Prevention of pulmonary tuberculosis / report by County Medical Officer of Health.

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STAFFORDSHIRE COUNTY COUNCIL.

PREVENTION OF PULMONARY TUBERCULOSIS.

Report by County Medical Officer of Health.

PRESENTED TO THE COUNTY COUNCIL MAY 12, 1903.

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Prevention of Pulmonary Tuberculosis.

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Presented to the Sanitary Committee, April 4th, 1903.

At a meeting of the Sanitary Committee of the County Council, held on February 7th, 1903, the following resolution was passed :—

"That the County Medical Officer of Health be instructed to report upon the need in this County for the provision of a Sanatorium or Sanatoria for the treatment of phthisis, and as to the steps, if any, which the County Council may advantageously take, in order to further or promote a scheme having such an object in view."

In accordance with this resolution, I have considered the question in all its aspects, and beg to report as follows :—

History of the Disease and its Causation.

In order that the Committee may have all the needful facts before them to allow of the subject being considered from every point of view, it may be well, in the first place, before dealing with the modern methods of treatment and prevention, to give a short summary of the progress and history of the disease, its causation, and the effect which sanitary progress appears to have had in diminishing its incidence. I would point out, however, that the lung is not the only site of tubercular disease, so that, when considering the figures I quote it must not be forgotten that their number would be considerably increased if diseases of a tubercular character affecting other organs and tissues of the body were included. It may be pointed out, however, that apart from the question as to the identity of causation in the case of all diseases classed as

tubercular, concerning which there may be room for difference of opinion, it is important for our present purpose to remember that pulmonary tuberculosis differs from other tubercular diseases in two respects—first, as regards age incidence, and, secondly, as regards the channel by which the disease is conveyed. While other tubercular diseases prevail mostly among children, the pulmonary affection is most prevalent among adults, and, while food, in all probability, plays an important part in the causation of the former, the cause of the latter, in the majority of cases, at any rate, is the direct introduction of the *materus morbi* into the lungs by means of the air breathed. While drawing this distinction, however, I would point out that the chief predisposing causes in all tubercular diseases are identical, namely, poverty and general insanitary conditions.

Dealing, then, with pulmonary tuberculosis only, the extreme importance of the question at once becomes apparent from a glance at the Registrar General's returns, which show that at the present time no fewer than 42613* persons die annually from that cause in England and Wales, and that these deaths represent about one-fifth of the deaths from all causes occurring among persons between the ages of 15 and 55 years.

In this County, excluding County Boroughs, I find from my returns that the mean annual number of deaths from this disease during the past ten years was 805.

I regret to say I cannot give any figures to show how the deaths compare with the number of persons actually suffering from the disease, but it has been estimated that the mean duration of illness, terminating in death, is from two to three years, so that there are in the Administrative County (including unrecognised cases which recover) probably no less than 2000 sufferers, most of whom, in all probability, are incapacitated from work, off and on, during one half the period of their illness. Irrespective, then, of the suffering which this involves, not only to the patient, but also to the family should he be the bread winner, the direct monetary loss which such illness and death

* Mean for ten years ending 1900.

represents is enormous, and if it can be shown that by any practicable means the number of sufferers may be reduced and the fatality lessened, then, apart from humanitarian reasons, it would pay to adopt such means.

It is only comparatively lately, in this country at any rate, that the question of adopting specific measures for reducing the mortality from phthisis has been seriously considered, but that the disease is amenable to preventive measures is pretty well established by the decline in its mortality coincident with the improved sanitary surroundings and conditions of the people. Again, the fact that complete recovery from pulmonary consumption does occur, is frequently demonstrated in the *post-mortem* room by undoubted evidence of repair of lung tissue being found in subjects who have died from an entirely different ailment, but who, as the condition of the lungs proves, must have suffered possibly many years before from consumption.

