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Haemoptysis in Phthisis

A clinical study.

by

Cyril Lewis.

May 13th 1897.

Haemoptysis in Phthisis.

"Haemoptysis" as defined by Sir Douglas Powell in his article on the subject in Quain's Dictionary of Medicine is "Blood spitting, having its origin in pulmonary or bronchial haemorrhage"

Bleeding from the vascular system of the lungs, may be due to a large and varied array of pathological causes, which include according to Theodore Williams

(i) alteration in the blood composition.

(ii) congestion of the lungs through cold or alcoholism.

(iii) cancer of the lungs and hydatids of the lungs

(iv) diseases of the heart & great vessels especially aneurysm of the aorta.

(v) congestion of the lungs from strain on the heart from over exertion.

(vi) embolism and thrombosis of the pulmonary vessels.

(vii) diseases of menstruation.

(viii) injuries to the thorax and lungs.

(ix) bronchiectasis.

and (x) phthisis, with regard to which he states, that if the before mentioned causes be excepted, it may be laid down as a

law, that Haemoptysis exceeding one ounce in amount, is due to changes in the blood vessels connected with phthisis.

It is with reference to the last named condition as stated in the title that we propose it consider the subject of Haemoptysis.

In the first place, it will be well to ascertain in what light Haemoptysis or blood-spitting can be regarded in connection with phthisis or pulmonary tuberculosis.

All observers are agreed, that when once the disease in the lungs has been definitely established, and the patient is recognised as suffering from phthisis, that haemoptysis must be looked upon as an important and additional sign of its presence.

As to whether however it can also be regarded as a cause of phthisis is a problem over which there has been much difference of opinion and one that, is much more difficult to settle than at first sight appears evident.

Hippocrates who expressed the earliest views on the question, argued that as pus generally follows blood, what more probable than that blood remaining in the lungs after an attack of blood spitting should, become pus and thus induce the pulmonary disease phthisis

This view was evidently generally believed up to the time of Laennec, at the early part of this century, for when dealing with the occasional causes of phthisis pulmonalis he mentions that haemoptysis is commonly regarded as one of the frequent causes of consumption. An opinion which he considers has no further foundation than what is supplied by the axiom "post hoc ergo propter hoc". As the congestions which give rise to haemorrhage have not any tending to produce pus, he does not regard them as being truly inflammations.

"It is indeed true" he says "that the" "first symptom of an alarming kind in the" "greater number of phthisical patients is" "haemoptysis, but if we examine the chest at" "this time, we shall frequently detect the" "presence of tubercles in the lungs. And" "when we consider this and know that the" "haemorrhage will probably return again and" "again in the progress of the disease, we are" "justified in concluding that tubercles in the" "lungs are the most frequent cause of haemoptysis"

After stating that we have no sufficient proof that haemoptysis by itself is capable of giving rise to tubercles, he says "If" "such were the case, we should find that"

"haemoptysical engorgement gradually transformed"
"into miliary tubercles and this I have never"
"seen." Before leaving the subject
he draws attention to the fact that a
haemoptysis, produced by a blow on the
chest, violent running, a fit of passion,
immoderate exercise of the voice etc is most
commonly productive of no further consequences
when it is once got under, whilst phthisis
frequently supervenes immediately to a
haemorrhage arising without any obvious cause
but which no doubt has, for its real
cause tubercles, which had previously and
perhaps for a long time been latent in
the lungs: and Louis in his "Researches on
Phthisis" (1825) p. 167 IIed:) supports most
strongly Laennec is his opinion that haemoptysis
is the consequence and not the cause of
tubercles.

He says that for upwards of 15
years he had made it an invariable habit
to enquire of every patient submitted to his
observation, and not affected with tuberculous
disease, if they had had spitting of blood
at any period of their lives and he was
always answered negatively, except from some
individuals who had had severe contusion
of the chest or from women whose catamenia

had been suddenly suppressed.
He adds with these exceptions haemoptysis denotes with infinite probability the actual presence of some tubercles in the lung.
He also refers to M: Fournet as adopting an obsolete notion in considering haemoptysis as an exciting cause of Phthisis.

Andral states, that his experience leads him to conclude, that of persons who have had haemoptysis, one fifth part have not tubercles in the lungs. That would however only leave one fifth to be accounted for by the other causes of haemoptysis, such as heart disease etc.

At this time it should be noted that in England, Dr Cullen and many preceding writers believed that consumption was the effect of Haemoptysis.

Later however, Laennec's views became accepted in this country and we find Sir Thomas Watson ("Practice of Physic" vol: II page 200) stating that "if a person "spits blood, who has received no injury" "to the chest, in whom the uterine functions" "are healthy and right and who has no" "disease of the heart, the odds that there" "are tubercles in the lungs of that person" "are fearfully high"

Austin Flint, in America, likewise agrees that "Haemoptysis, the haemorrhage" "limited to the bronchial mucus membrane" "and not depended on disease of the heart" "or on an injury of the chest, is always" "presumptive evidence of existing pulmonary" "disease"

Niemeyer however in 1866 delivered himself of views directly opposed to those of Laennec and his followers (Niemeyer's Lectures on Phthisis page -29- New Sydenham Society)

In considering the aetiology of pulmonary consumption, he states among the various foreign body by which direct irritation of the walls of the bronchi and of the parenchyma of the lung lead to phthisis, the blood which after a haemoptysis or pneumo-haemorrhgia remains behind and coagulates in the bronchi and alveoli exerts this instance most frequently

This assertion is neither supported by experiment nor clinical experience; Perl and Lipmann, whose experiments are recorded in Ziemssen's Cyclopaedia (and are quoted in our consideration on Haemoptysis and Pyrexia) found that when pure blood was injected into the lungs of guinea pigs, it produced some infiltration of the alveoli which at

the end of a few weeks disappeared entirely and this was the case when blood was injected in a coagulated state.

If the blood which Niemeyer regards as an irritant & cause of Phthisis came from a healthy lung and blood vessel, it would be expected to behave in a similar manner to the blood injected in the experiments alluded to, but no mention is made by the observers of Phthisis, — following the injections and again one would expect to find, if the above statement were trustworthy, that pulmonary consumption would be met with frequently in association with mitial disease (Stenosis) which is recognised as a common cause of haemoptysis, but as a matter of fact, this is seldom the case.

A little later on, he does not hesitate to say, that in the majority of cases of haemoptysis is followed by a more or less serious irritation of the lung and pleura. This again is contrary to our experience, for examples are far from uncommon in which no signs of pulmonary and — pleuritic irritation are associated with the attack. Even when it occurs in the course of phthisis, far less then would

it be likely to be the case, if it occurred in a lung otherwise healthy and possessed of greater vitality or power of resisting an irritant.

He next draws attention to the association of Haemoptysis and pyrexia and appears to consider that the presence of blood alone is sufficient to account for its occurrence.

In the present Thesis, this subject has been especially carefully dealt with in its own section and as stated there, if for no better reason, the probabilities are very much against it being a correct explanation.

Out of a large number of cases in which Haemoptysis occurs: only a comparative few are followed by a very high temperature: in the majority of instances, the temperature if raised at all, is only so slightly affected as to exclude the possibility of its being an indication of a pneumonic attack.
Bleeding in all the cases is the constant factor, if it is also the only cause, why should its effect be so uncertain ?

Does it not seem far more reasonable to look for some additional factor

which in the instances in which the pyrexia occurs may be associated with the blood and that this factor and not the blood is the cause? This at all events is the view we hold and if it is believed that the site of the bleeding is also the seat of a primary disease the probability that this is the correct explanation is even greater.

Niemeyer observes that "most" "of the cases in which previously healthy" "persons, immediately after an attack of" "Haemoptysis, are siezed with galloping" "consumption, cannot be otherwise interpreted" "than by assuming that the blood which" "remained behind in the bronchi & alveoli" "has lead to a pneumonia undergoing cheesy" "transformation, the retained blood and the" "products of inflammation afterwards breaking" "down."

The chief difficulty in encountering this statement lies in interpreting what Niemeyer means by a healthy person, for, in my experience I have not only never seen, but also never heard of an instance such as he quotes.

I have included in the section on temperature several instances in which an attack of Haemoptysis, occurring in patients suffering

from phthisis, whose temperature previously was normal and who were apparently progressing favourable, was followed by pyrexia and a marked aggravation both of the symptons and the disease & eventually ending in death in from 5 to 49 days.

In these cases however the patients were admittedly suffering from pulmonary tuberculosis in an inactive condition. The explanation offered for the startling results which followed the bleeding was, that blood originating in a diseased area carried with it bacilli organisms or products of decomposition, and was by gravitation or insufflation conveyed to distant parts of the lung, where owing to the presence of extraneous matter, irritation, inflammation or extension of the tubercular disease was set up, which if the patient was previously in a weak condition, might cause death very rapidly.

The case quoted by Niemeyer as being particularly instructive as regards the serious and alarming effects which may follow Haemoptysis can scarcely however be regarded as being in good health previous to the attack for he states that Wagner aet 32, admitted into Hospital

on January 1st 1862, had suffered and was suffering from syphilis, but also had had a cough since the winter of 1861, with profuse expectoration and on examination a vomica was made out at the apex of the left lung, and the temperature reached 100·4° F.

The patient improved under iodide of iron and cod-liver oil and milk during the month of January, the pyrexia disappearing, the sputum being reduced and 2lbs: in weight being gained.

On the 31st of January, patient had gone to bed feeling comparatively well.

On the following morning three basins filled to their edges with blood, were found. He died four weeks after the Haemoptysis with all the symptoms of a phthisis - florida. Putting aside the question of tubercle, which the pathologist asserts, was not present, is it not more probable that the blood discharged from the cavity took with it some irritating or decomposing matter, which gave rise to the symptoms, than that they should be referred to blood alone.

The case however, is noticed chiefly as an illustration of the loose way in which the term "healthy" is used.

Niemeyer eventually states his willingness to concede that attacks of bronchial hæmorrhage occur even more frequently in the course of pulmonary phthisis and in all its stages than they precede it.

In summing up his views as to the relation of bronchial and pulmonary hæmorrhage and pulmonary consumption he asserts in his "Practice of Physic" (vol II page 14) that "Bronchial bleeding may precede the" "development of consumption as its cause: " "the hæmorrhage leading to chronic inflammation" "and destruction of the lung"

In his lectures however published subsequently, the statement is somewhat modified and reads that "capillary hæmorrhage either" "bronchial or pulmonary does not unfrequently" "lay the first foundation for pulmonary consumption" "in persons whose lungs neither tubercles nor" "pneumonic deposits previously existed. this is" "brought about by blood which remained" "in the alveoli as well as the products of" "inflammation which this blood caused" "undergoing cheesy metamorphosis"

So to the end, he appears to regard Hæmoptysis as a fairly frequent cause of Phthisis, a view quite at variance with those propounded by Laennec & more in accordance

with those however of Hippocrates.

They however have not been generally accepted either in this country, Germany or America and the opinions of Laennec and Louis, though expressed before the recognition of the tubercle bacillus and the consequent appreciation of the infectious character of the disease have up to the present time held their ground.

The question however even at the present time is not entirely bereft of its difficulties.

Having noted and discussed the views held by other observers as to the relative positions as regards cause & effect which Haemoptysis must occupy in relation to Phthisis, it is now appropriate that we should state the grounds upon which we have from our own experience based our opinion upon the matter.

As stated before, when haemoptysis occurs in a case of pulmonary phthisis in which well marked evidence of the disease in the lungs is recognisable from the physical signs, it must be looked upon as an important and additional sign of the presence of the disease and one which from their frequent association might quite reasonably be expected to occur

Their relations however are more difficult to decide when a case of Haemoptysis is met with, which presents no evidence of heart disease, no history of haemophilia, scurvy or any previous tendency to bleeding, no history of menstrual suppression, if it should be a woman and no signs sufficiently definite to justify a diagnosis of pulmonary tuberculous at the time of examination but in which on re-examination a little later on, the physical signs of incipient phthisis can be detected at the apex of one or both lungs.

On being questioned as to his previous health, it frequently happens that the patient has no information to give. He very often says that he had noticed nothing unusual the matter till the bleeding came on and in answer to enquiries as to its onset, is only able to say that he felt something warm come into his mouth and on spitting it out, noticed that it was blood. He might have been stooping down or walking at the time or even sitting quiet, but he is quite sure that he had not been straining or doing anything unusual at the time.

In this hypothetical case (though similar cases are often actually met with), when the patient was first seen, he had had an attack of blood-spitting and after a careful examination and inquiry had been made, nothing that could be regarded as accounting for the bleeding could be discovered.

In this particular instance Phthisis shortly afterwards became recognisable. The question is, are we to regard the bleeding as a sign of the existence of a Lung affection, so slight that we are not able to detect its presence and so early that it has produced no effect upon the health of the patient or on the other hand are we to believe that the bleeding occurred spontaneously?

In such a case, where the bleeding came on without any unusual or even considerable exertion no one would, without great hesitation, venture to assert that it occurred spontaneously from — healthy blood vessels. Instances, I also have records of, in which blood spitting was the first symptom that attracted the patients attention, but in which the bleeding was preceded by more vigorous exertion — such as lifting heavy weights, running to

catch a train or running a race - swimming exercising in the gymnasium, following a bicycle race and in one instance after taking a hot bath. Here the patients themselves ascribed the occurrence of the bleeding to the preceding conditions and the disease which subsequently brought him to this hospital, they, in many cases, believed upon the theory of "post hoc ergo propter hoc" was due to the bleeding.

In these cases, there is ofcourse more ground for considering that the bleeding was brought on by the exertion and almost certainly its incidence was determined by the preceding circumstances, but whether these in themselves can be regarded as sufficient to account for its occurrence, in a person of sound health, and with no heart disease; no blood dyscrasia and no lung affection, involving the structure of the blood vessels, is a matter, which is open to very serious doubt. When it is borne in mind how enormously frequently severe physical strains are daily undergone how infinitesimally small are the number of instances in which they have been followed by an attack of Haemoptysis, the doubt as to whether it can alone be regarded as a possibility is

converted into a certainty that it is an improbability.

When the age is taken into consideration, at which such bleedings are most frequently met with - usually between 15 & 30, a period in which Vascular diseases are characterised by their absence, and the Vascular system in health is most accommodating in its arrangements for meeting the constantly altering conditions of the circulation associated with the activity of youth, and when it is also remembered that analogous bleedings in other parts of the body such as the brain - the abdominal organs and the digestive tract, are recognized as not occurring without some well marked cause and that the lungs are especially protected against over engorgement by the safty Valve action of the tricuspid orifice, one feels almost justified in going a step further and stating that the occurrence of pulmonary bleeding unassociated with any of the conditions alluded to, is not only an improbability but practically also an impossibility.

In these cases, in which such an attack of blood spitting is followed shortly afterwards by the appreciable development of phthisis, there can be little doubt, if the

statements just made are agreed with, that a focus of disease had originated before the onset of the bleeding and that the bleeding was the first sign or symptom of its presence.

The fact that the disease upon a subsequent examination could be more definitely determined might be accounted for, by an extension of the process taking place as it often does after hæmoptysis, the blood containing bacilli being drawn into previously healthy areas and producing secondary foci as described in the section on temperature or by the observer being able to make a more thorough investigation when the risk of bringing on a recurrence of the bleeding is less great.

So far the matter is fairly straightforward. We have decided in our own mind that pulmonary hemorrhage cannot in a healthy person come on spontaneously or even after considerable exertion and if after a careful physical examination no sufficient cause can be found for its occurrence and phthisis shortly afterwards becomes recognisable, we prefer to believe that the affection of the lung existed primarily but could not be detected and that the bleeding was the first sign of its presence, than to

look upon the bleeding as the cause of the disease.

Now however, comes a more difficult matter to explain and this is, how can such case of bloodspitting be accounted for in which phthisis can neither be detected at the time of examination nor at a subsequent date?

