PUBLIC HEALTH AUTHORITIES IN RELATION TO THE STRUGGLE AGAINST TUBERCULOSIS IN ENGLAND.

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The task with which I have been honoured—of reporting upon the action of English Public Health Authorities in regard to tuberculosis—can, I believe, be best fulfilled (*a*) by a review of the history of the mortality from tuberculosis in England since 1837, when vital statistics first became available, (*b*) by a statement of the factors which have been instrumental in causing the reduction in the mortality from tuberculosis shown in these statistics, and an attempt at weighing their relative importance, (*c*) by a description of the more direct measures taken in England to diminish the prevalence of tuberculosis, and (*d*) by a forecast of the lines on which preventive measures against this disease are likely to be extended.

(*a*) *Review of the Mortality from Tuberculosis in England.*

In 1838–42, the five first complete years of registration of deaths in England, the recorded death-rate from phthisis averaged 3·88 per 1000 of population (see Table IV.). It is doubtful if this figure can be trusted. At this time medical certification of the cause of death was not compulsory, and did not become so until 1874. Even in 1871 in about 8 per cent. of the deaths the cause was not certified by a qualified practitioner, though there had been a steady decrease in the proportion of uncertified deaths. Before this many deaths were probably ascribed to "consumption" on the strength of insufficient non-medical evidence. From the fifth decade onwards the statistics have become more trustworthy, subject to the further remarks on page 448.

[1] A paper read at the Meeting of the International Congress of Hygiene and Demography, Brussels, Sept. 1903.

The main results are given in the following table:—

TABLE I.

Death-rate from Phthisis Pulmonalis and from other Tubercular Diseases in England and Wales per million living of each sex.

Period	Phthisis		Other Tubercular Diseases	
	Males	Females	Males	Females
1851—60	2579	2774	915	700
1861—70	2467	2483	870	665
1871—80	2209	2028	849	651
1881—90	1847	1609	775	620
1891—95	1633	1303	658	
1896—1900	1321		581	

From the year 1851 to 1865 the phthisis death-rate was greater among females than among males, the difference between the two gradually diminishing. Since 1866 the phthisis death-rate has been uniformly in excess among males and increasingly so. The comparative male and female death-rates from phthisis and from other tubercular diseases during the last twenty years are shown in Table II.

TABLE II.

England and Wales. Annual Death-rate per million living from

Year	Phthisis		Other Tubercular Diseases	
	Males	Females	Males	Females
1881	1920	1735	794	621
82	1947	1758	824	643
83	1967	1797	787	639
84	1927	1733	823	669
85	1875	1670	736	589
86	1874	1612	821	652
87	1728	1508	649	591
88	1717	1428	724	586
89	1719	1435	755	621
1890	1868	1506	775	618
91	1780	1429	782	626
92	1624	1321	735	603
93	1635	1304	542	612
94	1559	1215	643	532
95	1559	1237	738	592
96	1480	1133	646	524
97	1526	1155	650	527
98	1509	1123	659	537
99	1549	1123	632	517
1900	1570	1110	630	510

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Between 1881 and 1900 the male phthisical death-rate has declined 18·2 per cent., the female phthisical death-rate 36 per cent. The decline in other tubercular diseases in the same period is for males 20·6, for females 17·9 per cent.

The decline in the death-rate from phthisis has not been uniform in extent at different ages. In the following table I have calculated the percentage reduction of the phthisis death-rate at each age-group for the two sexes, the comparison being between the average death-rates for 1851–60 and for 1891–95.

TABLE III.

Percentage Reduction of Phthisis Death-rate between 1851–60 *and* 1891–95.

	All ages	0—	5—	10—	15—	20—	25—	35—	45—	55—	65—	75 and upwards
Males	37	65	63	66	55	50	37	18	16	19	34	39
Females	53	57	58	57	59	59	53	45	44	46	51	51

Thus the decline has been greatest at ages under 20 in males and under 25 in females. The greater decline at the lower ages and in the female sex may be regarded as indicating that the domestic causes of tuberculosis have been removed to a greater extent than the occupational, to which men are particularly exposed. This is probably the case; but there is the disturbing fact that registered deaths from phthisis now more closely represent the real facts as to this disease than they did in the earlier years of registration of causes of death. The term phthisis or consumption is not now used so loosely as formerly, when any chronic chest ailment accompanied by wasting was liable to be called by this name. In recent years, furthermore, there has been an increasing practice on the part of medical practitioners to return deaths as due to "tuberculosis," which would formerly have been returned as phthisis. The result has been some exaggeration of the decline of the death-rate from pulmonary phthisis.

The statistics as to "other tubercular diseases" given in Tables I. and II. cannot be regarded as trustworthy. They include tabes mesenterica, tubercular meningitis, and other forms of tuberculosis (scrofula, etc.). In many instances in which the diagnosis of "tabes mesenterica" has been made, it has been shown post-mortem that there is no evidence of tuberculosis in the abdominal cavity.

When however allowance has been made for the errors of certification and registration to which reference has been made, it remains clear that there has been a most gratifying decline in the mortality from tuberculosis.

The amount of registered decline in each successive period of five years is shown in Table IV.

TABLE IV.

Phthisis Mortality.—Persons.

