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T H E S I S

MY EXPERIENCE OF THE OPEN-AIR TREATMENT
OF PHTHISIS.

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GENERAL OUTLINES.

A Thesis is defined in logic as an assertion or proposition, which is put forth to be proved or supported by arguments. The proposition here put forth is the discussion of the results of the treatment of phthisis at a Sanatorium near Dunedin in New Zealand, during the past eight years.

Before the advent of Europeans, phthisis was unknown in New Zealand, but it is now very prevalent amongst the natives or Maoris, and is responsible for more deaths amongst the rest of the population than any other disease.

The number of deaths in New Zealand from phthisis in 1905 was in the proportion of 5.70 in every 10,000 persons living. In the nine previous years it varied from 8.26 to 6.95 per 10,000. The mortality in England and Wales from the same disease during the year 1904 was 12.36, a fall of .38 as compared with the rate for the previous five years.

New Zealand owes its low death rate to its isolated position, its mild and insular climate, and the absence of large cities with consequent overcrowding. Then, too, there are few factories, the

majority of the population being engaged in agriculture and farming. Owing to these favourable conditions the general death rate is only 9.27 per thousand, which is said to be the lowest death rate in the civilised world. The Edinburgh death rate for 1905 was 16.1 per thousand.

Some diseases, such as ricketts, are practically unknown. Compulsory notification of phthisis has been in force for some four years; then, too, the entrance into the country of cases of advanced phthisis is illegal, and the shipping companies are made responsible for the cost of maintenance of any such patients, and their return to the port from which they came.

My first experience of the open-air treatment of phthisis was in the year 1898. I had then been engaged in a general practice for some six years in Dunedin, a town of 56,000 inhabitants in the southern end of New Zealand. In the course of my practice, I had had the usual number of cases of phthisis. These patients generally journeyed from one to another of the various localities supposed to have a specially good climate; but I do not remember that any of them ultimately recovered.

Having a patient who had tried the various modes of treatment with the sole effect of progress from

bad to worse, I engaged a cottage and attendant, and tried the open-air treatment. The results were to me startlingly successful. Other cases came, for whom I had to make provision, and in a short time I had a small sanatorium erected, which has now accommodation for 14 patients. This was the first institution of its kind in the country for several years.

A sheltered site with a sunny northerly aspect was selected on a hillside, at an elevation of 1200 feet above sea level. The air here is very pure, and there is a beautiful view of mountain ranges and valleys, some of the former rising to a height of 5000 feet.

The buildings are all of one story. The bedrooms are arranged in two wings with the nurses' quarters, dining rooms and Administrative portion forming a central block. Running the whole length of each wing are verandas, and covered-in ways connect these with the dining room. The door of each room opens on the veranda, and opposite the door is the window, so that both door and window communicate directly with the open air and a thorough system of cross ventilation is secured. As a rule both door and window remain open day and night, but one or other is closed in windy weather. Screens of wire gauze are also supplied for doors and windows.

The walls are wood-lined, and are either painted or oiled and varnished: the floors are polished with beeswax. Electric bells connect each room with the nurses' quarters. The furniture is simple and designed to avoid dust. A lounge is provided for each patient in the out-door shelters, of which there are two. For further details, vide ground plan and photographs.

The cure of consumption being largely a matter of improved nutrition, the diet is of first importance. At Flagstaff Sanatorium considerable latitude is allowed to meet individual idiosyncrasies, but the following is the ordinary regime for a patient who is below his normal weight.

At 7 A.M. a glass of warm milk. Temperatures by the mouth and pulse rate are taken at 7.30, and breakfast follows at 8. This meal begins with a plate of porridge or bread and milk, with cream, followed by underdone steak or mincemeat (sometimes raw) and eggs, raw meat sandwiches, bread and butter, milk or coffee. Then follows slow walking exercise, or rest as prescribed, and another glass of milk at 11 A.M. Pulse and temperature at 12.30.

At one o'clock comes lunch. This begins with soup, followed by roast beef or mutton, lamb, tripe or fowls, with plenty of potatoes and vegetables,

milk puddings or suet puddings and fruit. Bread and butter and one or two glasses of milk complete this meal. Afternoon - another walk or game of croquet if the temperature is not raised.

At 4 P.M. a glass of warm linseed tea is served to those desiring it. From 5 to 6 each patient rests again, and has the pulse and temperature again taken.

At 6 comes dinner consisting of fish, joint of meat and vegetables, pudding and cream, bread and butter, fruit and a glass or two of milk.