I, myself, personally prefer to believe that the hæmoptysis in these cases also is due to the existance of a small focus of tubercle in-sufficient to produce symptoms sufficiently marked to attract the patients attention or physical signs that can be detected by our methods of examination, than to regard the bleeding as occurring spontaneously or the result of strain alone.

My reasons for holding this opinion may be summarized as follows:-

1stly Because hæmoptysis is sometimes the first recognisable sign of phthisis. This we have decided in dealing with those cases in which it was preceded by neither symptoms nor physical signs, but in which they became apparent shortly afterwards.

2ndly Because it is often exceedingly difficult to disguise phthisis in the earliest stage

even with a conviction, upon other grounds, as to its presence exists.

3rdly Because I have records of cases in which Haemoptysis occurred in patients suffering from well marked phthisis without disturbing the general health, the body weight or the temperature and without in fact in any way interfering with the general or local condition of the case. [Three examples of this are recorded in the section on hæmoptysis & temperature] If this is possible in an established case of phthisis, why should it not be equally so in an earlier and less definite one?

4thly Because I have reason to believe that Phthisis can be arrested even when the disease has considerably advanced, and as this is the case, I think it even more likely that such a favourable ending is possible when the disease is in the earliest stage. This is quite borne out by the records of post mortem examinations in which cicatrices were found at the apex of lungs in patients suffering from other diseases & in whom there had been no history of phthisis

Upon these grounds I think we are justified in believing that the spitting of blood in a case such as we are dealing with, in which all the accepted causes of pulmonary haemorrhage have been excluded, was due to the presence of a limited focus of Tubercle in the lung, which as in the previous cases, could not be detected at the time of the examination. In this instance however, in which no evidence of disease could be subsequently recognized, the bleeding must be regarded as having appeared & disappeared without producing any extension of the disease with its associated physical signs.
As no further symptoms of its presence developed the disease must be regarded as remaining in a state of arrest.

The dis-similar ending of these last cases we have been discussing, in which Haemoptysis appeared without any appreciable cause, and which would be attributed by Ancell to a tendency of haemorrhage, which he regards as a characteristic of tuberculous pre-disposition, appears to me enormously strong evidence against the theory of a phthisis abhaemoptoë.

The fact that phthisis and mitral stenosis are not frequently associated

together, even though the later is a fairly common cause of haemoptysis is very much against it, but the inconsistency observed in the last cases, we have been dealing with is even stronger, for they are just the very cases in which the theory if correct ought to apply

It is excellent and plausible when the bleeding is apparently followed by the disease but unfortunately it does not hold good when Phthisis does not subsequently declare itself.

We must therefore regard haemoptysis entirely as a consequence and not as a cause of Pulmonary Phthisis.

Before passing from this subject however it will be well to quote one or two cases in illustration of Haemoptysis occurring as the first symptom, in a person who previously considered himself in good health.

I. A case of Phthisis in which Haemoptysis was the first symptom and came on after a hot bath.

Wells, aet 16, clerk, admitted May 4th 1892. Height 5ft: 11in: Weight 10st: 1lb:
History of consumption very marked, three sisters and one brother having died of it
Patient is very tall for his age & poorly nourished. He had never been very strong.

but had never had a serious illness.
He first suspected that his lungs were affected in Sept^r 1891. When he spat up a little blood after a hot bath.
He worked up to date of admission, but has had occasionally colour in expectoration. Cough occasionally: feels weak & languid.
On admission both apices were undoubtedly affected: the percussion was impaired: the vocal resonance increased: pectoriloque was distinctly audible on both sides: there was also a little wheezing in the right inter-scapula region.

II. A case of Phthisis in which Haemoptysis was the first important symptom and came on in the night

Union aet 26: warehouseman: admitted April 26^th^ 1895. Height 5 ft: 9 in: Weight 10 stone. Mother died of consumption. Patients health was very good till 2 years ago. Was passed at the age of 21 as an A1. life for insurance: has suffered from winter cough for about 3 years, the 1^st^ important symptom however was haemoptysis. The first attack, which was a severe one, coming on at 3 o'clock in the

morning sometime in August 1893. Since then he has had frequent attacks of blood spitting and a 2nd severe about Xmas 1894 and again in January 1895. On admission, consolidation of both apices was found with crepitations after cough at the left apex.

III. A case of Phthisis in which Haemoptysis was the first symptom and came on in the night after a bicycle race.

Clark: æt 23: photographer: Admitted – August 21st 1896 Height 5 ft 7½ inc: weight 10 st: 5 lb: No history of consumption in family. Patients health very good up to 2 years ago. Never any illness previously except croup. The present illness began just after he had finished training for a 3 mile race in July 1894. The night after the race he brought up about ʒ ii of clotted blood & has had 3 attacks since, the last being in May when he lost Op. This was the worse attack. He has never been well since the 1st haemorrhage

but worked up to 9 months ago, when the bleeding appeared for the 2nd time. His other symptoms have been cough and spit. Shortness of breath and sweating at night, but not during the last 3 months. Has not lost much flesh. On examination it was found that there was consolidation of the right apex: with crepitations and a patch of dullness with increased vocal resonance and crepitations under the left clavicle.

IV. A case of Phthisis in which Haemoptysis was the first symptom and came on in the night after swimming.

Harroll: aet 20: booking clerk: Admitted March 13th 1896: Height 5 ft: 8 in: Weight 9st: 13 lb: 4 in: Matural grandmother died of consumption. Patient enjoyed good health and never had a serious illness except typhoid fever as a child. The present illness began 2 years ago last summer, when after over-exertion in swimming he spat up a little blood. After three days he woke in the night & brought up about ʒvi

℥ iij VIII of blood. He had never had anything to complain of before that, as regards the chest. He laid up for six months and then returned to work and had no more bleeding till August 1895 when he brought up ℥ i or ℥ ii. He lost about the same quantity in December and January. His other symptoms have included cough and spit, shortness of breath; slight pain in chest and occasional night sweats. On examination: percussion was impaired at the right apex with prolonged expiration and increased vocal resonance. On the left side the physical signs extended to the nipple and crepitations were also audible over this area.

V. A case in which haemoptysis occurred 15 weeks ago followed by no symptoms of Phthisis and no physical signs

Whitaker: aet 26: decorator

Admitted February 10th 1896. Height 5 ft: 9 in: Weight 10 st: 7 lb: 8 oz:

Mother died of consumption.

Patient always enjoyed remarkably

good health and never had a serious illness. Fifteen weeks ago he had a bad fit of coughing and brought up about a tablespoon full of blood. Has had none since then but has given up work. His symptoms have been negative. Had no cough nor spit. No dyspnœa: no loss of flesh. Has not got weaker. Digestion however has not been good since he laid up. He has had pain at left apex. On admission he stated that he felt very well, had no cough nor spit that his appetite was very good: that he had no indigestion at the time: there was no cardiac symptoms and he slept well.

On examination, I was not able to detect any evidence of phthisis and the note I made of his chest condition was that the lungs were practically clear, but that the movement was defective on the left side.

VI. A case of Phthisis with history of hæmoptysis ten years ago.

Herman : aet 50 : traveller :
Admitted March 25th : 1896.
Father and brother died of haemoptysis
Patient enjoyed good health and never had a serious illness till 10 years ago, when one evening he coughed up about a mouthful of blood. During the next 2 years he had occasional attacks of bleeding but none during the last 8 years. The most he ever brought up was a couple of tablespoonfuls at a time. Has had a cough ever since with spit, but not sufficient to prevent him working till last winter, he gave up in December. His symptons have included in addition to those mentioned. Shortness of breath. Pain at right apex and sweating at night a long time ago.
On examination: an old dry Sonica was found at the right apex : there was also consolidation of the upper half of the right lung and left apex A few crepitations were audible at apices and occasional rales.

VII. A case of Phthisis with history of Haemoptysis 20 years ago: followed 17 years later by a recurrence of the bleeding.

Tucker: aet 49: Printer

A paternal cousin died of Phthisis.
About 20 years ago, patient brought up a quantity of blood, after a heavy lift, he was at work again in a few days and has followed his trade regularly till three years ago, when he had haemoptysis to amount of a pint. Has had cough on and off ever since with expectoration at times. Has had occasional night sweats and lost considerable weight. Has pain over left side of chest & dyspnoea on exertion.
On examination: at the left apex the percussion was unpaired and the respiratory murmur feeble.
This area was tender on percussion.
There was also a patch of dullness in left inter-scapula regions.
At the left base there was dullness and friction

Having discussed Haemoptysis occurring so early in Phthisis, that it was a matter of difficulty to determine which was cause and which was consequence, we now must proceed to take up the subject in relation to Phthisis definitely established haemoptysis being regarded as a sign of its presence.

Many points of interest & importance are noted as to the occurrance of Haemoptysis in phthisis.

In order to deal with questions that arise in this connection, it is proposed where possible to make use of the numerical method which was first adopted by Louis and which is characterised by Prof.r Laycock in his lectures on Medical Observation and Research as one of the great intellectual means of discovery of modern times and one of the two best methods of research in practical medicine which is open to observers engaged in that field.

In contrasting inductions based up on experience with those upon the numerical method he states "Induction "from the facts of experience indicates (and "it cannot be denied fallaciously in many instances)"

"the casual relations of things; the numerical"
"method examines and collates more precisely"
"the facts and observations, upon which the"
"induction is founded and gives the results"
"numerically. The numerical method"
"is in short none other than the method"
"by which experience and induction are"
"rendered as accurate as possible"
"When therefore we speak of the 'numerical"
"method in reference to medical science, we"
"only speak in truth of a more strict and"
"more systematic method of observation and of"
"induction than the method of common experience."

The first question that we propose to consider is the frequency with which haemoptysis occurs in Phthisis.

The answer to this question affords a good illustration of the greater precision with which a statement can be made when based upon the numerical method than upon simple experience.

Simple experience enables us to say that we have observed Haemoptysis frequently occurring in connection with phthisis — the numerical method, takes us further & enables us to say how often it has occurred in a definite number of cases.

In order to answer this question according to the numerical method we have examined the histories of 2000 cases of Phthisis in various stages of the disease admitted into the hospital.

The histories were taken in the majority of instances by myself, but in some by my assistant. In all cases however the question was asked as to whether the patient had ever had bloodspitting and those cases are only included in the affirmative in which there is a history of their having brought up pure blood and not spots or streaks or discoloured phlegm.

Out of 2000 cases of Phthisis in various stages of the disease & including men and women, there was a definite history of spitting pure blood in 805: in the remaining 1195, there was no history though spots or streaks of blood or discoloured phlegm might have been expectorated.

Reduced to percentages, the figures indicate that in 40·25 of these mixed cases there was a history of Haemoptysis.

The 2000 cases it will be noticed include both men and women, agreeing in so far that both were suffering from Phthisis. This being so, an analysis

may be made for the purpose of comparing the relative frequency of Haemoptysis in men and women, in addition to ascertaining the absolute frequency of its occurrence in either sex.

Out of the 2000 cases, 1210 were men and 790 were women.

Of the 1210 men, there was a history of definite haemoptysis in 538 or 44·5 per cent and of the 790 women, there was a similar history of haemoptysis in 267 or 33·8 per cent. — These are the absolute percentages in either sex, and on comparing them we see that the percentage is 10·7 higher in men than in women in the cases we are dealing with

TABLE 1. 2000 cases of Phthisis in various stages of the disease, analysed according to the history of Haemoptysis in either sex.

Sex	Numbers & Percentages	Haemoptysis	No haemoptysis	Total.
Women.	Number	267	523	790
	Per. centage	33·8	66·2	
Men	Number	538·	672·	1210.
	Per. centage	44·5	55·5	
Total in mixed cases	Number	805	1195	2000.
	Per. centage	40·25	59·75	

The statement that in 40.25 per cent instances there was a history of haemoptysis in mixed cases in various stages of the disease is too vague to be of any practical value.

Further analysis is therefore necessary in which some information as to the stage of the disease must be given.

As all the 2000 cases were carefully examined on admission, in the great majority of instances by myself, and the pulmonary condition noted, this information we are in a position to supply. I propose however, in this connection to simply divide the cases into two groups, namely those in which the physical signs of an excavation were present and those in which they were not.

I do not think any further subdivision sufficiently definite to justify a hard and fast distinction being drawn.

We have now two factors that may be taken into consideration in connection with the 2000 cases of phthisis, namely the history of Haemoptysis and the condition of the lungs at the time the patient was first seen.

From these records an analysis may be made, based upon the state of the

lungs at the time of examination, with a view to determining the frequency with which haemoptysis occurred in cases in which the disease was comparatively early and no excavation could be detected and cases in which the disease was more advanced and an excavation could be detected.

Out of 2000 cases of phthisis in various stages of the disease - 936 were in a comparatively early stage (no excavation) and 1064 in the advanced stage (cavity present).

Out of the 936 comparatively early cases there was a history of haemoptysis in 334 but in 602 there was not. Reduced to percentages the figures show that in the early cases, there was a history of haemoptysis in 35.7 per. cent.

Out of the 1064 advanced cases (cavities present) there was a history of haemoptysis in 471, but in 593 there was not. Reduced to percentages, it is seen that there was a history of haemoptysis in the more advanced cases in 44.3 per cent

These figures definitely show that the per. centage of cases in which there is a history of haemoptysis is higher when the diseased is advanced than when it is in the early stage

TABLE II. 2000 mixed cases of Phthisis analysed according to the stage of the disease and the history of Haemoptysis with percentage.

Stage	Haemoptysis	No haemoptysis	Total.
Early. No cavity	334 35·7 %	602. 64·3 %	936.
More advanced. Cavity present	471. 44·3 %	593 55·7 %	1064.
Total	805	1195	2000

These figures definitely show that the per centage of cases in which there is a history of Haemoptysis, is higher when the disease is advanced than when it is in the early stage.

Another definite statement that can be made is that out of 805 cases in which there was a history of haemoptysis at all stages of the disease, the bleeding occurred before the stage of excavation in 334 cases or 41·5 per cent. This statement is true as far as it goes, but it is quite possible, that the percentage might have been

higher, had we been able to tell whether the bleeding in the more advanced cases occurred before the stage of excavation had been reached.

On comparing the percentages in which there was a history of Haemoptysis one is justified in inferring that Haemoptysis does occur after the stage of excavation has been reached: but owing to the comparatively slight difference, 8·6 per cent between their frequency, it is probable that bleeding occurs more frequently in the earlier than the more advanced stages.

The facts in our possession also admit of a further analysis being made in order to show the per-centages of cases in which haemoptysis had occurred in men and women, according to the stage of the disease at the time of examination.

Out of 534 men in whom the disease was in the early stage, 210 had haemoptysis or 39·3 per cent.

Out of 676 men in whom the disease was advanced - 328 had haemoptysis or 48·5 %.

Out of 402 women in whom the disease was in the early stage, 124 had haemoptysis or 30·8 per cent.

Out of 388 woman, in whom the disease was advanced - 143 had haemoptysis or 36·9 %

This is shown in the following

TABLE III. Showing the per-centages of cases in which Haemoptysis had occurred in men and women, analized according to the stage of the disease at time of examination

Stage of Disease at time of examination.	Men.	Women.
Early (No cavity)	39.3 %	30.8 %
Advanced (Cavity present)	48.5 %	36.9 %.

This table serves to show more emphatically the greater frequently of Haemoptysis in men than women and it will be noticed that even in the early stage in men the per-centage is greater than it is even when the disease is advanced to the stage of excavation in women.

It is probable that the greater frequency of Haemoptysis in men is due to them having to lead more active lives and being more liable to over exertion, hurrying and strain, than women. Further being the bread-winners of the family in many cases, they are unable to give up their employment until more urgent symptoms show themselves.

We have up to the present considered the frequency with which haemoptysis is met with in mixed cases of phthisis in the various stages of the disease, also in a series of early and advanced stages.
So far however, we have not felt able to state numerically what per-centage of cases of phthisis have Haemoptysis at some period or other in the course of the disease.