Period	Death-rate per Million of Population	Percentage Decline in Mortality from Phthisis in each Period as compared with that in the immediately preceding Period
5 years 1838—42	3880	
No statistics 1843—49		
5 years 1851—55	2851	32·9[1]
,, 1856—60	2603	8·7
,, 1861—65	2528	2·9
,, 1866—70	2448	3·2
,, 1871—75	2218	9·4
,, 1876—80	2040	8·0
,, 1881—85	1830	10·3
,, 1886—90	1635	10·7
,, 1891—95	1461	10·7
,, 1896—1900	1321	9·6

If, as I believe is the case, the extremely high registered death-rate from phthisis in 1838–42 may be ignored as untrustworthy, and if, as is probable, for similar reasons the apparent decline between 1851–55 and 1856–60 is greater than the real decline, we then have remaining a series of years which can be divided into two groups. The first comprises the decennium 1861–70, in each quinquennium of which the decline was about 3 per cent.; and the second comprises the years after 1870, in which the decline has averaged from 8 to 10 per cent. The transition from the first to the second of these periods is abrupt.

(*b*) *Causes of the Diminution in Mortality from Tuberculosis in England.*

Considerations of space oblige me to assume a knowledge of the general course of sanitary legislation and administration in England. It is important to note that (excluding the doubtful years mentioned above) in the years in which sanitary administration first became

[1] This represents the decline of 13 not of 5 years. Reduced in the proportion of 13 to 5 it becomes 12·7 per cent.

generally operative throughout the country (1871–75) the decline in mortality from phthisis was triple that in the preceding quinquennium, and the higher rate of decline has continued up to the present time. It is not necessary to apportion the share in this decline which is to be attributed to works of main sewerage, to better systems of removal of domestic excretal and other refuse, to drying of the sub-soil[1], to diminished crowding in houses and their improved cleanliness, to improved industrial conditions caused by the operation of the Factories and Workshops and other Acts, and to the effect of the Compulsory Education Act, 1870. All of these have borne their part in producing the diminished mortality from tuberculosis. They almost certainly are not the only factors concerned, and the means by which the abolition of some of the above factors has caused a reduction of tuberculosis has probably been in part misinterpreted. Thus some of the most important of the above measures have directly diminished the opportunities for infection. Improvements in housing and the diminution of overcrowding undoubtedly have had this effect. The improved habits of the people have had the same effect to an even greater extent. Quite apart from the present crusade against spitting, there has been an immense improvement in the national habits in this respect and in general domestic cleanliness, which must have had a material effect in diminishing opportunities for infection. At the same time I do not wish to minimise the importance of indirect measures against tuberculosis. Opinions will doubtless differ as to the relative share which direct infection by means of spray during coughing or by dried expectoration on the one hand, and dirty, overcrowded, ill-lighted dwellings on the other hand, play in the causation of tuberculosis. All who wish to effect the most good will endeavour to the utmost to control both sets of factors.

Sir Hugh Beevor[2] has emphasised the importance of abundant food in the prevention of tuberculosis. He shows "a coincidence and a remarkable agreement between the fall in the phthisis-rate, the number of paupers, and the rise in the average wage." The Corn Laws prohibiting the free importation of corn into England were abolished in 1846, taking full effect on February 1, 1849, after which day the duty on imported corn became 1*s.* per quarter only. The 1*s.* duty was abolished

[1] In the *Practitioner*, New Series, Vol. XIII. 1901, page 206, I have given my reasons for regarding wetness of soil as of relatively small importance in the causation of tuberculosis.

[2] *Hunterian Oration*, 1899.

by an Act passed on June 24, 1869. The average price of wheat in the ten years 1837–46 was 56*s.* 7*d.*, in 1860 it had become 53*s.* 3*d.*, in 1862 55*s.* 5*d.*, since when it has declined to a minimum of 22*s.* 10*d.* in 1894 (see Table V. and Figure). It should be noted that owing to the failure of the potato crop, the Crimean War, and the depreciation of gold, the price of corn, notwithstanding unrestricted importation, did not decline until 1862[1].

TABLE V.

Average Prices of Wheat and Phthisis Mortalities.

Years	Price of Wheat per quarter in pence[2]	Death-rate per million of population from Phthisis	Proportional amounts in each Quinquennium. Average for entire period = 100	
			Wheat	Phthisis
5 years 1838—42	775·6	3880	141	172
No statistics as to the cause of death were kept 1843–49 inclusive.				
5 years 1851—55	668·6	2851	121	126
,, 1856—60	640·0	2603	116	115
,, 1861—65	568·0	2528	103	112
,, 1866—70	655·6	2448	119	108
,, 1871—75	655·6	2218	119	98
,, 1876—80	570·0	2040	103	91
,, 1881—85	481·2	1830	87	81
,, 1886—90	376·8	1635	68	72
,, 1891—95	334·8	1461	61	65
,, 1896—1900	343·0	1321	62	59

The close coincidence between the price of wheat and the phthisis death-rate is shown more clearly in Fig. 1. The reasons for this coincidence are not far to seek. The more abundant and cheaper supply of food has doubtless improved the physical condition of the population and made them less susceptible to the inroads of tuberculosis. It is not however simply and solely a question of cheaper food. The English population as a whole has increased its standard of comfort and has been able to afford not only better, more abundant, more varied, and more wholesome food, but is also better clad and better housed than it has been in the past. In 1861 a penny on the income-tax yielded £1,100,000, in 1901 it yielded £2,400,000, an increase of 118 per cent., while the population of Great Britain only increased 43½ per cent. in the interval. This improvement has affected not only those who pay income-

[1] Giffen: "Progress of the Working Classes, etc." *Journ. Statist. Soc.* 1883–4.

