of beds, and the other four rows, the latter being divided by a wooden partition about 6 feet high down the centre, against which the heads of the beds rested. The wards were limited to one floor, raised about a foot from the ground, and were open to the roof, which had been expeditiously covered over with a species of asphalted canvas, which, however, was not proof against successive inroads of snow and rain. In consequence of the building being only intended to do duty for a season, very little regard was paid to its durability, and natural ventilation triumphed over art, as the wind at times blew through the interstices of the wooden framework with the force of a moderate gale. This was all very well in summer, but as winter approached the necessity for warming the building became indispensable, and some large chauffers were placed at intervals along the centre, where chimneys, which were chiefly remarkable for their persistent refusal to carry off the smoke, had been hastily extemporised, but not before the cold had become so intense as readily to freeze water which had been spilt carelessly on the floors. And yet, in spite of these numerous shortcomings, the mortality among the patients admitted to the sheds was less than in the spacious hospital adjoining, fitted as it was with every ordinary requirement, and where an agreeable temperature was maintained by a system of heated air in the coldest weather. Dr. Paterson, who was then one of the physicians of the Edinburgh Royal Infirmary, relates a similar experience with regard to the same epidemic.* Here at Edinburgh, the experiment, if by such a name it could be called, went a step further, as in addition to wooden sheds, it was found requisite to have canvas tents pitched on the hospital "green," into which the sick were drafted after the other accommodation was exhausted. In analysing the results of his practice, Dr. Paterson found that in the hospital wards saturated for a century with the emanations of the fever stricken, the death-rate amounted to 15 per cent. for males, and 10 per cent. for females; in the temporary wooden structures to 12 per cent. for males, and 7 per cent. for females; while in the tents it did not reach a higher figure than 5 per cent. over the combined sexes. To follow up the comparison, a physician engaged in extensive district work among the poor of Glasgow during the prevalence of the same epidemic, went so far as to argue that the patients who were treated at their own miserable homes, had better prospects of

* "Edinburgh Medical Surgical Journal," No. 177.

recovery than those received into the fever asylums; that whereas the hospital mortality ranged from 12 to 18 per cent. of those received into it, the death-rate of the patients visited by the parish surgeons attached to various districts of the city, ranged only from 5 to 10 per cent. during the different phases of the epidemic. It is impossible to reconcile these separate influences, but we have good ground for believing, that patients suffering from contagious fever have better chances of recovery in an outhouse or other hastily contrived building, than in the best appointed hospital when it is injudiciously crowded.*

The experience of the Glasgow Hospital has been carefully tabulated in the annual reports of its managing body, from its foundation to the present time, and as it has increased at a progressive pace with the wealth and population of the city, its history may be looked upon as typical of that of the general hospital, founded to meet all the requirements of a manufacturing population. At the date of its establishment in 1795, the population of Glasgow was estimated at 71,000, and up to the end of the century the death-rate among the patients received into the Royal Infirmary, by which name it is best known, did not exceed 5·8 per cent. By the end of the first decade of the present century, the population having increased in the interval to 84,000, the mortality had reached 6·2 per cent.; it then rose to 7·7 per cent. on an average of the ten years 1810-20, the population in the meanwhile increasing to 101,000, while in the following decennium 1820-30, it had risen to 9·1 per cent. Since 1830, and to a less extent before this era, the city has been visited by some destructive epidemics, including fever, small pox, and cholera, which have materially disturbed the normal death-rate, but independent of these causes, there is noticed the same progressive tendency, the mortality during the last five years having reached an average of 10·9 per cent., the population in the meanwhile approaching half a million.

It would follow from the facts previously narrated, that there is no definite law further than habitual custom, by which the accommodation in any hospital is regulated. Nearly all permit more or less expansion when pressure of a particular kind is forced on them, while each preserves some special character depending on numerous causes, the chief of which are the design of original foundation, the nature of the medical organisation, and their affiliation or otherwise with a medical school. We may add to this that, until the time arrived when it was found absolutely necessary to exclude from hospital privileges vast numbers suffering from trivial ailments, the hospital mortality was comparatively small, that with

* "Results of Fever in Glasgow Hospitals and Out-door Practice Contrasted." James Adams, M.D.

the increase of population, the progress of arts and manufactures, together with facilities for locomotion, the demands on the charities multiplied, and involved a more suitable selection of cases which, being critical and urgent, were attended with a corresponding increase in the death-rate.

We will now proceed with the inquiry which *primâ facie* might be expected to throw much light on the past and present mortality of hospitals, namely, the death-rate of such diseases as are usually encountered in hospital practice. I have already referred to fever as affording us very insecure data of comparison, and the same insecurity extends to the nomenclature of diseases generally. The older writers had also a habit of lumping together under the same headings disorders of a totally different organic character; but from such data as we possess, I will endeavour to select some special diseases that may be thought susceptible of comparison. The first series to which I would refer are from the records of Sir Gilbert Blane's practice at St. Thomas's Hospital during twelve years from 1783 to 1795, comprising nearly 2,300 such cases as were likely to fall under the notice of a physician at the period:—

	Cured.	Died.	Mortality per Cent.
Continued fever	493	69	12·2
Intermittent fever	192	7	3·6
Pulmonary consumption	321	70	17·9
Bowel complaints	264	38	12·5
Scarlet fever	3	2	40·0
Small pox	29	12	29·2
Erysipelas	18	1	5·3
Dropsy	203	77	27·5
Diseases of women	256	18	6·5
Venereal disease	202	3	1·4

In addition to the above, Dr. Blane refers thirty deaths to what he terms obscure, anomalous, and complicated affections. The general death-rate at St. Thomas's at this period ranged from 7 to 8 per cent., while at Guy's, with a smaller number of surgical cases, it was a fraction more than 10 per cent. From tables in the appendix, we gather that the deaths in Guy's, from a very early period of the same century, were due to very similar causes, while in the course of the present century several of these diseases have almost entirely disappeared fron the death register, and their place has been usurped by others of an equally fatal tendency. Dr. Moses Buchanan, in a history of the Glasgow Royal Infirmary, furnishes a consecutive list of the diseases treated in that institution from its origin till the year 1831, from which the following abstract has been made to show the comparative frequency of the causes most likely to contribute to the mortality. With the

exception of the three years 1829-32, we have, however, no special record of the deaths from these affections :—

	Consumption.	Dropsy.	Fever.	Accidents.
1794 to 1800.....	50	108	327	126
1800 „ '10.....	284	289	810	467
'10 „ '20.....	496	505	3,700	932
'20 „ '30.....	469	597	6,868	1,877

From the experience of the three years referred to, we have the following results illustrating the death-rate in some of the more important medical and surgical affections :—

	Total Cases.	Deaths.	Mortality per Cent.
Accidents	542	63	11·6
Consumption	158	55	34·7
Dropsies	178	69	33·1
Dysentery	79	19	24·0
Peritonitis	14	7	50·0
Tetanus	6	5	83·3
Diseased joints	84	6	7·1
Paralysis	86	8	9·3
Fevers	3,242	321	9·9
Heart disease	34	19	55·8
Inflammation of lungs	204	14	6·8
Herniotomy	8	4	50·0
Rheumatism	280	4	1·4
Small pox	23	4	17·3
Lithotomy	15	2	13·3

It may be interesting to compare this table with others collected from the same hospital at separate intervals of a subsequent date, and for this purpose I will add two quinquennial periods, from 1844 to 1849, and from 1871 to 1876, limiting the diseases to four typical affections, and the surgical affections to two important operations and to accidents :—

	1829-32.	1844-49.			1871-76.		
	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.
Consumption	34·8	431	186	43·1	1,526	460	30·1
Pneumonia	6·8	141	38	26·9	636	154	24·2
Rheumatism	1·4	484	9	1·8	654	11	1·6
Fever	9·9	10,622	1,839	17·3	2,359	176	7·4
Accidents	11·6	2,182	272	12·4	5,389	686	11·4
Herniotomy	50·0	14	6	42·8	73	36	49·7
Lithotomy	13·3	30	3	10·0	39	4	10·2

But I doubt whether much can be made of this table that will throw light on the question of past and present mortality. Setting aside fever and its changing types, and consumption, which showed a much larger death-rate during 1844-49 than at other periods, and which doubtless was due to the bulk of the accommodation being absorbed by fever, the only malady which shows a marked disparity in its results is pneumonia, which seems to have attained a low death-rate, amounting only to 6·8 per cent., in the first period. It is impossible to account for this discrepancy, which may as likely as not be due to some error in the diagnosis or registration. Similar errors are not so likely to have occurred with regard to important surgical operations and their results, and in connection with this hospital we have uninterrupted returns from its commencement to the present time of the results of amputations of limbs, a subject which is often referred to as a test of the healthiness or otherwise of a hospital. I will give these from official sources in the following table, compiled from the statistics already published.* To avoid error in instituting comparisons, all the cases tabulated have been confined to amputations which have been made through the shafts of the bones alone, and those operations which have involved the loss of more than one limb have been purposely excluded :—

Glasgow Hospital.	1795-1838.			1839-49.			1849-74.		
	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.
Amputation of—									
Arm	23	11	47·8	49	15	30·6	134	45	33·5
Forearm	15	—	—	35	4	11·4	112	13	11·6
Thigh	12	11	91·6	32	21	65·6	118	63	52·5
Leg	22	15	68·1	53	22	41·5	109	49	44·9
	72	37	51·3	169	62	36·6	473	170	35·8

There is here a decided improvement in the last two intervals when compared with the first, and a slight improvement in the last interval when compared with the second. Numerous circumstances may combine to render results of amputation very different in one hospital when compared with another, but as we are dealing now only with the gross returns, it is not essential that we should further particularise details. For comparison with the above, we will now take the returns of the Edinburgh Hospital, which is of

* "Medical Gazette," vol. xxiv ; "Edinburgh Medical and Surgical Journal," No. 181 ; "Glasgow Medical Journal," 1874. Dr. Thomas.

older date considerably than that of Glasgow; and it may be noticed that primary amputations, or such as are necessitated from injury to life and limb, are more frequent in Glasgow than in Edinburgh. The returns are for a term of years of comparatively recent date, being limited to the ten years 1859-68:—

Edinburgh Hospital.*	Cases.	Deaths.	Mortality per Cent.
Amputation of arm	28	15	53·5
„ forearm	58	12	20·6
„ thigh	199	96	48·2
„ leg	86	38	44·1

* "Edinburgh Medical Journal."

This exhibits an average mortality over all amounting to 43·3 per cent., but it will be observed that what is usually looked on as the most fatal amputation, namely that of the thigh, more than exceeds in number all the others. We are now at liberty to compare with the returns of the Scotch hospitals the records of amputations at Guy's, which I will tabulate over three consecutive septennial periods, beginning with the year 1854:—

	1854-61.			1861-68.			1868-75.		
	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.
Amputation of—									
Arm.....	23	8	34·7	41	15	36·7	42	10	23·8
Forearm	21	2	9·5	18	6	33·3	19	3	15·7
Thigh	106	31	28·3	110	48	43·6	156	59	37·8
Leg	59	20	33·9	102	36	35·3	78	26	33·3

Note.—The average mortality for 1854-61 was 29·2 per cent.; for 1861-68, 38·4 per cent.; for 1868-75, 33·2 per cent.

Notwithstanding the fact that at this hospital as well as at others, resection of joints has taken the place in very many instances of the more formidable operation of amputation, leaving the latter alternative for the least hopeful class, there is an appreciable improvement in recent years, not only in the results of amputation but in surgical operations generally. In the absence of statistics of an early date, it is not easy to prove this, but considering the great improvements which have been made in surgical appliances, dressings, and in sanitary precautions generally, as well as the favourable results which daily attend operations which were

formerly looked upon as hopeless, there is ample evidence to show a great advancement in this department of surgery. At the same time, in spite of these advantages, the surgeon has to contend with numerous difficulties in the course of his hospital practice, which have certainly not diminished with advancing years, and which from time to time have seriously interfered with the success of surgical operations. In Sir James Simpson's compendious statistics of 2,089 cases of amputation, collected from English and Scotch hospitals, and mainly limited to the decade 1861-70, the gross mortality was found to average 40 per cent. of the cases. These were contrasted with an equal number of amputations performed by private practitioners on patients at their own homes, in which the death-rate was alleged not to have exceeded 10 per cent., the difference being so remarkable that the accuracy of the returns was soon called in question. It was argued, and not without reason, that information obtained from a variety of sources and from separate individuals, all desirous of putting the best complexion on their individual efforts, was scarcely a fair tribunal of appeal, and could not be contrasted with the accredited sources of hospital experience; yet, after making ample allowance for the deficiencies referred to, and which are not entirely unknown even in hospital practice, we are still warranted in believing that there is a balance remaining in favour of external success. This conclusion has not been arrived at without due thought of the many fallacies which beset all questions in which the data for guidance are of an unreliable character, but mainly from an experience of the risks inseparable from the surgical treatment of the sick in large bodies when contrasted with individual isolation. To the former condition the opprobrious term of hospitalism has been given, and, in the absence of a milder word, it is significant of the dangers which encompass hospital practice, and which are found to increase *pari passu* with the neglect of sanitary precautions. In dealing with the subject of amputation, we are, in fact, embracing the recognised conditions which originate and propagate the evils alluded to, whether they arise from contagion in the first instance or from the after effects of the operation itself.