About 9 P.M. the patients retire to bed.

Cold water packs for the throat and chest are used in many cases with advantage. Rubbing of the chest with various oils, sometimes with creosote added, has been given a thorough trial without apparent result.

Not infrequently patients are unable to take milk owing to difficulty in digesting the curd. In such cases boiled whey has been used with advantage; in other cases, dilution with soda water or with barley water, or simply with hot water may suffice. Fermented milk or kumyss has been used in some cases, but I do not think it has any exceptional value.

The patients are encouraged to use butter largely at each meal.

Raw meat juice has been freely given with good results.

The amounts of rest and exercise are regulated by the temperature. If it is above 98.6 F. under the tongue in the morning, or if it was over 100.6 the previous evening, the patient is kept in bed.

All patients are kept in bed for a few days on arrival.

The walking at first is very slow, at the rate of about two miles an hour; and seats are provided for frequent rests. I have seen several relapses caused in promising convalescents by too long or too hurried a walk, also by fatigue due to too much talking. Excitement of any kind I believe to be injurious to some patients, hence I do not think that entertainments or exciting games are advisable in Sanatoria. The more successful Sanatoria are those where a strict regime and regular discipline are enforced. In fact one of the chief reasons why a patient progresses better at a Sanatorium than at his own home, is because he is relieved from the over-anxiety of relatives, from the excitement of injudicious visitors, and other domestic worries.

Then, too, the association with others who have already improved under a similar course of treatment is of the greatest encouragement and assistance to the beginner.

It is found that as good or better results are

obtainable in the winter as in the summer. The cold air stimulates appetite and digestion, and reduces the fever, whilst the patients well wrapped up and supplied with hot bottles, experience no personal discomfort from the low temperature.

The patients very quickly lose any fear they at first had of catching cold from the abundant supply of fresh air. They become very sensitive to any closeness of the air in a room, and I have been told that it even seemed to make a difference if anyone stood between the patient and his open window. By day and night they are quite accustomed to, and rather prefer, a current of air passing through their rooms.

In favourable cases the initial aspect of pallor and delicacy soon becomes replaced by an aspect of robustness. Night sweats are practically unknown. The cough becomes easy and gradually disappears. Patients uniformly sleep well, the appetite is wonderfully good.

The gain in weight is sometimes remarkable. The highest on record at Flagstaff is eleven pounds in one week. A number of patients have gained 21 lbs in three weeks, and a steady gain of 3 lbs a week for some months is a common experience. Oneman 6 feet in height weighed only 9 stone on admission.

In eleven months he left with 15 stone to his credit, a gain of 6 stone. However a steady gain of $\frac{1}{2}$ to 1 lb a week is generally evidence of satisfactory improvement.

Each patient is supplied with a fresh muslin handkerchief daily, the expectoration is gathered in mugs lined with brown paper, or in pocket flasks, and is burned daily. In each room is posted a card of rules for the guidance of patients, giving general instructions, also cautioning against expectoration in the grounds and against swallowing the expectoration.

Most of the patients admitted, especially at first, were in advanced stages of the disease. They came to the Sanatorium only as a last resource, after other methods of treatment had failed. In spite of this, it will be seen that a very large proportion benefited and many have been permanently cured.

In most cases during their stay in the Sanatorium bacilli were found in the expectoration; but in this and other respects, imperfect records have been kept, owing to the pressure of work through having to carry on a fairly large general practice as well as to attend to the Sanatorium. In some cases, bacilli were found in the expectoration of patients when leaving with little or no physical signs of disease.

Most of the patients had taken freely of cod liver oil, its various emulsions, malt extract and creosote before admission. These and other remedies have been very little used, and are - I think - of value only in exceptional cases. Nux Vomica and soda bicarbonate have been frequently used for dyspepsia.

On a liberal and varied diet, constipation is not often troublesome, as there is a plentiful residuum which stimulates the peristalsis of the bowels. When necessary, cascara sagrada or a saline mixture of magnesium carbonate and sodium sulphate are used.

In phthisical patients there is probably less risk from giving large amounts of nitrogenous foods because elimination of waste products goes on more freely than in healthy persons, from the lungs, both in the breath and expectoration, and from the skin. In this connection it may be mentioned, one has noticed that patients who have a dry parchment like skin do not make good recoveries.

In one case, creosote was distinctly beneficial, the patient - a lady - had improved very much in every respect under the ordinary hygienic treatment. She was however troubled with much wheezing due to bronchitis, and with shortness of breath. She was

tall, fair, with a very fresh, florid complexion. Under creosote, her symptoms very rapidly improved.

