# Modern Methods

# In the Prevention and Treatment of

# Pulmonary Phthisis

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One of the most noteworthy features of recent years in the medical world has been the great advance made in the study of all questions relating to tuberculosis. The impetus giving rise to this has undoubtedly been the epoch making discovery by Koch in 1882 of the tubercle bacillus. Since that time many physicians including the late Dr. Koch himself have applied themselves assiduously to the discovery of some agent which would modify the tuberculous process in the direction of relief or cure. So far it cannot be said that any specific method of treatment has been brought to light but the work done has nevertheless been very fruitful of results.

We now have a much better understanding of the nature of the disease, the pathology, the methods of diagnosis, and our present methods of treatment are more rational and productive of better results than was the case before Koch gave to the medical world the result of his researches. One of the principal features of the present day treatment is the administration of tuberculin and opinions on the efficacy of this measure are not at all unanimous.

In the present thesis I propose to give an account of the modern methods of prevention and treat-

ment of phthisis and to attempt to show the relative efficacy of the various measures.

## Methods of Prevention.

Twenty years ago the general opinion in the profession was that phthisis was not a preventable disease. Nowadays there is hardly anyone who doubts that it can be prevented.

There has been during these years a gradual diminution in the death rate from tuberculosis and also the incidence of the disease is less. This decline was evident for several decades before the discovery of the Tubercle Bacillus. This indicates that the diminution in the mortality from tuberculosis may be attributed to the general improvement in the sanitary and hygienic surroundings and habits of the people rather than to any special measures directed against this disease in particular. Nor has there been any deviation from the steady progressive decline of the tuberculosis death rate to indicate that our more exact knowledge of causation has resulted in any marked effect on the mortality from the disease.

It is necessary therefore to inquire seriously into the reasons for this apparent failure of preventive medicine to produce any marked effect in the prevalence of a disease which is admittedly preventable.

The question may, however, be asked whether there

has really been any notable diminution in the prevalence of the disease or whether the lessened death rate may not be largely attributable to a diminished case mortality, whether it is due to prevention of the disease or to more successful treatment.

It is probable that both these factors are concerned in the result but it is difficult to know for certain. We have the figures of the mortality in relation to the population but we have no complete knowledge of the case mortality of phthisis. Without complete notification of cases we must remain uncertain whether or no the prevalence of the disease has diminished. We have evidence of a saving of life but whether this is due to prevention or to more successful treatment it is impossible to say.

The measures necessary to obtain the required information are universal notification of the disease. Many objections have been raised against compulsory notification which are rather objections to the administrative difficulties following notification rather than to notification 'per se.'

Next in importance to obtaining all possible information about the disease comes the need to disseminate information amongst the people. Much educational work has been done in this direction by the different health authorities throughout the country.

Besides the educational work health authorities

and preventive associations have focussed their activities on the establishment of sanatoria for the curative treatment of early cases. There is undoubtedly great value in sanatoria. The consumptive is trained in these institutions to regulate his life in a hygienic manner which he can continue to do after leaving the sanatorium. As Dr. Camac Wilkinson has pointed out existing sanatoria can only deal with a fringe of the problem as only a small proportion of the sufferers from consumption can undergo sanatorium treatment. The accommodation afforded is totally inadequate and sanatorium treatment to be adequately adopted would involve the state or municipalities in such an enormous expenditure as to be quite impracticable. The usual aim of the sanatorium is however the cure of the consumptive so that they cease to be centres of possible infection and are rendered fit to follow their employment with advantage to themselves and without danger to others. Towards this end which is an important and perhaps essential feature in an efficient scheme of prophylaxis, such sanatoria achieve little unless cases are admitted in the early stage of the disease and can be retained sufficiently long to allow of arrest being effected. There has lately been a considerable amount of criticism as to the efficacy of sanatorium treatment.

The comparative failure of treatment which these statistics in some measure disclose is due partly

to the large proportion of cases admitted with comparatively advanced disease and partly to the difficulty experienced in keeping the patients sufficiently long under treatment.

The chief reasons for the tardy admission of cases are the non recognition of the disease in its early stage and when it is recognised the patient does not at once commence systematic treatment.

The medical practitioner cannot be held responsible when the non recognition of early tuberculosis is due to the patient failing to seek advice. To overcome this difficulty it is of the greatest importance to examine those who are in contact with tuberculous patients.

A systematic examination of all "contacts" will often show the presence of early phthisis in patients who would not otherwise seek treatment.