As it is generally admitted that poverty and general insanitary surroundings have a potent influence as predisposing causes of consumption, it is satisfactory to note the steady decline in the mortality which has taken place in recent years, coincident with the growth of sanitation, affording, as it does, undoubted evidence of the preventible nature of the disease. The following are the rates of mortality per million of the population in England and Wales, for each quinquennial period since 1861:—

Period.	Deaths per 1,000,000 Persons living.
1861-65	= 2526
1866-70	= 2447
1871-75	= 2218
1876-80	= 2039
1881-85	= 1830
1886-90	= 1635
1891-95	= 1461
1896-1900	= 1321

It will thus be seen, that, in the absence of any preventive measures specially directed against the disease, and without any radical change in treatment, the death rate has

steadily declined, and that the present rate is no less than 47·7 per cent. lower than the rate 40 years ago, a fact which, in itself, is sufficient to justify very sanguine expectations as to what may be accomplished by the adoption of more direct preventive and curative measures based upon the more exact knowledge we now possess of the causation of the disease.

Until Köch, in 1882, discovered the tubercle bacillus, and demonstrated, by experiment, that consumption is infectious, it was generally believed that the disease had a hereditary origin; a belief which, naturally, tended to discourage any very active attempt being made to solve the problem of its prevention. This great discovery, however, entirely changed the complexion of things, and the most sanguine hopes were entertained that a specific against the disease would soon be found. These hopes, unfortunately, have not yet been realized, whatever the future may have in store for us in that direction; the knowledge, however, that we have to deal with an infectious ailment directly associated with a specific organism at once places the disease among the preventible class, and opens up fresh possibilities regarding its prevention.

In order to appreciate the importance of modern methods of prevention and treatment, a knowledge of the nature and behaviour of the tubercle bacillus is essential. It is an extremely minute rod-shaped organism, which flourishes in the lungs and is the direct cause of the disease. Among pathogenic organisms it is not the most tenacious of life under circumstances which do not favour its development, and it is important to remember that its vitality outside the body is influenced by various conditions. For example, it has been shown by experiment that, while the bacilli retain their vitality for over a fortnight in darkness, they die in two or three days when exposed to a bright light. It is likely, also, that insanitary conditions, generally, have a fostering influence on the vitality of the bacilli, apart from the potent predisposing influence they have as regards the contraction of the disease by persons whose lives are spent amid such surroundings.

Unless, however, a person is exposed to the infection of the disease he cannot contract it, and for this reason it is important

to consider the means by which the infection may be conveyed.

Here, again, Köch has done valuable work in demonstrating that the chief sources of danger are the following :—

1. A person suffering from pulmonary tuberculosis in an advanced stage may discharge tubercle bacilli into the air by the act of breathing.

2. The force of a patient's cough may discharge particles of tenacious sputum into the air.

3. A patient's sputum, by being exposed on the floor or retained in a handkerchief, ultimately dries and becomes pulverised, and may thus be carried into the atmosphere by moving currents of air.

As the risks, then, are so apparent, it is not surprising that whole families are cut down by the disease, and there is no need to look to heredity for an explanation of such occurrences. At the same time, it is no doubt true that heredity predisposes to the disease, and, as a matter of fact, many persons are for long periods exposed to its infection without contracting it.

It may be well to point out, however, that while the disease is undoubtedly infectious it cannot be so readily contracted as other diseases of the infectious class, and if the public, and especially patients and their friends, could be made to realize wherein the risk lies, and so be in a position to take ordinary precautions, the dangers, especially as regards incipient cases, would be reduced to a minimum. We must be careful, also, not to exaggerate this danger. So much has been said on this subject lately that there is considerable risk of a needless scare being established, which might have the effect of imposing greater hardships upon those who suffer from the disease than they, in any case, have to bear. That there is already some ground for this fear is apparent from an instance I recently heard of where the fellow clerks in an office where a young man supposed to be suffering from phthisis was employed declined to work in the same office with him and insisted upon his giving up his berth. It is difficult to realize the hardship which might result to thousands of persons who may be perfectly capable of

following their employment should an exaggerated idea of the danger of associating with phthisical patients become general, and it is most important that every effort should be made to check any such tendency arising from over-keenness to impress the public regarding the infectious nature of the disease.

Curative and Preventive Measures.

From the above facts it is obvious, that, although phthisis is an infectious disease, it differs essentially from other infectious diseases as regards the duration of illness and virulence of infection, therefore, the preventive measures indicated in the two cases differ. The main object in combating outbreaks of scarlet fever and other acute infectious ailments is to safeguard the public from infection by isolating the patient during the few weeks while the disease runs its course, but, even if systematic isolation was desirable in the case of phthisical patients, it would be impracticable to make the needful provision considering the number of the sufferers and the long duration of the illness. It does not follow from this, however, that the efforts of authorities in the direction of curtailing the mortality from the disease need be confined merely to a vigorous enforcement of the general provisions of the Public Health Acts, for improved knowledge regarding its causation has led to developments in its treatment and prevention which dictates the adoption of further and more specific measures by which it may be brought more directly under control.

