The subject of a thesis for the M.D. of the University of Edinburgh, a University renowned, not less for its antiquity and the extraordinary excellence of its teaching body, than for the success in after life of its students, is a matter of serious difficulty to the medical practitioners who in the midst of a large practice has little time at his disposal for writing. I approach then one of the great subjects of discussion with very great humility; yet as this subject is one, which in my practice here constantly comes under my notice I am constrained to accept it and to try to put together a few of the principal points relating to it. There is also a certain pleasure in writing upon a subject which has occupied a considerable portion of fourteen years of practice the subject of my thesis is a few points relating to the commencement of the tubercular form of phthisis.
In considering the commencement of phthisis we are not at once by the question of the bacillus this minute rod-shaped fungus measures from 0.003 to 0.0035 millimeters in length, and about one third of that measurement in breadth. The rods are straight or slightly curved, with rounded ends and often enclose bright spherical spore-like granules of uniform size. Arranged in linear lines and separated from one another by hyaline intervals, stained with magenta and then washed with nitric acid [ten percent, pollution], they retain the original dye and are then distinguished from any putrefactive or other bacilli. This organism is only capable of growth and multiplication under blood serum in animal broth at a constant temperature of thirty centigrade. All the conditions essential to the development of the bacillus are alone to be found naturally in the animal body. It is of comparatively slow growth and is unable to continue its development in decomposing fluids in the presence of more rapidly growing putrefactive bacteria.

* koch
the bacillus is of very tenacious vitality and will preserve its
virulence and capacity for
development for six weeks or
in decomposing spumum or
for six months in the dry state.
If a minute portion of bacillus
containing matter be placed upon
neutral culture surface and allowed
to germinate, and if a fragment
of the product of germination be
similarly cultivated on a fresh
surface, and so on for many
generations, [all foreign germs being
excluded], the last product of
inoculated, will be as potent in
producing tuberculosis as the first.
the bacilli, whether derived from
free cultivation on from tubercle,
it intimately diffused in water
and scattered in the form of spray
through an atmosphere in which
animals are placed will produce
tuberculosis in them. In the
spuva of all well-marked cases
of phthisis we find the bacilli.
In cavities in the lungs of phthisical
origin whether large or small
bacilli are found. In caseous
and catarrhal pneumonia com-
commodations of the lung, excepting
in the immediate neighbourhood
of cavities bacilli are few and
difficult to find, yet this material
is virulent in producing tubercle when inoculated. In the granulations of miliary tuberculosis bacilli are generally but not invariably found and often in small numbers. It cannot then be said that the position of the tubercle bacillus with regard to the aetiology of phthisis is as yet established. Although so intimate and exclusive in its association with the lesions of that disease that by its recognition in excreta or expectoration, we obtain a valuable criterion for diagnosis in obscure cases. We are unable to say with consumptives as with symptomatic diseases that we have health on one side and a specific organism on the other, that when we observe a patient sickening with phthisis the tubercle parasite is in possession of him and that we might hope by exterminating the bacillus to eliminate phthisis from our list of diseases. Koch believes that certain pathological changes are necessary to the reception of the germ. Klein states that it seems to be an acknowledged fact that some micro-organisms do not grow in the living tissues of a living animal and that this true with regard to septic and pathogenic organisms probably so-called; and explains their occurrence in diseased tissues.
during the life of the subject, by assuming that these tissues had become practically dead before the organisms could grow in them. This most important statement raises the question as to whether the tubercles baccillus settles and grows in healthy living tissues of the body or only in those pathologically altered. In other words does the baccillus cause tubercle or is it the effect of it? We know that it thrives in the bodies of animals when inoculated but this hardly proves that it finds a niche in a healthy tissue when merely brought into contact with it by the surrounding air.
The next point that we have to inquire into is the primary nodule or tubercle:

[1] What is it like?

[2] What is it composed of?

[3] Where is it situated?

[4] Whence does it come?

[1] A hard, semi-transparent cartilaginous-looking nodule about the size of a pin's head intimately connected with the surrounding tissue.

[2] It consists of a collection of small, rounded lymphoid cells with a delicate reticulo-stroma, no vessels being present. The nutritive supply is derived from vessels close to, until from the dense multiplication of cells the central portion suffers. In the centre is generally found one or more giant cells, irregular masses of protoplasm enclosing many nuclei with more or less branched outline which blends with the stroma of the tubercle. The chief feature then of this neoplasm is the grouping together of the cells to form a definite nodule of a certain size, barren of vessels and with a tendency to necrotise in the centre.
The position of the tubercular granulations at their commencement has been a matter of dispute. Klein has shown that the ultimate of the pulmonary arter branching, become inundated by the growing adenoid tissue. Sanderson considers the commonest seat of the tubercle to the sheaths of the minute bronchi.