A case of an opposite character was that of a young man of 21 years of age, who had been ailing for two years or more with vague symptoms, such as loss of appetite and rapid pulse and dyspepsia, for which it was difficult to account; until he developed a cough and evening fever. He was then given creosote by his medical attendant and continued to take it for a month, during this time he lost a stone weight and became much worse. As the only change in treatment was the giving of creosote, the aggravation was attributed to it. The medicine was stopped, he was taken to the Sanatorium, where, after several months, he began to improve. He made a complete recovery and has been well and hard at work for the past six years.

Several years ago, an Italian physician, Carlo Ruata, published a book on Tuberculosis, in which he strongly recommended inhalation of carbolic acid, creosote and alcohol mixtures by means of oro-nasal masks to be worn day and night. I persuaded some patients to give this a faithful trial for several weeks, with negative results.

I have also tried sprays and other inhalations without any benefit. As Professor Cornet of Berlin

points out, the most active and vital bacilli are embedded in the lung tissues or covered with serous exudations which render them impervious to inhalations; whilst the bacilli met with in the bronchioles or expectoration are mostly dead, or placed out of the range of action. In this connection, one is amused to read in the daily papers that ozone is the most important factor in the open-air treatment of consumption, because it is a deadly poison to the bacilli! To my mind the rationale of this treatment rests on an improved nutrition of the patient. The isolation, the rest, the freedom from anxiety in the Sanatorium life, and the pure air all contribute towards improved efficiency of digestion and the conservation of the nervous energy for the processes of assimilation and recuperation.

In seven years, there were treated in the Sanatorium for upwards of two weeks, 172 patients. The average number of weeks that each patient stayed was 13.76. The average gain of weight per patient was 12.8 lbs.

There were 145 cases, definitely improved, as shewn by gain in weight, and more or less improvement of the physical signs. In 27 cases no improvement resulted. In 78 out of the 145, there was arrest of all evidence of active disease, such as rise of

temperature with more or less complete disappearance of physical signs of disease and ability to do work and go about freely. These are classed as much improved or apparently cured. In the remaining 67, there was marked improvement, but still need for care to ensure recovery: these are classed as improved only.

There were 100 male and 72 female patients.

Following is a general tabulated Statement of the whole results and a detailed one of the result of treatment of the first fourteen cases.

SUMMARY OF RESULTS.

<u>Nature of case on admission.</u>	<u>Number of Cases.</u>	<u>Apparently cured.</u>	<u>Improved.</u>	<u>Not Improved.</u>
Consolidation or early cases.	79	63 or 79.7%	16 or 20.2%	-
Cavity or Advanced cases.	93	15 or 16%	51 or 55%	27 or 29%.
<u>Totals.</u>	172.	78 or 45.3%	67 or 38.9%	27 or 15.2%

TABLE OF FIRST FOURTEEN CASES TREATED.

Case	Length of stay in weeks.	Condition on Arrival.	Condition on Leaving.	Weight.			Remarks.
				On Arrival.	On Leaving.	Gain.	
1.	20	Phthisis, second stage.	All trace of disease gone, except little dulness left infraclavicular.	St. lb. 8 2	St. lb. 10 0	Lb. 26	Returned to work as clerk; began to lose weight; gave up work and returned to open-air life, and is now regaining lost weight.
2.	5	Phthisis, third stage.	No improvement.	8 6½	8 6½	Nil.	Died at home.
3.	3	Abscess of lung.	Practically cured.	7 10½	8 5	8½	Continued treatment at home, and is now perfectly well.
4.	20	Fibroid phthisis and pleurisy.	Much improved.	7 12	9 4	20	
5.	3	Incipient phthisis.	No signs of disease.	10 9	11 5½	10½	Has remained well, and is at work.
6.	11	Chronic phthisis; very dyspeptic.	Relative cure.	10 7	11 6	13	Is now at work.
7.	28	Fibroid phthisis.	One or two slight creaks over left upper lobe; air not entering quite so well as on right; otherwise normal.	8 11½	10 5½	22	Continued treatment at home, and is now at work.
8.	20	Crepitations general over upper lobes; temperature high; pulse rapid.	Crepitations less marked; temperature and pulse better.	9 0	9 8¼	8¼	Continued treatment, and is now at work.
9.	16	Laryngeal and pulmonary tuberculosis, three years' duration; albumenuria, crepitations, and dulness both superior lobes; hectic fever; pulse 104.	Right side clear; dulness and crepitations left upper lobe; tubular breathing left posterior apex; temperature normal; expectoration scanty.	9 8	10 4½	10½	Continues treatment at home; looking remarkably well.
10.	28	Very weak from severe repeated haemorrhages; coarse crepitations all over right side; dulness left upper lobe; expansion 1 in.	No haemorrhage for twenty weeks; crepitations and friction sounds less marked; expansion, 2½ in.	9 6½	11 0	21½	Continues treatment at home.
11.	10	Early affection both apices.	Physical signs completely gone; no bacilli in sputum.	10 6	11 3	11	At work; quite well.
12.	8	Advanced tubercular disease of lungs and larynx.	. . .	10 10	10 1½	..	Died.
13.	22	Extensive disease both lungs; dyspeptic and emaciated.	Slight improvement in physical signs; dyspepsia much better.	7 7	8 0	7	Continues treatment at home.
14.	12	Tubercular ulceration of right vocal chord.	Ulcer healed.	12 8½	14 5	24½	This patient gained 7 lb. in one week.