The systematic examination of children in the elementary and secondary schools should also be useful in detecting early tuberculosis. Another urgent requirement for the prevention of tuberculosis is the visitation of the homes of the consumptive with the view of obtaining an examination of contacts, such examinations should be carried out by experts in chest examination for the experience of all medical officers in sanatoria shows that the evidences of early tuberculosis in the lungs are easily overlooked.

As an illustration of the great importance of recognising contact infections and the necessity of the examination of these "contacts" I will relate the history of some cases occurring in my own experience.

History of the C- Family (1870-1877).

This family is related to me through marriage and although I was not in regular medical attendance on any of the members I frequently saw them during their several illnesses and am perfectly cognisant of the family history and of all the details.

There were originally four brothers and three sisters in the family, all very strong and healthy with no history whatever of consumption on either the father's or mother's side. The brothers worked at farming and road repairing and their sisters while doing the house work also assisted in the out door farm work. In 1870 Robert C- aged 27 sprained his ankle and after laying up with it for a day or two resumed work before it was quite well and consequently made it worse. He again layed up for a few days and again tried work. This was repeated on several occasions until ultimately caries was diagnosed in the bones of his foot and ankle. Several surgeons were consulted and all advised amputation of the foot but the patient refused. He lay at home for months with discharging sinuses in his foot, occupying the same bedroom - a small loft over

the kitchen in the farm cottage - as his three brothers. Ultimately pulmonary phthisis developed of which he died. About nine months before his death Hamilton C- emigrated to Canada. The third brother William C- aged 22 developed phthisis about six months after Robert's death, and died in a few months and about the same time the fourth of the brothers John C- aged 19 also contracted the disease and died some fifteen months later. The eldest of the sisters Mary Ann C- who nursed her brothers also developed pulmonary tubercle and died of it while the second Sarah C- having shown distinct signs of the disease, temporarily improved, got married and had one baby and then died of sonsumption three months later.

In addition to the above a servant girl Lizzie McG- who assisted in the house during the illness also contracted the disease and died of it, and here again no definite family history of tuberculosis could be elicited. The youngest of the sisters did not become infected, and she along with her brother Hamilton mentioned above, are still alive and are the only representatives of a once large and vigorous family.

History of the W- Family.

The second example is of later date (1886-1896). This family was personally known to me for many years and in addition having made careful enquiries, I can

therefore state with confidence that there was no known history of consumption in the family or near relatives. All the members were quite strong and healthy until one young woman Annie W- aged 29 went as a governess to a school in the south of England. There she was closely associated both socially and at work with another teacher who suffered from failing health and persistent cough and who at a later stage died of consumption. Annie W- after an absence of ten months returned home in failing health with bad cough and wasting. The disease which had all the usual symptoms of pulmonary phthisis, rapidly developed and proved fatal in twelve months. The family was rather large for the house and this patient occupied a small back bedroom poorly lighted and ventilated. A sister Mary W- aged 25 who nursed this patient and who after her death occupied the same bedroom, developed acute tuberculosis about five months later and died after about three months illness. The father, Arthur W- was the next victim and he, at the age of 55 died of consumption nearly two years after the first case. The family then removed into another house but nine months after the father's death, another girl Margaret W- aged 20, died of acute Tubercular Meningitis in 15 days. Four years later the mother died of consumption after a protracted illness. The last to contract the disease

was a brother Alfred W- and he after having several haemorrhages from the lungs went to South Africa and for a time was greatly benefited but ultimately died there of phthisis.

When one looks back on such cases as these, it raises the question whether, had the present day knowledge of the disease been available, it would have been possible to save all the members of these families with the exception perhaps of the first, by the more careful isolation of the patient preferably in the open air, and the rigid destruction of all infectious discharges, for it is the duty of the family physician not only to provide the best available treatment for the patient but also to so exercise his art and his scientific knowledge as best to secure the safety and well-being of all the members of the family and even of the whole community.

These examples show the great importance of infection by contact in phthisis. We are now fully cognisant of the existence of so-called "typhoid carriers" individuals who whilst apparently in good health yet harbour in their bodies the causative microorganisms of enteric fever which they throw off in the excretions and thus may cause the disease in others. We are fully aware that during an epidemic of diphtheria there will be many persons who apparently escape the

disease themselves who yet have the bacilli in the secretion of the mouth and fauces which expelled by cough may infect others.

In the same way there are tuberculosis carriers - individuals who though not in robust health are yet not suspected of being tuberculous but who are yet excreting tubercle bacilli and possibly infecting others. There may even be individuals who remain in good health and who may nevertheless be carriers and disseminators of tubercle bacilli.