In order to do this, we think it necessary to refer to the cases in which death occurred while the patient was under observation and by referring to the histories ascertain in how many of those completed cases there was a history of Haemoptysis or not.

During my term of office at the Hospital, 160 deaths have occurred and 147 of these are available for the present investigation as giving a positive or negative record of the occurrence of Haemoptysis.

Out of 147 completed cases of phthisis, there is a history of haemoptysis having occurred in 82 or reduced to percentages 55.8.

This then, is the most accurate answer to the query :- In what pre-centage of mixed case of phthisis does haemoptysis occur.

TABLE IV. 147 completed cases of Phthisis analized according to history of hæmoptysis in either sex.

Sex	Hæmoptysis	No hæmoptysis	Total.
Men.	60 or 56%	47	107
Women	22 or 55%	18	40
Total.	82.	65	147.

The above data permits us to make this observation with reference to the sexes

Out of the 147 completed case 107 were men and 40 women.

Of the 107 men, there was a history of hæmoptysis in 60 or 56 per cent.

Of the 40 women, there was a history of hæmoptysis in 22 or 55 per. cent.

It is of interest to note that in the completed cases, the per.centage in which Hæmoptysis occurred is so nearly equal in men and women (A fact which simple experience would have led me to believe was quite otherwise for my impression had been that hæmoptysis was decidedly more common in men than in women)

In the uncompleted cases it will be remembered, the per centage was considerably higher in men than in women in both the earlier and the more advanced stages of the disease and the ratio of increase in both sexes, in the more advanced stage as compared with the early stage was fairly equal.

The marked difference appears to occur towards the end.

TABLE V. Showing percentage of cases in which hæmoptysis had occurred in men and women, analysed according to the stage of the disease

Stage	Per centage	
	Men.	Women.
Comparatively early (No vomica)	39·3	30·8
More advanced (Vomica present)	48·5	36·9
Completed	56	55

The following inference might perhaps be permitted.

In the earlier stages of the disease the men are more actively employed than women, and the higher per centage of hæmoptysis

may be attributed as before suggested to their mode of living.

In the later stages of the disease both men and women are alike incapacitated and the sexes are placed upon a more equal footing in this respect.

The similarity of percentages as to the occurrence of hæmoptysis in both sexes towards the end may be regarded as demonstrating the action of the disease alone, which affects men and women in almost the same way, the disturbing factors having been removed.

Hæmoptysis in relation to the 1st symptom.

Having considered Hæmoptysis as far as we were able in connection with stage of the disease in the lungs, let us now endeavour to ascertain what relation its occurrence bears to the 1st sympton of the disease as observed by the patient

The 805 cases in which there was a history of hæmoptysis (out of the 2000 cases of Phthisis was have been dealing with) enable us to make the following statement upon this matter.

In questioning the patient as to the occurrence of blood-spitting, he frequently asserted that it was the first symptom he noticed, that he never knew that he had anything the matter with him, till he spat up some blood and went to the Doctor and was told his lungs were affected. In others he admitted that he had not been feeling very well for some time previously or that the cough had come on a little while before the bleeding, he was'nt very sure how long as it had not troubled him much.

In these cases, however it appeared evident that the bleeding was an early symptom, though it could not be actually regarded as the first symptom the patient had observed. In other cases the bleeding came on later.

As however blood-spitting is regarded as a serious sign by the general public its occurrence usually makes a marked impression upon the mind of the patient and he is generally able to fix the date of its first appearance pretty accurately. This taken in connection with the beginning of the illness which is always inquired into in our records enables us to obtain information

which serves with a fair degree of exactness our present purpose of ascertaining the relation of the 1st attack of Haemoptysis to the first symptom of the disease, qualified however by the additional clause "as observed by the patient"

Out of the 805 cases, however there were 112 in which the relation could not be made out, either the patient could not give any satisfactory information on the subject or the history was not sufficiently taken. These 112 cases therefore have been omitted from the accompanying table which has been made out to show at a glance the relation of the Haemoptysis to the first symptom in those cases in which sufficiently direct information could be obtained.

The facts contained in the following table, are of interest in bearing out what has been observed in connection with Haemoptysis in relation to the stage of the disease. There we saw that haemoptysis occurred relatively far more frequently in the early than the advanced stage. Out of 805 cases in which there was a history of Haemoptysis, we were able definitely to state that the bleeding occurred in at least 41·5 per cent of the cases before excavation had

been reached, though the percentage was probably higher owing to it having occurred in the early stage in the cases in which a cavity was present at the time of examination.

TABLE VI. Showing relation of haemoptysis to first symptom in 693 cases of phthisis, analysed according to sex and stated in percentages:-

Date of occurrence of Haemoptysis in relation to 1st Symptom.	Percentage		Total - Mixed cases	
	Men	Women	Number	Percentage.
1st Symptom.	28·1	20·4	178	25·6
Early.	18·	25·	141·	20·3
Within 6 months	26·8	20·4	172·	24·8
~ 1 year	12·9	12·2	88·	12·7
~ 2 years	7·4	10·4	58·	8·3
~ 3 years	3·	4·5	24·	3·4
~ 4 years	1·9	3·6	17.	2·4
~ 5 years	·4	·9	4.	·5
over 5 years.	1·5	1·8	11.	1·7

In this table we see that in 83·4 per cent of the cases, there is a history of Haemoptysis occurring within a year of the recognition of the disease by the patient

It also supports though not so markedly, what has previously been observed with regard to the sexes

It was noticed that in the uncompleted cases, which were able to get about when the disease was comparatively early and also more advanced at the time of the examination: the percentage in which there was a history of Haemoptysis was higher in men than in women, but in the completed cases the percentange was almost the same in both.

The inference was then made that bleeding probably occurred later in the course of phthisis in women than in men. This is slightly though decidedly borne out by the relation of Haemoptysis to the first symptom as the following statement will show.

TABLE VII. Showing haemoptysis earlier in relation to first symptom in men than in women and conversely

Haemoptysis in relation to 1st symptom.	Per centage	
	Men.	Women.
Within a year	86.	78.
Beyond a year	14.	22.

The steady downfall in per centages as the duration of the illness increases is also worthy of note. The eleven cases in which the bleeding occurred for the first time more than five years after the 1st symptom are probably cases in which the disease became arrested for a time and afterwards became active again

Haemoptysis in relation to Age.

Our records of the 2000 cases of Phthisis again furnish us with material for investigating this matter.

As before explained we have been enabled to fix approximately, the date of occurrence of the first attack of haemoptysis and as the age on admission has in all cases been noted it requires only a simple calculation to determine the patients age when the bleeding came on. This we have been able to do sufficiently nearly for our present purposes in all the 805 cases.

It is now proposed to analyse these cases according to the age at which the bleeding occurred and contrast with them the 1195 cases in which there is no history

of bleeding analysed also in the same way.

The following table states in per-centages the result of this investigation in the mixed cases and also the male and female cases

TABLE VIII. Showing the percentage of cases in which hæmoptysis occurs at various ages

Age.	Percentage in which Hæmoptysis occurs		
	Mixed cases (2000)	Males (1210)	Females. (790)
12 – 15	21·4	16·1	24·5
15 – 25	40·3	43·8	35·3
25 – 35	43·4	49·3	34·0
35 – 45	41·3	44·2	36·2
45 - 55	32·1	34·9	22·2
55 - 65	26·6	36·3	*

N.B 4 women over 55 years of age had Phthisis but no Hæmoptysis.

It will be noticed on studying these figures, in the mixed cases, that hæmoptysis occurs much more frequently in middle life i.e. from 15 to 45, than in either the earlier or later periods. The low percentage before the age of 15 will also attract the attention

On contrasting the percentages in the male and female cases it will be observed that they are generally higher in the former than the latter.

It is especially interesting however, to note that the only period during which the per centage is higher in the case of females is between 12 and 15. When it is fully 33 per. cent greater than in boys of the same age. This is probably owing to the more rapid development that occurs in girls as compared with boys at that period and also at the onset of the menstrual function

It will also be seen that the per centage of cases in which haemoptysis occurs in women suffering from phthisis, varies very little during the period of menstrual activity consequently the fall which occurs after the age of 45 is more noticeable.

In the case of men the marked rise in the percentage after the age of 15 is very striking and this rise is maintained as in the case of women up to the age of 45. the fall however afterwards is less abrupt and a moderately high percentage of Haemoptysis is continued till a later period of life than in the case of the women.

The next point we propose to investigate is whether the duration of life dating from the first symptoms is longer or shorter in cases of Phthisis in which haemoptysis occurred or in which it is absent.

In order to obtain information on this point we must refer to the fatal or completed cases.

From an examination of the histories in these cases we have been able to form the following table.

TABLE IX. Showing the duration of illness, dating from the 1st symptom in cases of Phthisis in which haemoptysis occurred and in which it was absent. Taken from 138 deaths.

Fatal	Cases in which Haemoptysis occurred.	Cases in which Haemoptysis was absent.
Within 1 year	42.5%	53.8%
Over 1 year	57.5%	46.2%

From these figures we see that the duration of life is longer in case of phthisis in which haemoptysis occurs than in those in which it is absent – for in the case of the former 57.5 per cent were not fatal within a year from

the commencement of symptoms as observed by the patient, whereas in the non-haemoptysis cases only 46·2 % survived that period.

This may be accounted for by two observations, which will be substantiated else-where, firstly, the haemoptysis is rarely fatal in the early stages and secondly, that haemoptysis is not common in acute pyrexia cases.

It must not however for a moment be considered that these figures throw any light upon the influence exerted by haemoptysis upon the course of the disease. The only inference that can be drawn from them is, that they indicate that haemoptysis is less commonly met with in rapidly fatal cases of phthisis than in those of longer duration.

This naturally leads us to enquire what is the duration of life, dating from the first attack of haemoptysis. From again studying the histories of the fatal cases we have this recorded:-

TABLE X. Showing the duration of life dating from 1st attack of haemoptysis: in 66 mixed cases of phthisis in which death occurred.

Fatal	Men		Women.		Mixed cases	
Within a week	10·6 %	59·5	10·5 %	84·3 %	10·6 %	66·7 %
a year	48·9 %		73·7 %		56·1 %	
5 years	36·1 %		15·7 %		30·3 %	
5 years or over	4·3 %				3 %	

From these figures we see that death is liable to rapidly follow haemoptysis, for in 10.6 per cent of the mixed cases, we have been dealing with, the patient died within a week and in 66.7 per cent within the first year., of the remainder 30.3 per cent did not live for 5 years and only 3 per cent survived that period.

On comparing the duration of life, dating from the first attack of haemoptysis in men and women, it will be noticed that the percentage is pratically equal in which death followed within a week.

In the cases however, in which death followed within a year, the per. centage is enormously higher (24.8 per cent) in the women than in the men.

It will be remembered that in investigating the frequency of haemoptysis occurring in Phthisis in the early - more advanced and completed cases, that the per. centage in which there was a history of haemoptysis was decidedly higher in men than in women in all except the completed cases in which there was a remarkable rise in the case of the women, bringing the per. centage eventually up to almost an equality with that of the men.

It was observed at the time that "the" "marked difference appears to occur towards" "the end of the disease"

This statement is borne out by the figures in this table, for we see in the case of women, the bleeding occurred in 84·3 per cent, within a year previous to death.

Arguing from the axiom of "post hoc, ergo procter hoc", it would seem probable that death would occur more frequently either directly or indirectly from hæmoptysis in women than in men, in these cases. Profiting however by our experience of the fallacy of this deduction in dealing with Hæmoptysis in its etiological relation to Phthisis, we see that such a statement must be avoided at present.

All that the figures justify us in saying is that the duration of life dating from the first attack of Hæmoptysis is as a rule shorter in women than in men and taken in conjunction with previous observations as to its frequency in the various stages of the disease, that it probably also occurs later in women.

The next point we shall endeavour to find out is whether the duration of life dating from the 1st Hæmoptysis

varies with the age of the patient, when the bleeding first occurred.

Sixty four of the cases, included in the last group are available for this purpose and from these the following table has been arranged.

TABLE XI. Showing duration of life from first haemoptysis, cases analysed according to the age at which the bleeding first occurred and stated in percentages.

Fatal.	Age at which bleeding first occurred.		
	10 – 19.	20 – 29	30 and over.
Within one year	52.6%	64%	75%*
~ five years	42.1%	32%	20%
Five years & over	5.3%	4%	5%.

* 20 per cent of these cases died suddenly in a few minutes.

A glance at this table is sufficient to show, that there is a marked difference in the duration of life depending upon the age at which Haemoptysis first occurred.

Where Haemoptysis first occurred when the patient was under the age of 20 : 42.1 per cent lived over a year and 5.3 per cent lived for 5 years or more.

Whereas when the bleeding first came on when the patient was 30 or over, only 20 per cent survived the year though 5 per cent lived 5 years or more as in the younger cases.

When Haemoptysis first occurred at an age intermediate between those we have mentioned it is interesting to note that the duration of life has also been affected in an intermediate manner: that is to say that fewer cases survived the year than in the younger group and more than in the older group.

Of the cases that died within the year when the patient was 30 or over when the bleeding first occurred, 20 per cent died suddenly from the first and only attack of haemorrhage.

From these observations we are able to say that death as a rule follows haemoptysis more closely as age advances.

They do not justify however, us in stating that haemoptysis has a more marked curtailing effect upon the duration of life in old than in young people

Having seen that in many instances death has shortly followed the occurrence of Haemoptysis, we now naturally desire to find

out in what percentage, death was actually due to its occurrence either directly or indirectly.

This may be obtained in the first instance from the total number of deaths from Phthisis and its complications which have occurred during my office at the Hospital, amounting to 160.

Of these 160 deaths, 40 were due either directly or indirectly to Haemoptysis, the remaining 120 being unconnected with it. From these the following table has been arranged.

TABLE XII. In 160 fatal cases of Phthisis: per centage in which death was due to Haemoptysis, either directly or indirectly or unconnected with it in men and women.

Death	Per centage in		
	Men	Women.	Mixed cases
Due directly or indirectly to Haemoptysis	27.5	15.1	25.
Unconnected with Haemoptysis	72.5	84.9	75.

From this table we see that 25 per cent of the deaths occurring in phthisis

from all causes, in the cases we have been dealing with was due either directly or indirectly to haemoptysis

It will further be noted, that in men the percentage due to Haemoptysis was much higher, 12·4 per cent, than in women.

This all the statistics we have previously considered would have lead us to expect – because the percentage of cases in which haemoptysis had occurred was higher in men than in women – with the exception of those obtained from the fatal cases, which pointed prima facie to the reverse in two ways. Firstly, because the per·centage of cases in which haemoptysis occurred was practically the same in men and women (56% and 55% respectively) and secondly because the duration of life dating from the first signs of Haemoptysis was shorter in women than in men.

According to the "post hoc doctrine", it would have been argued from these premises, that Haemoptysis had a more marked curtailing influence upon the duration of life in women than in men, but this statement was carefully avoided.

That such an inference would have been fallacious, has been demonstrated by

the fact that the per-centage of deaths actually due to Haemoptysis, is 12·4 per. cent, less in the case of women than in men, when calculated from all the fatal cases of phthisis.

It is even more markedly so, when the per-centage is taken from those cases only in which there is a previous history of haemoptysis, as shown in the following table

TABLE XIII. Showing the percentage of fatal cases of Phthisis, having a history of haemoptysis, in which death was due to haemoptysis (either directly or indirectly) or unconnected with it in men and women. Taken from 83 cases in which history was sufficient.

Death	Per-centage		
	Men	Women	Mixed
Due to haemoptysis	58·3	21·7	48·2
Unconnected with haemoptysis	41·7	78·3	51·8

In this table we see that the percentage of cases in which death was due to Haemoptysis in women, instead of being 12·4 per cent is 36·6 per cent less than in the cases of the men, demonstrating even more emphatically

as has just been anticipated the fact, that it would have been erroneous to infer that Haemoptysis had a greater influence in shortening life in women than in men.