DENTAL OPERATIONS - A CAUSE OF PHTHISIS.

Although not mentioned in the works of the recognised authorities, I have reason to believe that dental operations are a frequent determining cause of the onset of phthisis. On enquiring into the history of a patient, one is sometimes told, "My teeth were extracted under chloroform two or three years ago, and my illness seemed to date from that time. I have never been well since." Extensive operations on the teeth are undertaken in too light-hearted a manner, as if it were a quite trivial affair. The patient is assured that it is better to have all the teeth removed, to save further trouble, and the dentist proceeds to extract good and bad alike. Familiar to all are the resultant septic condition of the oral cavity, the anorexia and general upset of the alimentary system, not to mention the loss of blood and pulmonary irritation due to the anaesthetic. If the patient has already, as is often the case, a latent infection, better means than the above to ensure an attack of active tubercular disease could not be adopted. If the tubercle bacilli have not previously effected a lodgment in the system of the patient, such a result may readily

follow from the presence of open wounds, of such a favourable character to bacterial growth and development.

It is already known or suspected that decayed teeth are dangerous sources of tubercle infection. Particles of food lodge in the dental cavities, decomposition takes place, tubercle bacilli enter, propagate rapidly, and are absorbed by the lymphatics. This is a frequent cause of sub-maxillary and cervical adenitis, consequent on which may ensue joint affection, consumption, meningitis, or any of the other forms of tubercular disease.

The above observations furnish further reasons for the prevalent opinion that dental operations should be more restricted in the future. In the case of young people where there is any reason to suspect a tubercular tendency, i.e., latent tuberculosis, dental extraction under a general anaesthetic should be avoided. A local anaesthetic and the extraction of only one or two teeth at a time are preferable. I have seen bad results follow the administration of either ether, chloroform, or gas.

CHILD BIRTH AND CONSUMPTION.

The general experience in this connection agrees that while the pulmonary symptoms may remain quiescent or even improve during pregnancy, a serious aggravation follows during the puerperium. In the past six years I have had several cases which appear to contradict this view, and furnish some reason for the opinion that the relapse after child-birth is not necessary, but is due to the customary mode of treatment of the lying in woman. I quote these cases in some detail, as I consider this is a question of importance.

No. I. Mrs A. Aet. 33 about. Has had two children. She expected to be confined in about six weeks when she consulted me. She has had cough and expectoration for some months. A sister had recently died of phthisis. On examination well-marked râles were found in both upper lobes with impaired resonance, and harsh breath sounds. She had slight evening rise of temperature and was kept in bed for a month with wide open windows and good nourishment. A room was prepared for her confinement by having practically all the furniture taken out and curtains removed, while linoleum constituted the sole floor covering. The room was a small one and the bed lay

opposite a window, opened so that upper and lower sashes were on a level.

Another room was prepared for the baby and nurse with a fire and the usual furnishing.

The confinement was easy and no chloroform was given. The baby was very weakly and only survived 3 days. The mother made an excellent recovery. She kept her window open day and night in spite sometimes of solicitations of nurse and friends. At the end of four weeks or thereabouts, she seemed quite well, her lungs were clear and she was allowed up. Shortly after she returned to her home in the country, being cautioned to rest a great deal and to lead an open air life. She had no relapse and in June of last year a sister, who previously had had a course of treatment in the Sanatorium for well-marked pulmonary tuberculosis, wrote to me:

"My sister and I are keeping fine, and both of us are able to do our own work. My sister has two daughters, also a fine big healthy boy nine months old. Neither of us ever know what it is to have a cold."