[2] *Journ. Statist. Soc.* Vol. VIII. Part II. page 254.

tax. Sir R. Giffen, F.R.S., on whose authority[1] the above financial statements are made, showed[2] that while the workman's wages have advanced (in many trades he obtains from 50 to 100 per cent. more money than 50

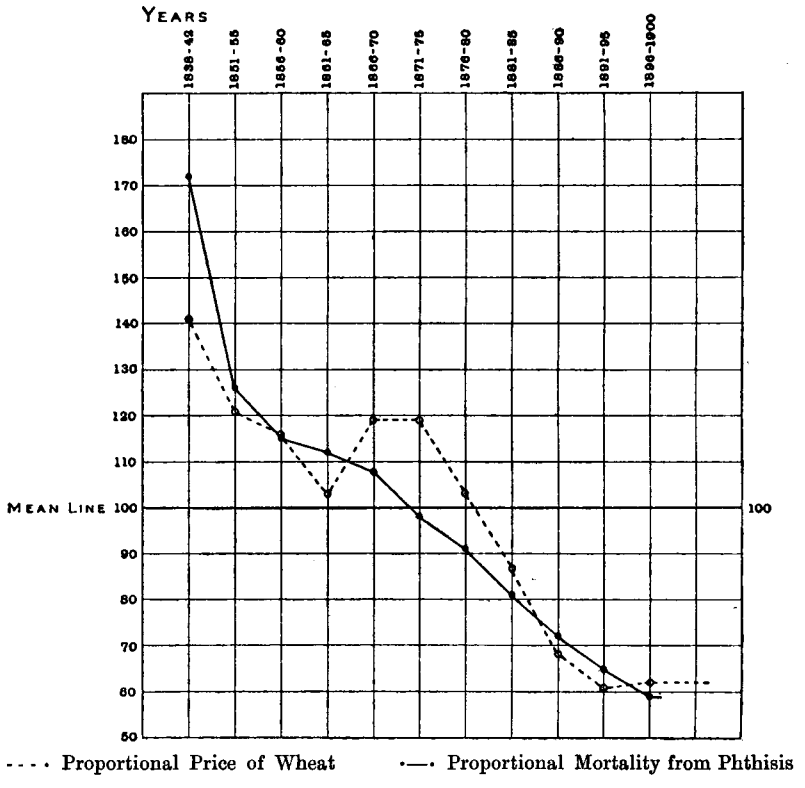

Fig. 1.

years previously for 20 per cent. less work), most articles he consumes have diminished in price[3]. While recognising that a section of the population still lives in extreme poverty, it is I think certain that the main mass of the English population lives in greater comfort than fifty

[1] "A Financial Retrospect 1861–1901." *Journ. Statist. Soc.* Mar. 1902.

[2] "The Progress of the Working Classes in the last Half-Century." *Journ. Statist. Soc.* 1883–84.

[3] Mr A. L. Bowley, M.A., after an independent investigation of a large number of trades concludes that "average income and average wages have increased at nearly equal average rates, and that both have nearly doubled during the period under review," 1860 to 1891. (*Journ. Statist. Soc.* Vol. LVIII. Part II. p. 251.)

years ago, and that this has been an important factor in causing the reduction in the mortality from tuberculosis. Poverty and tuberculosis are close companions, for poverty not only furnishes the appropriate soil, but also increases the closeness of contact and the frequency of opportunities for infection, and thus in two ways increases the mischief caused by the tubercle bacillus.

(c) *English Administrative Measures against Tuberculosis.*

This part of my subject may be considered in accordance with the following scheme of preventive measures, which although not exhaustive includes the most important measures.

A. *Means of ascertaining the existence of the disease.*

1. Bacteriological diagnosis.
2. Notification of cases, voluntary or obligatory.

B. *Direct preventive measures.*

1. Law against expectoration in places of public resort.
2. Disinfection and cleanliness.
3. Sanatoria.
4. General sanitary improvement.

C. *Education of the public and of patients in the importance of the preceding measures.*

Bacteriological Diagnosis. In the last few years a bacteriological laboratory has more commonly been recognised as an essential part of the preventive machinery in sanitary administration. Many practitioners examine their patients' sputa for themselves; others however have not the necessary time or skill; and some do not even yet realise its importance in the early diagnosis of tuberculosis. In Brighton, facilities for practitioners in this respect were provided in 1897, and in successive years the number of specimens examined has been as follows:—

		Number of specimens of sputum examined for practitioners
14 months	1897—8	21
12 ,,	1899	47
12 ,,	1900	86
12 ,,	1901	125
12 ,,	1902	169
6 ,,	1903	120

Notification of Cases. In England the obligation is laid upon the medical attendant and upon the householder or nearest relative of the patient to notify to the medical officer of health the fact that the patient under his charge or in his house is suffering from one of the notifiable infectious diseases (scarlet fever, diphtheria, enteric fever, typhus, small pox, cholera, erysipelas). Other diseases such as chicken pox, measles and whooping cough may be added to the list by any sanitary authority desiring to do so. The Central Government Authority (Local Government Board) has however until recently declined to permit local sanitary authorities to extend the provisions of the Infectious Diseases (Notification) Act to phthisis, the reason given being that "the Board have hitherto held the view that phthisis is not a disease to which the provisions of the above-mentioned Act could with advantage be applied." In the absence of such powers of compulsory notification the medical practitioners of Brighton were asked to co-operate in a system of voluntary notification of cases of phthisis. Similar steps have been taken in Manchester and Sheffield, and the following table shows the relative amount of voluntary notification secured in each of these communities.

Year	Brighton	Manchester	Sheffield
1899	113[1]	425[2]	33[3]
1900	105	1573	585
1901	153	1339	648
1902	224	1260	739
1903	165 (½ year)	323 (¼ year)	—
Census Population 1901	123,478	543,969	380,717

[1] Entire year. [2] From Sept. 6th to end of year. [3] Dec. 7th to end of year.