He says the masses of new growths are over-growths of masses infinitely smaller which existed before scattered through the lung and which only require to be increased in size to be indistinguishable from milicy tubercle. What is it then which produces this adenoid hyperplasia? If we fall back upon the theory of Dobell we shall, in the present state of our knowledge, find a fairly satisfactory answer to this question. He states that deficiency of fat in the blood causes oxidation and disintegration of albumenoid tissue with consequent production of molecular debris and that the effect of the imitation caused by the molecular debris is adenoid hyperplasia.
The next question we have to consider is: What is the cause of this deficiency of fat in the blood? The answer to this is:


[2] Inability to digest and assimilate the fat introduced. The blood is inadequately supplied with the elements of fat from the food; it is unable to supply enough for combustion, does not replace those taken up during intestinal digestion but takes up more to compensate for the deficient supply from the food. The fat elements of the albumenoids are then seized upon and these tissues are disintegrated in the process.
We now consider a few of the predisposing causes of this Disease:

Constitutional Liability:

In forty-eight per cent. of cases of phthisis hereditary influence is present—3:5% of which are females and 2:6% males. This difference however is due to the fact that males by exposure, i.e., more frequently acquire phthisis than the females. Dr. Weber has stated that phthisis is inherited as a predisposition, an inherent quality of soil favourable to the development of the Disease but that it can only be fertilized by the specific spores of that disease the first part of this paragraph I agree with; given this inherited tendency and expose a person with it to such a diet or such surroundings as will cause a degraded condition of the blood and a digestion unable to assimilate fat, tuberculosis is likely to take place.

Contagion:

Cases have come under my observation which obliged me to believe that under certain circumstances phthisis may be contagious in these cases the person attacked is generally confined to a small space and in constant attendance upon the invalid or is the husband or wife and liable to
inhale the breath before it has gone far from the mouth. It then assumes the pneumatic form. But as a general rule I think we may at present conclude that phthisis under ordinary conditions is not contagious. — (Bowditch).

Dusty Employments:

There is no doubt but that coal miners, tool grinders, etc., are liable to phthisis caused by such employments. Simon states that in a district those employed in any of these industries are twice as liable to phthisis as those who are not so employed. But here the disease is mechanically produced, there is no reason to suspect inhalation of the bacillus yet when the disease is confirmed the germ is present in the expectoration.

Climate:

Insufficient drainage is the only cause thoroughly made out it is invariably present in low, damp countries. — (Lancereaux). In sub-tropical and temperate climates, Jourdanet states that it almost ceases to appear at the half distance between the sea level and the snow line of any given latitude. In
the low damp inadequately drained places we also observe indigestion inability to assimilate food and a generally degraded condition of the body in these places also flourish aeropula, rickets, etc. Weber observes that a tendency to catarrh of the respiratory mucous membrane is a common source of phthisis.

[1] By producing numerous abrasions upon which the bacillus can settle.


[3] By rendering respirations more shallow to the same effect.

[4] By weakening the nutrition and energy of the whole system. The last clause is very true and it is my experience that those who are subject to catarrhs are also sufferers from digestive ailments, poor subjects, etc., and it is surprising how much less liable they become if we strengthen the body and increase the fat by improving the digestive organs. The processes of nutrition become more vigorous and the liability to phthisis ceases.
Social Conditions:

Phthisis has been described as a scourge of civilization; in nomadic tribes it is almost unknown. Wherever there exists a large population there also shall we find phthisis there also shall we find anxiety, mental worry, often unsanitary conditions, over-crowding, etc. and all these tend to lower the digestive organs and render them less able to supply the body with food so necessary to a healthy state. Some cannot get the food others cannot digest; in the effect is the same a lower vital condition and a tendency to phthisis. There is no doubt but that the continual inhalation of foul air causes want of appetite, indigestion and inability to assimilate the food especially the fatty portion. So also in those who work long hours under gas a case came under my care last winter. H. G. had been two years under the care of Dr. Williams, at the Brompton Hospital, suffering from weakness, want of muscular power and appetite, indigestion, headache, dry cough, etc., he was a clerk in the city working long hours under gas light, he had been taking during this time...
coddling oil and maltine this he said did him good but still he did not recover, he then left and came here as an insurance agent. He is out in the air all day exposed to all weathers, yet the tendency to catarrh has left him and he appears well; there is still however some dullness at the apex of one lung.
Now the most important point to the medical practitioner, if you will allow that there is, in many cases, a pre-tubercular stage in this disease, is: What are the symptoms which should lead you to suspect that there is a tendency to phthisis which is allowed to proceed will develop, but which, if stopped in time by treatment, may result in the re-establishment of health? The symptoms I would draw attention to are:

[1] Want of appetite, or rather a capricious appetite; our patient will one day eat and enjoy a dish which on the next he will abuse as indigestible: he will refer all his ailments to his digestive organs and as time goes on will reduce his diet to the smallest amount thinking that by these means he will enable his digestive system to recover its power.