The baby referred to in this letter was born in the country about three years after the previous confinement. I understand that during this last confinement a similar line of treatment was adopted.

Here then the dreaded second pregnancy was successfully passed and a healthy child born, not only so but the mother has since been so well that she is able alone to attend to her children and household duties, not for want of means, but because it is so difficult in New Zealand to procure competent domestic help.

No. 2. Mrs C. A nervous woman with much vitality, wife of a publican, had had several attacks of haemoptysis, during and before her 7th pregnancy, the youngest child being then about 6 years of age. She was confined in a room with open windows and they remained open during the puerperium. Her recovery was uneventful and she has remained well since - over two years.

No. 3. Mrs H. after haemoptysis and other symptoms of early phthisis, had treatment in the Sanatorium for 7 weeks during which she gained nearly a stone weight and left practically cured. She had then been married about 10 years and had 3 children the youngest about 5 years old. After leaving she continued to lead an open-air life and has had one subsequent confinement. Both mother and child have done very well.

No. 4. Mrs H.A. Had been ill for 2 years or more with extensive pulmonary affection (3 lobes)

before admission to Sanatorium. She has one child aged 6 years. Her course of treatment continued for 10 weeks, during which she gained 32 lbs. and made a good recovery.

After leaving she returned home and remained well, living strictly under open-air conditions but doing her own household work. She was confined about 18 months later. Chloroform was administered and instruments used. Open air conditions were not observed; she was in fact treated as an ordinary puerperal patient. A very serious return of the pulmonary tuberculosis followed and the larynx also became affected. She returned to the Sanatorium and had 12 weeks treatment with little benefit. Her case seemed hopeless; however she followed up the treatment at home with great perseverance and after another 3 months began to mend, her voice returned and she is now fairly well again.

Here there are three cases in which open-air methods and avoidance of anaesthetics were followed by no return of pulmonary trouble, and one case in which the same precautions were omitted and a serious relapse ensued.

In view of the above instances I would strongly urge that consumptive pregnant women should be treated on strict open-air lines before and during the

puerperium. No half measures should be used, and the nurse and patient should be thoroughly instructed in what was required beforehand. Moreover no anaesthetic must be given.

EARLY PHTHISIS AND TACHYCARDIA.

Physical examination of the heart often affords valuable indications in the treatment of phthisis, as well as in the prognosis. We must, for instance, regard as a signal of danger the advent of a weak second pulmonary sound, just as in cases of acute pneumonia. A frequent pulse rate is found in most cases of phthisis at some stage or other of the disease, while it sometimes constitutes a very early and noticeable feature. In many cases the tachycardia only comes on during exercise and slowly subsides as soon as the patient rests. In such cases which are probably due to enfeebled heart muscle, the exercise should be slight and caution should be taken to avoid any exertion until the system generally, and the heart muscle in particular, have been renovated.

In one case of a nervous lad accustomed to a quiet country home the excitement of leaving his room and lying on a lounge amongst other patients caused so marked a tachycardia that he had to be isolated for some time. Here the tachycardia was of systemic nervous origin. In two other cases the tachycardia was of quite a different character. In one the pulse rate when at rest was always about 150,

on the least movement - such as sitting up in bed - the heart's action became so rapid and forcible that it seemed to shake the whole chest and the pulse could not be counted.

He had much fibroid thickening of pleura - consolidation of lung tissue, with some cavitation and profuse purulent expectoration. He said that palpitation of the heart had begun over two years previously, and his previous medical attendant stated that he thought there must be pressure of enlarged lymphatic glands on the vagus nerve to account for the heart's action. He had been taking atropine and strychnia but no medicine was used during his stay in the Sanatorium. He was kept in bed for two months and at rest on a lounge for several more. After 8 months he was altogether a different man. The palpitation was gone, the pulse fairly normal and expectoration much diminished.

The other patient was a tall, thin, emaciated youth of 20. His pulse-rate varied from 120 to 140 when at rest. He had been in ill-health for about two years and the rapid pulse had been fairly continuous; the symptoms had been attributed to rapid growth and indigestion.

Although the pulmonary signs were not marked the diagnosis was clear - there was harsh breathing with

prolonged expiration over the left upper and lower scapular areas - and cogwheel breathing in the lower scapular area where fine crepitations afterwards developed. His temperature in the evening was 102° F. He had the typical appearance of the consumptive, the hectic flush, brilliant eyes, and timid, hunted look, with night sweats.