Note. *The figures for Brighton and Manchester are the number of new cases notified, for Sheffield the figures give the number of notifications.*

In a few other towns and districts the voluntary notification of phthisis has recently been practised to a certain extent.

The fear has been expressed that the voluntary notification of a case of phthisis might expose the doctor to the risk of accusation of a breach of professional secrecy, as the notification is not imposed as a statutory duty upon him. This has been felt by some doctors to be a real difficulty. I have always, when consulted on this point, expressed the opinion that no case should be notified without the consent of the patient; and in actual practice it is found that this difficulty has limited the operation of voluntary notification of phthisis chiefly to patients of the poorer classes, and particularly those treated in connection with the

poor law, or in public hospitals or dispensaries. Among these patients, and the small proportion of patients of a higher class who are notified, I have found that visits by the medical officer of health or his assistant are not unwelcome, and that the patients are usually grateful for the help they receive in having their rooms cleansed and purified, in being supplied with pocket spittoons and Japanese paper handkerchiefs, and especially in being helped to secure sanatorium treatment.

The difficulty however is an important argument in favour of compulsory notification of cases of phthisis to the medical officer of health; and it is satisfactory to learn that Parliament during the present Session has consented to a local enactment making phthisis compulsorily notifiable in the city of Sheffield. The powers thus recently conferred on Sheffield are set forth in the Appendix (p. 465). It will be observed that the powers are confined to the enforcement of notification by the medical practitioner and to the enforcement of cleansing and disinfection. No powers of compulsory isolation of phthisical patients are conferred, and no responsible person has so far as I am aware ever suggested or is likely to suggest that the granting of such powers is desirable.

Notification, whether voluntary or compulsory, is but a means to an end. It is necessary therefore to examine the action which is taken in regard to notified cases.

Having had over four and a half years' experience in Brighton of the voluntary notification of phthisis, our procedure has become fairly settled, and I am able to give a trustworthy opinion on the degree of benefit obtainable from it.

The procedure adopted is that (1) the notified patient is visited at home, or is interviewed at my office in connection with his proposed removal to the sanatorium for open-air treatment. At this interview exact details are ascertained as to the duration and history of the illness, the possible sources of infection, places of residence during the illness, occupation and work places during the past five years, habits as to spitting, and so on.

(2) The patient's room is cleansed and disinfected when required. This is always done when a change of address occurs, or when the patient is admitted to the sanatorium. These measures are carried out in every instance after the death of a phthisical patient, whether or not the patient's illness has been previously notified.

The process of disinfection applied is that the internal surfaces of the patient's room and all articles in it are sprayed with formalin solution. When wall papers are dirty these are then stripped, the

ceiling is whitewashed, bedding, carpets, etc. are removed to the disinfecting station and subjected to saturated steam in an equifex disinfector, and the entire room is scrubbed and washed[1].

(3) The patient is instructed as to the precautionary measures required, printed cards being given in addition to exact verbal instructions. If poor he is supplied with a pocket spittoon for outdoor use, and with Japanese paper handkerchiefs for indoor use.

(4) A careful sanitary inspection is made of each house in which a phthisical patient lives, and sanitary defects are remedied. It has been urged that apart from the notification of phthisis the Sanitary Authorities already have power to inspect dwellings and enforce the proper remedies against dirtiness and overcrowding; and to inspect workshops and factories and similarly provide remedies to prevent the inhalation of irritating or morbific dust. Very few districts however possess a sufficiently large staff of sanitary inspectors to secure even an annual inspection of every dwelling and workshop; and in the intervals of the visits serious evils may have been long in existence. Insanitary conditions are much more dangerous to the healthy when there is the superadded risk of infection; and the notification of cases of phthisis enables prompt and direct action for the removal of dirt and overcrowding to be taken at the point where it is most urgently required. It is the difference between drawing a bow at a venture and aiming straight at the mark.

(5) If the patient is lodged under unfavourable conditions, and especially if he is in danger of infecting others, he is, by arrangement with his medical attendant, admitted for a month into the Borough Sanatorium.

Indiscriminate Expectoration. There is no general enactment in England against indiscriminate expectoration. By-laws, *i.e.* local regulations, are however becoming adopted to an increasing extent which prohibit spitting in or on tramcars belonging to local authorities. The Glamorganshire County Council was the first Sanitary Authority to secure a more general by-law against spitting. Its substance is as follows:

A person shall not spit on the floor, side, or wall of any public carriage or of any public hall, public waiting room or place of public entertainment, whether admission thereto be obtained by payment or not.

Any person offending against this By-law shall be liable to a fine not exceeding £5.

[1] The methods of disinfection adopted in Manchester are fully described in *Trans. British Congress on Tuberculosis*, Vol. II. p. 18.

Since then a few other authorities have followed this good example, the most recent being the London County Council and Brighton.

Disinfection and Cleanliness cannot be efficiently secured unless each case of phthisis is notified to the medical officer of health. In actual practice it is found that in many instances no precautionary instructions have been given to the patient, or such instructions as have been given are neglected unless reinforced at intervals. Even in notified cases there is considerable danger of neglect of the simple precautions required, until or unless the patient has had Sanatorium training. The amount and details of disinfection required will vary according to circumstances. The methods adopted in Brighton are given on page 455, and reference is made to the Manchester methods. To secure primary disinfection and subsequent cleanliness in every detail is the most important object of notification.