Kayserling of Berlin (Tuberculosis Leipzig 1906 V. p.240) in referring to the subject of tuberculosis carriers suggests that they give off no bacilli but harbour them in the body for months or years until some accident or illness renders the soil fertile and they become actively tuberculous and thus centres of infection. It is also interesting to note in connection with this question of tuberculosis carriers that an infective tuberculous focus may be present in the body without any pathological changes either microscopical or macroscopical being discoverable. Thus Harbitz pointed out that a large proportion of school children were in this sense the subjects of latent tuberculosis. In most of the cases it was the lymphatic glands which were affected but a similar condition may occur in other organs and tissues even in the lungs

It may be, as has been suggested, that the bacilli in these centres of latent tuberculosis may have their virulence diminished, it may also be that though virulent, their power for harm is counterbalanced either by the activity of protective agencies in the individual or because the bacilli are isolated and cut off from communication with the rest of the body. In any case if this infective material were to gain entrance into some other individual whose tissues furnished a fertile soil disease might result.

We do not know how long tubercle bacilli may remain latent.

Harbitz (Untersuchungen über die Häufigkeit etc. der Tuberculose, 1905) suggests that it is only a few months or at most a couple of years, but it seems long enough to offer sufficient possibilities of danger to others. Apart, however, from this conjecture there is no doubt that many cases of tuberculosis of the lungs remain undetected and become sources of danger because their infectiveness is unsuspected. Squire has drawn attention (International Clinics 16th ser. 1906 IV. p.90) to the cases of chronic bronchitis in elderly persons in whom tuberculosis has supervened on the bronchitis, and, causing no new symptoms but merely an exacerbation of existing discomforts, remains undetected though examination of the expectoration would

demonstrate the presence of tubercle bacilli.

While it is very important to appreciate the infective nature of tuberculosis, the doctrine must not be carried too far. Tuberculosis is not ~~as much~~ as infectious as for example measles and scarlet fever.

Farquharson in a recent paper (Lancet 1910 II. 224) points out the necessity of prophylactic measures such as the prevention of spitting, the disinfection of sputa, the thorough cooking of meat and the boiling of milk, but would deprecate the view of regarding tuberculosis as a dangerous infection.

There is no doubt, however, that many consumptives can trace the commencement of their illness to close association with an advanced case of consumption. It has also been proved experimentally in cattle by Dr. Cobbett that infection was the determining influence, susceptibility playing a minor part (B.M.J. 1909, II. p.867). The experience with herds of cattle proved that once a herd had been cleared of tuberculous members and the cowshed had been purified, the herd could, in the absence of fresh importation of disease be kept permanently free from tuberculosis without any change in other conditions of environment.

## Methods of Treatment.

Just as in our methods of prevention the increased knowledge of the causation and pathology of the disease has revolutionised our methods of treatment.

A quarter of a century ago the consumptive patient whose illness was interpreted as the result of exposure and neglected cold was protected in every possible way. The pallid, worn, emaciated - perhaps hectic - sufferer was metaphorically and often practically wrapped up in cotton wool. Nowadays aerotherapy or open air treatment is one of the widely accepted facts of modern treatment. It is beginning to be recognised that aerotherapy is serviceable not merely in consumption but in the treatment of most diseases. While the general principle of aerotherapy has been universally adopted, there are numerous details to be considered in connection with the methods of carrying out this treatment and with the various adjuncts to it.

Many physicians favour complete rest for the consumptive patient. It is argued that to heal a congested and perhaps ulcerated lung rest is essential. Movement would presumably injure the lung both directly and indirectly. While rest is helpful and indeed essential at certain times/the prolonged continuance of resting treatment is fraught with unsatisfactory results.

The patients may seem in many instances to improve. Perhaps they put on weight in large amount. Often they become heavy and corpulent but it is commonly mere fat, the skin textures remain pallid and toneless, the muscular tissue remains soft and flabby and the individual himself is far from physiologically fit. The practice of continued rest in consumption proceeded from a faulty because insufficient conception of the disease. The attention of the physician was directed chiefly to the local lung lesion and ignored the general systemic or constitutional intoxication.

Even in respect of the affected lung itself rest beyond a certain degree and in special circumstances is most fallacious.

Dr. R. W. Philip (B.M.J. Dec. 24th, 1910) points out that very satisfactory results were obtained by breathing exercises and other movements at the Victoria Dispensary for Consumption, Edinburgh, more than twenty years ago in the pre-sanatorium period. At the present time most sanatoria have a system of regulated physical employment for their patients and rest and movement is prescribed according to well - defined indications. According to Dr. Philip (loc. cit.) so long as the tuberculous process is in active operation toxins are readily elaborated and passed freely to the muscles with resultant progressive dystrophy. At this stage the indication for treatment

is mainly rest. Rest has the double advantage of tending to stay the active local lesions and of limiting the output of energy by the dystrophic muscles.