For five months he was kept at rest and encouraged to eat as much as possible.

His temperature which was often of the inverse type, i. e., higher in the morning than the evening, slowly came down and he steadily gained weight. Eight months after admission he looked comparatively robust, his pulse was still rapid on exertion, but when resting came as low as 86. He went home, was well looked after, and for the past five years has remained perfectly well and hard at work. These two cases point either to pressure of enlarged glands on the vagus, or the action of tuberculin toxins on the cardiac nerves. They emphasize very markedly the value of complete rest under open-air conditions in improving the cardiac, as well as other symptoms.

NEURITIS.

Neuritis is frequently present in phthisis. It is a troublesome symptom and its importance is not often sufficiently emphasized.

It is sometimes erroneously diagnosed as rheumatism. Neuritis was a marked symptom in six of the 172 cases. In three cases the nerves of the lower limbs were chiefly affected, in other two the upper limbs and brachial plexus. Menthol 20% solution in oil was found useful locally. Also massage. In most cases the neuritis disappeared as the general health and nutrition improved. In one case it was a very painful and distressing feature a few weeks before death.

NEURASTHENIA AND PHTHISIS.

In three patients only was neurasthenia an important complication. Two of these were males, one a Jew. He was a man of about 49 and had been manager of a large business, he had worked early and late for a considerable number of years. In the Sanatorium he did well at first, but a relapse occurred, his throat became affected through driving in a cold wind. This discouraged him greatly and he could never quite recover the lost ground though he lingered for several years.

In the other two patients the nervous instability was of a more marked character; the one, a young lady, could never rest, and was quite miserable unless in the gayest company. Her prospects of recovery which were otherwise good were thus dissipated and she went down-hill rapidly.

The other case - that of a young man - was of a similar character and the disease proved rapidly fatal.

There is no doubt that a sound nervous system is of the greatest importance in combating this and other diseases. The neurasthenic patient is very amenable to suggestion, is over-anxious about his

symptoms, is generally dyspeptic, and is inclined to sleep badly.

All evil allies in a contest against the Tubercle bacillus.

PHTHISIS LARYNGEA.

Definite laryngeal complications were found in 17 of the 172 cases, i.e. in the proportion of 1 in 10. In all but one case the laryngeal affection was secondary to pulmonary disease. The one exception was that of a clergyman aged about 50 years, who had overstrained his voice in preaching. He had a tubercular family history and was himself said to have been delicate in youth. He was pale, anaemic, and rather thin, the vocal cords were red and congested. The voice was husky and the larynx painful. Cold water packs were applied to the throat; he was instructed to speak little and then in a whisper and was encouraged to eat well and try to gain weight. The effect was remarkable, he gained several stone in weight: his appearance altered from that of a student to the likeness of a burly farmer, and his voice soon returned. He went back to work, and has remained well and vigorous.

Most other cases have proved quite amenable to the same treatment, when the lung affection has not gone too far. When the patient improved generally, improvement in the larynx also occurred. On the contrary in a failing patient, the prognosis for the larynx is bad, and local medication is useless except for the relief of pain.

In the late stages when swallowing of food became painful, insufflations of orthoform, or of morphia and cocaine powder were used with good effect.

It is interesting to note how little is nowadays heard of the local treatment such as curetting, which was formerly so much in vogue.

Early diagnosis and prompt and thorough open-air treatment are of first importance.

HAEMOPTYSIS.

This was an early symptom in a considerable proportion of the cases. Such patients commonly do well perhaps because it leads to an early diagnosis: the patients are alarmed and radical measures are taken, before the general health has suffered.

In most of the cases at some time or another there were some blood streaks in the expectoration.

In four cases the haemorrhage was directly or indirectly the cause of death, either at or after leaving the Sanatorium. One of these was a girl of 17 years, who came to the Sanatorium a perfect skeleton. She had been ill for months, first with so called typhoid fever, which was probably tubercular peritonitis, then with pulmonary tuberculosis. There