Apart from the progress of surgical cases, which after all have but a subordinate effect on the general hospital mortality, it is our duty to consider more in detail the main factors which contribute to a high death-rate. The most important of these is undoubtedly consumption, a disease which as a rule is admitted to all general hospitals, though there may be regulations of more or less stringency with respect to the admission of the patients and their periods of hospital residence. When we know from the registrar-general that one-ninth part of the mortality of all ages, and one-fifth

of the deaths of the adult population of this country are due to the ravages of this disease,* it is but fair to expect that it would bring its influence heavily to bear on the hospital death-rate, especially in asylums instituted for its reception, but as was noticed in a previous page, there is no absolute rule in these matters, and the latter may show as low a death-rate as the others intended for general purposes. The main plea for special hospitals, founded on the assumption that patients suffering from incurable and other chronic maladies are not welcomed by other hospitals, can hardly hold good with regard to chest diseases, as the proportion of these treated in the latter, range, as we shall see, from one-fifth to one-tenth of the total number usually under treatment. At the same time the utterly hopeless character of consumptive cases renders it obligatory on the part of those entrusted with the selection of the patients, to place checks on their indiscriminate admission. In general hospitals this check is felt in the exclusion of patients in the first stages of the malady, among those who are more or less able to look after themselves, while the greater number received either suffer from some acute form of the malady, or are in a condition where to refuse admission would be tantamount to an act of cruelty. In the special hospital, on the other hand, admissions are regulated by the recommendation of subscribers, and as often happens these are far more numerous than the provisional accommodation, and as the least advanced cases of the disease are presumably most susceptible of benefit, there is a reasonable argument for their selection being preferred to those of a less hopeful character. Perhaps the best example of a special hospital is that instituted in the year 1841 at Brompton for the treatment of consumption and diseases of the chest, which was noticed to have had a death-rate of 10 per cent. in recent years, while some of the general hospitals greatly exceeded this figure. It may be further shown that while the death-rate is increasing in the general hospitals, there is some reason to believe that it may be diminishing at the special; at all events, such is the experience of the particular hospital under discussion. In a report of this institution, embracing a period of six years, from 1842-48, it is stated that $18\frac{1}{2}$ per cent. of the cases treated in the interval terminated fatally; and in the next report of the medical staff, extending over thirteen years, from 1849-62, the death-rate was reduced to 14·9 per cent., while the most recent annual reports bring it down to the very low figure of 10 per cent. In contrast to this, we learn from the statistical tables of Guy's and St. Thomas's, that the mortality of consumption in the former amounted to 40 per cent., and in the latter to 30 per

* Supplement to the Thirty-fifth Annual Report.

cent.; while the group of chest diseases in both institutions has an average death-rate of 25 per cent. On a recent visit to the Brompton Hospital I found that out of 248 inmates then resident in the institution not more than 12 were confined to their beds, and the resident medical officer assured me that this was a fair average of the number incapable of attending to their own wants; while at Guy's Hospital, at the same time, there were 38 cases of consumption, of which 8 alone were in a state to leave their beds. The lengthened residence of the patients at the Brompton Hospital, amounting to an average of seventy-five days, is peculiar, and though we are accustomed to look upon a prolonged stay of medical cases as one of the main factors of the hospital death-rate, it may, by excluding critical and advanced cases, have a tendency directly the reverse. We are also informed from a report of the medical staff, that on the occasion of the opening of a new wing of the hospital in 1855, and the greater facilities of admission afforded in consequence, there was a considerable accession of deaths, showing that while increase of accommodation in the general hospital may be attended with a diminished mortality, that of a special hospital for chest complaints is accompanied with directly opposite results. It may consequently be accepted as a general rule that the mortality of a general hospital is mainly influenced by the facilities or otherwise, given to the admission of advanced cases of consumption and other chest diseases, and in illustration of this fact I have constructed the following table, compiled from official sources, showing the proportion of chest complaints with the death-rates in several large hospitals during recent years. It is assumed that the same influences were at work in times more remote though in a modified form:—

	Consumption.		Other Chest Diseases.		Mortality per Cent. from both.	General Death-Rate.	Ratio of Chest Diseases per 1,000 Patients.
	Cases.	Deaths.	Cases.	Deaths.			
Bartholomew's .	135	63	481	133	31·8	9·8	106
St. Thomas's	807	246	1,198	240	20·0	8·5	73
Guy's	216	72	390	99	28·2	8·8	114
Glasgow	322	108	816	134	21·3	11·7	218

The numbers have been taken for separate years, with the exception of the returns from St. Thomas's, which extend over the period from 1857-61. The results are that on an average 128 in every 1,000 patients are treated for diseases of the respiratory organs (cardiac diseases being excluded), that the death-rate among the phthisical has a mean of about 33 per cent., among other chest diseases 21 per cent., or taken together the gross

mortality would amount to 25·3 per cent., or about 1 in 4 of the patients treated for chest affections. There is every reason to suppose that the increasing death-rate in most large hospitals depends on the larger number of chest diseases being admitted than was formerly the rule. We have already seen how Guy's Hospital may have been an exception to this rule, judging from the death returns of the latter part of the eighteenth and first half of the nineteenth century; but in the three epochs referred to in connection with the Glasgow Hospital, the fact is clearly established. Taken consecutively, the first interval indicates a death-rate in consumption of 34·8 per cent., and of 7·8 per cent. of the total deaths occurring in the hospital. In the second period, excluding the enormous fever returns, the deaths amounted to 43 per cent. of the cases of consumption treated, and to 14 per cent. of the total deaths from ordinary medical and surgical cases, while in the third period, embracing the past five years, the deaths from consumption alone, still excluding fever and small pox, amounted to 16·6 per cent. of the total mortality.

The next disease I purpose to refer to, with the object of discovering whether any material change has occurred by which its influence on the hospital death-rate has been felt, is pneumonia, or inflammation of the substance of the lungs. It is very probable, especially prior to the general adoption of auscultation in hospital practice, that other affections, involving diseases of adjacent tissues, may have been mixed up in the registration of this disease. The very small mortality adduced from the earlier returns of the Glasgow Hospital, and which do not exceed 7 per cent., would seem to give ground for this opinion. In the subsequent interval, when it is to be assumed that the characters of the disease were better understood, it was distinguished by a death-rate of nearly 27 per cent., while in the more recent epoch of five years it is slightly reduced, being now 24·2 per cent. Now in comparing these rates with others, we find that in the Edinburgh Hospital from 1839 to 1841,* there was a death-rate in pneumonia of 35·2 per cent., the highest I have been able to discover at any hospital; and afterwards from 1846 to 1850, the mortality at the same hospital was reduced to 27·7 per cent., still a high rate, but not higher than that observed at Guy's and Bartholomew's during the last ten years. It may be mentioned in passing, that in the interval from 1840 to 1850, a remarkable change was taking place in the medical treatment of all inflammatory disorders, and in none was this more marked than in the disease under consideration. Dr. Bennet, who was then registrar as well as physician to the

* Appendices to the Reports of the Managers. J. Hughes Bennet, M.D.

Edinburgh Hospital, and from whose statistics I quote, was also one of the ablest and most zealous advocates of the change, and the results of his experience are given in his "Clinical Lectures," which refer to seventy-eight cases under his care in the hospital, and which were attended with but three deaths. Now, considering that in the chief London hospitals we have had a mortality in pneumonia ranging from 14 to 29 per cent. during the last twenty-five years, and with small probability of abatement, it is unreasonable to suppose that we can make a standard of comparison from individual experience alone. During the past twenty years many hospitals have issued annual reports giving a summary of diseases treated with their results, and although these documents are not remarkable for much uniformity, the information they impart may be relied on as trustworthy. From these I have culled the following data, to illustrate rather the difficulty to be encountered in arriving at a fair estimate of the mortality in any one disease, than with the object of showing whether or not the death-rate has undergone any material change in the intervals referred to:—

Years.	Guy's.	Years.	St. Thomas's.	Years.	Bartholomew's.	Years.	Dublin Hospitals.
	Per cnt.		Per cnt.		Per cnt.		Per cnt.
1853–65	22·4	1856–60	14·3	1860–67	29·3	1860–68	15·2
'65–72	27·1	'74	21·6	'67–75	19·6	'70–75	19·0

Combining these with corresponding returns from the Edinburgh and Glasgow hospitals, we have a death-rate in pneumonia equivalent to 24 per cent. of the cases treated, and probably this is as near an approximation to the hospital mortality of this affection as we can hope to obtain.*

I had purposed adding to the short list of prevalent diseases, one or two others which have been familiar inmates of every general hospital from time immemorial, but the remote data we possess on these matters are so vague and unsatisfactory, that it would simply be a waste of time to enter on the inquiry. It will be a subject of more interest to inquire into the history of such affections, as we have reason to know were far more generally met with in public hospitals than they are at the present day, the chief of which were fever, small pox, ague, and scurvy, the two former contributing largely to the general death-rate, while the others being comparatively mild affections were readily remediable. I

* Dr. Aitken, in his "Practice of Physic," from the returns of nearly 5,000 cases of pneumonia treated in the hospitals in Virginia during the civil war, makes the death-rate at a less figure, 22·8 per cent.

have already referred to the eccentric effects of fever and small pox in modifying the death-rate from time to time, and it is a question germane to this inquiry whether these diseases as they are exhibited in hospitals, have increased or diminished in their intensity. As contributing to this end, I give the results of the treatment of fever at three separate intervals in the history of the Glasgow Hospital, beginning with the year 1829 and terminating with 1875. During the first epoch, comprising the ten years 1829-38, the mortality ranged from 8·7 in the two years 1831-34 to a maximum of 15·9 in 1836, while the mean rate over the period was 11·7 per cent. In the next decade, 1839-48, the mean death-rate was very nearly the same, namely, 11·9 per cent., while the range was greater, rising as high as 16·5 per cent. in the year 1839, during a severe outbreak of typhus, and falling to 5 per cent. in 1843, in the course of an epidemic of relapsing fever. Taken over the two periods, the mortality among the male sex exceeded that of the females by nearly 4 per cent., the relative proportion being 13·1 of the former, to 9·4 per cent. of the latter; at the same time females formed the majority of the patients received into the hospital. We will now contrast these figures with the results of the twelve years 1864-75, which exhibit an average death-rate of 13·3, or nearly 2 per cent. higher than the mean of the two previous intervals, the deaths among the male sex averaging 15·5, and of the females 10·4 per cent. The annual mortality in the interval ranged betwixt a minimum of 7·7 per cent. in 1871, and a maximum of 18·1 per cent. in 1873, and during the last few years of the period the male admissions began to exceed the female. In the Fever Hospital at Homerton, opened in 1871 under the Metropolitan Asylums Board, there have been treated 3,390 fever patients, with 601 deaths, which gives a gross mortality of 17·7 per cent., but as fully one-third of the patients were sufferers from scarlatina, known to be much less fatal than typhus or enteric fever, the returns can scarcely be compared with those previously quoted, although these are also greatly diluted with milder epidemics. We are not warranted in concluding from these and similar facts which might be adduced from the experience of other hospitals, that fever taken in its largest sense is either more or less deadly in its effects now than it was in former times. It is very possible that by a better system of selection, and from an improved knowledge of passing epidemics, many patients suffering from mild febrile attacks are now excluded from hospitals, and the mortality may appear to be intensified in consequence. This knowledge has at all events been invaluable in awakening us to the fact of the co-existence generally among the population of all large towns of two forms of fever, one depending on defective drainage or bad water, and the other arising

from deficient food and overcrowding, both causes within the province of sanitary legislation.

The virulently contagious character of small pox has always rendered it an unwelcome guest in every general hospital, and means were taken to have the disease isolated in separate rooms, wards, and in at least one hospital long before it was thought necessary to adopt the same alternative with regard to fever. As the Small Pox Hospital was instituted as much for the purposes of inoculation as for ordinary small pox, the data we possess of the mortality of the disease in that hospital during the last century are fallacious, and I will refer again for information on this point to Sir G. Blane's experience at St. Thomas's towards the close of the last century. In the course of his eleven years' practice there, Dr. Blane had under his care 41 cases, which were attended with a death-rate of 29·2 per cent. This was prior to the introduction of vaccination, and we have no authority for believing that any of the general hospitals received patients with inoculated small pox. Dr. Marson, of the Highgate Small Pox Hospital, gives us a return of 4,896 cases treated in that institution betwixt the years 1836 and 1855, of which 488 died, being at the rate of 9·9 per cent., and he also refers to the epidemic of 1863-64, which was attended with a much higher mortality, notwithstanding the general extension of vaccination.* The records of the Glasgow Hospital supply more definite details of the progress of small pox. When the branch building for fever was erected in connection with the general hospital, numerous small rooms opening into the wards were specially set apart for cases of the disease. These were found sufficient for ordinary purposes, but on the outbreak of epidemics of small pox it was frequently found necessary to occupy a couple of wards (male and female) with patients suffering from the disease. Nine years after the opening of the institution, only 22 cases had been received, and during the ten subsequent years 33 more were treated. The epidemic of 1823-24, felt severely in London, made an appreciable accession to the annual numbers, which averaged 45 for each of these years. From 1825 to 1835 the total cases amounted to 204, more than half the number being furnished by the two last years of the term. This epidemic reached its height in the following year, 1836, and, to render its history, as well as the events of the succeeding years, more intelligible, I will give the returns in a tabular form. These extend over a period of twenty-one years, divided into septennial periods, and are taken from the official records of the institution.

* "Reynolds' System of Medicine;" article, Small Pox.

Years.	Cases.	Deaths.	Years.	Cases.	Deaths.	Years.	Cases.	Deaths.
1832.....	3	1	1839	59	15	1846	99	10
'33.....	14	5	'40	61	18	'47	84	21
'34.....	62	4	'41	26	—	'48	48	13
'35.....	72	18	'42	38	5	'49	43	12
'36.....	110	45	'43	13	3	'50	78	18
'37.....	75	8	'44	10	—	'51	163	30
'38.....	35	10	'45	22	4	'52	115	19

Note.—The mortality per cent. for 1832-38 was 24·5 per cent.; for 1839-45, 19·2 per cent.; for 1841-52, 19·5 per cent.

The death-rate among the vaccinated taken over the whole period amounted to 7·1 per cent., and among the unvaccinated to 31·3 per cent. Since the close of the term active measures have been taken in Scotland to ensure a compulsory system of vaccination, and after 1871 other arrangements have been made for the treatment of small pox in Glasgow, apart from the general hospital; but the experience of the last six years, 1866-71, when small pox was still received into the hospital, gives a gratifying diminution in the mortality returns from any previous interval, the number of cases taken in during the time having amounted to 260 and the deaths to 28, equivalent to a mortality of 10·7 per cent. over protected and unprotected. Now from the hospital at Homerton, which was built for small pox as well as for fever, and which was opened in 1871, we find that there have been received into the establishment 4,372 cases of the disease, of which 811 terminated fatally, indicating a death-rate of 18·5 per cent.* Among these the vaccinated suffered in the proportion of 7·6 per cent., and the unprotected to the extent of 35·1 per cent., figures which approximate to the proportional death-rate in the Glasgow Hospital in the first half of the century, though the advantage is rather with the latter institution. The solution of the problem rests in the efficacy of vaccination, and the fact that seventy years after its discovery one in 5·4 of patients attacked with small pox should fall victims to the disease is a severe commentary on the sanitary arrangements at our command for successfully grappling with these epidemics.

In the case of intermittent fever, we have fortunately a disease which, however extensive its prevalence may have been in times gone by, left but little mark in the death register, and is now rarely seen in indoor hospital practice in this country Dr. Blane refers to 199 cases of ague which occurred at St. Thomas's during his term of office, with seven fatal results, but I have not been able to discover any death from the disease in the modern experience of

* Report of Fever and Small Pox at Homerton Hospital, 1876.

any hospital. We may gather from its infrequency that the causes which formerly originated it have been in great part removed by efficient drainage. Especially is this the case with numerous districts on the banks of the Thames, formerly pestilential marshes, as Lambeth, Erith, and Plumstead, which annually contributed their quota of intermittent fevers to the wards of Guy's and St. Thomas's.