What is known as the open-air treatment has been practised on a considerable scale for a good many years in Germany, and some three or four years ago the movement extended to this country. The old-established hospitals for phthisis, in the first instance, adopted the new method of treatment, and, subsequently, new hospitals were established, and are now being established, in different parts of the country for providing the treatment.

The purpose served by such institutions is both curative and preventive. The patients are placed under the most perfect hygienic conditions; they live, as far as possible, in the open air, or in rooms, which are arranged so as to provide ample light and air; their diet is plentiful and wholesome; and under

skilled medical care the general *régime* is adapted to the special circumstances of each case. The patients are thus placed under conditions which are favourable to recovery, and, at the same time, what is still more important, they acquire a knowledge of how they ought to live, and of the simple rules which should be followed in order to safeguard others with whom they afterwards will have to associate from contracting the disease. The benefit afforded by such institutions, then, is largely educational, and, from a preventive point of view, that is perhaps the strongest argument which can be advanced in favour of their being generally established.

Phthisical patients may be divided into three classes—first, those who are suffering from the disease in the initial or incipient stage; second, those in whom the disease is more acute but not far advanced; and third, those who have passed through both these stages and whose lungs have suffered to an extent which renders the prospect of recovery hopeless.

So far as treatment is concerned, only those who are in the first or second stages of the disease can hope for benefit in sanatoria, but, from a preventive point of view, it is most desirable that the advanced cases should be housed under conditions which will prevent the risk, serious as it is in such cases, of infection being conveyed to friends and relatives of the patients. I shall have a suggestion to make later on in this report as to how the third group of cases may be provided for.

Prospects of Success from Treatment in Sanatoria.

I had hoped to be able to show by figures the advantages of modern compared with older methods of treatment, and, with that object I addressed a circular letter to the resident medical officers of old-established hospitals for consumption throughout the country asking for the needful data upon which such a comparative statement might be compiled. Most of those with whom I communicated very courteously supplied me with such figures as were available, but I regret to say that in no instance did the returns permit of the desired statement being framed. That the results of the open-air treatment of consumption have been most encouraging, however, cannot be

doubted, in view of the unanimous testimony in its favour on the part, not only of the resident and honorary medical staffs of existing sanatoria, but of the medical profession generally.

Although I cannot give figures to show the success of the modern compared with the older methods of treatment, the following Table* shows the results obtained at various sanatoria for paying patients. In judging of the results it is important to take into account the first column of the Table, which shows whether the patients treated suffered from the disease in the early or advanced stages.

RESULTS OF TREATMENT IN 23 SANATORIA FOR PAYING PATIENTS.

Name of Sanatorium.	Stage A = comparatively early; B = advanced.	Percentage of cases in which there was apparent arrest of the disease.	Total percentage of cases in which there was real improvement.	Authority.
Brehmer	A and B	26·6	75 to 80	M. Achtermann Kobert.
	A	58·0	89	
Nordrach Colonie	A and B	30	95	Knopf.
Hygeia	A and B	22·5	68·7	A. C. Klebs.
Falkenstein	A	28	73	Dettweiler and Hess.
Reiboldsgrün	A	41·6	70·2	Driver.
Canigou	A	55	65	Giresse.
	B	6	31	
Hohenhonnef	A	43·4	69	Meissen.
Leysin	A and B	12·7	72·2	Burnier.
	A	53·3	86·6	
Winyah	A	81	100	von Ruck.
	A and B	22·6	65	
Davos (Turban)	A	50	90	Turban.
Muskoka Cottage	A	41	74	Elliott.
Römpler's	A and B	27	?7	Römpler.
Sharon	A and B	25	—	Bowditch.
Haufe's St. Blasien	A and B	17	84	Sander.
Montana	A	10	50	Stephani.
	B	2	12	
De Trespoey	A and B	22	55	Crouzet.
Lauretian	A	46	62	Riched.
	B	18	40	
SANATORIA IN ENGLAND.				
Nordrach on Mendip	A	45	82	Rowland Thurnam.
Moorcote	A	85	100	Baker.
	B	10	60	
Crooksbury	A	45	87	R. Walters.
	B	0	45	
Rudgwick	A and B	31·5	89·5	McCall.
Nordrach in Wales	A and B	77·2	84·2	Morton-Wilson.
Rossclare	A	20	95	Crosby Walch.