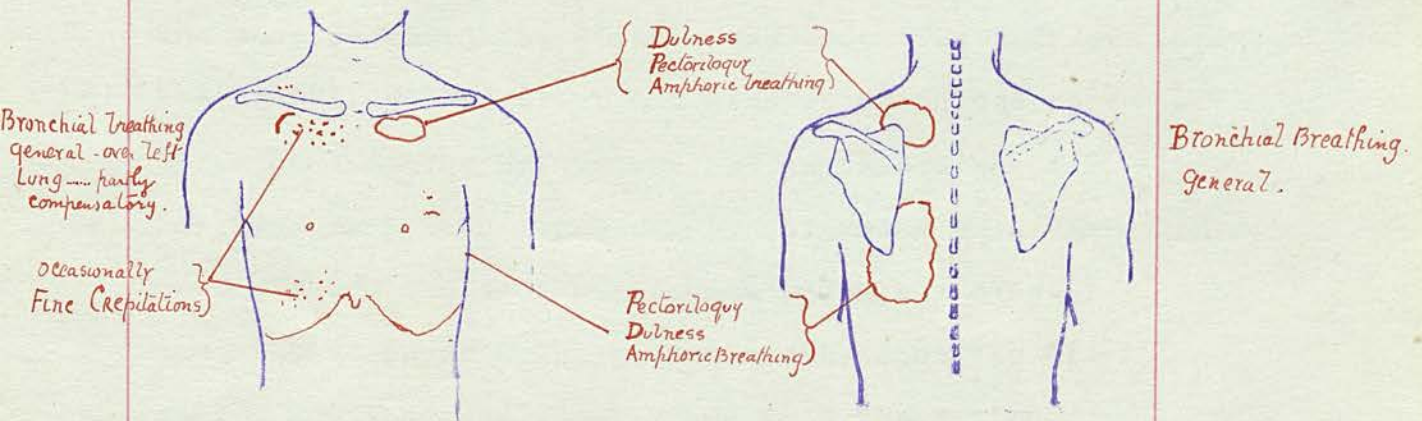
was cavitation and extensive affection of three lobes of the lungs. She reacted well to treatment, gained 2 stone in weight, and was apparently on the way to recovery. Menstruation, which had been absent for two years at length returned, and with it came for the first time a violent haemoptysis. This attack passed over, leaving her very weak, and the following month when menstruation returned a second attack of haemoptysis ensued and proved fatal.

The treatment usually adopted was low diet, rest in bed and aperient medicines to ensure low blood pressure. Morphia was used where necessary, e.g. if the patient was much alarmed, and it was requisite to do something to secure mental quiet. Cold compresses and turpentine inhalations are useful as suggestive measures. Amyl nitrite capsules are also kept ready for use.

A CASE OF EXTENSIVE CAVITATION.

A young man has for the past 18 months been under my care with lesions, so extensive that it is remarkable he should be able to be up and about as he is on most days. He has a good steady pulse and eats well. He expectorates every morning when he sits up, about three ounces of pus, evidently the accumulation in a cavity for the night. His temperature per rectum is usually 98° to 99° F. in the morning and 100° to 101° at night. I felt doubtful at first if the physical signs in the left lower lung did not point to pneumothorax, but there was an absence of any coin percussion sounds and he did not have the shortness of breath sufficiently marked.

Following are diagrams giving details of physical condition of chest:-



VARIOUS COMPLICATIONS.

One case of tubercular meningitis occurred out of the total of 172. The patient, a man of 50 years of age, had been ill for 6 years or more, a general roseolar rash accompanied the meningitis and he died within 10 days.

Diabetes and phthisis occurred in one case in a man of 56. The diabetes was of a severe character and the phthisis came as a late complication. The patient did not last long, but died comatose.

General Paralysis of the Insane and phthisis were associated in one patient. His chest symptoms got better and the cerebral affection, which was at an early stage, did not seem to make much progress during the six months he was in the Sanatorium.

Lupus. One patient, a young woman was treated for this disease. Her father and two sisters had died of pulmonary phthisis. She was thin, anaemic and underweight. The disease was under the left ear, the size of half a crown and ulcerating in one corner. Some months before she had had a course of X ray treatment with improvement. By means of a concave mirror, sunlight was passed through a blue ammoniated copper solution and focussed on the disease. She improved greatly and in 3 weeks time,

when she went home there was much less congestion and portions were quite healed. She was seen again a year later and the disease was then spreading again

Albuminuria complicated the phthisis in three cases. They were kept mainly on a non-nitrogenous diet and all improved.

Pleurisy was a frequent complication. When painful, if the lower part of the pleura was affected, strapping was found very helpful. If the trouble was in the upper part of the chest, mustard leaves were usually applied.

Pyopneumothorax occurred in one patient. A case of advanced phthisis. He was removed to the General Hospital and an operation performed without benefit.

GENERAL OBSERVATIONS.

The etiology of most of the cases treated was uncertain. In some, there was a history of previous tubercular trouble in the family, but in the majority there was no such history. Less than twenty of the patients were over forty years of age, the great majority were young adults between twenty and thirty.