Besides diseases attributable to malarious causes, there were others depending on faulty diet, which were much more commonly met with in the last and beginning of the present century than they are at the present day. Apart from fever, the result of famine, the chief of these dietetic distempers was scurvy, which however was much more frequently noticed in an endemic form in army and naval hospitals than in the general hospitals of the country. As the disease was equally under control with ague, its existence had scarcely an appreciable influence on the hospital death-rate. The last account of any formidable outbreak of scurvy, as it exhibited itself in hospitals, was in 1847, when the poor were still suffering from the potato famine, and when 102 cases were received into the Glasgow Hospital, with but one fatal result, probably due to some accidental complication.

Before proceeding to discuss in general terms the remaining factors which have indirectly influenced hospital mortality in past and present times, and their limits of prevention, it may be desirable to refer in this place to a class of special hospitals of early date, whose history has been unhappily associated with many fatal objections. Founded with the benevolent aim of enabling the poor to obtain the best medical skill, combined with a comfortable home at a critical period of their lives, lying-in hospitals can hardly be said to have successfully fulfilled the object of their promoters. That the evils associated with them have long since been thoroughly known, may be judged from the very slow progress they have made in public estimation during the last hundred years, when compared with other curative establishments throughout the country,* and judging from recent disclosures, there is small probability of their regaining general confidence and support. In attempting an analysis of the results of practice in some of the more prominent of these institutions, it is unfortunate that we should have no well-defined standard of death-rate proportion in child-bearing to aid us. The nearest approximation to it may be found in the returns of the registrar-general, from which we learn that in the course of the twenty-eight years 1847-74, the deaths among mothers in England and Wales have been at the rate of 5 per 1,000 children born alive,

* In London, with one insignificant exception, the date of the last foundation was 1765.

the annual mean ranging from 4·2 in 1857 and 1859, to 6·9 per 1,000 in 1874. From the fact of still-born children being omitted from the register, and especially from a well-known inclination on the part of a large body of medical practitioners to assign deaths after confinement to other causes rather than to accidents of childbirth, the proportion stated above is generally thought to be considerably under the mark. On the other hand, when we come to examine the certified experience of maternity charities, where women are attended by medical students at their own miserable homes, we have results which show the dangers of parturition in a much more favourable light. In summarising the annual returns of the extern maternities in connection with Guy's, Bartholomew's, and St. Thomas's Hospital for the twenty-one years 1856-76, comprising an aggregate of 74,850 cases, and where there can be no conceivable object in concealing the true cause of death, the mortality among mothers has not been found to exceed 4·1 per 1,000 deliveries.* In comparing this estimate with those which rule in lying-in hospitals, it is desirable (in order to appreciate the disparity) to extend the data over as long a period of time as we can obtain reliable records. The largest establishment of its kind, and also the oldest, is that long known as the Rotunda, or Dublin Lying-in Hospital, which has the rare good fortune to possess statistics of its annual experience from its foundation to the present time. The numbers referred to in the following table comprise 198,481 cases of confinement in that hospital, which were attended with 2,778 deaths to mothers, being equivalent to a death-rate of 13·9 per 1,000:—†

Rotunda Lying-In.

	Deaths per 1,000 Mothers.		Deaths per 1,000 Mothers.
1745–60	11·5	1811–20	15·0
'61–70	14·8	'21–30	13·3
'71–80	10·6	'31–40	13·1
'81–90	9·6	'41–50	13·6
'91–1800	8·8	'51–60	15·6
1801–10	9·7	'61–70	32·7
		'71–75	21·7

It will be noticed that while the death-rate was 10·3 per 1,000 during the last half of the eighteenth century, diminishing gradually towards its close, it rose after the first ten years of the present century to 13·3 for the first half, and since 1851 it has increased to the large average of 31 per 1,000. When we know that this insti-

* See table in Appendix.

† Summarised from "Dublin Medical Journal," vol. 1869; and from Dr. Johnston's Annual Reports, from 1868 to 1875.

tution is most ably administered, that it has the reputation of being the best midwifery school in the kingdom, and that its sanitary arrangements are of the most perfect description, it is impossible to avoid the conclusion that there must be some hidden cause at work to account for the dangers which appear to be inseparable from all hospitals of a similar character. The records of the London lying-in hospitals are not so comprehensive as those of the Rotunda, and are of more recent date, but we are indebted to the younger Heberden for an account of the annual results of the British Lying-in Hospital from the date of its foundation till the end of the century, during which time 25,892 patients were confined at the institution, with 391 deaths, being equal to an average mortality of 15·1 per 1,000. During the last twenty-two years the mortality has been nearly the same, viz., 15·7 :—

British Lying-In.

	Cases.	Deaths.	Deaths per 1,000 Mothers.
1749–58	3,292	78	23·6
'59–68	4,773	94	19·6
'69–78	5,637	106	18·8
'79–88	5,513	91	16·5
'89–1800	6,677	22	3·2
1854–64	1,181	11	9·3
'65–75	2,059	40	19·4

This hospital, it will be observed, commenced its operations with a very heavy death-rate, which improved materially as the century advanced, and during the last twelve years from 1789 to 1800, it diminished to the small proportion of 3·2 per 1,000 confinements. The circumstance has been noticed by Dr. Guy* as indicative of the great improvement which took place in the public health in the latter part of the century, and is borne out by the returns of the Dublin Hospital just quoted, as well as by the experience of the general hospitals already referred to. We have also an early record of the City of London Lying-in Hospital, extending over twenty years at the fall of the past and beginning of the present century, showing that during the interval the mortality of that institution did not exceed 5 per 1,000. I will give the numbers in full, as they have been kindly supplied to me by Mr. Outhwaite, the secretary :—

* "Lectures on Public Health."

City of London Lying-In.

	Cases.	Deaths.	Deaths per 1,000 Mothers.
1790–1800	4,456	26	5·7
1800–10	4,097	18	4·3
1855–65	5,378	69	12·8
'65–76	4,751	68	14·3

The mortality during the past twenty-three years has consequently been at the rate of 13·5 per 1,000, which, taken on the whole, is a more favourable return than is obtained from any kindred establishment. But the hospital which, above all others in the country, has tended to throw discredit on lying-in institutions, by reason of its high mortality, is that known as "Queen "Charlotte's," instituted in 1752, for the reception of married as well as single women. Whether the results were more favourable in the past century than in the present, we have no means of knowing, as the figures at our command do not extend further back than 1828, but even in the old hospital, which it was thought necessary to demolish on account of its excessive mortality, the deaths were less numerous than in the new. The following table, summarised from the annual results, will illustrate the experience of the hospital from 1828 :—†

Queen Charlotte's Lying-In.

	Cases.	Deaths.	Deaths per 1,000 Mothers.
Old Hospital—			
1828–38	2,035	35	17·1
'38–48	1,937	35	17·8
'48–56	1,496	42	28·0
New Hospital—			
1856–65	3,285	123	37·4
'65–76	4,328	97	22·3

The mean death-rate in the old hospital was consequently 20·4, while in the new it has amounted to 28·8 per 1,000. The building has accommodation for forty beds, and does not appear to have suffered from overcrowding, the mortality being at its highest in the years 1859 and 1860, when it marked a mean of 84·3 and 70·3 per 1,000, while the total numbers treated in these years were among the smallest annual averages. I will conclude

* "Medico-Chirurgical Transactions," vol. xlvii, Dr. Brodie. The "Lancet," January, 1876, Mr. Charles Hawkins.

these few remarks on lying-in hospitals, by a tabular contrast from the practice of the four metropolitan obstetric hospitals, and the three extern-maternity charities of the endowed hospitals for the same period of twenty-two years (1855-76) :—

	Queen Charlotte's.	British Lying-In.	General Lying-In.	City of London.	Guy's.	Bartholomew's.	St. Thomas's.
Deaths per 1,000	28·2	15·7	14·8	13·5	4·1	3·1	3·5

In the course of the previous pages I have but scantily referred to the effect on mortality of vices inherent or imported into the hospital itself, though this subject so intimately connected with preventive medicine, claims an importance second to none in the entire range of hospital economy. That hospitals are necessary for the safety and medical treatment of the sick poor is an undisputed fact; that they are also essential for medical education is equally incontestable, but in accepting the facts as indicative of the two great ends they seek to fulfil, there are certain objections attached to them which make us hesitate before pronouncing them faultless. The isolation of the sick poor in mediæval times apart from the healthy community, the crowding together of outcasts suffering from some loathsome complaint in an ill-contrived building, and the feeling of apathy, if not of horror, with which they were regarded by the world outside, were not calculated to excite public interest in their behalf. The same causes which we read of as giving rise to excessive mortality in gaols, workhouses, camps, and crowded ships, had no doubt their counterpart in lazar houses at home as well as abroad, and have occasionally, though not often, invaded the wards of our British hospitals. These are the same which from time immemorial have been associated with a high death-rate among all cases, and may be reduced to the four conditions which we now know to be irreconcilable with health, namely, overcrowding, which is only another name for foul atmosphere, innutritious or improperly regulated diet, bad water supply and want of cleanliness. Prior to the modern hospital period, that is to say before the eighteenth century commenced, public and personal hygiene appear to have been utterly disregarded in this country, and the numerous houses employed for lepers were established more as refuges for the discarded than as asylums for the sick. The scanty supply of vegetables and fuel, together with the filthy habits of the people, and the malarious exhalations, especially in towns, all contributed to the production of disease of a fatal character, so that in London the death-rate during the latter half of the seventeenth century, as calculated by Dr. Farr from the bills of mor-

tality, was as high as 80 per 1,000, nor was it till the eighteenth century was considerably advanced that a material improvement took place. The benevolent aims of those who originated the few hospitals in this country in the first half of the past century, embraced not only the immediate wants of the sick poor, but also extended to the necessary requirements of the buildings intended for their reception. Though not in much repute at the present time, many of these were constructed on the self-same principles which guide our modern ideas on hospital sanitation, and all were greatly in advance of anything which had hitherto been done either in this or other countries. Into such all kinds of disorders were admitted, without regard to their morbific influences;* yet however disastrous the results may have been, they were apparently less formidable than parallel occurrences which have happened in times less remote. The eighteenth century represents the turning point in the health history of this country, when the mortality in London alone fell from the figure just quoted to 50 per 1,000 annually then living of the population, leaving its mark on the diminishing death-rate of the hospitals, especially towards the close of the period. The measures periodically employed to improve the hospital health, the cleaning and whitewashing, were in part much the same as they are now, but as the population rapidly increased, and there was no corresponding increase in the eleemosynary accommodation, there may have been a tendency to crowd too many sick in the same building, and although we are not able to point to any very appreciable differences in the mortality in consequence, the evil was so palpable, that in course of time it cured itself, and the question of sufficiency of individual cubic space gradually became of paramount importance in every hospital, old and new. At the same time, and for the same reasons, classification of patients, according to their diseases, coupled with isolation of the contagiously affected, gradually took the place of the mixed system. The first step towards it consisted in the separation of syphilitic cases from the others, possibly as much for moral as for physical reasons. Afterwards when epidemics prevailed, and hospital patients became liable to attacks from being placed in proximity to the contagiously affected, necessity required that rooms and wards should be set apart for their reception, and this proving insufficient, special hospitals were extemporised or founded to meet the ever recurring visitations. These again with the enormous growth of the population have been found utterly unable to cope with the demands

* We have, however, no record of patients suffering from the plague having been admitted into the only two hospitals then existing; in fact, in an old regulation of St. Thomas's, the admission of plague patients is strictly prohibited.

made upon them, and the medical treatment of the sick poor, which the christian charity of a previous age regarded as a sacred trust, has for the most part been consigned to the control and support of the legislature. With the provisions made in all large towns for the isolation of contagious diseases, there are now no adequate reasons why persons suffering from the same should claim admission to the general hospitals, seeing that they simply multiply the risks inseparable from the practice of these establishments. But even in the best ordered hospitals, it is not always easy to prevent occasional incursions of contagious disease among patients admitted for totally different affections, especially when such distempers assume the epidemic form and are imported from without. In such cases the origin of the infection is usually traced to personal communication of patients with their friends or relatives. The evil was so manifest in London during the epidemic of small pox in 1872, that all the general hospitals, without any preconcerted arrangements, felt it necessary to suspend the usual privileges of allowing patients to be visited by their friends, and the salutary effect of this rule at Guy's and Bartholomew's, and no doubt at other hospitals, was soon apparent. In Howard's time greater license was permitted to the hospital inmate, for besides the privilege of receiving his friends at any hour of the day, he was permitted to visit them at their own homes. The abuses arising in consequence are commented on by the philanthropist, and like most evils connected with the internal government of hospitals, were remedied in time by virtue of their own incongruity.

We have also to consider another class of infectious disorders which, in modern times, have been viewed as the opprobria of hospitals, but which, if subjected to the same summary proceedings as have been recommended in the case of the contagious fevers, the hospital would be robbed of half its usefulness. These are the distempers generated within or it may be imported into the hospital itself, so well known to interfere seriously with the satisfactory progress of surgical complaints, and to contribute to the mortality of such as have undergone important operations, or who may have sustained severe wounds of the surface of the body. It is not very clear how these diseases originate, or by what medium they retain their morbific influence. Viewing them in their worst light, they may be inherent in a building, contaminating its structural elements, but more often they are attributed to a septic atmosphere engendered by the retention or succession of a large number of persons suffering from open wounds. The affections referred to are erysipelatous inflammation as distinguished from the idiopathic forms of the disease, gangrene in its widest sense of unhealthy action in wounds, and pyæmia or blood poisoning, which is

assuredly the most formidable of the three. It is a peculiarity of these occurrences that they may express themselves either singly or in combination, that one or other may arise spontaneously or may be spread by infection, and that they are greatly influenced by atmospheric changes. It is not disputed that they take place in the field of private practice; indeed, we have the highest authority in support of the opinion that the most disastrous form of blood poisoning is equally to be met with outside as within the walls of hospitals, but from the mass of evidence adduced, it is impossible to avoid the conclusion, that in spite of numerous precautions they periodically appear in their most aggravated shape amongst hospital patients. Nearly every hospital in the country has its experience of the ravages of septicæmic disease, and it is well known that surgeons from time to time desist from performing the most trivial operations lest they should encounter this fatal complication. The remedies which have been employed periodically for rooting out the infection well illustrate the prevalent impression, that the disease is to a great extent inherent in the structural elements of a building. Inner walls have been renewed, floors relaid, non-absorbent materials have been substituted for the more porous kind, and, in some instances, entire demolition of the hospital has been the only remedy which was thought worthy of serious recommendation.* It is doubtful whether such arbitrary proceedings as those last referred to admit of justification. If a hospital from its architectural peculiarities be ill-contrived for the treatment of the sick, there is a strong reason why it should be rendered useful for the purpose by structural alterations, and if this be impracticable, to raze it to the ground, but it is scarcely possible to realise such an alternative. It may have been gathered from some previous observations, that in all asylums for the sick we must be prepared to anticipate some almost necessary evils. To permit patients suffering in common to occupy adjacent beds, and to breathe the same atmosphere, is a condition necessarily associated with every establishment for the maintenance of the sick, the evils arising from which can only be grappled with successfully by measures which, on a large scale, it would be practically impossible to carry out. These would naturally consist in a process of individual isolation, the stamping-out, so to speak, of every malady from which there was cause to apprehend infective tendencies, and by providing for its special service a separate apartment, attendants, utensils, and other surroundings. The isolation of one or other of the more hazardous operation cases, as habitually practised at the larger hospitals, testifies to the expediency of the separate system, and is a tacit admission of expected benefit on the part of those