* From the King's Sanatorium Prize Essay, by Arthur Latham, M.A., M.D.Oxon., M A.Cantab., published in *The Lancet*, January 3rd, 1903.

Perhaps the best testimony, however, to the value of sanatorium treatment of consumptive patients is the fact that the State Insurance Societies of Germany have established, and maintain at their own cost, numerous such institutions; we may reasonably conclude, therefore, that they find the treatment pays from a business point of view.

How may Sanatoria be Provided?

It is obvious that small Authorities cannot individually provide and maintain sanatoria, as the cost would be prohibitive; in fact, joint action with that object in view is even more strongly indicated in this case than in the case of general isolation hospital provision. If, then, provision is to be made for the open-air treatment of consumptive patients by Sanitary Authorities, they must either unite for that purpose, or the County Council, as the Central Authority, must make the needful provision. Boards of Guardians, however, have the power of providing sanatoria for the treatment of pauper cases, and this power is being exercised in certain cases. While it is not desirable that Boards of Guardians should provide for the isolation of general infectious cases among paupers—that duty, for many reasons, being more appropriately undertaken by Sanitary Authorities—in the case of a disease like pulmonary consumption, which is infectious in a different sense, and in a lesser degree, it is, in my opinion, desirable that Boards of Guardians, either individually or jointly, should provide the accommodation. As a matter of fact, it would pay them to do so, as the benefit which would accrue from the treatment in the case of patients in whom the disease had not reached an advanced stage, would necessarily lessen the expenditure on relief, because many patients whose maintenance would otherwise be a more or less permanent charge upon the Union funds until the disease terminated in death, would, by proper treatment, be able to resume work.

At the present time, the various Boards of Guardians and Poor Law Authorities in the Metropolis are considering this question, and at a recent conference of these bodies the following resolution was passed:—"That this conference of Poor

Law Authorities, having discussed the question of the open-air treatment of consumption, is of opinion that the time has come when provision should be made for the treatment by this method of the sick poor of the Metropolis suffering from phthisis, and it recommends the matter for the consideration of the Local Government Board, with a view to the necessary steps being taken by that Board for the carrying out of the proposal."

With this object, also, three Boards of Guardians at Liverpool have united and are erecting a sanatorium at Harwell, Delamere Forest; while at Bradford one Board of Guardians have decided to erect a sanatorium for the patients of the Bradford Union in preference to joining with other unions. It is expected in the latter case that an average of twenty cases in the early stages of the disease will have to be provided for. In other cases, Boards of Guardians are making provision by the payment of annual contributions towards sanatoria already provided by voluntary effort and supported by private subscriptions and payments from Sanitary Authorities. In this County the Board of Guardians of Wolverhampton have already made provision for the treatment, in special wards, of phthisis among paupers

Apart from pauper cases, however, there are, of course, a large number of cases among artisans and others who cannot afford to pay for treatment in private sanatoria, and, in my opinion, it is for this class, more especially, that provision should be made by Sanitary Authorities.

As regards the power of County Councils to provide sanatoria for phthisical patients, as the Committee are aware, by the Isolation Hospitals Acts they are empowered to provide, or cause to be provided, hospitals for the reception of patients within their administrative areas suffering from infectious diseases as defined by the Infectious Diseases Notification Act, 1889. It is true that phthisis is not included among such diseases, but the Council, or any Committee to whom they may have delegated their powers, are further empowered to

specially include in the above definition *any other infectious disease*, and it has been admitted by the Local Government Board that phthisis may legitimately come under that category. We may take it, therefore, that the law enables County Councils to provide sanatoria.

Suggested Scheme for Providing Sanatorium Treatment.

In the terms of the resolution quoted in the introduction to this report, and allowing, as I think we must allow, that the sanatorium treatment of consumption is of the utmost value both from a curative and preventive point of view, it must be admitted that I have established the fact that there is need for such provision in this County. We have now, therefore, to consider "the steps, if any, which the County Council may advantageously take in order to further or promote a scheme having such an object in view."