On the other hand when the tuberculous lesion is less active or in the process of arrest and the production and carriage of toxins is correspondingly less abundant and rapid the dystrophic muscles tend to recover themselves physiologically. When a lung is breaking down rapidly and there is continued absorption of poisonous products with corresponding systemic intoxication, evidenced by rise of temperature, increased pulse rate and rapid muscular wasting, rest must be the order of the day. The circulation which is the chief channel of dissemination of the poison must be kept as quiet as possible.

As recovery is taking place the aim is to restore physiological function by carefully adjusted movements. It may be that under the influence of activity a process of auto-inoculation is instituted. That is to say by reason of the accelerated circulation a certain amount of toxin is carried through the system. This stimulates the increased formation of antibodies and a condition of relative immunity is produced. The dose of exercise must be carefully regulated.

Activity in excess may serve to aggravate the

local process. The lung trouble may once more take on an acute character and an excessive discharge of toxins into the system may result.

Systemic disturbance from excessive activity reveals itself by evidence which is available both to the physician and patient. The symptoms produced include loss of appetite, malaise, headache, fever, and increased pulse rate.

Where a scheme of systematic exercises has been carried out as at the Royal Victoria Hospital, Edinburgh and at Frimley in connection with the Brompton Hospital the results have been invariably good.

The patients as a rule feel a progressive sense of well being, keenness, healthy appetite and digestion, return of fresh colour to face and skin and gain in weight.

Besides aerotherapy another mode of treatment must be mentioned about which opinions are not as unanimous but which is nevertheless being extensively practised by physicians. This is tuberculin therapy. Tuberculin has undergone many vicissitudes since its introduction by Koch in 1890. It was at first received with loud acclamation and hailed as a panacea in all cases of consumption. Unfortunately it did not fulfil the hopes entertained of its utility, either because it was given in too large doses or in unsuitable cases. It was for a time discarded but recently

there has been a great renewal of interest in the treatment principally as the result of the work of Wright.

There are a large number of varieties of tuberculin on the market but most physicians use either Koch's New Tuberculin T.R. or Bacillary Emulsion. The advice is generally given to use that dose of tuberculin which will just fail to give a recognisable reaction in the form of a rise of temperature. This seems a difficult rule to carry out as if a certain dose produces a slight rise of temperature on one occasion it does not follow that it will do the same the next time it is administered. Yet it is only by obtaining a slight reaction and then giving a smaller dose that we can attempt to carry out the rule.

The control of tuberculin injections by the estimation of the opsonic index as has been suggested is a complicated matter since the estimations must be made regularly at fairly frequent intervals if they are to be of any value and they must be made by a person skilled in this mode of investigation.

Many cases are unsuitable for tuberculin therapy. Dr. W. C. Bosanquet (B.M.J. Jan. 21, 1911) states that tuberculin is unsuitable in febrile cases. In pulmonary phthisis treatment by tuberculin has been disappointing. An antitoxic serum for tuberculosis has been prepared by Marmorek of the Pasteur Institute,

but in pulmonary disease it has also been proved a disappointing remedy. As with tuberculin better results are obtained with this preparation in surgical tuberculosis.

On the whole tuberculin therapy at the present time cannot claim general acceptance as a recognised remedy but it is worthy of a further trial in selected cases as an adjunct to other modes of treatment.

The Drug Treatment of Pulmonary Tuberculosis.

So much interest has of late years been centred round the sanatorium treatment of pulmonary tuberculosis and still more recently round the use of tuberculin that the use of drugs in this disease has received but comparatively little attention. In the Lancet Nov. 19, 1910 Dr. James R. Tombleson published six cases treated by potassium bichromate. The cases all exhibited advanced disease, nevertheless the results were uniformly good. The drug was given in doses of $\frac{1}{4}$ grain ($2\frac{1}{2}$ minims of a 10% solution in water) either alone or in combination with a tonic mixture such dose to be taken in a wineglassful of water after food at first twice and later three times a day. Dr. David B. Lees advocates the employment of continuous antiseptic inhalations. He has published the results in 20 cases of incipient phthisis in which the treatment has been employed with success. He used the same treatment in 20 cases of more advanced disease with

equally good results.

Dr. McElroy recently recorded three cases of the successful treatment of phthisis by intravenous injections of chinosol with formaldehyde (Lancet Nov. 12, 1910) but these results are too few from which to draw any conclusions.