This table proves quite the reverse and permits a definite statement to be made namely that Haemoptysis had a greater influence in curtailing life in men than in women in the cases we have been dealing with

It will also be noticed that the difference in the percentages of deaths due to haemoptysis, when calculated from all the fatal cases, as compared with those — calculated from the cases with a history of haemoptysis, is very much more marked in men than in women. In men it is 33·8 per cent greater in the latter calculation, whereas in women, it is only 6·6 per cent.

From this it is fair to conclude that Haemoptysis in women, though occurring in almost as many cases, taking the disease throughout, as men, is not so serious a nature and is less frequently the actual cause of death.

As it has several times been mentioned that deaths may be directly or indirectly due to Haemoptysis, it may not be out of place here to explain what is meant by this statement before analysing the deaths under their respective headings.

Death is regarded as being directly due to Haemoptysis, when the patient either dies during the actual attack of bleeding or so shortly afterwards, that the patient dies suddenly either of asphyxia or syncope produced by the bleeding.

It is regared as being indirectly due to Haemoptysis, when the actual cause of death appears to have been initiated or accelerated by the attack. In the cases we are dealing with, the immediate cause has been either bronchio-pneumonia or heart failure

The following table shows 40 deaths directly or directly due to Haemoptysis analysed according to sex.

TABLE XIV.

Death due	Per. centage in		
	Men	Women	Mixed.
Directly	45.7	40.	45.
In. directly	54.3	60.	55.

We here see, that death referable to Haemoptysis occurs less frequently during than after the attack and that sudden death occurs rather more frequently in men than in women.

As it has already been noticed that the duration of life following is decidedly shorter when Haemoptysis occurs later in life: it will be interesting to find out whether the deaths are in any way affected by the age of the patient at the time of the fatal haemorrhage, for this the following analysis has been made.

TABLE XV. 40 deaths from Haemoptysis analysed according to the mode of death in cases over and under the age of 30.

Mode of death	Percentage on age	
	under 30	over 30.
Suddenly fatal during attack.	22·7	72·2
Pneumonia.	31·8 } 77·3	–
Heart failure. Extension of disease	45·5 }	27·8

From these figures we see that the mode of death from Haemoptysis is very different in cases under and over 30 years of age.

In those over 30 Haemoptysis proved suddenly fatal during the attack in 72·2 per. cent., whereas this was the case in only 22·7 per. cent. of the cases under 30.

On the other hand in the younger cases death was due either to pneumonia or heart failure in 77·3 per cent as compared with 27·8 per cent in the older ones.

It is also worthy of note that pneumonia only followed haemoptysis in the cases under 30, where it was responsible for 31·8 per cent of the deaths.

Following this, it will be of interest to ascertain whether the mode of death varied at all with the season of the year. In order to demonstrate this, the following table has been arranged.

TABLE XVI. Showing 40 fatal cases due to Haemoptysis, analysed according to the mode of death occurring in the summer & winter months.

Season.	Per. centage on Mode of Death.		
	Sudden	Pneumonia	Heart failure.
Oct^{r} – March	7 or 38·8	5 or 71·5	8 or 53·4
April – Septem^{r}	11 or 61·2	2 or 28·5	7 or 46·6

From this, we see, that the percentage of deaths in the winter months from Heart failure and especially pneumonia was higher than in the summer months and in the summer months, the percentage in which the Haemoptysis proved suddenly fatal was 22·4 per cent more than in the opposite season.

One last point of interest must be attended to in connection with the deaths and that is, that in only four instances did the first attack of Haemoptysis prove fatal. In all the other cases, bleeding had occurred previously. In all 4 cases death was caused by asphyxia.

The points of similarity in the cases are arranged in the accompanying table

TABLE XVII. Showing details in the 4 cases, in which the 1st attack of Haemoptysis proved fatal.

Name	Age	Weight below standard	Stage of disease	Date of Death	Time	Occupation at time
		st: lb: oz:				
Borer	32	3 - 11 - 8	Excavation.	July 21st 1893.	6·20 a.m.	Getting out of bed.
Staples	35	3 - 1 - 0	do.	Apl: 25th 1895	6·45 a.m.	ditto
Jagged	33.	1 - 8 - 8	do.	Dec: 28: 1895	7·55 a.m.	Putting on stockings.
Castle	37	2 - 12 - 12	do	July 25th 1896	11·15 p.m.	In bed.

It will be noticed that the bleeding in these cases, first came on, in patients who were considerably below their standard weight over the age of 30 and in whom the pulmonary disease had reached the stage of excavation

It is also interesting to note that the bleeding in three instances occurred about the same time in the morning while they were getting up. —

— Haemoptysis considered clinically. —

We must now proceed to consider Haemoptysis occuring in the course of Phthisis from its clinical point of view and in the first instance, it will be well to divide the various attacks into groups according to the amount of blood lost during an attack. Such a sub-division must be regarded purely as an arbitory one and made simply as a basis for description.

Group I. Discoloured expectoration, which includes streaks of blood in the expectoration and dots of dark blood that are occasionally coughed up.

Group II. Slight Haemoptysis, where actual blood is brought up, but the amount does not exceed a few ounces.

Group III. Severe Haemoptysis, where a larger quantity of blood is lost, amounting to ten ounces or a pint or more.

We now propose to discuss these groups more fully:-

Group I.

Streaks of blood are often found in the expectoration and often cause the patient some alarm. This, however, I have seldom found a serious matter. It sometimes occurs if the patient has slight catarh or the cough has been unusually troublesome and sometimes comes from the throat or back of the pharynx

The discoloured spit however is more important as it sometimes precedes a more definite attack of haemoptysis.

I have at all events, fifteen instances recorded in which this was the case.

The case of Greenlaw, might be quoted as an example of this.

Greenlaw, aet 49: pensioner in Indian Army. Admitted to the Hospital May 2nd 1894. Apices of both lungs affected with a sonica at the right apex. Chest affected, he thinks 5 or 6 years. Has always had a cough in the morning with spit streaked with blood, but never actual haemoptysis. On June 2nd it is noted that in the morning he had a good deal

"of colour but this time not mixed with the pellets he coughs up". This "colour" was probably discoloured spit and certainly not actual blood for he was allowed to get up as usual. In the afternoon about 4.30, he had a severe attack of hæmoptysis loosing about ℥xxv. of blood.

In certain cases terra cotta coloured or markedly blood stained sputum may be brought up every day for a long time, with occasionally small quantities of pure blood. The patient is in many instances so used to it that it ceases to alarm him & when admitted into the hospital, objects to being kept in bed for it. Such a case is that of

case II. Salmoni, act 28: compositor: admitted December 30th 1896.

Both lungs affected, the upper third of the right lung in the early stage, the left more extensively, with a cavity under the clavicle. Thinks his lungs have been affected for about 2½ years, when he caught a bad cold. About 18 months ago, he first had discoloured spit, no pure blood at first. The spit has been either streaked with blood or been blood and phlegm mixed ever since and has never been quite

clear for more than 3 or 4 days in succession

It has been more decidedly blood stained since last May. There is generally more blood in the morning, when he has the usual fit of coughing

Treatment never stopped the bleeding and he never thought of staying in bed or laying up for it. His other symptoms have been shortness of breath only on going upstairs or up a hill. Only seldom has night sweats & only lost a little flesh the year just passed. Does not feel very weak and has very little pain.

During his stay at the hospital, the bleeding was un-influenced by the treatment, and he brought up ʒj to ʒ iii of discoloured expectoration, varying in shades, sometimes being quite bright and at other times darker in colour.

His weight kept about the same, but he left as he objected to confinement in the hospital.

Several more instances I have records of, in which dis-coloured spit has been brought up frequently, for a considerable period

In the cases of two women, they

stated. that they had been in the habit of frequently bringing up a little colour every fortnight or three weeks for several months. The menstruation was irregular in one case, but regular in the other, in this case the colour sometimes came with the period but sometimes did not

Discoloured expectoration is however far more commonly seen following an attack of haemoptysis and in fact is almost invariably met with during the clearing off of the attack.

Group II: Slight Haemoptysis, where actual blood is brought up, but the amount does not exceed a few ounces.

Such attacks are most commonly met with in the early stages of the disease They may however also occur in advanced cases as well.

In itself, an attack such as we are considering, cannot be regarded as a serious matter, for the amount of blood lost is not sufficient to affect or weaken the patient.

The case of Harrup (Chart N° 42) which is quoted in the section on temperature.

is an example of this.

He lost ℥ IX one day and ℥ IV a day or two later, and never felt the worse for it at all. He continued to gain weight just as though it never had occurred.

Slight attacks of bleeding even when they frequently occur need not necessarily interfere very much with the patients progress, this is seen in Wellers case.

Case III Weller, girl: act 19: servant.
Admitted January 22nd 1894.
No history of consumption. Has had a cough and spit ever since she had inflammation of the lungs, two and a half years ago. Had haemoptysis a month ago for the first time, loosing about half a pint of blood: none since.
On examination, I could only detect slight consolidation of the apices, with occasional rhonchi over the chest.
Her weight on admission was 8 st: 3 lbs:
during her stay at the Hospital, she had several slight attacks of bleeding from February 23rd to April 8th. For instance on February 23rd she had a little bleeding. On March 2nd brought up ℥ II

of blood and there was colour in the expectoration, which used to be frothy after the bleeding, till the 15th. when it is noted that she brought up two or three mouthfuls of bright frothy blood.

From March 17th. when it is noted, that the expectoration was quite clear but white and frothy, she had no more colour till the 24th. when she had a little for 4 days and again on the 1st. of April about 3j. in the night and again on the 8th. she had some more bright blood.

After this she had no more before she left on the 30th. having gained 1 stone 3/4 lb in weight.

Slight attacks of bleeding on the other hand, do not turn out so satisfactory, for very often they are followed by a rise of temperature, which indicates that some extension or fresh activity of the disease has been lighted up presumably by the occurrence of the bleeding.

Here however, it is not to the actual amount of blood lost that the bad effects are due, but this subject has been dealt with in detail in the section on temperatures. —

Instances are there recorded in which quite a small attack of bleeding is followed by a rapid rise of temperature and in some instances death in a very short period as in the case of Dix and Ayres (pp. 20 & 21 and charts Nos 6 & 7.)

Then again, though the temperature may not rise so high or the end follow so rapidly, a secondary tubercular infection of some distant part of the same lung or of the other lung may take place as in the case of Highley (p.p 37. chart N° 31) in whom this occurred and who lost a stone in weight in six weeks. The bleeding preceding this only being ℥ ii in 2 days and ℥ iv in 5 days and he was steadily improving previous to the attack

Less unfavourable instances than these in which a rise of temperature was associated with a slight attack of haemoptysis are also recorded in the same section.

In some cases slight recurrent attacks occur from time to time their incidence being marked upon the chart by a more or less pronounced rise of temperature. In these cases, though the patient does not get rapidly worse

still he gradually looses ground

Goodrich Clarkes case (№ 38 chart) is an example of this, and on his chart which is included in the series, will be found a record of his body weights and the character of the bleeding.

Apart from the intervention of Pyrexia it must be mentioned that death may result from heart failure initiated by a comparatively slight attack of hæmoptysis. Tuckers case may be quoted in illustration. (Chart № 48)

Tucker, aet 35. Labourer

Admitted March 11th 1896. Patient never had a days illness in his life till last June, when the cough and spit came on. He did not give up work till September, but has done nothing since. On admission complained of cough & spit, dyspnoea and weakness. No fainting. No œdema, but the hands often cold. On examination, both lungs affected to nipple in front with considerable excavation at right apex. Heart sounds were weak there was a systolic impurity in the tricuspid area.

On March 16th: complained of pain at right side in the evening examined chest, no friction audible, gave mustard leaf.

March 17th: Pain better. Feels been in himself. 11·10 p.m. Woke with something in his throat and brought up ℥X of bright blood: partly clotted.

in a second or two: it poured out.

March 18th ℥iii of bright blood in the night but the last few spits have been clear. Pulse 120. In the afternoon had two spits of colour. 12 p.m. cough rather troublesome - had brought up some terra cotta coloured spit in evening.

March 19th 9.30 a.m. Saw him before breakfast. Pulse scarcely perceptible at wrist Said he felt very weak: breath very short. Heart sounds fluttering & very feeble. Gave ether & strychnia but with no avail, he died of heart failure.

Before leaving this group of cases it must be mentioned that sometimes in cases of sudden death due to Hæmoptysis only a small quantity of blood is brought up. I have records of 3 instances in which this was the case viz:—

(i) Stapley, who was found on the floor almost asphyxiated, having brought up about ℥vi of bright blood & who died within an hour of the attack.

(ii) Castle, who had an attack of hæmoptysis at 11.15 p.m. whilst in bed. He rang the bell & was at once attended by the Nurse and a few moments later by myself, when he was almost unconscious, the jaws tightly clinched and the face livid. Artificial respiration (the mouth having been opened & the tongue drawn forward) was performed.

Ether injection given and also an injection of strychina, without avail. He never re-gained consciousness and died in a few minutes. He only brought up ℥iv of blood.

(iii) Boer, who died within forty minutes from the onset of the attack, having only brought up about ℥i of dark clotted blood. He was seen by my colleague who has made the following notes of the case. "I was" "called to see the patient at" "6.20 a.m. as he had haemoptysis:" "when it commenced he had got" "up and went to bedroom door" "and called for the Nurse, who" "got him back to bed at once." "When I reached him I found" "from ℥ss to ℥i of dark clotted" "blood in his spit cup and there" "were also some clots in the" "chamber. He was quite unconscious" "& was not bringing anything up." "He was breathing very heavy and" "he was drenched with clammy" "perspiration. There was no gurgling"

"but I put my finger into the
"larynx but could feel no clot
"Rales were audible over both
"lungs. Ergotinin gr 1/100 injection
"and later M30 Ether were given
"as his pulse began to fail
He never however regained consciousness and died at 7 a.m."

Post mortem examination revealed a cavity the size of a large orange in the upper lobe of the right lung, which was opened into on removal, from it escaped a large quantity of dark, partly clotted blood.
There were scattered tubercles throughout the lung. There was also a cavity at the left apex the size of a filbert filled with thick pus and scattered tuberculous nodules were found throughout ~~the~~ lung.

Heart. Right auricle filled with mixed clot - also a small quantity of the same in right ventricle
Left auricle empty and left ventricle contracted and contained a small quantity of mixed clot, aortic valves competent some slight atheroma above the attachment of the sigmoid

valves. Cardiac muscle pale.
Trachia empty

In this case the bleeding had taken place into the cavity and could not be properly discharged, syncope and death having followed.

We thus see that even slight attacks of Haemoptysis may be followed by very disastrous results. In all the cases however, in which the issue was so unfavourable, the disease of the lungs was extensive and advanced & the patients general condition very unsatisfactory.

When the patient previously was in good health and the disease in the early stage, the attack is in most cases satisfactorily recovered from. —

Group III. Severe Haemoptysis, where a larger quantity of blood is lost amounting to 10 ounces, a pint or more.

Bleeding to this extent is generally, in my experience, met with in cases which have reached the stage of excavation.

It however sometimes occurs in cases in which a cavity cannot be detected.

I have before me, 100 cases of haemoptysis analysed according to the stage of the disease.

at the time of the bleeding. In 39 of these cases Oj or more of blood was brought up during the attack and of these all but nine had reached the stage of excavation

Of the nine in which the disease was less advanced and the bleeding considerable, there was in addition to the pulmonary disease evidence also of mitial disease in 4 cases.

Instances are met with in this group in which after a large quantity of blood has been lost during an attack of haemoptysis a rapid and satisfactory recovery is made. The following case is an example of this.

Case IV. Rolfs, aet 43, a chemical broker. Admitted February 5th 1894.