A short account of what has been done in other counties in this direction, so far as I have been able to ascertain the particulars, will probably assist the Committee in arriving at a solution of this difficult problem.

The question of providing a Sanatorium for the West Riding of Yorkshire was considered at a meeting of representatives of Sanitary Authorities in the Administrative County, called by the County Council, in October of last year, when a scheme, prepared by the County Medical Officer of Health, was submitted for approval. Shortly, the proposal was this, that the County Council should erect and equip a sanatorium, available, upon terms, for every district; the District Councils to guarantee the cost of maintenance only (estimated at £1 per week per patient) of each patient sent from their respective districts. Whether the Local Authorities provide this sum out of public funds, or charge it, or part of it, to the patient, or raise it by local philanthropy, does not concern the County Council.

The proposal was to erect a hospital to accommodate 50 patients (35 men and 15 women), and the following figures were given as being the probable cost of the scheme:—

(1) INITIAL ESTABLISHMENT COST :—	£	s.	d.
Site, say 30 Acres at £120	3600	0	0
Buildings, including Furnishing, &c., at £450 per Bed	22500	0	0
	£26100	0	0

(2) ANNUAL EXPENDITURE :—

Interest and Repayment of Loan of £3,600 for Site, borrowed at 3½ per cent. for 50 years				
Ditto for Loan of £22,500 for Buildings, &c., borrowed at 3½ per cent for 30 years				1380 0 0
SALARIES :	£	s.	d.	
Medical Superintendent ..	400	0	0	
Matron	80	0	0	
Nurses, four at £30	120	0	0	
Maids, six at £18	108	0	0	
Cooks, two, at £35 and £18...	53	0	0	
Engineer, Gardener, & Porter	200	0	0	
				961 0 0
Officers' Diet, 15 at 15s. per head per week				585 0 0
Fuel, Lighting, &c. (2s. per head per week)				348 0 0
Rates, Taxes, &c. (6d. per head per week)				87 0 0
Repairs, Renewals, and Sundries ...				150 0 0
Total Annual Amount to be provided out of County Fund ...				£3511 0 0

Equivalent to a Rate of about $\frac{1}{9}$th of 1d. in the £.

In addition to this sum, the amount to be recovered by the County Council from the District Councils, to cover the cost of food, medicines, &c., for patients, at £1 per week per patient, would be £2,500; so, that, according to the above estimate, the total annual outlay, including interest and repayment of loan, to establish and maintain a sanatorium for 50 patients would amount to, say £6,000.

I am inclined to think that the above estimate is excessive in some respects, but, of course, as regards certain items in it, local

circumstances may account for this. The sum set apart for land, for example, seems high, and from enquiries I have made, I am satisfied that the building need not cost so much, although I am aware that similar buildings are being erected in the neighbourhood of London at the present moment costing £500 per bed, and the sanatorium now being erected for Manchester, as a free gift, exceeds that sum considerably. As regards the question of structural cost, however, I shall have more to say later.

The estimate both of the administrative and maintenance expenses also seems to be higher than need be. I have obtained details of the actual expenditure in the case of an existing sanatorium for non-paying patients, and I find that the joint expenditure under these headings is about 13 per cent. less than the estimate given above. It is true that in this case the beds only number 24, but one would expect for that reason that the proportionate administrative and maintenance expenditure would be higher in place of lower. I may mention that in the case of the sanatorium I have taken for comparison the mean number of beds occupied during the year was only 20, but in working out the comparative cost I allowed for that. I would also point out that the medical superintendent of the institution in question informed me that the administrative expenses were higher than need be because the building had been adapted for its present purpose and, therefore, could not be administered so economically as if it had been built specially.

In Lancashire, the County Council have sanctioned the expenditure of a sum of £10,000 to make provision for the open-air treatment of consumptive patients, and at the present time I understand that a scheme is being considered for the establishment of a sanatorium for that County.