General Sanitary Improvement. Further details under this head are scarcely necessary. I have already (page 449) expressed my opinion that some of the most important reforms of the last half-century have lowered the mortality from phthisis in part by diminishing the opportunities for infection. At the same time, the enforcement of by-laws requiring a sufficient air space at the rear of as well as in front of dwellings, enabling every room in a house to be swept by air and purified by the sun, have doubtless greatly helped in the same direction. Even more important probably has been the influence of sanitary supervision in securing the cleansing of rooms and the abatement of overcrowding.

The Sanatorium Training of Consumptive Patients. Even when definite precautionary instructions have been given by myself to notified phthisical patients, it has occasionally been found on subsequent visits that these are not effectually carried out. It is one thing to make the patient understand the instructions given, another to ensure that he will conscientiously carry them out. To ensure this end the patient's self-interest, as well as his conscience, must be utilised. If he can be taught heartily to believe that his own welfare and that of his family is favoured by the precautionary measures recommended to him, we may usually rely on his co-operation. How to secure this educational influence became then an important question early in my local experience of the notification of phthisis in Brighton. Although a large amount of good was done by the visits to phthisical patients, there was reason to believe that some of them continued carelessly to disseminate infection in workshops, etc. by means of their sputa. After a few

months' experience of sending selected patients to an open-air sanatorium outside Brighton, I obtained, in July 1902, the consent of the Town Council to the admission of four consumptive patients into one of the isolation pavilions of our Borough Fever Hospital, which is very favourably situated for this purpose[1].

In my report on this subject I pointed out that the cases notified to us are usually suffering from the disease in a stage at which cure cannot be expected even by three months' treatment in an open-air Sanatorium; but that apart from the possibility of cure, it was in the public interest to admit phthisical patients not living under favourable conditions at home to the Borough Sanatorium for a month or two, according to circumstances. It would diminish disease and improve the public health in three ways:

(1) The patient himself would improve in health, and be enabled to start afresh, with an increased prospect of recovery.

(2) While he was in the Sanatorium his home could be cleansed and purified: his wife and family would have a holiday in the sense of being free from repeated attacks by the contagium of phthisis.

(3) The patient when sent home would have been taught to so manage his expectoration that he would no longer be a source of risk to his family and to those with whom he worked.

This course was at once adopted, and before the end of 1902 the number of beds utilised for this purpose had been increased to ten.

The majority of the patients are unable to come into the Sanatorium for longer than a month. They would lose their means of livelihood if they were absent from work for longer than that time. In a certain number of other cases, however, it has been possible to arrange for a longer treatment, and if the improvement made in the month has been such as to justify continuing the expense of the treatment, it has been continued for a second or even a third month.

Under present circumstances we are annually passing through the Sanatorium 100 to 120 phthisical patients. As the total deaths from phthisis in 1902 were only 174, as each consumptive patient lives several years, and as those of higher social status are not so likely to be the cause of infection to others, it can be confidently hoped that in a few years nearly every phthisical patient in Brighton who is a source of

[1] No difficulty has arisen owing to patients being afraid of acquiring scarlet fever or diphtheria, and no cross-infection has occurred; each disease has a separate pavilion with its own separate recreation ground. The phthisical patients are treated on the same lines as in other open-air Sanatoria.

danger to others will have had a month's practical training in the simple precautions required to prevent him from becoming so.

From the above statement it will be gathered that the curative aspect of Sanatorium treatment is regarded as of secondary importance. We are chiefly concerned with educating these patients, and thus avoiding risk to others. At the same time the patients have a practical personal demonstration of the benefits to be derived from abundant food, an open air life, and freedom from infective dust. When they leave the Sanatorium at the end of the month, which in the majority of instances is the limit of time, they are without exception ardent advocates for the fresh air *régime*, and I have not yet known one out of the 71 patients thus treated (to June 25th, 1903) who, after leaving the Sanatorium, has again become careless as to coughing and expectoration; and this notwithstanding the fact that only a minority of the patients leave us without expectoration. They have so far improved in health that they are most eager to continue the *régime*, so far as their means will allow.

It appears to me that in connection with Sanatorium treatment, too much stress has been laid upon the cure of the patient. Such cure must be exceptional unless the treatment can be continued for six or more months, and unless it can be begun earlier in the disease than that at which cases of phthisis are usually notified. Each of our patients is informed before he is admitted to the Sanatorium (unless the disease is in its earlier stage) that a cure cannot be secured in the time during which he will be treated, but that he will be taught how to manage himself so that when he leaves he can, so far as his means admit, continue the treatment, and can pursue his daily life without risk to his relatives or fellow workmen. It is made a *sine quâ non* that as soon as the patient is admitted to the Sanatorium his house shall be thoroughly cleansed and disinfected. When he returns home, therefore, both he and his family are freed from the risk of infection by old infective material.

The educational part of Sanatorium treatment, as developed above, is more important in the public interest than its curative aspect. The majority of cases are notified in the second or even in the third stage of the disease. The natural history of phthisis is, as is well known, one of repeated exacerbations with intervals of quiescent disease. During the quiescent intervals the patient, if belonging to the artizan and labouring classes, resumes his work, and so is a continuing source of danger not only to his family but also to those employed with him. Hence it is of

the utmost importance that, although his illness is at an advanced stage, the patient should receive that practical instruction in the management of his expectoration, and should receive that practical demonstration of the benefits which will accrue to him personally which, in most instances, can only be secured by temporary residence in a well-managed Sanatorium. Our rule in selecting patients is to prefer (1) men to women, and (2) those still able to work; because in most instances, by treating and training these the circle of good achieved is wider than when we treat and teach those with a more limited environment. There are exceptions to this rule. Several instances could be quoted in which the mother of a large family suffering from chronic phthisis has infected every child in succession, while she has remained able to carry on her family duties. Hence a certain number of selected female patients are admitted when we have beds available for them[1].