No history of consumption. Patients' illness began with blood spitting in September 1892 when he brought up about a teaspoonful of blood after dinner. No cough or any symptom of lung disease previously. He had quinsy shortly afterwards. From Dec. 5th 1892 to January 16th 1893 he had eighteen attacks of haemoptysis, loosing during that time a great deal of blood. Up to the following June, he had no serious attack. In June, he received a blow on the chest and brought up ℥XII of blood and on another

occasion ℥ xvi of blood. In December 1893 while in Bournemouth, he had five attacks the severest being ℥ vi. Since then has had no bleeding. His other symptoms have been comparatively slight but he has had cough and spit: occasional pains in the chest, night sweats in December 1892 and has lost one stone in weight since the beginning of the illness.

With reference to the Haemoptysis, he further states that he has found if he strains with his right arm it is liable to bring on the bleeding. He also mentions that in August last he brought up casts of the bronchi and these he showed me preserved in a bottle.

On examination, the percussion was impaired on the right side to the nipple. cavernous breathing, whispering pectoriloque and bronchophony were audible at the right apex: the breath sounds below this area were very faint and the expiratory murmur was prolonged. The vocal resonance was increased at the left apex behind. Height 5 ft: 6in: Weight 9 st: 6 lb: 2 oz:

On the 15th his weight is noted as being 9 st: 9 lbs: 4 oz: a gain of 3 lbs in 9 days.

On the 23rd he complained of flatulence after food.

On the 24th: Had ℥i of bright colod. Thinks it was brought on by sitting in a hot room. Sent to bed.

On the 25th: Had ℥iii at 4.45 a.m. Says "he felt hot in the night, turned round in bed and the blood was in his mouth"

On the 26th Temperature normal. Expectoration of a greenish brown colour. 11 p.m – ℥ss of bright colour.

On the 27th 2.30 p.m ℥vi to ℥viii of blood, gave morphia gr 1/4.

On the 28th: ℥i of blood in the night.

On March 1st 2.30 a.m ℥xii of blood and at 8.15 - ℥ii

On March 2nd ℥i of blood in night at 4.15 - Gave morphia gr 1/4 and ordered the injection to be repeated every six hours.

On the 3rd he lost about ℥ii of blood during the day

On the 4th "No blood since yesterday at 9 p.m"

On the 6th "No more colour since the 3rd allowed to sit up. Morphia injections discontinued.

March 15th Weight 9st: 7lb: 12oz: He evidently lost several pounds during the attack for though he had a fortnight to recoup himself, a loss of 1/2 lbs: is noted.

He had no more bleeding till he left on the 14th of April when his weight was 10 st: 0 lb: 6 oz: A gain of 8¼ lbs in 10 weeks, during which time he had had the attack of Haemoptysis, in which he lost nearly Oij of blood.

This case, I have quoted very fully as I have heard from him each Christmas since he left. In 1895 he tells me that "since the morphia injections, I have been almost entirely free from haemorrhage" and in 1896 (Xmas) "I now weigh 11 st: 8 or 9 lbs and feel as well as possible" This report received more than two and a half years after the attack is very satisfactory evidence of the completeness of the recovery.

Another instance of recovery from severe Haemoptysis that I have a record of is that of Kaife (Chart No: 25.) I quote it very briefly.

Case V. Kaife: aet 32: painter. Admitted for the 2nd time December 13th: 1895. While in the hospital last year, he lost between November 15th and 23rd ʒLXIII ℥ of blood. During his stay of fourteen weeks, during which time this attack occurred he gained on the whole 2 lb: 2 oz: weighing when he left on the 14th January 1895 – 9 st: 3 lb 14 oz:

After leaving he had another attack of Haemoptysis while staying in Ventnor, when he lost 6oz (℥iii) of blood again. He has not worked since he left, but kept fairly well through the summer till November when he lost ℥i of blood, since then his cough has been worse and there has been more expectoration and shortness of breath.

On examination, it was found that there was consolidation of the upper third of the right lung with scattered crepitations over the whole lung and consolidation of the left apex with a little friction below the left nipple.

In the cardiac examination, a pre-systolic impurity is noted internal to the apex - so there was probably some mitial stenosis in addition to the pulmonary condition.

His weight on the 2nd admission was 10st: 9lbs: or 1 stone 5 pounds heavier than when he left 11 months previously.

During his 2nd stay at the Hospital he lost about 10 oz of blood in 10 days.

This time he lost 5½ lbs in weight in 17 days. His weight on leaving however was 10 st 3lb: 8oz, which left him 3½ lbs. above the standard for his height.

Less favourable consequences attending severe attacks of Haemoptysis are however only too frequent and though death may not very shortly supervene, the downward progress of a case may date from such an attack of bleeding.

In these cases as pointed out elsewhere the bleeding is followed almost invariably by a rise of temperature, which may at first be high and afterwards lapse into the hectic type with a maximum of 100° or 101° in the evening.

An example of this is seen in the case of James Evans - who though loosing a little weight, 2¼ lbs in the fortnight before the attack lost 11½ lbs during the month in which it occurred, I quote the case briefly

Evans: aet 17: farm labourer Chart No: 45
Admitted October 21st 1896.
Brother and sister died of consumption.
Patient always enjoyed good health and never had a serious illness till the present one, which he dates as beginning about a year ago, though the cough first came on two winters ago, disappearing in the summer. Has not worked for a year. Has had cough & spit: shortness of breath: pain in left side, sweating at night: loss of flesh & weakness but never any haemoptysis.

On examination, both lungs affected, vomica left apex with creaking and crepitations over the whole lung. The Right apex in the earliest stage. Height 5ft: 8in: Weight on October 27th 10 st: 13 lb: almost up to the standard for his height. On December 17th weight was 10 st 13 lb: 8 oz: and on the 31st 10 st: 11 lb: 4 oz: a loss of 2¼ lbs in the fortnight. On January 1st 1897, about 9 p.m. he had Haemoptysis, as he was on his way from the bath to his bedroom (having just had a hot bath). He brought up about ʒ XIV of blood. After this, he had no more actual blood, but brought up blood and expectoration mixed and afterwards discoloured spit & eventually brown or rusty spit for 11 days: when it became quite clear. It is worthy of note that the expectoration was very frothy after the bleeding for several days and the amount was considerably more, being about ʒ VI as noted on the 19th of January and frothy in character.

On the 28th his weight was 9 st: 13 lb: 12 oz: showing a loss of 11½ lbs during the month.

Instances of severe Haemoptysis associated with pyrexia causing a rapidly fatal termination is seen in the

cases of Dale and Spencer (charts Nº 1 & 3 respectively) which are recorded in the section on temperature.

Severe Haemoptysis may cause death almost instantaneously by asphyxia or syncope.

Long (chart Nº 46) is an example of a case of phthisis with marked pyrexia in the course of which severe Haemoptysis occurs. The actual Haemoptysis is preceded by discoloured expectoration (as mentioned in group I.) he certainly three severe bout of bleeding (XLII ʒ : XXIV & X ʒ respectively) were recovered from. Eventually however he died of asphyxia from an attack in which a very large quantity of blood was lost.

It will be noticed on the chart that no fall of temperature followed any of the severe hemorrhages, as is so often described.

The disease in this case had reached the stage of excavation — as was the case in all the sudden deaths from haemoptysis that I have seen.

Another case may be recorded in which the fatal attack of haemoptysis was the first and only one and in which the patient previous was up and about.

Jagget, Janet: æt 33: housemaid (chart No: 47)
No history of consumption. Admitted Nov: 27th 1895. Dates beginning of the illness to an attack of inflammation of the lungs in last July. No other illness. Throat affected since July also. Has had cough since that time with expectoration, which varies in amount, but never very much as it does not necessitate the use of a spit cup. No history of night sweats nor haemoptysis.

On examination, both lungs affected with a large vomica at left apex and probably a smaller one at the right. Heart has moved slightly to the left. Height 5ft: 1in: weight on the 20th December 6 st: 13 lb: 8 oz: (1 st: 8½ lbs below her standard). She lost 2½ lbs between November 28th and December 20th which was the last time she was weighed before death.

On the 26th she complained of a pain in the left side, but did not lay up for it

On the 28th at 7.55 a.m Had sudden attack of Haemoptysis, in the bedroom as she was putting on her stockings. She brought up three measured pints of blood and a considerable amount on the floor and night gown. She died in less than 4 minutes probably from asphyxia.

Death may also follow Haemoptysis through heart failure initiated by the attack of bleeding, without the intervention of marked pyrexia.

I quote Lacey's case as an illustration of this

Lacey aet 21. warehouseman.
Admitted August 19th 1896.
No history of consumption. Has had a cough in the morning since March, 1895. with sometimes a good deal of spit.
Had haemoptysis about a tea cupful in November 1895. About four months ago had haemoptysis for a week (3j or more a day) Has only seen a streak or two since. Has had night sweats and been very weak since the beginning of his illness, but never kept in bed. Has lost two stones in weight in eighteen months. Troubled very much with dyspnoea.

On admission, complained chiefly of shortness of breath & weakness.

On examination, both lungs affected to about the sixth rib in front: vomica at apex: scattered crepitations over both lungs.

Jaggett, Jane: æt 33: housemaid (chart No: 47)
No history of consumption. Admitted Nov^r 27^th 1895. Dates beginning of the illness to an attack of inflammation of the lungs in last July. No other illness. Throat affected since July also. Has had cough since that time with expectoration, which varies in amount, but never very much as it does not necessitate the use of a spit cup. No history of night sweats nor hæmoptysis.

On examination, both lungs affected with a large vomica at left apex and probably a smaller one at the right. Heart has moved slightly to the left. Height 5ft: 1in: weight on the 20^th December 6 st: 13 lb: 8 oz: (1st: 8½ lbs below her standard). She lost 2½ lbs between November 28^th and December 20^th which was the last time she was weighed before death.

On the 26^th she complained of a pain in the left side, but did not lay up for it

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We have now described a number of varieties of pulmonary haemorrhage as clinically met with beginning with the expectoration simply streaked with blood up to the severe and fatal gush in which upwards of three pints of blood were discharged in almost as many minutes.

We have seen that in several instances a definite attack of haemoptysis may be preceded by discoloured expectoration hence it should be looked upon as a sign of some significance not to be entirely disregarded as is so often the case.

We have seen also that the possibilities are similar in the cases of the comparatively slight & more severe attacks of Haemoptysis. Following both attacks we have recorded cases in which satisfactory recovery was made.

Following both attacks we have seen that the patient may get decidedly worse without actually dying very shortly after it and following both attacks we have noted that the patient may die either of pneumonia or suddenly from asphyxia or syncope, or less rapidly by heart failure.

The amount of blood in itself therefore cannot be regarded as an essentially important factor in deciding the issue of a case.

Having considered a number of clinical types of Haemoptysis and the various results which are liable to follow the attack, it is now proposed to consider certain points of interest in connection with its occurrence which the records of some hundred cases of Haemoptysis, that I have before me, are able to furnish.

I. Meteorology.

Though careful and systematic observations are taken at the Hospital, I have been unable to find anything like a consistent relationship between the meteorological changes from day to day and the occurrence of haemoptysis.

Upon logical grounds, it would seem exceedingly unlikely that meteorological conditions, should have any decided influence in determining an attack of haemoptysis.

If it were otherwise, in a hospital such as this, where there are so many similar cases, changes favourable for the production of haemoptysis would initiate an attack in a considerable number of cases at about the same period.

Though two or three cases of

haemoptysis frequently occur together, there has never been a sufficiently large number at one time to arouse the idea of looking for a general and widely reacting cause to account for their incidence.

We have, however, analysed the 102 cases of haemoptysis, we have been dealing with, according to the months in which the attack came on and also the 40 deaths according to the months in which they occurred.

Months	No. of cases of haemoptysis	No. of Deaths.
January.	7.	3.
February.	11.	2.
March.	6.	7.
April.	6.	1.
May	4.	5.
June.	9.	4.
July.	11.	3.
August.	8.	4.
September.	7.	3.
October.	6.	3.
November.	13.	1.
December.	14.	4.

We see from this table that nothing very definite can be stated as regards the onset of the attack and as the 102 cases of Haemoptysis are by no means a complete record of all the attacks that have occurred in the last five years, whereas the deaths are, it would not be fair to calculate the percentage of deaths in the various months from the number of cases included in the first column of the table.

Attention has already been drawn to the more frequent occurrence of pneumonia in the winter and sudden death in the summer following haemoptysis. Those from heart failure being about the same in both seasons.

II. Cause. — As regards the production of an attack of haemoptysis in phthisis, most general causes have to be dismissed upon the same grounds that were mentioned with reference to the meteorological question. It may be well here however to enumerate a few circumstances which were followed by haemoptysis and which were looked upon by the patient, as the exciting cause of the bleeding.

In discussing the etiological relations of haemoptysis, we noted that in several instances, the first attack of haemoptysis

followed very rigorous exertion, such as racing either on foot or on a bicycle ~ swimming ~ lifting heavy weights and such like.

In the hospital instances are constantly occurring in which much milder muscular movements are sufficient to determine the attack.

In several cases, bleeding has occurred in the evening as the patient is walking upstairs to bed and an attack of coughing is frequently the exciting factor.

We have seen in the cases of Ayres and Jagged that stooping was sufficient to bring on the bleeding and in the case of Rolfe, it will be remembered that the bleeding came on if he strained with his right arm.

Straining at stool, is noted in three instances as bringing on bleeding and when the patient is already suffering from an attack, this exertion is not unfrequently sufficient to start a recurrence, and I have twice seen an attack of haemoptysis follow singing. In one instance the bleeding came on as the patient was straining to take a high note.

Sometimes haemoptysis comes on during sleep - the patient waking up to find blood in his mouth. In Leahs case he did not know till next morning that he had brought up any blood in the night.

One case dreamt that he was struggling with burglars and on waking found that he had had haemoptysis. In one case, the first attack, which proved suddenly fatal occurred when the patient was in bed lying quiet. The bleeding in all cases does not appear to come on at the time of exertion, but some hours afterwards.

In several cases, it has been noticed that patients have had haemoptysis in the night after having an unusally long walk during the day, and in one case, a patient who played the French horn in the Mounted Artillery Band, told me, that if he had been playing for longer than usual during the day, he frequently found that bleeding came on during the night.

In one of two instances the attack has been attributed to the warmth of the room and in two instances it has followed a hot bath. One woman said, she had bleeding when the weather was damp, but this can scarcely be regarded seriously in this country.

These comparatively trivial circumstances are obviously of themselves insufficient to bring on Haemoptysis and we venture to take this opportunity of again stating that

we think, it is exceedingly improbable that even the more rigorous forms of exertion are sufficient alone to produce pulmonary haemorrhage in a person who is really in sound health. —

Before the disease was established we saw that it required some unusally heavy strain to bring on Haemoptysis; after phthisis had definitely developed in certain instances, all that was necessary to bring on the bleeding was some slight additional or unusual exertion. and in some cases that was superfluous, for the attack came on while the patient was resting and asleep.

Haemoptysis occurring in this way, namely when the patient is at rest, renders the fact evident, that the chief factor to be considered in connection with its occurrence is the presence of the disease in the lungs.

III. Haemoptysis in relation to the stage of disease.

Here again I propose to divide the cases into two groups, namely than in which an excavation can, and those in which an excavation cannot be detected by the physicial examination.

(i) Haemoptysis occurring in the early stage before excavation may be fairly profuse.

In Harrup's case we saw an instance of ℥IX being brought up in a few minutes and in James Evans (just after taking a bath) ℥XIV, also in one bout. On the whole however, the bleeding is seldom very severe before the stage of excavation is reached. Out of 32 cases in which haemoptysis occurred whilst under observation & cavity could not be detected, seven only brought up Oj of blood or more. In three, of the most severe of these cases, there was evidence of mitial disease, complicating the pulmonary condition. In one of these, death from cardiac failure followed the attack. This is the only case of which I have record, in which death from haemoptysis occurred before the stage of cavitation.

The disease, however, may extend rapidly, as is fully explained elsewhere and vomica may develope or become recognisable very shortly after the bleeding. Holdaway's case illustrates this:, the vomica formed after the first attack of bleeding and was present consequently when the second attack came on, which proved fatal.