* As at the Lincoln and Norwich hospitals.

who are perhaps least willing to admit the septic tendencies of aggregation. In lying-in hospitals we have an infectious disease, supposed by many to be generically the same as that met with in general hospitals, and which has been the cause of the mortality conspicuous in these establishments. The same principle operating in private life compels the accoucheur to abandon his practice until relieved of the consciousness that he is no longer the instrument of conveying death to others; but in general hospitals the alternatives at our command must necessarily be limited to the speedy removal of the affected from proximity to those not similarly attacked. In most large hospitals provision is now made for the separate treatment of patients suffering from traumatic erysipelas and phagedena in special wards, apart as much as possible from the others, with separate attendants, into which are drafted such as have contracted the disease in the hospital, as well as those who have been attacked with it at their own homes. It is a noteworthy fact in connection with the experience of Guy's Hospital, and it will probably be found to be the same elsewhere, that the number of patients annually received into these wards with infected wounds, directly from the outside, is considerably in excess of those taken from the surgical wards, who may be presumed to have contracted the disease inside the hospital. Though a serious obstacle to recovery, the mortality among patients suffering from the affections specially referred to is scarcely appreciable, nor have we any reason to believe that they are of a more fatal character at the present day than was the case in the past. On the other hand, the fatality accompanying the pyæmic condition has been brought into greater prominence in modern times on account of the progress of pathology and sanitary science, but it is very doubtful whether, as a cause of death-complication in disease, accident, or operation, it is more frequently met with in proportion to the numbers otherwise liable to contract it, now than formerly. If judged correlatively by the experience of lying-in hospitals, there might be some reason to fear that the danger had not reached its acme; but, apart from the doubtful identity of pyæmia with puerperal fever, the preventive measures, which an improved knowledge of the baneful results attending these diseases require, can be more hopefully carried out in the general than in the special hospital. The death register of Guy's Hospital for the twenty-two years 1854-76, contains entries of 436 cases of pyæmia which have occurred during the interval, 171 of which have supervened on surgical operation, while the remaining 265 have followed from injury or disease from which, in many cases, the patients had been suffering prior to their admission. Although the annual percentage of cases has been greater during the latter half than in the former half of the period, the increase

may be satisfactorily accounted for by a corresponding addition to the number of surgical operations, and especially by the accession of a larger number of patients suffering from septic symptoms on admission. Facts of a similar character may be adduced from the returns of other hospitals of approximate size, though, in the absence of unanimity with regard to the pathognomonic characters of the malady in question, the numerical relations are liable to vary with the conceptions of different observers. So far as our knowledge goes, the disease does not seem to have been recognised as the cause of mortality in hospitals till near the middle of the present century, when attention was specially drawn to its frequent occurrence in the Parisian hospitals.* Still it is clear from the numerous observations of the older writers, that a suppurative fever, to which various names were attached, was frequently met with in camps and hospitals after gunshot wounds and other accidents as well as operations, and was the cause of much mortality. In our own day, it is customary to associate old hospitals and those of faulty construction with periodical outbreaks of septic disease, but the data we possess on the subject show, that the mephitic influence is by no means confined to them. Mr. Erichsen, who has paid much attention to the subject, states that hospitals built prior to the pre-sanitary age, that is before 1840 or thereabouts, are peculiarly liable to it, especially on the upper floors, to which, assuming the volatility of the poison it has a tendency to rise. Mr. Cadge, of Norwich, who has long held the office of surgeon to the hospital of that town, asserts that within the last six or eight years, notwithstanding numerous sanitary precautions which previously appeared to secure the patients from attack, the disease had been increasing in virulence from the greater strain on the hospital resources, caused by the necessities of a working population which had increased out of all proportion to the accommodation. Similar experience to that of Norwich might be obtained from the history of other establishments in analogous circumstances; but on the other hand, we have the testimony of the officers of St. George's and St. Thomas's Hospitals, that the disease is not unknown in the airy establishment erected for sanitary purposes in connection with the first at Wimbledon, while in the palatial institution belonging to the latter on the Thames Embankment, pyæmia is as frequently met with as it was in the old buildings in Southwark. Taking every circumstance into consideration, there is no substantial ground for believing that an old hospital, provided its arrangements with regard to individual space, freedom of ventilation, drainage, and water supply are satisfactory, is more likely to develop and spread hospital disease than

* Sedillot, "De l'Infection Purulente," 1849.

those of more recent construction, and that the recurrence of these distempers depends, like the mortality of the hospital itself, on the severity of the surgical diseases admitted to its wards.

In commenting on past and present mortality, it is but fair that some reference should be made to the beneficial influence which an improved knowledge of the resources of medicine might be expected to exert on the results of treatment. A casual glance at the tables representing an increasing death-rate in the hospitals is not calculated to produce an impression favourable to the influence of therapeutics, nor will a closer acquaintance with the subject render it more commendable. There is no experience more painfully evident in hospital narrative than the absence of guiding principles in therapeutics, and when we come to examine the multifarious remedies which formerly were vaunted as specifics, and which have been replaced by others that in the course of another generation will be classed among the fashionable follies of the day, it is impossible to avoid the conclusion that physic, *per se*, is powerless as an agent in prolonging life, or in grappling successfully with the ordinary fatal ailments of humanity. But, in spite of, and parallel with this uncertainty, there has been an educational influence at work in the hospitals, throwing new light on the various departments of scientific medicine, the effects of which are less visible in the hospital itself than in the vastly improved condition of the public health in every district of the country. It may appear sophistical, but it is not the less true, that the high mortality referred to is partly due to the better knowledge we possess of diseased conditions, and consequently of the requirements of the most needy, but, at the same time, unless some controlling power restrained its exercise, the consequences would be disastrous to the main objects which the hospital is required to fulfil. This agent can only be found in the educational department. It is clear that, where hospitals are incorporated with medical schools, they must be provided with all essentials to enable them to convey to the student a clinical knowledge of every department of his profession, and it would be unreasonable to expect that such could be accomplished in a hospital mainly devoted to the worst aspects of disease. The enormous growth of special hospitals of late years, chiefly in the metropolis, although originating as much from motives of personal aggrandisement as from public philanthropy, proves the necessity of having every branch of medicine and surgery taught in the general hospitals. It is possible that the lighter ailments which, as a rule, are treated in the former, may have had some slight effect in appropriating from the latter a certain proportion of their milder cases, but the influence on the general hospital mortality from this cause would be barely appre-

ciable. It is also, I think, evident from the facts narrated, that notwithstanding the tutorial requirements of the great hospitals, there has been latterly a disposition to increase the medical at the expense of the surgical departments, and to eliminate from both a class of patients whose long residence would interfere with a rapid succession of more critical diseases. The division of labour so necessary for the promotion and organisation of the scholastic department must, however, be maintained if it is desired to keep abreast of the requirements of the time, and from this cause, if from no other, it is barely possible that the death-rate in the future will much exceed that which has been experienced during the last few years. So long as voluntary effort on the part of the community was able to cope with the requirements of the sick poor, there was much less occasion for the medical than for the surgical accommodation, but with the great increase of population during the present century, the medical beds in hospitals have become universally utilised, while in London, and other large towns, large numbers suffering mainly from chronic medical ailments have found a permanent refuge in the sick wards of the workhouses. These, besides being generally overcrowded, were unfitted in many other respects for the reception of patients, and measures, it is well known, have been taken by the Local Government Board during the last ten years to grapple with the increasing evil by the erection of hospitals apart altogether from the workhouses. In London, where the want was most felt, commodious buildings have been opened by the instrumentality of a board appointed jointly by the ratepayers and the Government, into which are received a class of patients differing but little from those ordinarily taken in to the general hospitals. These asylums have been planned on the most approved models of the day, and possess numerous advantages in a domestic point of view over the endowed and subscription hospitals; but, judging from their high standard of mortality, we can readily understand the exceptional position they occupy when contrasted with the tutorial establishments. As an illustration I will take the returns of the Poplar and Stepney sick asylums, as furnished me by Dr. Goldie, the medical superintendent. The hospital was opened in 1871 :—

	Number of Cases.	Number of Deaths.	Mortality per Cent.
1871	903	97	10·7
'72	2,501	292	11·6
'73	2,426	403	16·6
'74	2,320	396	17·0
'75	2,121	413	19·4
'76	1,694	409	23·5

The mean residence of the patients in this asylum is sixty days, and the beds are pretty equally divided among men and women. No distinction is made in the wards betwixt medical and surgical cases, but by far the largest number are of the former character, and to this circumstance we are bound to attribute the excessive mortality. From the fact of the asylum being placed in the east end of London, and in a district which has special claims on the London Hospital, it may be assumed to modify to some extent the death-rate of that institution. Looking at the mortality of the London Hospital for the years prior to and following the opening of the asylum, there seems some foundation for the supposition, and it is very possible that the relief afforded thereby has acted as a continuous check on the increasing mortality of that establishment.

Apart from the urgent requirements of the sick, the influences of teaching and the organisation of special hospitals, there is no department of this subject which brings into greater relief the contrast betwixt the past and present history of hospitals, as that which relates to the measures which have been taken from time to time to improve their sanitary condition. It is needless to recapitulate the defects so frequently complained of as characteristic of numerous hospitals of a past age. We can see now that it was mainly when exceptional circumstances occurred through epidemic outbreaks and rapid increase of a poor population that occasional overcrowding occurred, and that the result was an increased rate of mortality. The first step which prudence would suggest as a remedy would consist not only in a limitation of the numbers usually received into the hospital, but in the provision by which every patient should possess an adequate amount of space that could not be encroached upon under any circumstances. Of equal importance to individual cubic space came the question of ventilation, or how the air in a given area should undergo continuous changes from the outside atmosphere in a manner not incompatible with the comfort and well-being of the patient. When these points were conceded, next came the problem, how they could best be carried out in the old hospitals as well as in those more recently built. It was a comparatively easy matter to determine the first, but the second, which was necessarily incorporated with it, has been a fruitful source of trouble and anxiety to every one experienced in hospital hygiene. A reference to the numerous plans of hospitals figured and described in the Sixth Report of the Medical Officer of the Privy Council, will explain how the difficulties which encompass the subject depend more on the original construction of the buildings used for the sick than from any other defined cause. It has been found, and more frequently is it the case in small hospitals, constructed very possibly for other pur-

poses, and on a plan not dissimilar to ordinary dwelling houses, that the transit of air in the inhabited apartment is seriously impeded, if not rendered nugatory, by faults of window construction, especially when these are limited to one aspect. In addition to restrictions on a free supply of air, it has been also shown that prior to the middle of the present century less attention was paid to the trapping of waste water and soil pipes, the flushing of drains, to cleanliness, and in fact to all questions of sanitary importance than is now thought necessary, and instances can be adduced from the experience of nearly every hospital, testifying to outbreaks of septic maladies from one or other of these causes. The whole subject of hospital hygiène engaged so much attention in connection with the faulty accommodation for our sick and wounded soldiers, that a Government Commission was appointed in 1857 to consider its entire bearings, and the result was a report containing numerous recommendations in favour of establishing that principle in hospital construction by which the atmosphere could get ready access to the wards from all available points of the compass.* The recommendations were supported by high authority, and since the period in question there has been a general disposition in the construction of all new hospitals of any size, to follow the plans approved by the commission. These consisted in the formation of a series of oblong blocks placed at right angles to a corridor communicating with each block, the best examples of which are to be seen in the Herbert Hospital on Woolwich Common, and in the new St. Thomas's Hospital. The wards of these and numerous other buildings constructed on similar principles, are liberally supplied with windows on both sides, as well as at the ends opposite the doorways; and the beds, alternating with the windows, are always limited to two rows within the outside walls. To the arrangement thus indicated, and which had been borrowed from France and Belgium, the term pavilion has been applied, and while little exception can be taken to it on sanitary grounds, there is some reason to fear from the avidity with which it has been taken up by local as well as by governmental authorities, that it runs a risk of being over estimated, at the expense of other and possibly better arrangements. The fact that the principle sprung from the wants of the army medical service with its cumbrous administrative machinery, and for a class of patients whose diseases were altogether different in the bulk from those met with in civil hospitals, had, no doubt, a main share in giving the system a preference to others, in which the facilities for always obtaining fresh currents of air were less. These currents, though harmless and even salutary, are not always

* Report of the Commissioners for improving the Sanitary Condition of Barracks and Hospitals, 1863.

agreeable even to persons in fair health, and they are known to be positively hurtful to patients suffering from chest and nervous diseases, and in truth, to the great bulk of what we are accustomed to call medical cases. On the other hand, the artificial heat which in public hospitals is often found necessary to supplement or to take the place of the ordinary fire-place, is frequently injurious to surgical patients, and, though it may be necessary under certain circumstances, systems of warming are extremely difficult of application in buildings constructed on the pavilion principle. It seems now almost essential that in every public hospital both objects should be fulfilled, and this cannot be accomplished by a rigid adherence to one undeviating principle. In the one case the aim is to obtain freedom of air by a judicious arrangement of windows, so that they may be opened partially or wholly without direct drafts on the beds, and the other, to secure it by the same means, plus one or other of the appliances which modern ingenuity has suggested to render it more agreeable to the patients. In our capricious climate, and especially in cold weather, the very best measures yet introduced to supplement the common fire-place have been found to be comparative failures, and the bulk of the inventions intended for the admission and extraction of vitiated air are, in their action, extremely unsatisfactory. Indeed, in many cases they have been found to be positively injurious, from the fact of the flues, channels, and valves through which either fresh or foul air are conducted, becoming harbours for dust, dirt, or noxious emanations, which it is usually impossible to eradicate, on account of their narrow and tortuous courses. The truth is that the problem for obtaining an agreeable and equable temperature in all weathers, though it may appear a comparatively simple one to the engineer and architect, is really most complex when applied to the practical requirements of a sick ward. The cause of this is simple enough, for apart from the novel fact of the patients having to occupy the same apartment day and night, the incoming air is always liable to be over- or under-heated, deprived of its moisture or contaminated with impurities derived from underground communications or from other channels through which it may have to pass. To mitigate the latter evil, recent experience gives a preference to the direct admission of the external atmosphere to the wards by grated openings in the outside walls, whence it passes over steam or hot water pipes placed in immediate apposition, and probably this principle, as auxiliary to the fire-place, is the best that can be adopted. Then the question of the escape of the vitiated air is another which has equally perplexed the ingenuity of scientific men, especially where, as in numerous special hospitals, the free opening of windows is impracticable. It would be foreign to the subject of this essay to

recapitulate the numerous contrivances having in view this object, but we know from experience that the natural temperature of respired—which must also be vitiated—air will cause it to ascend, and that its ascension may be hastened by any process of rarefaction or extraction applied to aid it. Hence in many new and in some old hospitals, it is common to meet with openings in the ceilings communicating either directly with the chimney flues or with chambers made purposely surrounding them, through which, it is generally hoped, currents may be established upwards through the roof. This simple process of aspiration is far less costly and less liable to untoward results than the most elaborate plans employed in some English and in numerous foreign hospitals; but neither are altogether satisfactory, and preference is now usually given, and with reason, to the old empirical process of carrying windows to within a few inches of the ceiling, by which means they serve the double purpose of admitting fresh air at a high level or of emitting foul air which may have risen to the same stratum. It is obvious that in matters of engineering skill we certainly have the advantage of our forefathers, though in hospital mortality we are not in a position to point out better results. It is but reasonable, however, to infer, from the attention which has been universally paid for many years to the twin subjects of warming and ventilation, and to the stringent regulations in force with regard to them in all public hospitals, that a more comfortable and healthy condition of atmosphere is ensured, and one which is better adapted in every way for the successful treatment of disease.