Education of the public and of patients. The preceding review will have made it clear that the line in which most good is to be expected is in the writer's opinion by the training of patients, especially by their training in a Sanatorium. The education of the public is progressing apace, but in order to prevent exaggerated fears careful instruction is necessary. Panic is caused by imperfect knowledge, not by properly weighed instruction. Increased attention is being paid in our elementary schools to physical training and to the teaching of domestic hygiene, though they are still too much neglected; and if these two lines of teaching were to be adopted in every school, a much more rapid decline in the death-rate from phthisis could undoubtedly be secured.

In the preceding review of the struggle in England against tuberculosis, no attempt has been made to review what is being done to secure freedom of our meat and milk from tuberculosis. In regard to the condemnation of tuberculous meat, the rules laid down by the Second Royal Commission on Tuberculosis are generally followed. In regard to milk, several towns have special powers to secure the examination of milk from herds of cows suspected of being tuberculous, and to prevent the consumption of cow's milk from cows, the milk of which has been shown to contain tubercle bacilli. The details of the administration of these special powers are given by Dr Niven in vol. II. p. 282, of the "Transactions of the British Congress on Tuberculosis,"

[1] For details as to the amount of provision of Sanatorium treatment in England see Postscript, p. 461.

1901. At the present time a Third Royal Commission on Tuberculosis is studying the intercommunicability of bovine and human tuberculosis.

Forecast as to future progress. The preceding review of the history of tuberculosis in England since 1838, and of the causes, including the administrative sanitary measures, which have caused it to decline in amount, will leave little doubt as to the trend of future measures having the same object in view.

Two ends are aimed at, and there need be no quibbling as to their relative importance. The first is to fortify each member of the community against the disease when he is invaded by its active cause, the tubercle bacillus. The second is to protect each member of the community against the invasion of the tubercle bacillus. I have already indicated my belief that many of the reforms which are supposed to have operated in the first direction, especially improvements in housing and in cleanliness, have also operated still more in the second direction. A difference of opinion as to the *modus operandi* need not prevent combined action in the struggle against tuberculosis in each direction. The encouragement of treatment in Sanatoria and still more of the training in Sanatoria on which I have laid stress is ideal in this respect. Such training teaches the patient the importance of the fortifying influence of an out-door life, of sunshine and of general hygiene, including a personal condition of high nutrition. It also teaches him the importance of the careful and cleanly control of his expectoration, in the interest of himself and of his friends. In the next twenty years we shall have not only steady improvement in general sanitation, but in all probability, the notification of every case of phthisis with efficient measures of disinfection and cleansing and such an extension of Sanatorium treatment as has hitherto appeared to be impracticable; and it is not difficult to foresee that along with the general adoption of these measures will come a reduction of tuberculosis at a rate much more rapid and more extensive than has hitherto been secured. There is, I believe, more hope of the almost complete extermination of tuberculosis than of any of the acute infectious diseases, with the possible exception of typhus and small-pox.

POSTSCRIPT.

Sanatorium Treatment of Phthisis in England.

In his address to the British Congress on Tuberculosis, Dr R. Koch stated "the only country that possesses a considerable number of special

hospitals for tubercular patients is England, and there can be no doubt that the diminution of tuberculosis in England, which is much greater than in any other country, is greatly due to this circumstance." This statement in its entirety is scarcely capable of substantiation. In its literal sense it cannot be held that the limited number of special hospitals for consumptives in England can have had so great an effect on the total death-rate from tubercular diseases as is here claimed. The proportion of such hospitals to the total number of tubercular patients is extremely minute. If however the total number of tubercular patients treated in general hospitals and still more those treated in workhouse infirmaries be included, there is good reason for attaching a high importance to the removal of these patients from their relatives and to the nursing of them under conditions in which personal infection is greatly limited in extent. A majority of the total tubercular patients belong to the poorer classes, and a very high proportion of these drift into the workhouse infirmaries. The following particulars as to the parish of Brighton illustrate this point. During the three years ending Oct. 1st, 1901, 211 phthisical patients were admitted to its workhouse infirmary. Each of these patients on an average spent 316 days in the infirmary. A large number (48) of them left the infirmary after an average stay of 136 days; 51 others left the infirmary after an average stay of 146 days and were subsequently readmitted, their average length of stay when they returned being 591 days. The average stay of those dying in the infirmary was 133 days before death, not including the time spent in the infirmary by these patients on previous occasions. During the three years in which the above 211 patients were admitted to the infirmary about 400 deaths were caused by phthisis in the parish of Brighton. On the assumption that each patient discharges infective material for three years before death, and that there were thus 1,200 phthisical patients in the parish of Brighton, it follows that nearly 18 per cent. of the total phthisical patients were removed from their homes during a large portion of the time when they were most infective. The patients thus removed were those whose home conditions were such as to render spread of infection almost inevitable. Conditions similar to those of Brighton hold good for other parts of the country.