In Worcestershire, the County Council took the initiative in a movement for providing a sanatorium by voluntary effort, and the owner of a building leased it, together with 30 acres of land, at a nominal rent for a term of five years. Shelters were then erected, providing accommodation, in cubicles heated by a hot-water circuit and lighted by electricity, for 16

patients, eight of each sex, the building itself being utilized as an administrative block. It is estimated that the maintenance and establishment charges will amount to £75 per bed per year, and promises have been obtained from different persons of subscriptions amounting to £1,000 per year for five years. So far as the action of the County Council is concerned, it was limited to the taking of the initial steps and the payment of a contribution of £300 towards the outlay.

In Westmorland, a sanatorium has been provided much on the same lines as in Worcestershire, excepting that the building was originally a convalescent home, and a rental of £70 a year is paid for it. The working expenses are provided by annual contributions from various district councils (£60 a year entitling to the free use of one bed), by annual subscriptions and donations, by contributions from patients directly or indirectly, and by periodical efforts in the shape of charity entertainments, &c. The County Council, I may state, contribute £120 per year, and are entitled to the use of two free beds, and that is the limit of their interest in the scheme; while among the various contributing authorities 12 are entitled, from the amount of their contribution, to the free use of one bed; one to the free use of two beds; and another to the free use of four beds.

If, on considering the facts and arguments set forth in this report, the Committee should come to the conclusion that it is desirable to make provision for the open-air treatment of phthisical patients, the question next to be considered is—how may such provision be made ?

The County Council may take the initiative in various ways. For example, the machinery of the Council might be utilized merely in an initial capacity, to organize a movement with the view, if possible, of obtaining what is wanted by the help of philanthropic persons, as was done in Worcestershire. Again, the Council might proceed under the Isolated Hospitals Act, and endeavour to induce (I take it that no one would advocate compulsion) Authorities to unite for the purpose, with or without a promise of financial help from the County funds. On the

other hand, the Council might undertake the whole responsibility, and provide the necessary funds—structural, administrative, and household—from the County rate.

Personally, I do not advocate any of these methods. Of course, if any philanthropic person or persons came forward and offered to provide the site or the building, well and good, but an attempt to obtain the sum necessary by donations or subscriptions in a county like this would not, I fear, prove adequately successful, and would involve considerable subsequent administrative difficulties.

On the other hand, I doubt whether the suggestion to form an area of consenting authorities would meet with adequate support, even if a substantial contribution was made from the county funds; and, as it would manifestly be impossible to make provision for more than a mere fraction of the phthisical cases, the refusal of admission to patients, which necessity, I fear, would frequently compel, would, sooner or later, lead to friction between the Committee of Management and District Councils.

As regards the suggestion that the County Council might defray the entire cost, it is not only open to the last-mentioned objection, by reason of the fact that each authority would be rated for the amount, but it would kill all much-to-be-desired voluntary local effort towards obtaining financial help to the scheme, in the shape of contributions towards the maintenance charges from sick clubs or patients themselves, as local authorities would not then feel called upon to exert themselves in that direction.

The scheme I would strongly advocate is one on the lines of that approved by the West Riding County Council, which is open to none of the objections mentioned above. Months ago—before I had heard of the Yorkshire scheme—knowing that, sooner or later, the question would come forward in this County, I had been thinking over the policy it would be desirable to advocate in the event of some scheme being decided upon, and the conclusions I then arrived at were practically identical with those which have met with approval in Yorkshire.

By such a scheme every authority in the Administrative County, through the county rate, would contribute *pro rata* to the cost of the machinery, and each authority would be in a position to make use of the machinery, so far as its capacity permitted, on the payment of, say, £1 per patient per week or, possibly, less, if it were found that the household expenses, for which alone they would be directly responsible, could be defrayed for a smaller sum. It would rest with the local authority as to whether they themselves found the whole of this amount, or whether part, or the whole of it, might be charged to the patient, or subscribed by charitable persons, and in all probability funds would also be forthcoming from sick clubs, as the parent Friendly Societies are at present considering that matter. In fact, with such a scheme, it might very well happen that the local rates would not be trenched upon at all as regards this payment, the local authorities being merely the persons by whom the money collected from other sources would be passed on to the centre.

Suggested Accommodation and Probable Cost.

If the County Council should determine to make provision for the open-air treatment of phthisical patients in the Administrative County, it will, of course, be necessary to consider the question of the accommodation to be provided very carefully and in detail, but, for the present purpose, it will suffice to indicate, generally, what would appear to be desirable, having regard to the population to be served, and the physical circumstances of the County.