Apart from the means, natural or mechanical, employed to secure a sufficient supply of air for hospital purposes, it is relevant to the subject here to refer to recent attempts which have been made to deprive the hospital atmosphere, by chemical means, of those subtle and deleterious organisms which rightly or wrongly are assumed to have a powerful influence in spreading infection. The subject is naturally involved in considerable mystery, but it contains so much of real value in connection with preventive medicine, and has hitherto been so successful in its results, that there can be no doubt of its being prosecuted with advantage further. The oxidising and purifying properties of numerous earthy salts and mineral sulphates had been long known and in use in hospitals before the more ambitious title of disinfectants came into general use. Their employment was encouraged as much for the destruction of foul smells as for any occult virtue they were supposed to possess in destroying infection; but as the knowledge of the properties of numerous antiseptic agents advanced, greater facilities were given to their employment, which is now strenuously enforced in hospitals, and

indeed in all public places where there is reason to apprehend danger from noxious exhalations. The hopelessness of attempting to disinfect an inhabited apartment, unless indeed the atmosphere in it is made irrespirable, is a condition usually recognised, and has received confirmation from recent experiments, but apart from such desideratum, there are plenty of ways in which disinfectants may be and are advantageously employed in hospital practice. In the washing of foul and contaminated linen, in the rinsing of bedpans and chamber utensils, and of all vessels in constant use by patients suffering from typhoid and analogous distempers, even in vigilantly attending to their uses, the *employés* are kept alive to the risks which continually beset them in the course of their duties. The results of their ordinary employment on the hospital health must, however, be of an entirely negative character. But there is another aspect of the question, which gives reason to hope that the influence of antiseptics may be more satisfactorily determined. A conviction that the atmospheric impurities which interfered with the healthy action of wounds and induced the nosocomial distempers previously referred to was due to organised germs or ferments, led an eminent surgeon to originate a plan of treatment by which wounds undergoing the reparatory process should on no account be brought into immediate contact with the air until the latter was thoroughly washed and deprived of every noxious element.* This system of dressing wounds, to which the term antiseptic is applied, involves a large amount of care, patience, and personal attention on the part of the manipulator, and the increased cost of the material employed is an objection which may possibly weigh against it in the minds of hospital committees. For all that, the antiseptic process has been gaining ground, both in this country and abroad, as exceptionally well adapted for hospital purposes. Mr. Lister claims from its sedulous employment the almost complete, if not entire, banishment of gangrene and pyæmia from his hospital wards, and similar experience of its utility may be had from numerous establishments where the system has been judiciously practised. In several of the surgical wards of Guy's Hospital, erysipelas attacking wounds which have been diligently protected by this method is now unknown, and cases of pyæmia after surgical operation are very rare. In the last report of the Seamen's Hospital it is stated on official authority that the deaths from pyæmia have diminished to less than half of what they were prior to the introduction of antiseptic dressings, "notwithstanding the presence of numerous "foul ulcers and open wounds." Similar experience could be obtained from other sources showing that in the topical application of

* "The Lancet," September, 1867. "Transactions of Royal Society, Edinburgh," 1875, Professor Lister.

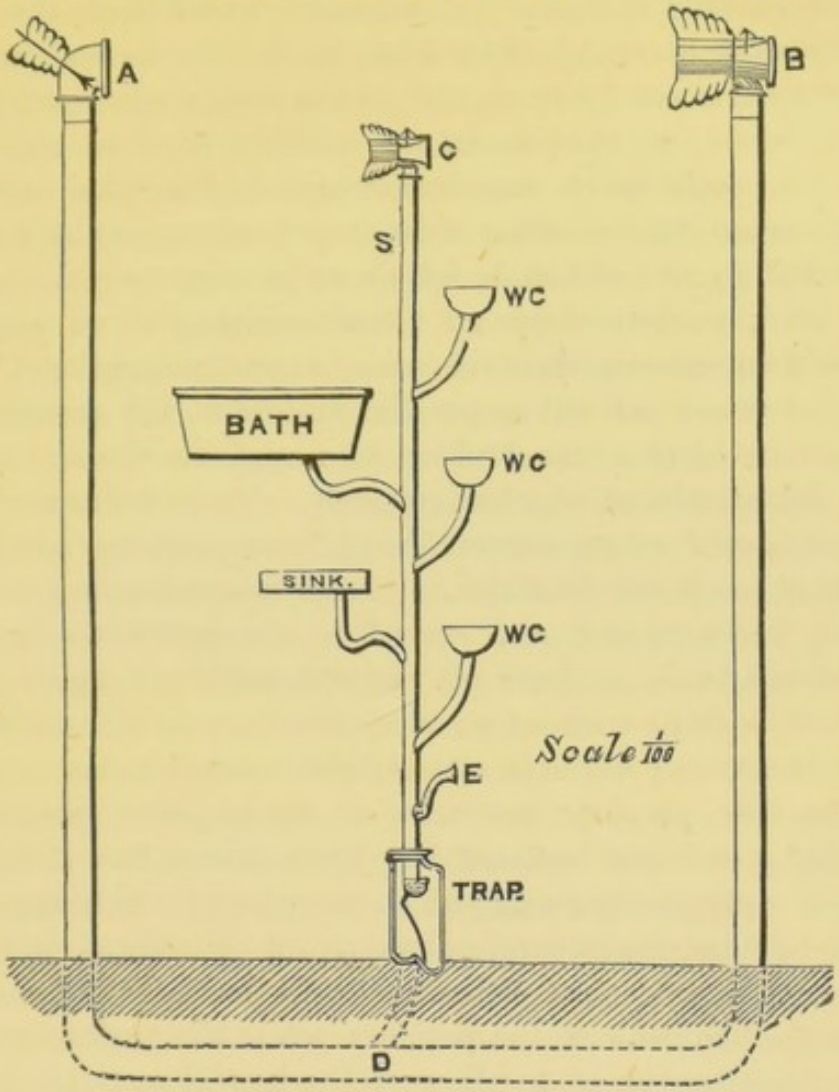
antiseptics we have the means which, if industriously employed, will go far to mitigate the prevalence of nosocomial distempers, and may possibly, when our knowledge of the subject is more matured, and less cumbrous arrangements take the place of those now in use, assist in solving the problem, how to render the hospital atmosphere as healthy as that which exists outside.

In connection with the past and present measures employed to aid in the hygiène of hospitals, or in other words, to reduce their mortality, we have still to consider several important departments to which much attention has been paid in recent years. These comprise the arrangements for drainage, and for dieting and nursing the sick, to which we may add cleanliness, although it may follow as a corollary to the others. There is little doubt, that the introduction during the last half of the eighteenth century of water-closets into private dwellings and public institutions, though an immense advance as regards cleanliness and comfort on the old system of open latrines, has at the same time given rise to some of the greatest difficulties with which the modern hospital has to contend. These owe their origin to the escape of sewer gases from drains and cesspools in immediate communication with, or in rooms adjoining the wards, where they are proved to be detrimental alike to the sick and the healthy. In all the old hospitals, and indeed in the majority of those built during the present century, the main sewer, as well as the numerous minor conduits into which the waste water as well as the sewage of the hospital are allowed to fall, were made to pass underneath the structure itself. Formerly, and until a comparatively recent period, these were made of brickwork, and in course of time became subject to leakage, less perhaps from natural decay, than from accumulated obstructions, aided by the incessant incursions of rats. The neighbouring ground becoming in consequence saturated with sewage, the effluvia from the same insidiously escaped from the basement, and was soon discerned in passages and staircases, and has often been found to permeate the sleeping apartments. The remedy in such cases would appear to be simple enough, but in the vast majority of instances, it is seriously compromised by the ignorance which prevails as to the position and curves of the drains, of which it is usually impossible to discover any accurate plans. But a more frequent cause of evil from sewage gas arose, as in fact it does still, from the faulty trapping of soil and waste water pipes either underground, or in proximate communication with the habitable parts of the building. The first objection has been remedied in most of the old hospitals by the substitution of glazed earthenware pipes for the brick or barrel drains, placed, where possible, outside the walls, and at such a gradient as to ensure a rapid current, while the latter has been found much more

difficult to deal with. The various sanitary appliances introduced for preventing the reflux of foul air through soil pipes and other direct channels of communication, have been attended with more or less success, but it is universally felt that in certain meteorological conditions the traps and valves in common use are not proof against the subtle invasion of the noxious element. In the best devised valve closet now in general use in hospitals and government buildings, the inventor (Jennings) has thought fit to supplement the ordinary action by an apparatus by which a small portion of antiseptic fluid may be thrown into the basin each time it is used, in order to avoid the danger referred to; but it is clear that mechanical devices of this nature involve constant supervision, and are out of place in an hospital. The remedy lies in an efficient ventilation of the soil as well as of the drain pipes, and until such is effected we have no absolute security against the reflux of sewer gas. An approach to this desideratum has been made both in private houses and in public institutions, by permitting the escape of pent up sewer gas in soil pipes through a half-inch tube, in immediate connection with the soil pipe, and having its open extremity communicating with the external atmosphere high above the roof. A more perfect system than this to include drains and sewers alike, has been carried out in one of the ancient quadrangles of Guy's Hospital, which gives reason to hope that the difficulties so frequently referred to may be satisfactorily overcome. This method, which is best known by the name of the inventor, Mr. Banner, has been frequently discussed in the art and science journals, and consists essentially in the establishment of a continuous atmospheric current through the soil pipe, independent of another through the drain. In the former case this is effected by a short inlet pipe communicating directly with the fresh air near its base, while its upper extremity extending above the roof is surmounted with a foul-air withdrawing cowl; and in the case of the drain or sewer, if its course is in immediate contiguity with the building, a current throughout its entire length may be established by vertical shafts on the old plenum and vacuum principle recommended by Reid and Peclet. How this has been effected at Guy's Hospital may be judged of from the accompanying sketch, which is intended to show how each soil pipe has been dealt with, as well as the accompanying drain, which in this instance runs parallel with the side of the hospital with an incline from each extremity.

No exception has been taken to the new arrangements, which appear to act well in all weathers, in foggy days as well as in high winds, when sewers and soil pipes are most liable to be filled with sewer gases. The system also does away with what has hitherto been a necessity, namely syphon traps and elaborate machinery in

connection with waste water and cistern supply as well as with the closets themselves. It is very likely that in the pre-sanitary



A—Inlet to admission air shaft to drain.
B—Outlet to extraction shaft from drain.
D—Drain.
C—Outlet for air from soil pipe.
E—Inlet for fresh air to soil pipe.
S—Soil pipe.

age, when the effects of sewer gases were less understood, the true causes of occasional outbreaks of numerous local distempers among hospital patients may have escaped detection, but we are now more accustomed to attribute unhealthy conditions to this source than to any other. There is every reason to presume that we are right in doing so, and there cannot be a doubt about the necessity of using every precaution in our power to avert them.

Almost equal in importance to a continuous supply of fresh air is the question of dieting the sick. This subject did not form so conspicuous a part in the administrative rule of the old hospitals as it does at the present day. It was scarcely to be expected at a time when all manner of acute diseases demanded a starving regimen, that much attention could be paid to varieties in the diet roll, but during the last thirty or forty years a well-arranged

dietary has been regarded by the physician as perhaps the chief instrument wherewith he can cope successfully with curable or palliate incurable disease. It scarcely admits of doubt that the greater attention which has been paid to this subject, to the building up of wasted tissue, and to the special alimentary requirements of diseases, the characters of which were not formerly understood, must have exercised very considerable influence in diminishing mortality. That some important regulations regarding diet existed in the oldest hospitals at a very early date, we have already seen, as time advanced alterations and more variety were introduced to accommodate the scale to the changing customs of the nation, but it was not till nearly the middle of the present century that special attention was devoted to numerous minor though important details of dieting arrangements. These comprised not only suitable scales for patients suffering from various conditions of disease, but extended, to allow of variety to the manner, in which the food was prepared and served to the patients. In the best arranged hospitals, instead of the old-fashioned daily supply of boiled beef, with or without potatoes, we have the meat roasted and boiled alternately; while in critical and special cases, which generally form from 20 to 30 per cent. of the inmates, various articles to which by common consent the term extras has been applied, have been universally employed to tempt the sickly appetite. In addition to these the general introduction of aërated waters, fresh vegetables, tea, cocoa, and coffee in the diet scale, have done much to promote the comfort of the patients, while the various methods of concentrating food so as to allow of the largest amount of nourishment in the smallest possible bulk, are continually receiving fresh impulses. The principle of supporting nature in her efforts to ward off disease as well as in assisting the vital powers to surmount attacks by means of a well-arranged dietary, is one which is now universally acknowledged, and its influence has been felt more strikingly in the case of hospital patients than among any other class of the community.