The number of indoor paupers (including vagrants and insane) was 7·7 per 1,000 of the population of England and Wales in 1848 and 6·9 per 1,000 in 1902, the lowest in the interval being 5·8 in 1860. During the same period the number of outdoor paupers declined from 55·0 per

1,000 of population in 1849 to 17·7 in 1902. Hence a much higher proportion of the total number of pauper patients are now treated in workhouse infirmaries than formerly (Fig. 2). It has been estimated that one-eleventh of the total pauperism of this country is caused by

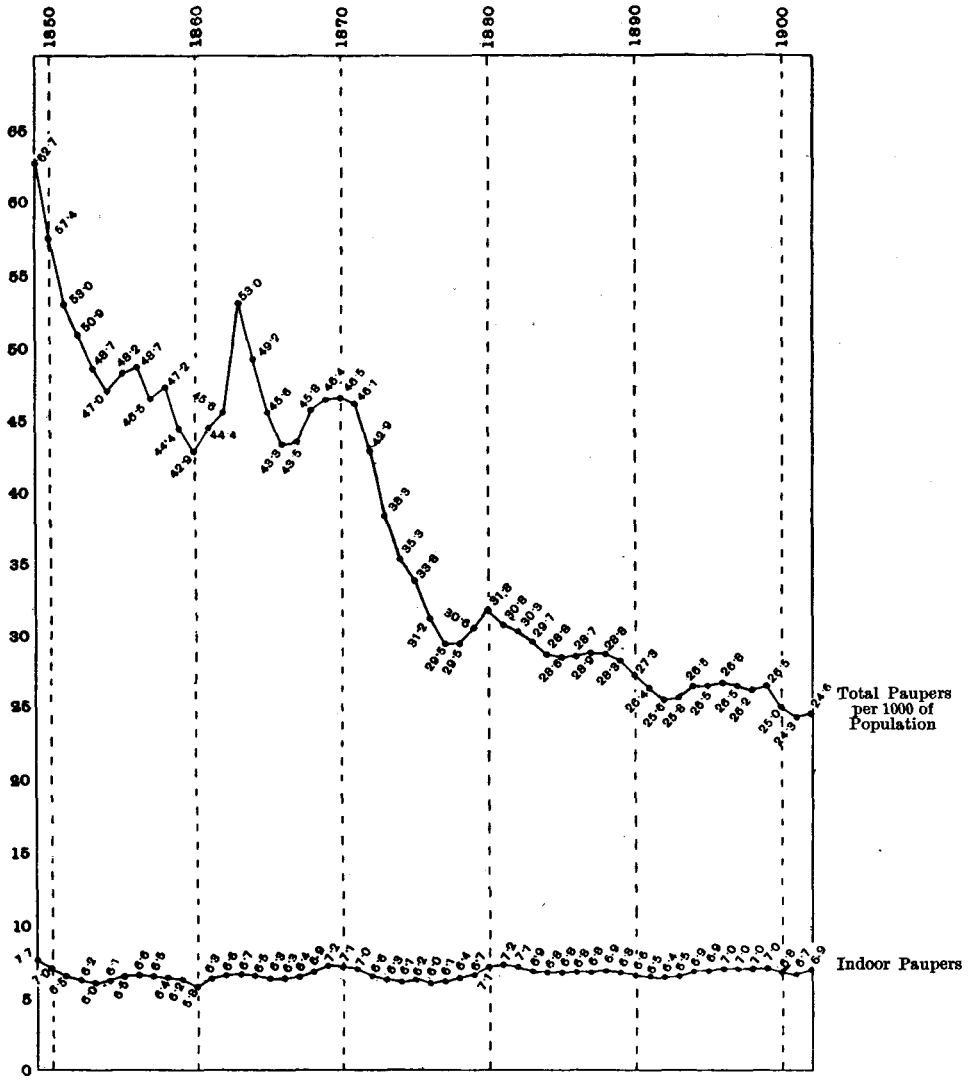

Fig. 2. Number of Paupers including Vagrants and Insane relieved in England and Wales each year from 1848–9 to 1901–2, classified as indoor and outdoor paupers per 1000 of Population.

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phthisis (Dr Milson Rhodes). It is highly probable that the 5·8 to 7·7 per 1,000 of the total population who reside in workhouses comprises a very high proportion of consumptives. I am unable to obtain statistics as to the number of indoor paupers before 1838; they were almost certainly much fewer than in later years.

The withdrawal of this large number of patients in the later stages of phthisis from their homes must have had an important influence in diminishing the spread of the disease; and if among "special hospitals" be included workhouse infirmaries, Koch's statement quoted above is in a large measure justified.

In classifying institutions for the reception of tubercular patients we must therefore attach the first importance to the workhouse infirmaries. In a steadily increasing proportion of infirmaries these phthisical patients are treated in separate wards.

1. Poor-law provision. { A. For early cases. B. For advanced cases.

There is no poor-law provision for early cases as such, but an early phthisical patient if unable to work might be admitted to the workhouse infirmary. Workhouse infirmaries are invaluable as homes for advanced phthisical patients.

Recently efforts have been made for further specialization of the parochial treatment of phthisis. The three poor-law districts forming the city of Liverpool have combined to erect a large Sanatorium for pauper patients, and it is probable that other poor-law authorities will follow this example.

2. *Special Municipal Sanatoria for Phthisis* under the control of Sanitary Authorities and supported out of the general rates (as distinguished from the poor-rates) have not yet been built. Details have been given of the system under which 10 beds in connection with an already existing Fever Hospital are permanently reserved at Brighton for phthisical patients. Where separation of diseases can be secured this is probably a more economical plan, except for very large cities, than a totally separate institution. In Manchester (Dr Niven's Annual Report for 1901, page 230) during 1901, 20 cases of phthisis were treated in the otherwise empty local small-pox hospital, but the experiment had to be stopped owing to the admission of small-pox cases. The city of Sheffield decided in 1901 to establish a Sanatorium for phthisical patients, and finally obtained the consent of the Local Government Board to borrow money under Sec. 131 of the Public Health Act for this purpose. This scheme has not yet been carried out.

3. *Combined Public and Private Enterprise.* The most striking instance of this is the Westmoreland Sanatorium, an adapted building equipped by the kindness of Dr Paget Tomlinson, towards the support of which several Westmoreland Sanitary Authorities and Boards of Guardians contribute.