In the first place, on economical grounds, it is desirable that the whole County should be served by one institution, and there ought to be no difficulty in finding a site, in some central part, conveniently accessible to the large population in the north and south. The ideal site for the purpose would be on the south-western slope of a hill, where the sub-soil is dry and porous, and where an ample water-supply is available. It is also desirable, I think, that sufficient land should be obtained to allow of the needful quantity of milk, which is an all important item in the dietary,

being produced on the premises, as well as vegetables, as the cultivation of the latter would afford useful occupation for those patients for whom a certain limited amount of out-door exercise may be desirable.

As regards the building itself, it would differ from the ordinary isolation hospital. It is not desirable, for example, that the patients should be congregated in wards; the majority should be provided with separate sleeping rooms, although one or two rooms, with two or three beds in each, might be useful for patients in whose cases association is indicated.

As regards the cubic space per patient, as the aim and object of the treatment is to insure the freest circulation of air possible, it is not essential to provide 2,000 cubic feet, which is the necessary space for general isolation hospitals, in fact, little over half that amount is all that is needful; on the other hand, a dining hall, which may also serve as a recreation room, is a desirable provision. In most other respects, the principles of construction are the same, the all important consideration, after fresh air, being provision for plenty of light and the absence of anything in the interior design which will favour the collection of dust, or interfere in any way with efficient cleaning. It is also desirable that the rooms should be warmed by low-pressure hot-water circuit, and lit by electricity.

I have mentioned these special details because otherwise it might not be apparent why such institutions cost so much to provide.

Whether the structure should be of a permanent or temporary character, is a question about which there is considerable difference of opinion among experts, and this, of course, has a very important bearing upon the question of cost, although not so important as at first sight might appear, as will be seen from the estimates given later. This is one of the points which will require very careful consideration, and, before coming to a conclusion, it would be desirable to inspect various existing buildings of both types. I may point out, however, that wood-lined iron buildings, as usually erected, are not well suited for the purpose, and if temporary buildings are to be entertained,

it must be understood that they should comply with certain specific requirements, which need not be detailed at this stage, which will involve an expenditure considerably in excess of that required for such structures as a rule, although, of course, considerably less than the amount required for permanent buildings.

There is one consideration, however, which, from a politic point of view, tells in favour of temporary buildings. If this system of treatment, combined with future advance in preventive measures generally, is to be attended with the success which is anticipated, what is to become of the large permanent buildings for which, in course of time, there will no longer be any need for the purpose for which they were erected? It is true that more than one generation will pass away before this much-to-be-desired time arrives, still, one may reasonably hope that it will come, and it certainly is a possibility which may legitimately be taken into account in considering the question of temporary or permanent buildings.

The question of cost of building is one which cannot accurately be arrived at until several, at present, unknown factors are available—such as the nature of the site and the facility for conveyance of material,—but I think the following figures may be accepted as being approximately within the mark, provided exceptional difficulties, from a building point of view, are not met with. I may mention that in framing this estimate I had the advantage of the opinion of a well-known hospital architect of very high standing, who has lately designed several buildings of this class. As regards the establishment expenses, my estimate is based upon the actual figures of a similar institution which was erected some two years ago.

ESTIMATED CAPITAL AND ANNUAL EXPENDITURE.

	£
(a) CAPITAL EXPENDITURE :—	
Site, say 30 acres, at £80 per acre	2,400
Buildings, including furnishing, &c., 50 beds, at £350 per bed	17,500
	£19,900

(*b*) ANNUAL EXPENDITURE :—	£
Interest and repayment of loan of £2,400 for site, borrowed at 3½% for 50 years	102
Interest and repayment of loan of £17,500 on buildings, &c., borrowed at 3½% for 30 years...	951
Administrative charges, including salaries, wages, and maintenance of staff	1,354
	£2,407

Adding to the above estimate the sum of £1 per bed per week, for which, as suggested, local authorities should be responsible (£2,600 a year), the total annual expenditure involved in providing and maintaining in full use a sanatorium for 50 patients would be, say, £5,000, and the County Council's share (£2,407) of this expenditure, practically one-half, would be represented by a rate of 0·163d. in the £.