II. Haemoptysis occurring, when the disease has reached the stage of excavation, may be very variable in character

The possibilities are of course obviously greater because all the various stages of the process may be represented in the same individual, and the bleeding consequently may either be of the milder type we are just considering as occurring in the earlier stages or of a more profuse and serious nature such as is met with, when an aneurism rupture or a medium sized artery is eroded into.

Out of 69 cases of haemoptysis occuring when the disease has reached this stage, I find that in 32 Cs or more was brought up during the attack — the amounts of blood lost however range from 5 measured pints to an ounce or less.

In the 39 out of the 40 cases that I have records of, in which death has resulted from haemoptysis a cavity was diagnosed previous to the fatal attack.

The solitary exception, we have just quoted amongst the earlier cases and it will be noted that death in that case was due to heart failure. I have therefore no record of sudden death occurring from haemorrhage when the pulmonary disease was in its early stage.

In the two cases in which death from pneumonia followed haemoptysis, the disease had reached this stage.

We thus see, that the condition of the disease in the lungs gives an important indication for guidance in deciding upon the prognosis of a case of haemoptysis.

Before passing from the condition of the lungs, it may be well to mention, that shortly after an attack of haemoptysis, coarse and bubling crepitations can often, though not invariably, be heard over the region from which the blood is coming. These can often be distinguished by the patient himself & the sound is generally described as a 'rattleing'. This is sometimes audible to those round the bed and may remain for some time or clear off so soon as the bleeding stops.

Crepitations, if the bleeding has been severe, can very often be detected at the base of one or both lungs, due to gravitation or inhalation of blood to that region, these in the same way may clear up, but the process is usually a longer one.

As before mentioned, after an attack evidence of extension of the disease can frequently be recognised by an increased area of impaired precussion, fresh patches of increased local resonance & bronchial breathing & crepitations

Again, as before mentioned, cavnica can sometimes be made out where they could not be previously detected.

Friction sometimes also developes after an attack of Haemoptysis.

IV. Haemoptysis and Recurrence.

There can be very little doubt as to the liability of haemoptysis to recur. Out of the 102 cases that we have been considering, there is a definite history of previous haemoptysis in 77 cases. In 21, the attack we had the opportunity of observing, was the first that occurred, and in 4 the history was indefinite.

In the cases with a previous history, some remarkable accounts of the amount of blood lost are given by the patients, but these have generally to be accepted with caution. In one case for example, the patient, who at the time

of examination, had no sign of an excavation stated that he brought up half a gallon of blood in one attack. In some instances, the bleeding recurs from time to time and is of a particular type.

In some cases small in amount, and not associated with any unfavourable symptoms, as in the case of Salmoni and Weller. In others, the bleeding is always severe: in some cases being rapidly recovered from, in others, pulling the patient down very considerably. Agnes case (whose chart N° 24 is given) is an instance of recurrent hæmoptysis, the attacks never being severe, but always weakening him a good deal. Skaifes (whose chart no. 25 is also included), is an example of the larger attacks successfully recovered from.

In some women, hæmoptysis is especially liable to occur at the menstrual period, but I have never seen an instance in which all the attacks were associated with that event.

Sir Thomas Watson quotes a case, in which hæmoptysis occurred once a month at the menstrual period for 38 years.

In some instances, patients state that the bleeding is generally preceded by some symptom, which enables them to anticipate its advent. The symptom most often mentioned in this connection as far as memory serves me, is pain usually at some particular spot in the chest.

Amongst the 21 cases in which the first attack of bleeding occurred whilst in the hospital, almost all the varieties of haemoptysis both as regards the attack and the results are met with.

In four instances sudden death occurred, including deaths from asphyxia and syncope, one case of pneumonia (Dix) ending fatally and one case of cardiac failure after a very severe haemoptysis, during which over 5 measured pints of blood were lost in 12 days. In one case, slight attacks of haemoptysis occurred in the course of a pyrexia case getting worse apart from the bleeding.

Examples are also met with in which the first attack of bleeding set up a re-infection of the lung, causing the patient to get worse rapidly, and on the other hand, instances are seen in which the recovery has been very complete and satisfactory.

These observations justify us in saying that the first attack of haemoptysis can be just as severe as a subsequent one but very much more depends upon the stage of the disease at the time of the bleeding.

V. Age.

The question of age in relation to haemoptysis has already been touched upon in the statistical section.

It is sufficient here then to state, that the analysis of the various attacks of haemoptysis according to age and the extent of the disease, shows that the largest number of severe haemorrhages occurred when the patient was over 30 and the disease had reached the stage of excavation. The 4 sudden deaths following the first haemoptysis are included in this category and also 9 cases in which a pint or more of blood was lost in the attack.

Further it may be mentioned that though severe bleeding may occur at an earlier age, it is less likely to be of so large an amount.

VI. Relation of Haemoptysis to the 1st symptom.

Occurrence of Haemoptysis in relation to the first symptom.	No. of cases.
1st Symptom	24.
Early	12.
within 6 months	19.
~ 1 year	16.
~ 2 years	6
over two years.	1.

This is an analysis of 78 of the 102 cases, in which the histories were decidedly definite

It will be seen that in nearly a third of the cases, Haemoptysis was the first symptom and in two-thirds it occurred within the first six months.

Attention may here be drawn to the fact that a slight attack of haemoptysis occurring really early in the course of phthisis is often of great service indirectly to the patient

When phthisis begins indefinitely with only symptoms of lassitude and disinclination for exertion and perhaps

dyspepsia, in addition to a slight cough on rising in the morning, the patient never realises that there is anything really the matter with himself, and he gets but little sympathy from his friends. Should however, even a slight attack of blood spitting make its appearance, both patient and his friends become alarmed. He is sent to the Doctor, who likewise gives the case more serious consideration, attaching greater importance to physical signs in themselves, scarcely sufficient to base a diagnosis upon, but which supported by the occurrence of haemoptysis, enable him to state positively that there is actual disease in the lungs and that this is the time above all others in which an effort must be made to check its progress and endeavour to secure an arrest before further damage is done.

On the other hand the disease may go on unattended to and when it eventually reaches the Doctor, it is found that it has advanced considerably and the general health has been so weakened that it becomes a matter of greater difficulty from every point of view to

improve the patient and even then owing to the irreparable damage that has been done, the possibilities afterwards are very much more limited.

VII. Weight and height

A statement of the body weight alone conveys very little information as to the nutrition of the individual: a weight say of 11 stone in a short person of 5 ft: 1 or 2 inches would mean, that he was very stout. Whereas if it was the weight of a man 6 ft: it would mean that he was very badly nourished. It is necessary therefore that the height should be taken into consideration as well.

In this thesis, where it has been desired to give an indication of the nutrition of the patient his height & weight have been stated; and in addition the result of a comparison of the individuals weight with that recorded in the table of Dr Hutchinson, for the same height has been added, with a statement of whether it was so much above or below the standard.

Attention has several times been drawn to the fact in the

section on temperature, that disastrous results have followed haemoptysis especially in cases that were poorly nourished previous to the onset of the attack and it was there noted that Griffen was the only case that weighed a stone more than the standard for her height.

In studying her case the evidence of a vitality, unusual in cases of phthisis was manifest throughout and it was thought possible that there might be some relationship between this resisting power and the satisfactory state of her nutrition as demonstrated by records of her height and weight.

This encouraged us to work out the subject still further, and so in all cases in which haemoptysis of ℥v or more occurred, the weight immediately preceding the bleeding was compared with its standard by Hutchinson and the result noted.

The cases were then classified into three groups: firstly where sudden death followed haemoptysis, secondly where death resulted indirectly from haemoptysis and thirdly where death did not result.

The results obtained from

from the comparision before mentioned were then added in each of the 3 groups and an average obtained

The following is the result

(i) In cases where death occurred suddenly directly due to haemoptysis

st: lb: oz:

The average deficiency was 2 . 7 . 7

(ii) In cases where death was indirectly due to Haemoptysis.

The average deficiency was 2 . 5 . 6

(iii) Where haemoptysis of ℥V or more did not end fatally.

The average deficiency was 1 . 8 . 6

We thus see that in cases which ended fatally the nutrition must have been very much at fault and it is interesting to note that the deficiency is greater in the most rapidly fatal cases

These figures are worthy of some consideration as they are sufficiently decided to be the result of something more than accident

The question as to whether weight is invariably lost during an attack of haemoptysis is rather difficult to answer as the patient is confined to his bed several days after the bleeding has been arrested and does not leave his room till some

days later. A considerable time therefore has to elapse between the cessation of haemoptysis and the date of his being weighed, during which period it is quite possible that weight may be gained even though it was lost during the attack itself.

In some instances the gain during the interval may more than cover the loss during the attack and thus an uninterrupted increase in weight may be simulated.

In others, the recovery may not be so complete, but even if it is only slight the total loss during the attack is masked and again on the other hand the loss may be continued, not only during the attack but also during the interval and in this case the loss would be exaggerated.

On the whole, I think weight is generally lost during the attack if it be at all severe and especially if it is associated with a marked rise of temperature.

In some instances, however this is not so, as seen in Weller's case, who had bleeding off and on for over six weeks and gained a stone in fourteen weeks.

VIII.

Cardiac condition.

In phthisis it is a well recognised fact that the heart muscle in common with other muscular structures in the body participates in the general weakness and further, is liable to undergo degenerative changes

In most phthisical cases bruits can be elicited, by making the patient exert himself previous to the examination and subjectively most patients complain of dyspnœa, especially on occasions in which additional strain is put upon the heart.

Dyspnœa in phthisis, being referable to such a number of causes it is a difficult matter to decide which is really the prevailing one, even in each individual case.

In some however without doubt it must be attributed to the condition of the heart for instances are often seen in which the dyspnœa is quite out of proportion to the amount of the pulmonary affection.

It is interesting further to note that organic disease is not very common in phthisis, and that the cardiac symptoms are more frequently due to weakness of

the muscular structure than to the valves of the heart.

In the 102 cases we are dealing with, dyspnœa on exertion, such as walking up stairs or up an incline was complained of in the majority of instances - in some with the addition of palpitation, in others with a tendency to cyanosis and coldness of extremities.

A history of oedema of the feet is recorded in only four cases and of fainting in two cases.

As to the existence of valvular disease of the heart in addition to the disease of the lungs, in these cases, I feel justified in speaking positively of four cases only, in three of which there was mitial stenosis and in one mitial incompetence: it is noted that a systolic bruit was audible at the apex and conducted towards the axilla, but but the fact of its being regarded as of valvular disease is not definitely stated as in the other case.

In the 4 cases, in which there was valvular disease the haemoptysis was considerable in amount. In Challen's case 28 ounces in six days, in Kaifes 68 oz. in three weeks, and during his 2nd admission

10 ounces in 10 days, in Beasleys 24 oz: in four days and in Barnhouses case which proved fatal from heart failure 35 oz: in 19 days.

In Challens case the temperature improved after the attack as will be seen on referring to his chart (N°. 34) He also gained weight rapidly and made excellent recovery. In Skaife and Beasleys cases (charts N°. 25 & 28) the attack was not associated with pyrexia: there was however a tendency for the temperature to be subnormal afterwards.

It must further be mentioned that in the case of Beasley, Barnhouse and Skaife, the disease had not reached the stage of excavation and that they were the only three instances of the group (before stage of excavation) in which the amount of blood lost exceeded one pint.

It may safely therefore be stated that Valvular disease of the heart, complicating phthisis, has a tendency to increase the amount of blood lost during an attack of haemoptysis.

This subject will again be referred to in connection with treatment.

IX. Haemoptysis occurring in the course of phthisis with pyrexia, is not nearly as frequently met with as in the apyrexia cases, when however it does occur it must be regarded as a serious complication.

A marked instance of this has already been mentioned in the case of Long in connection with large quantities of blood being lost in an attack. A glance at his chart (N° 46) will show that the temperature was practically uninfluenced by the bleeding.

In almost all the cases in which sudden death from haemoptysis occurred there had been pyrexia previous to the attack.

In several cases I have been able to obtain the charts up to a short time before death and these are included in the cases of Boreo (Chart N° 50, Castle (54), Faunch (55), Folds (52), Jagged (47), Long, Mac Conchie (53) and Stapley (51).

(In the last mentioned case which appears to be an exception to the above statement, it has subsequently been discovered that the temperatures are not recorded for several days, immediately preceding death. It is therefore of little value in throwing light upon the question we are considering.)

One point of interest in connection with Gold's case must be recorded: namely that he was being treated with tuberculin up to the time of his death. On the 21st of December 1895 he was ordered an injection of m VIII of a solution of tuberculin (1-20 in distilled water) twice daily and this was given on the morning of the fatal attack. He died at 8.30 p.m. having got out of bed to use the night stool. He lost a large quantity of blood.

In these cases the temperature appears to indicate the activity of the disease and the subsequent haemorrhage, the fact that the activity has been in the neighbourhood of a large blood vessel.

The idea is supported also by the fact that severe exercise or straining is unnecessary to bring on the bleeding.

The disease has so eroded an artery or the wall of an aneurism, that it requires only the slightest additional rise in blood pressure, to cause the rupture.

This, in a person with extensive disease and a weakened physique is sufficient to produce a fatal issue almost instantaneously.

All cases of course do not turn out so unfavourably, in some the bleeding, as before mentioned, does accelerate the end, but in others, as we have seen in the case of Challen, the temperature and general condition improves after the attack.

The subject of pyrexia following haemoptysis is dealt with at considerable length in a section of its own.

Haemoptysis in relation to Temperature.

As the state of the Temperature gives a very trustworthy indication of the progress of a phthisical case, it will be of interest to investigate the extent to which the chart may be influenced by the occurrence of an attack of Haemoptysis.

For the purpose of considering this subject I have collected a series of some 50 charts in the course of which an attack of bleeding from the lungs has supervened.

On reviewing these charts, it is in the first place noted, that the attack of Haemoptysis in some instances came on when the temperature was perfectly normal and in others when the temperature was previously high or irregular.

On analysing the cases upon the basis of the condition of the chart before the bleeding, it is seen that in

24 cases the Temperature was normal
18 cases the Temperature was only slightly irregular, but not sufficiently steady to be regarded as quite normal.
6 cases the Temperature rose to 100° in the evening and was hectic in character.

} before the outset of the attack

and 2 cases the fever was more marked reaching 102° and remittent in character. } before the onset of the attack.

It is thus evident that Haemoptysis may occur and probably also more frequently does occur, when there is an absence of Pyrexia and the case is apparently progressing favourably.

This leads us on to consider the influence of Haemoptysis upon the Temperature during the attack.

On examining the charts in this connection, it is at once recognised that the effect is of a very varying character. In some cases the temperature is practically unaffected or if anything slightly improved, in others, it is most strikingly affected and the subsequent course of the chart entirely altered; variations inter-mediate between these two extremes are also met with.

In order to pursue this subject satisfactorily some arrangement or classification of the charts must be made.

It is now proposed to group the charts according to the extent to which the temperature is affected by the attack, and as will be seen later, the degree of Pyrexia associated with the bleeding has a very marked influence upon the ultimate issue of the case.

Extent to which Temperature was raised.	Names of Charts.	No. of cases.	Fatal	Recovered.
GROUP I. 103° and over	Dale, Pope, Spencer, Eyre, Evans, Dix Ayres, Barnhouse Griffin, Leah, Dawson, Reed, Walker.	13.	9.	4.
GROUP II. 101° to 103°	Holdaway, Lennard Highley, Payne Eyre, Challen, Dane, Morgan, Nash, Clarke, Batchelor, Bruce, Beacham, ~~Chambers~~ Usher, Beswick	15.	3	12
GROUP III. Temperature rose but did not exceed 101°	Morofski, Hargreaves Cohen, Ayris, Berry, Micklebrugh Spencer, Ellingworth	8	0	8
GROUP IV. Temperature normal during attack.	Johnson, Harrup & Weller	3.	0.	3.
GROUP V. Temperature sub-normal during attack.	Vignes, Knife, Fourbach Minnard, Beasley.	5	0	5

It may be well to mention here that in arranging this classification, it has been noted that in Group I. which includes the highest temperatures of the series during the attack, the temperature in 5 out of the 13 cases was previously normal, and in the remainder, was only slightly raised or irregular before the attack. This being the case it may fairly be inferred that the pyrexia in someway resulted from the bleeding.