In contrasting the present with the past history of hospitals, there is no department which has been so fruitful of commendation as that which relates to the improved condition of those charged with the more immediate care of the sick. It is well known that a considerable advance has been made in nearly all hospitals in this branch of the service, but it is doubtful whether in the discussion of the question we have not been too apt to lose sight of the inglorious labours of the workwomen of the past. That deaths may have occurred in hospitals from carelessness, apathy, or ignorance on the part of the nurse is beyond question, that they have arisen from neglect, foolhardiness, or officious

meddling on the part of the medical superior is equally probable, but considering the dependent position of the former, her failures were less to be reprobated than the shortcomings of those to whose administrative authority the interests of each separate establishment were relegated. If nursing is to usurp or to be allowed a licence at all in keeping with the responsibility which is often sought to be associated with it, no amount of intelligence, training, and technical instruction, can be considered too great for the guidance of those entrusted with the work, and human nature in the end must be the gainer. But if, on the other hand, it is simply employed as a subordinate means of carrying out the directions of a medical superior, there is barely room for the display of critical knowledge, and it is this condition of the art which has met with most favour of late years in public hospitals as well as in private life. The supply of female labour in this country has always harmonised with the demand for it, and there has been no lack of obtaining nurses of respectability for hospital purposes, provided inducements equal to those offered in other spheres of life are held out to them. The improved conditions of the present day consist in the vastly reduced amount of work expected from the nurse, in her domestic position being rendered more comfortable and remunerative; and to ensure her being fitted for her duties she has to undergo a period of probation and training more or less protracted. These changes have been effected in hospitals contemporaneous with a general improvement in the demand for female labour, especially in the department from which all authorities agree the best class of nurse is derived, that of domestic service. It was no doubt from the same source that the female hospital staff were formerly recruited, but "Omnia mutantur nihil interit." The truth is we have learnt so much to depreciate the efforts of our progenitors in these and kindred matters, that we are disposed to forget that modern knowledge is simply the outcome of previous experience, and that the social habits of the people become incorporated with each epoch of hospital history. Much benefit, however, may be expected to accrue from the application of this knowledge to the immediate wants of the sick, especially as regards the efficiency of those to whose domestic care they are entrusted, and though experience shows that what is termed high class nursing is necessarily associated with greatly increased cost, yet the advantages are held to be reciprocal, and the public, who may be supposed to be the best judges of what concerns their interest, have unanimously endorsed the principle.

If doubts have been expressed regarding the efficacy of some modern means employed for the improvement of the hospital health, it is impossible that any one can take exception to the important

domestic virtue of cleanliness, whether in its personal application to the patients, or embracing in its wider sense their numerous surroundings. Vigilant attention to this subject is unquestionably of modern growth, notwithstanding the numerous references made to the necessity for it by Howard and other writers in their time. It involved a principle which was slow to take root, because its opposite extreme was closely interwoven with the habits of both patients and attendants, and it was long before the fact was universally recognised that unless cleanliness was enforced in every department, the best constructed hospitals might readily become pest houses, and the best medical and surgical skill comparatively useless. It has been remarked by a great authority, that a hospital is an establishment "which never rests from fouling itself, nor are there any "products of its foulness which ought not to be regarded as "poisonous."* The principle of cleanliness cannot be too strongly inculcated as among the most essential elements of hospital success, and among the best arranged hospitals of the present day suitable provision is made to secure it by every available means. Lavatories have been introduced for the purposes of daily ablution, and bath-rooms are now pretty generally considered as part of the necessary equipment of every ward, although it is to be feared that they are not so generally utilised as they ought to be. Equal facilities are allowed for renewing bedding and bed-linen, and for the cleansing of ward furniture generally; while the employment of agents of a purifying and disinfecting nature go far to remove the dangers to be apprehended from infection, vermin, or fomites. It is, or ought to be the special province of every ward superior to see that these, together with many other homely details of domestic management, are efficiently carried out, for they form the basis of all hospital hygiène. If vigilantly enforced they cannot fail to mitigate many objections inseparable from a system which, however great its advantages may be to the labouring community, has certain evil influences associated with it tending to mar its usefulness. What are usually supposed to be graver matters may be safely left to the architect, the engineer, and especially to those to whose medical and surgical skill the care of the sick is more immediately entrusted, but their joint efforts will avail little unless they are unceasingly accompanied with a watchful regard for the most scrupulous cleanliness.

* Mr. Simon.

APPENDIX.

I.—*The Main Causes of Death in Guy's Hospital, at Various Intervals during the Last, and beginning of the Present, Centuries.*

Year.	Total Deaths.	Fever.	Small Pox.	Chest Affection.	Dropsies	Injuries.	Mortification.	Syphilis.	Other Causes.
1732	269	24	6	98	47	5	10	11	68
'34	257	24	6	90	55	5	19	6	52
'35	258	14	13	71	58	2	12	10	78
'36	264	30	7	75	48	4	12	11	77
'37	258	52	11	77	41	7	5	13	52
'41	322	83	3	86	44	6	6	9	85
'42	355	71	8	100	56	3	4	12	101
'43	306	54	12	104	37	—	7	18	74
'44	288	41	8	110	52	4	10	13	50
'45	289	61	14	106	34	3	4	5	62
Proportion per cent. to general deaths ...	—	15·9	3·1	31·9	16·6	1·3	3·1	3·8	24·3
1770	223	26	5	53	51	3	21	7	57
'71	247	43	2	58	46	2	36	2	58
'72	233	50	1	59	49	2	26	7	39
'73	233	59	—	45	31	4	34	8	52
'74	184	26	12	57	34	2	19	3	31
'75	234	25	—	80	43	3	16	5	62
'76	209	37	5	60	30	2	20	3	52
'77	222	41	3	83	40	2	15	6	32
'78	225	31	—	66	38	4	16	8	62
'79	250	30	2	80	42	3	24	5	64
Proportion per cent. to general deaths ...	—	16·3	1·3	28·3	17·8	1·2	10·2	2·4	22·5
1800	360	68	—	129	46	11	23	1	82
'01	284	75	—	86	46	8	22	—	47
'02	341	63	—	107	47	20	28	—	76
'03	309	42	—	114	44	19	22	—	68
'04	325	27	—	119	57	21	19	1	81
'05	294	36	—	99	45	13	21	2	78
'06	270	25	1	97	44	8	24	2	69
'07	303	16	—	91	51	17	34	—	94
'08	290	16	—	86	43	16	20	3	106
'09	322	29	—	89	37	24	25	2	116
Proportion per cent. to general deaths ...	—	12·8	—	32·9	14·8	5·1	7·7	0·3	26·4

II.—*The Main Causes of Deaths in Guy's Hospital from* 1854-72.

Years.	Total Deaths.	Fevers.	Nervous System.	Respiratory Organs.	Organs of Circulation.	Organs of Digestion.	Genito-Urinary Organs.	Injuries.	Other Causes.
1854-60 inclusive....	2,978	91	182	813	311	431	367	483	300
Percentage mortality to general deaths.....	—	3·0	6·1	27·3	10·5	14·5	12·3	16·2	10·1
1861.....	458	12	28	143	40	50	55	78	52
'62.....	468	24	36	107	53	52	59	73	45
'63.....	486	11	36	96	58	61	73	100	51
'64.....	480	11	39	108	45	67	62	109	39
'65.....	488	11	26	100	55	64	67	102	63
'66.....	534	11	32	121	81	58	69	97	65
'67.....	509	12	36	131	46	68	73	101	42
'68.....	466	10	23	96	76	59	56	83	63
'69.....	496	13	23	119	74	60	72	76	59
'70.....	498	10	23	88	49	60	87	91	90
'71.....	555	5	27	130	63	67	83	85	95
'72.....	471	6	22	110	66	66	69	66	66
Percentage mortality to general deaths.....	—	2·3	6·0	22·8	11·9	12·4	14·0	18·0	12·6

III.—*Mortality in Guy's Hospital from* 1814 *till* 1876, *distinguishing Medical from Surgical Cases.*

Year.	Medical Cases.			Surgical Cases.			Total.
	Discharged.	Died.	Mortality per Cent.	Discharged.	Died.	Mortality per Cent.	Mortality per Cent.
1814	778	157		1,629	73		
'15	802	187		1,556	85		
'16	745	167		1,664	78		
'17	827	163	17·34	1,662	81	4·75	9·4
'18	781	168		1,522	84		
'19	857	175		1,573	78		
1820	782	162		1,602	93		
'21	857	177		1,666	72		
'22	791	159		1,794	99		
'23	745	176		1,729	84		
'24	—	—	16·87	—	—	6·16	9·9
'25	798	157		1,482	107		
'26	857	173		1,514	124		
'27	834	148		1,658	134		
'28	721	143		1,549	103		
'29	787	161		1,510	136		
1830	901	157		1,396	149		
'31	1,163	207		1,771	138		
'32	1,115	179		1,641	108		
'33	1,204	161		1,621	109		
'34	1,290	175	13·81	1,805	125	6·93	9·8
'35	1,245	203		1,740	118		
'36	1,238	195		1,923	111		
'37	1,307	230		1,750	156		
'38	1,297	191		1,769	118		
'39	1,022	190		1,666	141		
1840	1,352	190		1,977	127		
'41	1,224	199		1,843	136		
'42	1,519	209		1,908	121		
'43	1,529	239		1,990	152		
'44	1,401	236		2,012	158		
'45	1,420	215	13·73	1,933	126	6·50	9·7
'46	1,449	260		1,931	149		
'47	1,521	240		2,139	144		
'48	1,426	246		1,971	129		
'49	1,493	249		1,956	126		

III.—*Mortality in Guy's Hospital from* 1814 *till* 1876, *distinguishing Medical from Surgical Cases—Contd.*

Year.	Medical Cases.			Surgical Cases.			Total Mortality per Cent.
	Discharged.	Died.	Mortality per Cent.	Discharged.	Died.	Mortality per Cent.	
1850	1,712	227		2,160	122		
'51	1,742	282		2,367	135		
'52	1,623	224		1,957	118		
'53	—	—		—	—		
'54	1,809	369		2,300	157		
'55	1,608	248	13·66	2,290	156	5·31	9·1
'56	1,740	271		2,477	133		
'57	1,890	278		2,461	100		
'58	1,819	288		2,479	142		
'59	1,688	288		2,566	128		
1860	1,728	272		2,487	148		
'61	1,834	303		2,585	155		
'62	1,723	292		2,678	176		
'63	1,566	293		2,929	193		
'64	1,652	290		2,870	190		
'65	1,610	297	15·73	3,116	191	5·94	9·9
'66	1,617	355		2,866	179		
'67	1,507	332		2,763	177		
'68	1,539	290		2,776	176		
'69	1,584	332		2,615	164		
1870	1,476	303		2,650	195		
'71	1,632	352		2,825	203		
'72	1,776	308		3,050	163		
'73	1,756	326	16·51	2,738	198	6·56	10·6
'74	1,872	377		2,741	217		
'75	1,902	362		2,823	198		
'76	1,781	385		2,829	208		

IV.—*Number of Patients Annually Discharged and Dead in Guy's Hospital since the Commencement of the Institution in* 1725, *with the Average Percentage Mortality for each Decennium.*

Year.	Total.	Discharged.	Died.	Mortality per Cent.
1725*	—	—	83	
'26	—	—	139	
'27	1,080	923	157	14·4
'28	1,480	1,276	204	
'29	1,846	1,572	274	
1730	1,728	1,514	214	
'31	1,716	1,506	210	
'32	1,737	1,468	269	
'33	1,939	1,683	256	
'34	1,781	1,524	257	13·8
'35	1,889	1,631	258	
'36	2,007	1,743	264	
'37	1,760	1,502	258	
'38	1,798	1,548	250	
'39	1,745	1,468	277	
1740	1,895	1,587	308	
'41	2,203	1,881	322	
'42	2,194	1,839	355	
'43	2,114	1,808	306	
'44	2,002	1,714	288	
'45	1,892	1,603	289	14·8
'46	1,923	1,633	290	
'47	2,135	1,820	315	
'48	2,081	1,802	279	
'49	2,057	1,766	291	
1750	1,980	1,685	295	
'51	1,890	1,639	251	
'52	1,847	1,607	240	
'53	1,948	1,693	255	
'54	1,951	1,693	258	
'55	1,873	1,607	266	12·6
'56	1,936	1,706	230	
'57	1,823	1,603	220	
'58	1,749	1,588	161	
'59	1,841	1,637	204	
1760	1,845	1,672	173	
'61	1,875	1,669	206	
'62	1,907	1,673	234	
'63	1,911	1,698	213	
'64	1,667	1,469	198	
'65	1,881	1,657	224	
1766	1,900	1,692	208	
'67	1,847	1,641	206	11·1
'68	1,858	1,648	210	
'69	1,985	1,771	214	
1770	2,076	1,853	223	
'71	2,155	1,908	247	
'72	2,230	1,997	233	
'73	2,156	1,923	233	
'74	2,194	2,010	184	
'75	2,247	2,013	234	10·2
'76	2,239	2,030	209	
'77	2,350	2,128	222	
'78	2,412	2,187	225	
'79	2,064	1,814	250	
1780	2,405	2,129	276	
'81	2,320	2,077	243	
'82	2,226	1,994	232	
'83	2,141	1,901	240	
'84	2,158	1,938	220	
'85	2,539	2,335	204	10·4
'86	2,152	1,919	233	
'87	1,965	1,717	248	
'88	2,090	1,854	236	
'89	2,469	2,256	213	
1790	2,243	2,021	222	
'91	2,037	1,815	222	
'92	2,166	1,891	275	
'93	2,345	2,047	298	
'94	2,184	1,915	269	
'95	2,376	2,114	262	10·2
'96	2,466	2,209	257	
'97	2,574	2,321	253	
'98	2,702	2,398	304	
'99	2,642	2,328	314	
1800	2,770	2,410	360	
'01	2,653	2,369	284	
'02	2,774	2,433	341	
'03	2,680	2,371	309	
'04	2,482	2,157	325	
'05	2,666	2,372	294	
'06	2,505	2,235	270	

* From the decayed condition of the first registration book, it has been found impossible to calculate the numbers during the first two years of the series.