4. *Paying Sanatoria* have sprung up in various parts of the country and are doing good work. For particulars as to these reference may be made to the list published by the National Association for the Prevention of Tuberculosis and to Dr F. Rufenacht Walters' work on Sanatoria.

5. *General and Special Hospital Provision.* The various special hospitals for phthisis still carry on their good work. There is, on the other hand, an increasing objection on the part of the authorities of general hospitals supported by voluntary contributions to admit phthisical patients. Public and medical opinion, in fact, appears rightly to be undergoing the same change of opinion in favour of separate treatment as has occurred in regard to enteric fever[1].

6. *Homes for advanced cases of Phthisis* have already been mentioned, so far as parochial patients are concerned. For less poor patients homes are greatly needed for advanced cases where the home circumstances are unfavourable to the patients and their relatives.

APPENDIX.

SHEFFIELD CORPORATION ACT, 1903. SECTION 45.

1. (A) Every registered medical practitioner attending on or called in to visit any person within the city shall forthwith on becoming aware that such person is suffering from tuberculosis of the lung send to the medical officer of health a certificate stating the name age sex and place of residence and employment or occupation (so far as can be reasonably ascertained) of the person so suffering and whether the case occurs in his private practice or in his practice as medical officer of any hospital public body friendly or other society or institution.

(B) Any such medical practitioner who fails to give such certificate shall be liable on summary conviction to a fine not exceeding forty shillings.

(C) The Corporation shall pay to every such medical practitioner for each certificate duly sent by him in accordance with this section a fee of two shillings and sixpence if the case occurs in his private practice and of one shilling if the case

[1] The special hospitals in London provide accommodation for about 665 patients, while those in the provinces and Scotland have together only about 78 beds (Dr Kelynack, *The Hospital*, April 25, '03, p. 58).

occurs in his practice as medical officer of any hospital public body friendly or other society or institution.

(D) A payment made to any medical practitioner in pursuance of this section shall not disqualify that practitioner from serving as a member of the Corporation or as a guardian of a union situate wholly or partly in the city or in any municipal or parochial office.

2. (A) Where the medical officer of health certifies that the cleansing and disinfecting of any building (including in that term any ship vessel boat tent shed or similar structure used for human habitation) would tend to prevent or check tuberculosis of the lung the town clerk shall give notice in writing to the owner or occupier of such building that the same or any part thereof will be cleansed and disinfected by the Corporation at the cost of the Corporation unless the owner or occupier of such building informs the Corporation within twenty-four hours from the receipt of the notice that he will cleanse and disinfect the building or part thereof to the satisfaction of the medical officer of health within the time to be fixed in the notice. If within twenty-four hours from the receipt of such notice the owner or occupier of such building has not informed the Corporation as aforesaid or if having so informed the Corporation he fails to have the building or the part thereof disinfected as aforesaid within the time fixed by the notice the building or the part thereof shall be cleansed and disinfected by the officers and at the cost of the Corporation under the superintendence of the medical officer of health. Provided that any such building or part thereof may without any such notice being given as aforesaid but with the consent of the owner or occupier be cleansed and disinfected by the officers of and at the cost of the Corporation under the superintendence of the medical officer of health.

(B) For the purpose of carrying into effect the provisions of this sub-section the Corporation may by any officer authorised in that behalf who shall produce his authority in writing enter on any premises between the hours of ten o'clock in the forenoon and six o'clock in the afternoon.

(C) Every person who shall wilfully obstruct any duly authorised officer of the Corporation in carrying out the provisions of this sub-section shall be liable to a penalty not exceeding forty shillings and if the offence is a continuing one to a daily penalty not exceeding twenty shillings.

3. (A) The medical officer of health generally empowered by the Corporation in that behalf may by notice in writing require the owner of any household or other articles books things bedding or clothing which have been exposed to the infection of tuberculosis of the lung to cause the same to be delivered over to an officer of the Corporation for removal for the purpose of disinfection and any person who fails to comply with such requirement shall be liable on summary conviction to a penalty not exceeding five pounds.

(B) Such articles books things bedding and clothing shall be disinfected by the Corporation and shall be brought back and delivered to the owner free of charge.

4. If any person sustains any damage by reason of the exercise by the Corporation of any of the powers of sub-sections (2) and (3) of this section in relation to any

matter as to which he is not himself in default full compensation shall be made to such person by the Corporation and the amount of compensation shall be recoverable in and in the case of dispute may be settled by a Petty Sessional Court.

5. No provisions contained in any general or local Act of Parliament relating to infectious disease shall apply to tuberculosis of the lung or proceedings thereto under this section.

6. All expenses incurred by the Corporation in carrying into effect the provisions of this section shall be chargeable on the district fund and general district rate.

7. The Corporation shall cause to be given public notice of the effect of the provisions of this section by advertisement in the local newspapers and by handbills and shall give formal notice thereof by registered post to every medical practitioner in the city and any other registered medical practitioner known to be in practice in the city and otherwise in such manner as the Corporation think sufficient and this section shall come into operation at such time not being less than one month after the first publication of such an advertisement as aforesaid as the Corporation may fix.

8. The provisions of this section shall cease to be in force within the city at the expiration of seven years from the date of the passing of this Act of Parliament or by Provisional Order made by the Local Government Board and confirmed by Parliament, which Order the Local Government Board are hereby empowered to make in accordance with the provisions of the Public Health Act, 1875.

9. The term "Medical Officer of Health" in this section shall mean the Medical Officer of Health for the time being of the city or any person duly authorised to act temporarily as Medical Officer of Health for the city.