## Personal Observations.

The treatment of phthisis in the early part of my experience as a general practitioner was largely symptomatic and practically entirely so amongst the poorer classes. Amongst the better classes a change of air was frequently recommended with beneficial results in not a few instances but the regulated open air treatment was not available then even for the rich as it is understood today. However, amongst the latter I can recall a few instances of cure even in those early days but on the other hand, amongst those who were too poor to go away at all or who could only stay away from work for a few weeks, I cannot call to mind a single case of permanent recovery in the earlier half of my experience. This is hardly to be wondered at seeing that all that could be done in such cases was to treat the symptoms as they arose such as cough, haemoptysis, night sweats, etc., and though it was possible as a rule to afford some slight relief, one now has much doubt if any permanent benefit accrued. Comparing that period with my personal experience our-

ing the past ten years one has to record a promising change for the better although even now the percentage of permanent recoveries amongst the poorer classes is lamentably low. No doubt earlier diagnosis is now possible when such aids as the bacteriological examination of the sputum and the use of the tuberculin test in its various forms are available. Of the latter I have little experience but the use of tuberculin ointment as advocated by Moro is simple of application, fairly reliable and apparently free from dangerous after-effects. Early diagnosis is a factor of very great importance as affecting the prospect of cure and this (apart from the advantages derived from the fresh air treatment) to some extent contributed to my success in a few instances in the treatment of phthisis amongst the working classes within recent years. These successes have not been numerous amongst patients of that class but the following three which are selected as the best, show that such recoveries are now possible although by no means frequent.

No. 1. Mrs. T- S- married, no children, developed phthisis with well-marked consolidation, several haemorrhages, night sweats, etc. Open air treatment was carried out at an early stage by means of a bungalow in the back garden of a cottage. After twelve months she was almost well and after two years all the symptoms had cleared up and she has now been perfectly well for over three years.

No. 2. Miss B- M- aged 19 had well marked phthisis with consolidation at the right apex and was sent by some friends to a Sanatorium at Bournemouth for open air treatment for three months. She returned considerably improved but by no means cured. The open air treatment was continued at home under my supervision in a workman's cottage for about eighteen months and resulted in a complete cure. This patient has now been in perfect health four years. A peculiarity about this case is that there was a marked shrinking at the right apex which after recovery resulted in the formation of a large hollow or concavity beneath the right clavicle.

No. 3. George L- aged 35, brewery labourer developed phthisis with haemoptysis, etc. Open air treatment was tried in the garden for two months with benefit but the patient returned to work and in about six weeks was worse than before. The open air treatment was tried again for a few weeks when the patient was sent to his brother in the country in Hampshire when the open air treatment was continued and after thirteen months of this the patient returned to work and has remained quite well for nearly three years.

In spite of these occasional cures one is bound to look upon every case of well developed phthisis amongst the working classes as presenting but little hope of

permanent cure. My experience would go to show that the foregoing remark applies with special force to men. A working man has neither the time nor the money to devote to sanatorium treatment. Even if he receive some financial assistance to enable him to procure proper sanatorium treatment for a few months, the good to himself is usually undone in a few weeks or months when he is compelled to return to work to provide for the necessaries of his family. The indirect benefit to the other members of the household continues in so far as the patient usually retains the careful habits inculcated at the institution and so prevents the infection of others. If the open air treatment be attempted at home as it always should be - after the patients return, success may be attained in a few cases, but as a rule the necessary rest cannot be procured, or the fresh air in the factory in which he has to work and relapse follows relapse until the patient is too ill to work and the disease far too advanced to afford the faintest chance of recovery.

I can call to mind many instances where partial cures were affected by a few months sanatorium treatment but where a relapse ensued after return to work for a short time, and I can entertain no doubt that many of these cases would have been permanently cured had the time and money been available to continue the treatment in the first instance.

## Summary and Conclusions.

(a) That Pulmonary phthisis is an infectious disease and although hereditary predisposition has some influence, yet, as far as the poorer classes are concerned environment is vastly more important than heredity.

(b) That for all classes and especially for the working classes salvation lies far more in prevention than in curative measures.

(c) That although compulsory notification of the disease would be attended with beneficial results, much quicker and more lasting benefit would be attained if general medical practitioners as a whole would realise the importance of strict preventive measures by the destruction of all infectious discharges and would insist on these being adequately carried out from the earliest stage of the disease.

(d) That a few cases of phthisis can be cured in working class cottages by the employment of open air treatment.

(e) There is no specific treatment of pulmonary tuberculosis. Tuberculin has given disappointing results, and drug treatment can only be regarded in the present state of our knowledge as palliative and symptomatic.