IV.—*Patients Annually Discharged and Dead in Guy's Hospital—Contd.*

Year.	Total.	Discharged.	Died.	Mortality per Cent.	Year.	Total.	Discharged.	Died.	Mortality per Cent.
1807....	2,856	2,553	303		1840....	3,646	3,329	317	
'08....	2,646	2,356	290	11·6	'41....	3,402	3,067	335	
'09....	2,655	2,313	322		'42....	3,694	3,353	341	
					'43....	3,757	3,427	330	
					'44....	3,911	3,519	392	
					'45....	3,807	3,413	394	9·7
					'46....	3,789	3,380	409	
1810....	2,669	2,384	285		'47....	4,049	3,660	389	
'11....	2,802	2,508	294		'48....	3,772	3,397	375	
'12....	2,636	2,361	275		'49....	3,824	3,449	375	
'13....	2,658	2,368	290						
'14....	2,637	2,407	230						
'15....	2,630	2,358	272	9·9	1850....	4,221	3,872	349	
'16....	2,654	2,409	245		'51....	4,526	4,109	417	
'17....	2,733	2,489	244		'52....	3,876	3,580	342	
'18....	2,555	2,303	252		'53....	3,265	2,961	304	
'19....	2,685	2,430	255		'54*	4,635	4,109	526	
					'55....	4,302	3,898	404	9·1
					'56....	4,621	4,217	404	
					'57....	4,729	4,351	378	
1820....	2,639	2,384	255		'58....	4,728	4,298	430	
'21....	2,772	2,523	249		'59....	4,670	4,254	416	
'22....	2,843	2,585	258						
'23....	2,734	2,474	260						
'24....	2,508	2,261	247		1860....	4,635	4,215	420	
'25....	2,544	2,280	264	9·9	'61....	4,877	4,419	458	
'26....	2,668	2,371	297		'62....	4,869	4,401	468	
'27....	2,774	2,492	282		'63....	4,981	4,495	486	
'28....	2,516	2,270	246		'64....	5,002	4,522	480	
'29....	2,585	2,288	297		'65....	5,214	4,726	488	9·7
					'66....	5,017	4,483	534	
					'67....	4,779	4,270	509	
					'68....	5,078	4,612	466	
1830....	2,603	2,297	306		'69....	4,695	4,199	496	
'31....	3,279	2,934	345						
'32....	3,043	2,756	287						
'33....	3,095	2,825	270		1870....	4,624	4,126	498	
'34*	3,395	3,095	300	9·8	'71....	5,012	4,457	555	
'35....	3,306	2,985	321		'72....	5,297	4,826	471	
'36....	3,470	3,161	309		'73....	5,018	4,494	524	10·6
'37....	3,443	3,057	386		'74....	5,207	4,613	594	
'38....	3,375	3,066	309		'75....	5,285	4,725	560	
'39....	3,019	2,688	331		'76....	5,203	4,610	593	

* New wards opened.

Note.—For Table V see p. 73.

VI.—*Relative Mortality of the Sexes in Guy's Hospital from the Year* 1854 *till* 1876, *distinguishing Medical from Surgical Cases.*

Year.	Mortality among Males.							
	Medical Cases.				Surgical Cases.			
	Dis-charged.	Died.	Mortality.	Total Mortality.	Dis-charged.	Died.	Mortality.	Total Mortality.
1854....	1,007	221	17·9		1,491	118	7·3	
'55....	841	164	16·3		1,430	99	6·5	
'56....	953	184	16·1		1,525	93	5·7	
'57....	1,050	166	13·6	15·78	1,458	65	4·3	5·94
'58....	1,041	168	13·8		1,482	110	6·9	
'59....	923	187	16·8		1,560	80	4·9	
1860....	914	178	16·2		1,475	106	6·7	
'61....	968	189	16·3		1,576	108	6·4	
'62....	915	171	15·2		1,618	115	6·6	
'63....	810	187	18·7		1,835	135	6·8	
'64....	825	180	17·9		1,862	136	6·8	
'65....	827	204	19·7	18·61	2,120	136	6·0	6·57
'66....	832	223	21·3		1,812	136	6·9	
'67....	773	199	20·4		1,790	119	6·2	
'68....	752	191	20·5		1,784	132	6·8	
'69....	816	207	20·0		1,705	113	6·2	
1870....	780	196	20·0		1,706	141	7·6	
'71....	827	214	20·5		1,829	158	7·9	
'72....	845	179	17·4		1,904	119	5·8	
'73....	854	190	18·1	19·66	1,682	137	7·5	7·50
'74....	909	227	19·9		1,662	155	8·5	
'75....	908	234	20·4		1,772	145	7·5	
'76....	858	224	20·6		1,786	146	7·5	

VI.—*Relative Mortality of the Sexes in Guy's Hospital—Contd.*

Year.	Mortality among Females.							
	Medical Cases.				Surgical Cases.			
	Dis-charged.	Died.	Mortality.	Total Mortality.	Dis-charged.	Died.	Mortality.	Total Mortality.
1854....	802	148	15·5		809	39	4·6	
'55....	767	84	9·8		860	57	6·2	
'56....	787	87	9·9		952	40	4·0	
'57....	840	112	11·7	12·11	1,003	35	3·3	4·26
'58....	778	120	13·3		997	32	3·1	
'59....	757	101	11·7		1,014	48	4·5	
1860....	814	94	10·4		1,012	42	4·0	
'61....	866	114	11·6		1,009	47	4·4	
'62....	808	121	13·0		1,060	61	5·4	
'63....	756	106	12·2		1,094	58	5·0	
'64....	827	110	10·7		1,008	54	5·0	
'65....	783	93	10·6	12·46	996	55	5·2	4·83
'66....	785	132	14·3		1,054	43	3·9	
'67....	734	133	15·3		973	58	5·6	
'68....	787	99	11·2		992	44	4·4	
'69....	758	125	14·2		910	51	5·3	
1870....	696	107	18·3		944	54	5·4	
'71....	805	138	14·6		996	45	4·3	
'72....	931	129	12·1		1,146	44	3·7	
'73....	902	136	13·1	12·96	1,056	61	5·4	4·84
'74....	963	150	13·4		1,079	62	5·4	
'75....	994	128	11·4		1,051	53	4·8	
'76....	923	161	14·8		1,043	62	5·6	

VII.—*Patients Discharged and Dead in Guy's Hospital since the Commencement of the Institution to the Present Time, Arranged in Decennial Periods.*

	Discharged.	Died.	Mortality per Cent.
1725 to 1731	5,285	849	13·8
'31 „ '41	15,660	2,607	14·2
'41 „ '51	17,551	3,030	14·7
'51 „ '61	16,445	2,258	12·0
'61 „ '71	16,771	2,136	11·2
'71 „ '81	20,139	2,313	10·3
'81 „ '91	20,012	2,291	10·2
'91 „ 1801	21,448	2,814	11·5
1801 „ '11	23,543	3,023	11·3
'11 „ '21	24,017	2,612	9·8
'21 „ '31	23,841	2,706	10·1
'31 „ '41	29,896	3,175	9·6
'41 „ '51	34,537	3,689	9·6
'51 „ '61	39,992	4,041	9·1
'61 „ '71	44,253	4,883	9·9
'71 „ '77	27,725	3,297	10·6

TABLE V.—*Glasgow Royal Infirmary. Accidents, with Mortality, during Separate Intervals.*

Year.	Cases.	Deaths.	Mortality per Cent.	Year.	Cases.	Deaths.	Mortality per Cent.
1866	958	112		1871	1,057	114	
'67	866	74		'72	1,205	134	
'68	838	74	8·9	'73	1,333	150	11·4
'69	902	79		'74	1,250	149	
'70	1,064	77		'75	1,144	139	

VIII.—*Admissions and Deaths in St. Thomas's Hospital from* 1734 *till* 1790, *with the Death-Rate of each Decade to the Year* 1877.

Year.	Admitted.	Died.	Death-Rate per 100.	Year.	Admitted.	Died.	Death-Rate per 100.
1734.....	2,646	307		1763	3,423	292	
'35.....	3,025	355		'64	3,212	292	
'36.....	2,656	316		'65	3,358	276	
'37.....	2,860	321	11·11	'66	3,101	301	
'38.....	3,027	318		'67	3,357	277	8·88
'39.....	2,747	261		'68	3,352	220	
'40.....	2,593	296		'69	3,369	257	
				'70	2,682	212	
1741.....	3,163	378					
'42.....	2,744	278					
'43.....	2,803	262		1771	3,352	247	
'44.....	2,785	251		'72	3,190	250	
'45.....	2,750	273		'73	3,161	195	
'46.....	2,921	294	9·87	'74	3,276	220	
'47.....	2,778	253		'75	3,236	219	
'48.....	2,723	247		'76	3,175	221	6·71
'49.....	3,033	277		'77	4,461	235	
'50.....	2,721	294		'78	3,171	187	
				'79	3,225	232	
1751.....	2,810	287		'80	3,486	259	
'52.....	3,089	231					
'53.....	2,894	247					
'54.....	3,926	264		1781	4,222	256	
'55.....	3,263	287		'82	3,540	292	
'56.....	3,044	305	8·70	'83	3,258	233	
'57.....	2,990	276		'84	3,190	211	
'58.....	3,151	267		'85	3,436	246	
'59.....	3,040	348		'86	2,926	218	7·12
'60.....	4,000	291		'87	2,977	219	
				'88	3,023	247	
1761.....	3,488	408		'89	3,049	207	
'62.....	3,325	369		'90	2,861	185	

Death-Rate of each Decade—*Contd.*

1791–1800	7·97
1801–10	6·45
'11–20	6·36
'31–40	8·42
'51–60	7·76
'61–70	11·36
'71–76	12·15

IX.—*Relative Mortality of the Sexes in St. Thomas's Hospital during the Past and Present Centuries.*

Year.	Admissions.		Deaths.		Relative Mortality per Cent.		Total Mortality.
	Males.	Females.	Males.	Females.	Males.	Females.	
1786	2,022	904	161	57			
'87	2,007	970	151	68			
'88	2,073	950	174	73	7·54	6·62	7·25
'89	2,092	957	153	54			
'90	1,977	884	128	57			
1791	1,795	1,108	148	73			
'92	1,882	1,098	155	81			
'93	1,979	1,029	162	89			
'94	1,881	953	177	64			
'95	1,845	955	167	64			
'96	1,868	897	158	72	8·45	6·98	7·97
'97	1,904	870	164	49			
'98	1,849	821	142	68			
'99	2,030	824	164	42			
1800	1,928	870	168	56			
1801	2,148	979	157	56			
'02	2,040	950	133	51			
'03	2,003	927	141	55			
'04	1,939	915	131	61			
'05	1,812	910	118	43			
'06	1,906	965	125	54	6·38	5·65	6·45
'07	1,973	971	140	45			
'08	2,045	941	128	63			
'09	1,884	885	135	45			
'10	1,902	905	136	56			
1811	1,919	881	146	48			
'12	1,964	915	121	43			
'13	1,754	932	132	45			
'14	1,981	964	130	45			
'15	1,980	969	134	44			
'16	2,016	968	125	48	6·88	5·31	6·36
'17	2,048	1,041	127	43			
'18	2,141	1,061	158	75			
'19	2,129	950	155	54			
'20	2,107	1,073	151	74			
1831	2,222	1,205	181	79			
'32	2,068	1,161	156	73			
'33	2,103	1,046	213	71			
'34	2,100	958	171	66			
'35	2,324	1,095	201	82			
'36	2,120	1,197	217	81	9·31	6·73	8·42
'37	2,045	1,226	234	69			
'38	2,110	1,189	214	85			
'39	2,208	1,120	174	70			
'40	2,075	1,121	230	86			

IX.—*Relative Mortality of the Sexes in St. Thomas's Hospital—Contd.*

Year.	Admissions.		Deaths.		Relative Mortality per Cent.		Total Mortality.
	Males.	Females.	Males.	Females.	Males.	Females.	
1851	2,436	1,927	137	101			
'52	2,457	1,828	161	90			
'53	2,555	1,817	250	103			
'54	2,651	1,791	261	140			
'55	2,612	1,839	215	126	8·55	6·64	7·76
'56	2,700	1,852	235	134			
'57	2,675	1,837	248	112			
'58	2,492	1,834	211	142			
'59	2,399	1,691	220	130			
'60	2,406	1,546	233	117			
1861	2,426	1,528	241	139			
'62*	1,432	920	157	75			
'63	1,074	777	113	78			
'64	1,125	759	126	114			
'65	1,158	765	115	81	11·14	10·87	11·36
'66	1,165	779	138	85			
'67	995	676	135	70			
'68	1,121	682	118	89			
'69	951	672	116	75			
'70	900	690	117	91			
1871†	1,088	803	136	82			
'72	1,847	1,380	279	127			
'73	1,582	1,432	220	118	14·00	9·83	12·15
'74	1,752	1,425	248	123			
'75	1,679	1,346	254	155			
'76	1,811	1,414	230	162			

* Removed from London Bridge to Surrey Gardens.

† „ to new hospital on Albert Embankment.

X.—*St. Thomas's Hospital. Medical Mortality during the Past Twenty-Six Years.*

	Medical. Males.			Medical. Females.			Total Medical Mortality.
	Discharged.	Died.	Mortality per Cent.	Discharged.	Died.	Mortality per Cent.	
Old Hospital—							
1850	745	113	13·17	947	69	6·79	9·11
'51	757	83	9·88	970	77	7·35	8·47
'52	776	106	12·01	970	67	6·46	9·01
'53	837	161	16·13	937	73	7·22	11·65
'54	1,034	180	14·82	928	104	10·07	12·64
'55	939	139	12·89	920	90	8·91	10·96
'56	1,004	159	13·67	983	86	8·04	10·97
'57	990	169	14·58	887	79	8·17	11·67
'58	883	136	13·34	825	108	11·57	12·50
'59	918	153	14·28	876	100	10·24	12·35
Average	—	—	13·60	—	—	8·44	—
Surrey Gardens							
1860	908	151	14·25	783	81	9·37	12·06
'61	981	175	15·13	761	89	10·47	13·16
'62	617	100	13·94	490	44	8·23	11·51
'63	394	69	14·90	377	48	11·29	13·17
'64	402	65	13·91	337	72	17·60	15·63
'65	374	59	13·62	369	49	11·72	12·69
'66	374	88	19·04	339	50	12·85	16·21
'67	314	81	20·50	301	30	9·06	15·28
'68	300	71	19·13	300	56	15·73	17·46
'69	289	79	21·46	291	36	11·00	16·54
Average	—	—	15·92	—	—	11·32	—
New Hospital—							
1870	274	68	19·88	293	53	15·31	17·58
'71	296	90	23·31	322	50	13·44	18·46
'72	548	167	23·35	642	86	11·81	17·53
'73	462	102	18·08	579	74	11·33	14·46
'74	486	129	20·97	608	62	9·25	14·86
'75	521	155	22·92	629	94	13·00	17·79
'76	555	149	20·20	564	110	16·32	17·00
Average	—	—	21·48	—	—	12·69	—

XI.—*St. Thomas's Hospital. Surgical Mortality during the Past Twenty-Six Years.*