The next point to be considered is the character of the charts, on carefully analysing them three types can be recognised

(i) The Continuous, where the temperature is raised both morning and evening with only slight remissions. This is more usually seen when the temperature is considerably elevated.

(ii) The Remittent, where the temperature is raised throughout the day. never falling to the normal line, but in which the variations are more marked.

(iii) The Hectic or Inter-mittent, where the temperature is raised for a portion of the day, usually the afternoon or evening, dropping to normal or subnormal for another portion, usually in the morning.

It will thus be seen that the types of Temperature are identical with those occurring in the course of ordinary Phthisis and due other causes.

In these instances however, they are indicative of processes initiated by or resulting from an attack of Haemoptysis.

Two questions naturally here arise Firstly :- How Haemoptysis affect the temperature ? and secondly :- Why does it do so in some cases and not in others?

In the first place, when haemoptysis occurs, a certain amount of blood is almost sure to be introduced into some distant part of the same lung or even into the opposite lung. This fact is supported by the auscultatory examination shortly after the bleeding, when coarse crepitations are often heard over an area of lung that was previously quite clear, and especially at the base to which the blood would be favoured by the action of gravity. The post-mortem examination in cases of death following Haemoptysis, also affords evidence on this matter, blood is almost invariably found in the bronchi on both sides. Again Phthisis, may almost be regarded as a bilateral disease - one lung is hardly ever affected alone for any length of time. - There can be little doubt that the infection is carried, through some of the secretion being drawn from primarily affected to the sound lung.

When bleeding occurs, this is even more likely to be the case, for the blood is discharged

more rapidly than the secretion and consequently the breathing is more embarrassed — also the patient is more excited in his movements and cough, and so insufflation of blood into distant bronchial systems is almost sure to result.

Now the presence of blood in the bronchial system and air vesicles (i.e. outside its proper vascular channels) cannot be regarded as a sufficient explanation of the temperature and symptoms which often follow Haemoptysis. This has been demonstrated by the experiments of Perl and Lipmann and those of Sommerbrodt, which show that healthy blood when injected into the lungs of guinea pigs produced infiltration of the alveoli which at the end of a few weeks had entirely disappeared, and this was also the case, when the blood was injected in a coagulated state [Ziemssen Vol: V page 306 quoted by Williams].

Again Brown Sequard used to administer his animal extracts by intra-tracheal injection, as he found that they were more rapidly and effectually assimilated by this method. and intra-trachial injections of guaiacol and menthol I have frequently given without observing any signs or symptoms of lung irritation — a result which a priore might be more reasonably expected, than the introduction of an homologous fluid such as blood. The fact also, that Haemoptysis is frequently not followed by an

Elevation of Temperature or other unfavourable symptoms, as is frequently the case in Haemoptysis associated with Mitral Stenosis, is evidence in support of the theory, that they cannot be referred to the action of blood alone.

The site of Pulmonary Haemorrhage in Phthisis may practically always be regarded as occurring in a diseased portion of the lung, and in most instances from vessels themselves diseased, it is highly possible therefore, that the blood having its source in such an area, should take with it some of the material in its immediate vicinity which might include Tubercle Bacilli or other organisms and debris.
Blood augmented in this way can scarcely be included in the term 'pure' and differences in the effects produced by its presence may be explained without any objection being raised on the ground of Perl and Lipmann's experiments. It might more reasonably be expected to behave in the manner we have just attributed to Tuberculous Sputum only probably more rapidly and markedly.

To the extraneous matter, associated with the blood, then must the symptoms and temperature be referred.

If blood of this description is inhaled into a distant part of the lungs, it is quite possible that it might act as a foreign body

and produce irritation of the Pulmonary tissue, causing the temperature to be raised but when its effect ends here, the temperature would probably only be raised temporarily.

The effects however may proceed further, and in addition to causing irritation, may produce inflammation, setting up an attack of Broncho or Catarrhal pneumonia, which may be limited or wide spread in extent. Such a condition is associated with a marked rise in temperature, which is of the continuous type at all events in the first instance; and is frequently followed very shortly by death, if the area of inflammation is great; on the other hand there may be a Tuberculous infection as well and if the patient survives the Bronchial pneumonia, its effect is seen in the chart a little later, which assumes the tubercular characteristic of high temperature, with considerable re-missions and afterwards intermissions.

Again Tuberde Bacilli alone may be conveyed to a distant part of the lung or lungs, and set up fresh foci of disease or extension of the Tuberculous process, without any preliminary Broncho pneumonia and this is ofcourse by far more commonly the case.

Several charts illustrative of these conditions are included in the series

The question as to how Haemoptysis affects the temperature, must be explained upon the grounds, that have just been given, by irritation; inflammation or extension of the Tubercular process being set up, by the introduction of blood conveying Bacilli, other organisms or debris into some distant part of the lung or lungs – along the bronchial tract.
As to why this should happen in some cases and not in others, it is more difficult to offer an explanation and any attempt even, must necessarily entail a large amount of speculation.

It might be suggested that any extraneous material that could be dislodged was removed at the first burst of bleeding, and got rid of at once, and that the blood following subsequently might be regarded as pure.
The blood first lost would be less likely to be insufflated than the latter, owing to the breathing being less embarrassed and the patient being less excited at the commencement of the attack.

As a matter of fact in several instances in which the temperature rose highest the bleeding was very slight and would thus be less likely to wash away thoroughly and remove any debris in the neighbourhood.

Again the site of the bleeding in some instances might, owing to its relation to the Bronchi, favour or hinder the direct

discharge of blood from the lungs and thus diminish or increase the likelihood of its being inhaled else where, or increase or diminish the amount of foreign material it might collect on the way.

Perhaps a more probable explanation and certainly a less fanciful one, may be found in the resisting power of the tissues to which the bacilli are conveyed.

With regard to infection of Tubacle by the air, this is generally admitted.

Out of a number of persons equally exposed to Tubercular infection — the staff of a consumption Hospital for instance — some develope Phthisis, others do not. The difference here must lie in the individuals and not in the presence or absence of bacilli.

Bacilli undoubtedly in both instances reach the lungs, but in the one case the vitality or power possessed by the tissues of resisting their action renders them practically innocuous, in the other case however, the vitality or resisting power is insufficient, subsequently the bacilli flourish, react upon the tissues and produce the disease.

If the resisting power of the tissues plays such an important part in determining the development or suppression of bacilli conveyed through the bronchial tract by

the air, there can surely be no reason for believing that this power should not have a somewhat similar influence when the organisms are conveyed along the same tract by the blood.

Upon these grounds therefore, the condition of the tissues upon which the bacilli are implanted may reasonably be allowed in some measure to account for the varying results following Haemoptysis, as represented by the temperature.

Having now completed a general survey of the whole series of charts and attempted to give a rational explanation for the association of Pyrexia with Haemoptysis, it is now proposed to consider the subject in more detail from its clinical aspect, taking the charts in groups, arranged according to the degree to which the temperature was raised during the attack.

The first group includes the cases in which the temperature rose to 103° or over. That Haemoptysis followed by a rise in temperature to this extent is a very serious matter is demonstrated by the fact, that out of 13 cases included in the group, nine proved fatal in a very short time.
In five out of the thirteen cases, the temperature before the attack may be regarded as normal,

and these we shall consider first.

The following important facts in connection with the cases are tabulated for convenience of comparison

Name	No. of chart	Stage	Weight below Hutchinson's standard st: lbs: oz.	Weight gained in period before bleeding Weight lbs oz.	Weight 10 days.	Day on which the Temp: began to rise.	Maximum Temp: and Day Recorded		Amount of Blood lost	Result.
Dale	1.	Excavation	0 - 10 - 12	1 . 4	21.	2nd.	104.2	3rd.	50 oz.	6th day fatal.
Pope	2.	Excavation	2 .. 1 .. 6	stationary	40	1st.	104.4	2nd.	5 oz	20th ditto
Spencer, Wm.	3.	Excavation	2 - 0 .. 8	4 - 0	21.	2nd.	103.2	3rd.	20 oz.	5th ditto
Tyler	4.	No excavation	2 .. 7 - 0	1 . 8	69.	2nd.	104.2	5th.	12 oz	
Evans, George	5.	Excavation	0 - 13 - 0	2 .. 8	41.	2nd.	103.	5th.	15 oz	

In all five cases, it will be noted that the temperature rose in the first three days after the bleeding, and that the maximum temperature which ranged from 103° to 104·4 was reached in from two to five days. The onset therefore, is remarkably similar in all, but on following the charts a little further, certain differences may very soon be distinguished — confining our attention to the charts alone it will be noted in Dales case (Chart No 1.) that after the maximum had been reached the temperature never fell below 102° till death occurred on the morning of the fifth day.

In the 2nd of the series (Pope) (No 2.) the chart resembles the proceeding one very markedly for the first four days, but on the fifth day, the temperature dropped to 100° and though the maximum for the four subsequent days varied between 102° and 103° there were remissions of from 2 to 3 degrees. From this point onwards, the chart became very irregular, the Pyrexia being associated with intermissions as well as remissions, till death supervened on the 20th day. This is an instance in which I think the tubercular infection followed a preliminary broncho-pneumonia.

The next case (Spencer) (No 3) the temperature after reaching its maximum 103·2

at 2 p.m on the third day, began to fall gradually dropping to 98°8 at 6 p.m on the fourth day. Thus simulating an improvement during the night, however it rose again to 101° 6 at 2 a.m. and from that time gradually fell, till he died at 4.15 p.m.

In the two following cases, the attack, was not terminated by death, but it will be seen that the subsequent temperature was decidely influenced by its occurrence.

In the case of Tyse, the temperature reached 104°.2 on the evening of the fifth day. During the 5 following days the temperature though raised, gradually declined with varying remissions till on the 11th day the maximum was 99° F. (chart N°4.) From this date onwards the temperature did not exceed 99° but was usually subnormal for a portion of a day during the month he remained under observation. — It is hardly necessary to add that he was very much weakened by the attack and his weight considerably reduced. On comparing the weights before and after the attack (the latter being 18 days after the temperature was normal) it is seen that 7¼ lbs were lost. The weight previously was stationary.

The last case of this series, (Evans): the temperature reached a maximum of

of 103° at 6 p.m on the fifth day after the bleeding. During the next three days it gradually fell, till on the fourth day it was below 100° for 24 hours. From this onwards however it continued irregular swinging from one to two degrees in the 24 hours and frequently reaching 100°, till another attack of bleeding occurred, which was followed by a similar, though not so severe, a rise of temperature, the chart following, being even more irregular. (chart N° 5.) As the previous temperature was quite normal, this is an instance of instability of temperature following Haemoptysis. It indicates an extension of the disease which has been confirmed by a physicial examination

We have now carefully examined the charts in this section of the groups and recognized that they are all similar until the maximum temperature is reached; from this point onwards they vary both as regards the character of the chart and the termination of the case.

The constant factor in the five cases is the bleeding, occurring as it did when the temperature had been previously normal and as will be seen by referring to the table at the commencement, when the patients were gaining weight [certainly in four cases out of the 5] and apparently progressing favourably.

For this reason there can be little doubt that the bleeding was also the exciting factor.

Now, how to account for the subsequent differences – on looking again at the table, it will be seen that the height of the temperature cannot be said alone to have decided the issue, for in one of the cases that recovered, the temperature exceeded 104° — Whereas in one of the fatal cases, it only reached 103·2. The stage of the disease cannot either be considered responsible, for in one of the favourable cases there was considerable excavation in the right lung.

The amount of blood lost might be also suggested as a cause, but in itself it is not sufficient, for in the one of the fatal cases 5 oz was all that was lost, whereas in the non-fatal cases it amounted to 12 and 15 ounces respectively.

The general condition, as roughly represented by a comparison of the patients weight, with the weight standard by Hutchinson at a similar height, is again insufficient. For though, all the cases are below the average weight, two only approach it within a stone and of these one was fatal and the other not – conversely the patient with the lowest weight for his height [2½ stone below the standard] recovered.

From these observations it is very evident that one factor alone is quite insufficient to account for the variations that occur and in order to do so we must proceed a little further and consider the different points in combination. Just as it is necessary to do so when considering the prognosis in any case whether it be Haemoptysis or any other disease.

Beginning with Dale, it will be noticed that he is only 10¼ lbs below the standard and so may be regarded as being fairly well nourished, in his case however the disease is in the 3rd stage. The amount of blood he lost was 0 ℥ij, the largest by far in the series: the temperature it will be remembered was high, and continuously so without intermissions for three days, indicating the severity of the inflammatory process, preceding his death. These factors combined to produce the fatal issue.

As a contrast to this, Evans' case may be considered, as their general condition was most similar and there was in both cases advanced disease of the lungs. They differed however in two points, firstly in Evans' case the temperature was neither as high nor as continuous as in the proceeding one [and did not reach its maximum till the fifth day] and 2ndly the amount of blood lost was only one third in quantity

These points were sufficient to turn the balance in his favour.

In the three remaining cases the body weight was from 2 to 2½ stone below the standard. The amount of blood lost appears to have very little influence. In Tyes case the lung disease was in its early stage and it will be noted, that the rise in the temperature was more gradual than in the cases of the other two. He eventually got the better of the attack whereas it proved fatal in the cases of Pope and Spencer.

In Popes case the persistent character of the fever rendered the prognosis unfavourable.

In Spencers case a recurrence of Haemoptysis on the second day, which nearly produced asphyxia, served to weaken the heart and complicate matters - towards a fatal termination.

We now pass to the consideration of the 2nd portion of the Group I.

In these cases the temperature reaches 103° and over, but previous to the Haemoptysis and subsequent pyrexia, it is slightly elevated or unstable.

Name.	No of Chart	Stage.	Weight below Hutchinsons Standard.	Max: Temperature reached	Amount of blood lost.	Remarks.
			st: lbs: oz			
Dix	6.		1 . . 10 . 4	104°.4.	℥iiii in 6 days	Fatal on the 6th day.
Ares	7.			104°.	℥iiii in 5 days	Fatal on the 5th day.
Barnhouse	8	Softening	3. 0 12	103°.6	℥xxxiiii in 18 days	Died on the 21st day
Griffin	9.	Excavation	1. 0. 0	105°.4	℥xxviii in 15 days	Died on the 49th day.
Leah.	10.	No exc.	- no height record -	103°.2	℥xxxiiii in 5 days	Died on the 41st day.
Dawson	11	do.	do.	104°.6	Small attacks - 8 weeks	Died on the 42nd day.
Reed	12	Softening	3 . 0 . 12	103°.	About ℥xi.	
Walker	13.	Exc: & soft:	- 10 . 4	103°.	About ℥vii.	

In glancing over the eight cases included in this section, we note that some of the types, which we have just been considering in the previous section, are again represented, but in addition some new examples are met with, influenced probably by the pre-existing condition.

The disastrous effects of Haemoptysis associated with this degree of pyrexia is even more marked than in the preceding group for out of eight cases six proved fatal. [75 per cent as compared with 60 per cent in the previous section of this group].

An individual consideration of these is therefore demanded.

Taking firstly the cases of Dix (No. 6) and Fives (No. 7) The temperature in each case was unsteady before the bleeding. The amount of blood lost was in both instances about 3i, on the 3rd evening in both cases the temperature rose in the case of Dix to 103·4 and Fives to 105· in both instances the temperature dropped to below normal in the night, followed in the case of Dix by a re-action, in which the temperature rose to 104° on the fourth day and a maximum of 104·4 on the fifth day, from which time till death on the sixth day it was continually high, never falling below 101·2.

In the case of Fives however, the reaction

was feeble in character [very different from Dix in which the temperature rose to a still higher level after the fall.] for it only reached 102·2 at 6 a.m. on the morning of the 5th day falling rapidly to 96°, when he died on the same evening.