In some cases the outset of the disease dated from an attack of measles, or of whooping cough. As already stated several asserted that their chest trouble began after having a large number of teeth extracted.

This may have been the determining cause where the disease was previously latent, or, as dentists are notoriously negligent of aseptic precautions, infection may have been directly introduced by means of the dental instruments or sponges.

In one case the following family history was elicited. The father had emigrated to New Zealand from Scotland forty years previously; two of his brothers had died there of phthisis when youths. He himself though still living and sixty eight years of age was always looked on as delicate, and he had had pneumonia very badly. His eldest daughter was lame from childhood with a stiff knee, probably of

tubercular origin, when thirty five she developed dry pleurisy which yielded to open-air treatment, as a ^{child} she had ring-worm very badly. Another son, though now very robust, had abscesses of the glands of the neck in childhood. Two other sons and a daughter were now robust though two at least were ailing at twenty. A third daughter the youngest was apparently quite strong, until twenty six years of age, she then developed pneumonia and pleurisy, quite twenty five years after her father's illness. The whole period of forty years they lived in the same house. Here it is evident that several of the members of the family were infected by tubercle, the eldest daughter suffered most in general health, the second son got rid of the disease through the cervical glands, which broke down and discharged. The youngest daughter may possibly have received infection in infancy, which remained latent until she was twenty six years of age.

Another explanation of the facts might be that all the children inherited from the father a susceptibility, or suitability of soil, for the tubercle bacillus. Then infection would probably take place from different sources, in the case of the eldest daughter from the father, in others perhaps from milk or other sources of infection.

This would agree best with the recently published observations of Nathan Raw of Liverpool, viz., that tubercle of the glands is due to bovine bacillus, while pulmonary phthisis proper is due to Koch's bacillus. There is however another factor to which I do not think due importance has been assigned, i.e. the fact that people inherit a variable vulnerability or disease tendency in various organs. Hence the same debilitating agent, such as exposure to cold, may induce in one person an attack of diarrhoea, in another a cold in the head, in a third rheumatism, a fourth bronchitis and so on. Perhaps the term 'suitability of soil' may be extended to include this factor, as well as that of adaptability for the growth of certain organisms.

I have this year spent the month of February at Davos, and while there visited the principal Sanatoria and had some conversations with Drs Turban, Carl Spengler and others.

Dr Spengler stated that there is a clinical difference between cases of infection by bovine and by Koch's bacillus, viz. that patients infected by the former bacillus are restless, and when feverish do not benefit by rest in bed. He shewed me a preparation of Koch's and bovine bacilli on one slide, in which the much greater size of the bovine bacillus

was very evident. He also states that the bovine bacillus has large spores

Bovine Bacillus with spores.

*Shows also comparative size of
Bovine + Kochs bacillus.*



As seen in microscopic specimens at Davos.

as in diagram, which are often distinguishable.

He uses injections of tuberculin largely; where there is bovine tubercle, he gave injections of Koch's lymph: for disease with Koch's bacillus he gave injection of an emulsion of bovine tubercle.

The use of the *Uro* he said, was to be avoided.

It is interesting to note that this is identical with the views of Dr Raw.

I also spent three days at the Nordrach Colonie in the Black Forest. Here, while the climate is not so good, the methods of treatment are more precise and thoroughly carried out. The results too were much more successful, so far as I could compare them.

The principal Sanatoria at Davos have the disadvantage of being too large for a nervous patient. Then, owing to the intense cold after sunset, the dining and other rooms were mostly all closed up, and on the tables of some of them were to be seen hot house plants in bloom. All have double doors and windows and all the rooms are heated by hot water

pipes. In this way, although the air outside the Sanatoria is very pure and bracing, the air inside is often close and stuffy.

Dr Otto Walther's views on the subject of the after care of patients are interesting. He advises them to go back to the work to which they are accustomed, e.g. if clerks, they should go back to their offices. He considers that the chief thing to avoid is fatigue, and for a clerk to take up outdoor work to which he is unaccustomed, would mean overstrain and relapse. He says some of his most permanent and satisfactory cures are men, who are now working in offices in London.

It is difficult to say what percentage of the much improved or apparently cured cases relapse after leaving the Sanatorium. Many do so through their own fault, others through unfortunate surroundings. Amongst my own cured patients, who have stood the test of several years hard work, are farmers, porters and labouring men, shopkeepers, clerks, ministers and other professional men, as well as hard working wives and mothers.

FINIS.