Year.	Surgical. Males.			Surgical. Females.			Total Surgical Mortality.	Total Medical and Surgical Mortality.
	Dis-charged.	Died.	Mortality per Cent.	Dis-charged.	Died.	Mortality per Cent.		
1850.....	1,443	60	3·99	786	28	3·43	3·79	6·44
'51.....	1,521	54	3·42	871	24	2·68	3·15	5·46
'52.....	1,519	56	3·55	778	22	2·75	3·28	5·84
'53.....	1,454	95	6·13	774	24	3·00	5·07	8·10
'54.....	1,378	83	5·68	739	34	4·39	5·23	8·95
'55.....	1,435	86	5·65	769	76	3·27	4·83	7·74
'56.....	1,453	82	5·34	730	42	5·44	5·37	8·12
'57.....	1,438	91	5·95	832	21	2·46	4·70	7·98
'58.....	1,382	75	5·14	868	34	3·76	4·62	8·18
'59.....	1,275	69	5·13	679	28	3·96	4·72	8·54
Average	—	—	4·92	—	—	3·48	—	—
1860.....	1,242	82	6·19	652	36	5·23	5·86	8·89
'61.....	1,191	83	6·51	601	33	5·20	6·07	9·70
'62.....	824	63	7·10	436	25	5·12	6·52	8·92
'63.....	563	44	7·24	321	30	8·54	7·72	10·34
'64.....	600	61	9·22	316	42	11·73	10·10	12·66
'65.....	667	56	7·74	308	32	9·41	8·27	10·24
'66.....	649	51	7·28	359	34	8·65	7·77	11·47
'67.....	557	68	10·88	292	26	8·17	9·96	12·28
'68.....	605	54	8·19	300	26	7·97	8·12	12·09
'69.....	531	48	8·29	304	28	8·43	8·34	11·89
Average	—	—	7·33	—	—	7·42	—	—
1870.....	515	55	9·64	307	32	9·42	9·57	13·02
'71.....	535	50	8·54	318	28	8·09	8·37	12·90
'72.....	1,104	112	9·21	611	41	6·28	8·18	12·26
'73.....	925	114	10·97	717	48	6·27	8·98	11·18
'74.....	997	119	10·66	710	61	7·91	9·53	11·69
'75.....	904	99	9·87	662	61	8·43	9·27	13·08
'76.....	1,026	81	7·31	688	52	7·02	7·20	12·15
Average	—	—	9·49	—	—	7·44	—	—

XII.—*Mortality at Separate Epochs in St. Bartholomew's Hospital.*

Year.	Admissions	Deaths.	Mortality per Cent.	Year.	Admissions.	Deaths.	Mortality per Cent.
1783	3,825	139		1825	4,302	365	
'84	3,579	132		'26	4,420	349	
'85	3,972	182		'27	4,916	259	7·27
'86	3,750	316		'28	4,863	353	
'87	3,836	340	6·30	'29	5,128	317	
'88	4,553	371					
'89	4,303	368					
'90	4,367	318		1830	5,250	363	
				'31	5,275	414	
1791	3,825	284		'32	5,148	379	
'92	3,993	274		'33	5,164	392	
'93	4,285	375		'34	5,267	346	7·74
'94	3,783	321		'35	5,662	366	
'95	4,402	316		'36	5,548	424	
'96	4,206	325	7·97	'37	5,452	572	
'97	3,890	322		'38	5,135	480	
'98	3,878	324		'39	5,038	364	
'99	4,425	370					
1800	4,506	372		1840	5,015	419	
				'41	4,724	324	
1801	4,410	326		'42	4,838	339	
'02	3,895	325		'43	5,372	377	
'03	3,908	339		'44	5,673	361	
'04	4,006	312		'45	5,419	356	7·20
'05	3,700	308		'46	5,841	383	
'06	3,643	286	7·93	'47	5,801	428	
'07	3,958	342		'48	5,826	480	
'08	3,849	279		'49*	5,692	432	
'09	4,033	312					
'10	3,940	292		1860	5,686	623	
				'61	5,602	597	
1811	3,857	277		'62	5,430	605	
'12	4,075	311		'63	5,390	557	
'13	3,909	274		'64	5,556	617	
'14	3,933	288		'65	5,598	567	10·77
'15	3,020	272		'66	5,070	563	
'16	2,675	250	7·76	'67	5,170	548	
'17	2,599	195		'68	5,422	573	
'18	2,751	197		'69	5,124	571	
'19	2,914	245					
'20	4,057	314		1870	5,090	525	
				'71	5,687	556	
1821	3,744	258		'72	5,528	503	
'22	4,347	277		'73	5,339	489	9·91
'23	3,725	269	7·27	'74	5,777	569	
'24	2,810	336		'75	5,548	571	
				'76	5,125	563	

* Exclusive of 477 cases of cholera, which were attended with 102 deaths.

XIII.—*Relative Mortality of the Sexes at Separate Epochs in St. Bartholomew's Hospital, distinguishing the Two Main Subdivisions of Disease.*

Year.	Medical Cases.				Surgical Cases.			
	Males.		Females.		Males.		Females.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1842.....	640	120	680	83	1,769	71	1,749	65
'43.....	907	146	774	88	1,883	77	1,808	66
'44.....	957	141	767	75	2,032	73	1,917	72
'45.....	924	134	791	67	1,912	83	1,792	72
'46.....	1,051	135	916	97	1,951	93	1,923	58
'47.....	1,089	154	919	36	1,915	98	2,328	80
'48.....	1,075	174	944	101	1,882	103	1,925	102
'49.....	1,108	151	954	118	1,833	81	1,797	82
'50.....	989	133	913	94	1,872	80	1,748	71
'51.....	1,038	243	950	107	2,019	113	1,950	81

Note.—Mortality per 100 admissions, medical: males, 15·65; females, 10·0; Surgical: males, 4·57; females, 3·95.

Year.	Medical Cases.				Surgical Cases.			
	Males.		Females.		Males.		Females.	
	Dis-charged.	Died.	Dis-charged.	Died.	Dis-charged.	Died.	Dis-charged.	Died.
1870.....	860	208	980	152	1,266	101	1,131	64
'71.....	932	224	899	143	1,923	127	1,377	62
'72.....	805	197	876	141	1,885	118	1,447	59
'73.....	928	204	871	145	1,775	95	1,276	45
'74.....	935	237	984	150	1,879	120	1,410	60
'75.....	816	239	952	157	1,940	117	1,269	58

Note.—Death-rate per 100 cases treated to a termination, medical: males, 19·87; females, 13·7. Surgical: males, 5·9; females, 4·2.

XIV.—*Medical and Surgical Mortality in St. Bartholomew's Hospital at Separate Epochs.*

Year.	Medical Cases.			Surgical Cases.		
	Admissions.	Died.	Mortality per Cent.	Admissions.	Died.	Mortality per Cent.
1830	1,647	201		3,603	162	
'31	1,623	238		3,652	176	
'32	1,704	246		3,444	133	
'33	1,668	224		3,496	168	
'34	1,667	210		3,600	136	
'35	1,845	240	15·31	3,817	126	4·24
'36	1,818	269		3,730	155	
'37	1,868	413		3,584	159	
'38	1,530	308		3,605	172	
'39	1,390	218		3,648	146	
1840	1,386	236		3,628	183	
'41	1,261	183		3,463	141	
'42	1,320	203		3,518	136	
'43	1,781	234		3,691	143	
'44	1,724	216		3,949	145	
'45	1,715	201	13·34	3,704	155	4·31
'46	1,957	232		3,874	151	
'47	2,008	250		3,793	178	
'48	2,019	275		3,807	205	
'49	2,062	269		3,630	163	
1850	1,902	227		3,620	151	
'51	1,988	150		3,969	194	
'52	1,966	277		3,831	190	
'53	2,011	293		3,803	192	
'54	2,364*	354		3,739	171	
'55	2,255	350	14·14	3,711	209	5·13
'56	2,370	337		3,563	216	
'57	2,480	364		3,339	213	
'58	2,427	416		3,379	171	
'59	2,526	385		3,339	154	
1863	2,074	322		3,316	235	
'64	2,048	401		3,508	216	
'65	2,079	374		3,519	193	
'66	2,005	418		3,065	145	
'67	1,938	365	18·34	3,232	183	5·7
'68	2,351	392		3,071	181	
'69	2,149	415		2,975	157	
1870	2,128	360		2,962	165	
'71	2,198	367		3,489	189	
'72	2,019	338		3,509	177	
'73	2,148	349	16·94	3,191	140	5·13
'74	2,306	387		3,471	182	
'75	2,164	396		3,384	175	

* Exclusive of 326 cases of cholera, attended with 108 deaths.

XV.—*Relative Numbers of the Sexes Treated in the Glasgow Royal Infirmary during the Last Ten Years, with the Mortality of the Different Classes.*

I. MALE MORTALITY.

Year.	Medical.			Surgical.			Fever.		
	Total.	Died.	Per Cent.	Total.	Died.	Per Cent.	Total.	Died.	Per Cent.
1866....	1,344	189		1,527	130		664	120	
'67....	1,321	161		1,495	107		477	73	
'68....	1,431	181	12·42	1,579	98	6·89	474	83	15·91
'69....	1,415	136		1,594	115		871	153	
'70....	1,244	172		1,700	96		977	112	
1871....	1,396	192		1,657	132		746	69	
'72....	1,424	218		1,959	171		314	46	
'73....	1,487	234	14·65	2,097	161	8·42	185	46	13·47
'74....	1,551	228		2,022	201		60	10	
'75....	1,774	253		1,801	160		62	12	
'76....	1,653	236		1,820	132		21	4	

II. FEMALE MORTALITY.

Year.	Medical.			Surgical.			Fever.		
	Total.	Died.	Per Cent.	Total.	Died.	Per Cent.	Total.	Died.	Per Cent.
1866....	796	85		643	51		571	76	
'67....	796	105		519	25		417	68	
'68....	803	81	10·18	631	32	5·14	407	42	11·38
'69....	807	57		588	35		789	99	
'70....	727	72		634	32		911	65	
1871....	860	108		764	48		601	35	
'72....	795	119		679	50		281	37	
'73...	787	108		664	43		124	9	
'74....	852	104	13·47	677	54	6·35	84	8	8·08
'75....	945	145		592	37		46	4	
'76....	852	102		637	43		39	2	

XVI.—*Medical and Surgical Cases Admitted to the London Hospital from* 1856-76, *with the Mortality for each Year.*

Year.	Admitted.			Died.			Mortality per Cent.		Total Death-Rate.
	Medical.	Surgical.	Total.	Medical.	Surgical	Total.	Medical.	Surgical.	
1856.....	—	—	4,209	—	—	291	—	—	6·9
'57.....	—	—	3,935	—	—	315	—	—	8·0
'58.....	—	—	3,976	—	—	301	—	—	7·5
'59.....	—	—	3,669	—	—	343	—	—	9·3
1860.....	—	—	3,918	—	—	323	—	—	8·2
'61.....	—	—	4,169	—	—	350	—	—	8·4
'62.....	—	—	4,164	—	—	318	—	—	7·6
'63.....	1,287	3,081	4,368	160	221	381	12·4	7·1	8·7
'64.....	1,156	3,078	4,234	167	278	445	14·4	9·0	10·5
'65.....	1,176	3,141	4,317	164	220	384	13·9	7·0	8·9
'66....	1,248	2,996	4,244	177	217	394	14·2	7·2	9·3
	825	—	825	327	—	327	39·5*	—	—
'67.....	1,499	2,835	4,334	249	177	426	16·6	6·2	9·8
'68.....	1,588	3,344	4,932	308	210	518	18·7	6·4	10·5
'69.....	1,488	2,910	4,398	277	197	474	18·6	6·7	10·8
1870.....	1,549	3,206	4,755	338	244	582	21·8	7·6	12·3
'71.....	1,637	3,144	4,781	308	226	534	18·2	7·1	11·2
'72.....	1,884	3,508	5,392	359	239	598	19·2	6·8	11·1
'73.....	1,913	3,700	5,613	355	274	629	18·5	7·4	11·2
'74.....	2,391	3,304	5,695	405	263	668	16·9	7·9	11·7
'75.....	2,358	3,446	5,804	446	251	697	18·9	7·3	12·0
'76.....	2,443	3,860	6,303	448	278	726	18·2	7·3	11·6

* Number refers to the cases of cholera treated in the hospital during the year.

XVII.—*Annual Returns for the Last Twenty-one Years from the Lying-in Charities attached to the Three Endowed London Hospitals, the Women being Confined at their own Homes.*

Year.	Guy's.		Bartholomew's.		St. Thomas's.	
	Confinements.	Deaths.	Confinements.	Deaths.	Confinements.	Deaths.
1856	2,011	6	956	7	402	1
'57	1,731	6	943	2	705	2
'58	1,651	5	990	7	859	None
'59	1,640	5	823	1	648	„
1860	1,404	4	997	1	632	„
'61	1,505	4	1,141	1	621	2
'62	1,691	3	1,346	5	432	2
'63	1,576	11	1,331	8	643	None
'64	1,608	12	1,278	2	728	5
'65	1,568	8	1,229	4	741	1
'66	1,585	3	566	3	No	returns
'67	1,727	4	568	1		„
'68	1,783	8	881	3		„
'69	1,929	5	902	1	1,291	7
1870	2,183	10	921	1	1,232	4
'71	2,240	8	345	1	1,082	4
'72	2,518	7	463	2	920	3
'73	2,213	16	537	1	1,318	10
'74	2,449	17	655	2	1,475	11
'75	2,334	9	631	1	1,438	5
'76	2,451	13	792	2	1,591	2
Deaths per 1,000	—	4·1	—	3·1	—	3·5

Note.—Of the total children born in connection with the Guy's Lying-in Charity, 44·4 per 1,000 were still-births; and 1,011 children were born to every 1,000 confinements.

XVIII.—*Annual Returns from the Four London Lying-in Hospitals for the Last Twenty-Two Years.*

Year.	Queen Charlotte's.		City of London.		General Lying-in.		British Lying-in.	
	Confinements.	Deaths	Confinements.	Deaths.	Confinements.	Deaths.	Confinements.	Deaths.
1855.....	170	4	433	6	358	15	139	2
'56	88	—	468	7	352	7	122	—
'57.....	245	3	464	2	244	5	105	1
'58.....	341	4	484	2	282	5	62	—
'59.....	320	27	426	3	264	3	77	2
1860.....	256	19	469	11	278	3	102	—
'61.....	369	18	534	6	278	13	114	1
'62.....	351	19	505	11	237	2	103	4
'63.....	386	7	583	3	267	—	171	1
'64.....	384	13	505	9	289	2	186	—
'65.....	225	9	507	9	297	3	175	5
'66	408	5	494	11	308	1	210	5
'67.....	412	7	445	9	337	10	288	5
'68.....	464	3	493	1	319	7	172	4
'69.....	414	6	475	4	308	2	169	1
1870.....	484	6	327	14	341	2	153	9
'71.....	452	7	460	4	297	1	226	4
'72.....	433	11	421	2	311	—	195	3
'73.....	416	17	403	4	314	5	172	3
'74.....	443	9	425	7	278	2	144	—
'75.....	394	9	400	4	264	6	155	1
'76.....	416	19	408	8	293	3	—	—
Mortality per 1,000	—	28·2	—	13·5	—	14·8	—	15·7

Note.—The death returns are taken from the "Annual Summaries" of the registrar-general, and the number of confinements have been supplied by the secretaries of the respective institutions.

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