[2] Irritability of temper: this of course is common in all cases of indigestion but in these cases it is difficult to relieve by the ordinary cholagogues so successful in cases of over-loaded liver: small things will upset the temper of one naturally good-natured.

[3] Headache: This is of a peculiar kind, a dull, heavy, stupid condition combined with loss of memory and relieved rather than increased by a small allowance of stimulants.
Lassitude. This is a prominent symptom. Our patient complains of weariness, inability to do the daily work, and appears careless as to whether he does it or not; he wishes to be left alone and yet when so left his thoughts are of an unhappy nature and he often returns to relate his unfortunate feeling.

A sensation of fulness after food common in other forms of indigestion with sleepiness in the afternoon.

Palpitation of the heart when lying down and want of sleep mostly due to this, also dreams of an unpleasant nature and a feeling of not having rested when rising in the morning.

Certain dryness of the skin which loses its natural soft condition and upon the cheeks and nose especially appears reddish and scurfy; the palms of the hands are also dry.

There is a tendency, even in this stage, in the nails to become almond-shaped.

Want of nerve power. Our patient finds that whenever he is set to do anything requiring nerve that he is either unable or disinclined to do it and if it becomes a necessity it fatigues him more than it should.
A lowered temperature of the body this however becomes increased as the symptoms develop.

A pulse which is often very slow when the person is at rest but which upon a little exertion is abnormally quickened.

Loss of weight.

Cough but this is generally at a later stage. Great convenience for fat and inability to assimilate it Mr. Hutchinson states I am inclined to believe that this symptom (difficult assimilation of fatty matters) may be of great use for purposes of diagnosis. Exceptions undoubtedly occur, but as a general rule, it might be laid down that the severity of the tubercular dyscrasia is measured by the difficulty with which codliver oil is borne. The need of the remedy is mostly in exactly inverse ratio to the facility with which it is digested. In these cases you will find open inquiry that the tongue is clean, the bowels regular, and of good color and consistence, and that the urinal is generally healthy clear and of normal amount. Perhaps occasionally phosphatic.
Treatment:

Change of scene, long hours in the open air, nourishing food of easy digestibility such as milk, eggs, brandy essence of beef, fish, chicken, &c., at first; this however must be increased as appetite and digestive powers return. The meals should be regular, and early hours should be strictly kept. The sleeping apartment should be large and airy, gentle exercise should be taken but over-exertion carefully avoided. A sea voyage is an excellent thing as the patient is out all day inhaling the purest air which increases appetite and digestive power whilst at the same time he takes nothing out of himself by exercise, all depressing emotions must be banished, all worldly cares and worries taken away.

Altitude:

Of the advantage of this I have had no great experience, it is supposed, by diminishing the oxygen in the air to prevent metabolism. The medical treatment consists in supplying fatty matter to the body in a form which requires little digestion and it is here that codliver oil is of so great value. The form I generally use of codliver oil and maltine can be absorbed with less difficulty than any other fat where this is inclined to sicken.
and here I may say that it seldom does so if taken early enough, and although the patient may feel sick at the name of codliver oil yet when he has taken it he is often surprised how easy it is to retain it, maltine by itself may pave the way for the combination of the next two. The best thing is Devonshire cream which is a pleasant form of fatty food. Pancreatic emulsion I have not found of very great benefit except in children, I have however not given it an extended trial, as from its disagreeable taste patients dislike it and I find codliver oil with maltine more useful and less distasteful. It will be useful to try the oil in all doubtful cases as where it can be taken we may be sure it is necessary.

It is hardly necessary to state here that the liver, stomach, &c., should be kept in order by the usual remedies when required.
Climate:

The economy of fat and carbon as well as an air so mild as to do away with the dangers of catarhal attacks being the climate best suited to the tubercular patient I may here quote a paragraph from Dr. B's tell. He says: It is evident that if the object is to be met by climate, we must look for an atmosphere which, while pure, we may yet convey as little oxygen to the lungs as is consistent with the continuance of life and nutrition. It must, therefore, be either rarefied, or diluted with some unirritating matter. The combination of a certain amount of rarefaction with a considerable dilution with aqueous vapour is the form most readily to be found. Again, we must look for an atmosphere sufficiently warm to save some of the demand for carbon to supply animal heat, and we must look for a place where this warm diluted air can be freely breathed with as little exercise as possible, so that histogenesis may be passive, and the demands for mechanical force reduced to their lowest degree. At the same time we must try to combine a bright and cheerful landscape and pleasant society, to encourage the pursuit of a vegetative life without depressing the spirits. I cannot better typify such a place in this country than by mentioning Torquay.
With its lovely scenery, beautiful bay, mild air, its pure water brought from the distant Dartmoor hills, its drainage so perfect that enteric fever, dysentery, &c., have ceased to exist, surely Torquay is one of the favoured spots on the earth and it is no wonder that those in search of health, in spite of a long and often tedious railway journey, seek it during the months of Spring so cold and bleak in less favoured places.

Ventnor resembles Torquay but is not so warm.

Pennyfarthing is slightly warmer but the distance is great, the journey tedious, and the place wanting in attraction.

Bournemouth is not so warm but the pine woods are said to exercise a beneficial effect in phthisical cases.
The Riviera

Cannes is delightful in warm years but when the seasons at home are bad it is worse there than it is here. A patient of Dr. Yeats' writing from Cannes in February, 1883, says: We have had dreadful weather. On the 5th we woke up to find the place in deep snow, from a foot and half to two feet, down to the waters edge. The thermometer is down to 25 degrees Fahrenheit. We never have anything as bad as this in Torquay.

Nice is hardly the place to send an invalid with a tendency to chest affection. The winds, says Elisee Reclus, are extremely inconstant and sometimes of insupportable violence. At the end of the Winter and the beginning of Spring, when the mistral blows with fury, the blackish dust which it sweeps before it in a whirlwind does not yield in intensity to the rain of cinders showered down by a volcano.

 Mentone is about the best of the Riviera health resorts. With a mean temperature of 49 Fahrenheit for the months of January, February, and March, the value of this place, in lung disease, is incontestable. It has however its faults; the mistral blows there, it is very dusty, and there is only one flat road.
San Remo is well protected with a temperature as warm as Mentone, with slightly less difference between night and day temperature and less difference between the temperature of Summer and Winter. The mistral however is felt here and more so than at Mentone. It is on clay soil and on this account somewhat damp. Cases of consumption however do well here in the first stage.

Algiers. The mean temperature of Algiers is about 58 degrees Fahrenheit during the Spring months that is nearly 10 degrees above Mentone and 15 degrees above that of England. The difference between night and day is less than in the Riviera resorts it is however rather rainy. The sirocco blows but seldom, perhaps for three or four hours once a week, but coming as it does across the great Sahara desert it is laden with a penetrating dust very irritating to the lungs in pulmonary cases. It is less humid than Madeira and suits the first stage of phthisis. The sanitary matters however are bad enteric fever being very prevalent.

Madeira is a typical representative of a warm and humid atmosphere surrounded by sea air. It persons with great debility with feeble circulatory organs and to advanced cases of
is only
Phtisis this climate is most suitable, where there is no chance of a permanent cure. Phtisical patients may live considerably longer here than elsewhere. It is not suitable for the cases we have under consideration.

Cairo. Patients do well here who require dry heat. At Cairo five or six showers would be the average in the winter. The change between night and day temperature is great and the invalid should be careful to protect himself from the sudden fall of temperature at sunset, as well as through the cold nights.

The Canary Islands are drier than Madeira and are useful in almost all cases, but the accommodation is bad, the prices ruinous, and at times the cold severe.

A patient of mine writing from Opatava, in February last, says: "We are surrounded by snow, I have not been out for three weeks. All the invalids who have traced the weather have caught cold. The place during this month is disgusting."

Tasmania in Australia and Nelson in New Zealand are two of the best places abroad but then their
Distance is so great an obstacle that patients fight shy of them.

There are many more health resorts but I have no space here to dwell upon them, indeed this paper has reached already an inordinate length. In going back over these resorts I think that in this stage of consumption where long hours in the open air are so necessary I should first choose one of the South of England resorts where so much more comfort can be obtained than abroad, and where there is no risk of cold by a three days' journey. If this is not warm enough I should try Cairo or the Canary Islands and lastly Mentone or San Remo. If however money and time are of no consequence I should advise, in preference to anything, a sea voyage to Tasmania. I could have brought forward from my note book many cases proving the indigestion stage to have been present for times varying from three to six or nine months before cough or other prominent sign of phthisis was observed, and in others, symptoms of indigestion, without loss of weight at the commencement, going on to this (loss of weight) and ending with cough and the ordinary first stage of pulmonary Disease, as I stated above however I fear this paper is already too long and will weary the reader of it which is a thing no reader ever forgives.