In the event of the buildings provided being of a temporary nature, the inclusive capital cost per bed would amount to something like £200, which would reduce the outlay to the extent of £7,500, while the other expenditure would remain the same. It must be remembered, however, that the Local Government Board would not grant a loan for 30 years for such a building, and if a loan were sanctioned at all the limit would probably be 15 years. Allowing for this, the total annual expenditure, exclusive of patients' household expenses, would amount to £2,324 (a saving of £83 only per year), equalling a rate, for which the County Council would be responsible, of 0·158d. in £.

It will thus be seen, that when the shorter period for which a loan would be sanctioned in the case of a temporary building is taken into account, the economy effected is but slight, and would probably be more than wiped out by the increased cost of repairs in the case of such a building.

In suggesting 50 beds as being the desirable number to provide, I have taken into account the number of Authorities in the Administrative County, who, in all probability, will wish to

avail themselves of the right to send patients,; also, I believe it is a fact that a sanatorium of that size can be administered at a lower rate per bed than a smaller one.

How may a Sanatorium be used to the best Advantage.

Considering the large number of persons who are suffering from phthisis in the County, it is obvious that Sanatorium treatment can only be provided for a small proportion of them, and, because, in a public health sense, prevention is the all-important consideration, it is most desirable that such buildings, when provided out of public funds, shall be utilized in such a way as to secure the highest efficiency from that point of view. This end, in my opinion, can best be attained by looking upon Sanatoria as educational centres where patients may be taught the simple rules by which their recovery may be effected, and by which the risk of infection being conveyed to others may be avoided. To accomplish this much, a residence in the institution of from six to eight weeks would probably suffice, whereas the minimum period necessary to effect a cure, or, rather, an arrest of the disease, would not be less than four months.

According to this suggested policy, an institution of 50 beds would be capable of receiving 300 patients annually, and, granting that an appreciable number of these benefited by the lessons they had been taught, in the course of a few years the gain to the community of having a considerable number of living examples of the advantages of such teaching scattered throughout the County would be very great, apart from the actual benefit accruing to the patients themselves.

It must be remembered, however, that the chief danger to the public arises from persons in whom the disease is too far advanced to admit of any benefit by treatment, and until some plan is devised by which such persons may be confortably and safely housed, we cannot hope to eradicate the disease. To solve this difficulty is not an easy matter, as the personal feelings of the sufferers and their relatives must be

considered, and considerable opposition would be met with in endeavouring to induce (which at present is all that can be done) such patients to leave their homes for the few remaining months they have to live. At the same time, from the point of view of the physical comfort of such patients, the advantage would be very great, and if their relatives and friends were permitted to pay them frequent visits, in all probability many would avail themselves of such provision, and for every person so housed there would probably be a saving in illness and possible death of one or two others.

In housing advanced cases, it would not be necessary to provide accommodation on the same scale, and at the same cost, necessary for curable cases, the comfort of the patients and the safety of the public being in this case the only consideration, so that the provision of specially-constructed buildings is not essential. This being the case, I venture to suggest that Authorities already possess, or soon will possess, buildings for another purpose, which would serve this purpose admirably during the considerable intervals when they are standing vacant; I refer to hospitals provided for the isolation of small-pox patients. Even now such buildings stand empty for long periods, during the absence of small-pox, and, if, as there is reason to hope, Government intend to make re-vaccination compulsory, the need for them at all will practically be abolished. Of course, it would be comparatively simple to come to some arrangement by which such hospitals might be made available for this important purpose, and I may mention that a movement with that object in view is now in contemplation in the case of the Metropolitan small-pox hospitals.

In concluding this report, I would point out that I have merely dealt with the question generally, and that, should the matter be carried further, it will be necessary to go very much more into detail before a specific scheme could be framed. As, however, the County Council would no doubt be guided in the policy they may adopt by the attitude of Local Authorities, and

public opinion generally throughout the County, it may be thought desirable to take steps, by public meeting or otherwise, to ascertain what support a scheme, based upon the lines suggested, would be likely to meet with. For both these purposes, namely, the framing of a general policy by the County Council, and the taking of the initial steps, to ascertain the feeling of Local Authorities regarding such a policy, I hope it will be found that this report contains the needful information.

Stafford,
March 31st, 1903.

GEO. REID,
County Medical Officer.