The charts of these two cases (Nos 6+7) it will be noticed bear an unmistakeable resemblance to the charts of Dale (No 1) in the case of Dix and of Spencer (No 3) in the case of Ayres.

In both Dix and Ayres cases the end proved fatal just as in Dales and Spencers. In the case of Dix and Dale on the sixth day and of Spencer and Ayres on the 5th day.

The disease in all four cases had reached the stage of excavation and in all four cases the body weight was below the normal standard.

In the case of :-

Dale it was	10 lbs.	12 oz	In both these cases a high temperature was supported.
& Dix	1st 10 lbs	4 oz	

In the case of :-

Spenser it was	2st 0 lbs	8 oz	There was a general tending to collapse.
& Ayres	3st. 0 lbs	0 oz.	

Ayres and Spencer have clinically another fact in common, namely, that the recurrence of bleeding during the attack in both instances caused great dyspnoea, almost amounting to asphyxia.

The next two charts we take are those of Barnhouse and Griffin. (Nos 8 and 9) They record a rise in temperature following Haemoptysis, such as we have already seen, the maximum of 103° being reached on the fourth and fifth days respectively. They however present, a little later in their course a marked and more continuous fall than we have yet met with, and the subsequent course of these charts is also of interest.

Taking the chart of Barnhouse first, after the maximum temperature of 103° is reached on the fourth day, the temperature gradually falls till on the sixth day at 10 a.m. 97° F is reached and at 10 p.m. 96° ~ The temperature remained below 98° for 52 hours.

On the ninth, tenth and eleventh days the maximum temperature varied between 99° and 99°2 with a fall to sub-normal at some part of the day: on the six following days the temperature rose — reaching on the 17th day 103°6 On the 18th day there was an abrupt fall to normal, with a slight rise in the evening to 99°8, on the 19th the temperature varied between 97°6 and 99°, on the 20th it fell to 96° again and remained sub-normal during the day, showing however an attempt at re-action. This however proved abortive for the temperature never

rose above 97° again — He died in the early morning of the 21st day.

In Griffin's chart (No 9) the temperature after reaching the maximum 103° on the fifth day, is seen to fall gradually till 98° is reached on the seventh day. On the eighth day however a remarkable rise is recorded the temperature reaching 105·4 at 9 a.m. The temperature was taken every hour during the day, and is seen to fall steadily [with one exception temperature at 1 p.m. being 101·4 and at 3 p.m. 103·2] till 95·8 was reached. The temperature remained below 97° in this case for 20 hours. This was on the eighth and ninth days & on the tenth the temperature varied between 98·4 and 100·8. From this onwards till she died on the 49th day, the maximum daily temperature varied between 99° and 102° with remissions and intermissions of from 2 to 4 degrees.

A few clinical points in connection with these charts we have discussed, must be mentioned before putting them aside.

Barnhouse to begin with was 3 stone below his standard weight. The temperature previous to the attack was only slightly unsteady — when the attack came on he not only lost a pint (measured) of blood but

also had marked fever. The prolonged intermission which followed clearly indicated that he was markedly prostrated by the attack and during this period there was no further bleeding, as soon however as the re-action commenced the bleeding again returned. During this time he again had fever and lost an additional ℥xv of blood. Collapse again followed from which in his exhausted state he could not rally, though the evidence of an attempt can be recognised.

There are two points in connection with Griffin's case, which stand out prominently and agree remarkably well with facts we have previously brought out :-

1st. The maximum temperature 105°.4 is considerably the highest I have on record in connection with Haemoptysis.

2nd. The body weight exceeds the standard by 1 stone and is the only instance in the series in which the weight is not below the standard. This indicates that though the lungs were considerably affected the general nutrition was but slightly interfered with.

To attain the marked degree of pyrexia reached in this case, a potentiality on the part of the individual is required in addition

to a sufficiently powerful stimulating factor.

This potentiality, which in my experience, is seldom met with in cases of Phthsis, is evidently present in the case we are considering.

It is to this, in my opinion, that the usual altitude of temperature must be attributed. Were it otherwise, it must be due to the exciting or stimulating factor; but this we have decided is probably the same in all the cases included in this series. Ofcourse the amount of stimulation may vary but if this is the cause why should this instance be an isolated one?

When the stimulation has been very great in the other cases we have considered, death has followed in a very short time, but the degree of pyrexia has in no case been within a degree of the present one. In addition to this potentiality of responding adequately to a powerful stimulus (which must undoubtedly have been present in order to produce the record we have been considering) there is evidence from the subsequent character of the chart of the existence of considerable vitality or resisting power.

After the maximum temperature was reached there was a rapid fall to 95°.8

indicating collapse. A similar condition to that of Barnhouse before described. — In the case of Griffin however, in which the previous rise was far more marked, a longer period of depression might be expected than in the case of Barnhouse. On the contrary the duration was far shorter — [20 hours as compared with 56 during which the temperature was below 98°]

The resolution again, was in Griffin's case, far more complete. The temperature only being once sub-normal [before the occurrence of Haemoptysis when 3x of blood was lost] in the next four weeks, whereas in the other case the temperature was sub-normal for a portion of the three days after the continuous depression had passed away.

Lastly in Griffen's case after the depression had been recovered from, the temperature assumed a definite type which continued until she died on the 49th day.

I think this clearly shows that the influence of the well-nourished state of the body before the attack, is evident throughout the chart — nothing confirming this more definitely, than the long period during which she survived the attack.

The next two cases are those of Leah and Dawson. (Charts Nº 10 and 11).

In both cases the temperature before the bleeding was unsettled running to 100° at night. The disease in the lungs in both cases was extensive. The prognosis, quite apart from the Haemoptysis was unfavourable. Its incidence however was followed by a rise of temperature, in Leahs case to 103°.2 - in Dawsons 104°.6. From these dates, the previous unsettled character of the charts was exaggerated, the maximum temperature in the day ranging between 100° to 103° with remissions and intermissions, till death which occurred on the 41st and 42nd days respectively from extension of the disease, exhaustion and heart failure.

[The weight in Dawson's case was much below the standard for her height and Leahs unfortunately cannot be obtained as the height is not recorded.]

The last two charts of this group are Reed and Walker. (Nos 12 and 13)

The temperature in both cases previous to the bleeding was only slightly irregular, they, in this instance are similar to the first section and also as regards their subsequent character, bear a marked resemblance to types

we have already considered.

The amount of blood lost was not a marked feature in either case: 3 XI and VII oz respectively.

The disease in both cases had not reached the stage of excavation.

The rise in temperature in Reeds' case occurred on the second day and the maximum reached on the third. The temperature then gradually fell (as seen in No. 12 chart) and was under 100° all through the ninth day. The temperature from that date settled to normal.

In this case, the heart which was previously weak, became still weaker causing him to suffer from dyspnœa on slight exertion. He left the Hospital four months later but the effects of the journey produced heart failure and he died the day after leaving.

In Walkers case the temperature reached 103° on the seventh day after the first appearance of blood and remained high — above 101° for seven days. It then lapsed into a chart of the remittent and inter remittent type. He left the Hospital at the end of 2 months having partially got over the effects of the attack, but the case was complicated with ascites.

Occasionly, it should be mentioned a rise in temperature to 103° is met with after Haemoptysis appearing suddenly and disappearing equally so. I have two charts in which this is recorded. (Nos 43 and 44) In one instance it was followed by a normal temperature for six days, the only point noted at the time was that the patient complained of headache & constipation.

In the other, by a temperature varying between 98° and 100° for six days.

As the rises were isolated and the subsequent character altogether different to that seen in the cases we have been considering, I have not included them in the series, though their charts are included for the sake of completeness.

We have now carefully examined a group of charts, in which the most marked instances of pyrexia associated with Haemoptysis, that I have had experience of, is recorded.

We have seen that Haemoptysis occurring when the temperature previous to the attack was normal or only slightly irregular, may be followed, usually in from one to two days, by a marked rise in the temperature, which reaches its maximum of

103° or over within the week and that the results of such an attack, are of a very serious nature.

It is also worthy of note, that though the attacks were very similar in character in the two sections (i) when the temperature previous to the attack was normal and (ii) when the temperature was previously unsettled, still the death rate was higher in the latter (viz: 75 per cent) than in the former, which was 60 per cent.

Probably, owing to the cases in which the temperature was irregular not being so well when the attack came on, and so having less resisting power.

The death rate in all the cases was as high as 69 per cent and the remainder who recovered were greatly weakened by the attack and convalescence was a long and tedious process.

It has also been noted that pyrexia may follow Haemoptysis in cases apparently strong and well nourished, as well as in the emaciated, and also, that it may occur in cases in the early stage before excavation has been reached.

Further the temperature, is not influenced materially by the amount of the Haemorrhage,

and it is quite possible, as we have seen, for a very high temperature to follow a very slight attack of bleeding.

We afterwards passed to the subject of prognosis and decided that undue stress should never be laid upon a single factor to the exclusion of others, otherwise there is a great likelihood of being led into error. This was practically demonstrated when discussing the cases in the first section. The various points should be considered in combination and special attention should be payed to the general condition of the patient: the extent of the lung disease & the condition of the heart. The amount of blood lost during the attack should also be taken into account.

In two instances a marked rise in temperature was followed by a collapse which lasted for several hours, both cases ended fatally — as we decided, that the collapse of temperature indicated great constitutional weakness, it must always be regarded as a very unfavourable indication.

Lastly, we saw that there may be a rise in temperature to 103°, abrupt and transitory in character, which may be regarded as merely accidental & not applicable to the statements that have just been made.

Clinical Types of Group I.

Fires : aet 24 : admitted Oct. 12th 1896.

Clerk : No history of consumption. Father aet nearly 70, is a yeoman of the guard.

Patient has had no previous illness of importance, generally enjoyed good health and been free from colds, but never very strong. Says he was in ordinary health till 5 weeks ago, when he had a few spits of colour when walking in the street. Had about the same amount the following day but none since. Has had more or less cough ever since, but no expectoration. Had a night sweat 3 weeks ago. Has lost 7 lbs: in weight, but thinks that he has been loosing weight slightly for some time. No pains in chest. Breath has been much shorter than formerly. Has not worked since the blood spitting.

Present condition. Shortness of breath is his chief symptom: has also slight cough: no palpitation: no faintness nor œdema. Appetite good: tongue fairly clean. Bowels constipated (This has always troubled him a good deal.) Has not been able to take fatty foods till lately. Sleeps well.

On examination, it was found that the percussion was impaired, the vocal resonance increased and the expiratory murmur was prolonged over the right lung from the apex to the 4th rib in front and the middle of the interscapula region behind with a few scattered crepitations and over the left lung to the 6th rib in front and the angle of the scapula behind. The physical signs of a cavity at the apex were almost quite distinct in front and fairly numerous crepitations were audible all over the affected area.
The movement of the left chest was impaired and there was flattening under the left clavicle.
The apex beat of the heart is noted as being diffuse and very visible in the 4th & 5th spaces: the left border being outside the left nipple line
The first sound was impure in the tricuspid area.

His height was 5ft 9in: and his weight 8st: 8lb: 0oz – (3 stone below the standard for his height)

He kept fairly well from this time and on the 3rd of December, his weight had increased to 8st: 13lb: a gain of 5lbs in 7 weeks. On the 2nd Dec: it is noted that he feels very well: but the breath is rather short. Has a dry barking cough with very little spit.
On Dec: 5th: The morning temperature was 100° and in the evening it was 99°2.

At about 9 p.m. he brought up ℥i of bright blood. It came on as he was stooping to pick up a candle stick from the lower shelf of a cupboard. The bleeding stopped of itself and only a little ice was given.

Dec: 6th, No sign of colour during the night and none during the day. He was kept in bed. The morning temperature was 99°.8: the evening 100°. No symptoms to cause alarm, but told him to write and inform his people.

Dec: 7th: Morning temperature 98°. He coughed rather badly at 2 a.m. and brought up one spit of colour. Had a fairly good night. at 3.20 p.m. had about ℥i of bright blood, mixed with tenacious spit. Heart's action was very excitable and rapid. His face became very livid & the dyspnoea was very marked: necessitating his being propped up in bed. Complained of gurgling in the left side, numerous bubbling rales were audible over this area.

At 7.25 it is noted that

the pulse was 140. Respirations 44 per minute: Temp.ᵉʳᵉ 102°

8.25 — 124 — 36 — 103°.8

9.25 — 134 — 45 — 105°

He had one spit of colour at 8.40.

9.50 — A rapid examination was made —

crepitations were audible over the greater part of both lungs: but the breath sounds were less audible on the left side, over the lower half of the chest than the right. - he was not disturbed for an examination of the back. 15 grains of Salicylate of Soda with Cinchona were ordered 3 hourly and m iii of Liq Strychnia to be injected hypodermically also every 3 hours.

11. p.m. Ears, lips and finger nails somewhat cyanosed. Patient very drowsy, and a little inclined to be delirious, but answers when spoken to.

Dec: 8th: 12 midnight Pulse 120: Respirations 50. Temperature 104°.2.

During the night the pulse kept over 120 the respirations over 32 and the temperature above 100°.6 till 10.30 a.m. when they fell to 104: 32 and 98° respectively. The temperature did not rise again till 4 p.m. when it was 100°.4 and at 8 p.m. 101°.4. pulse 116 and respiration 32.

On examination numerous crepitations were audible all over both lungs, especially the lower half, where they were fine in character and characteristic of œdema.

Dec: 9th Temperature 6 a.m. 102°.2.

Pulse 120. Respiration 32.

Has not slept all night. Was given inhalations of oxygen at intervals.
At 10. a.m The temperature fell to 96.6. the breathing rose to 40 and the pulse remained at 122. From this he never rallied, his strength gradually failing
At 5 p.m His temperature dropped to 96. the breathing 36 and the pulse 112. and he died at 8.30 p.m of heart failure.

Autopsy:- Right lung hepatised with few tubercles Scattered tubercule granulations all over the lung. Well marked oedema of lower lobe.
Left lung – Pleura thickened at the upper part – indicating disease was of older standing here. Some of the lobules were evidently collapsed as indicated by the depressions on the surface of the lung: over which the pleura was not thickened. On section a considerable cavity was found at the apex with somewhat thickened walls containing a little yellow purulent matter. Numerous tubercles throughout the entire lung.
There was also well marked oedema.
Both lungs were extremely congested: the veins being distented with dark blood.
The heart weighed 12½ ounces.

No evidence of valvular disease.
Muscular coat was pale & veins (coronary) were engorged.
The heart was distended with post mortem clot and some ante mortem as well.
The right side was especially over-distended.
The immediate cause of death, was undoubtedly cardiac failure.
The case was evidently one of broncho-pneumonia following slight haemoptysis

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It might perhaps be well to include a 2nd case more briefly

Dix: girl: æt 17: admitted April 27th 1894. No occupation.
Father and Mother died of phthisis: brother and sister are also delicate.
Patients health good up to last November when she was laid up for a week in bed. She has no idea as to what was the matter. After this, the cough came on, which has continued ever since. Her symptoms have been cough and spit. A little colour once. Shortness of breath. Pain in left side. Sweating at night. Loss of flesh. Menstruation regular up to November, was unwell for one day only in January and not again ~~till~~ Easter.

On admission, complained only of slight cough with a little spit and shortness of breath on exertion.

On examination, it was found that there was a cavity at the left apex and a few crepitations over upper half of the chest: the right apex showed signs of being affected in the early stage.

A systolic bruit was audible over the base of the heart: haemic in character.

Her height was 5ft: 2in: and her weight 7st: 6lb. 10oz (being 1st: 10lb: 4oz under her standard). From this time she seemed fairly well but the appetite was not good. This was the only thing she complained of. Her temperature which had been 100° on admission, had improved and after a little while was discontinued being taken.

On the 29th of May — Her weight was 7st: 0lb: 2oz. A loss of 6½ lbs in 4 weeks. She was again put on temperature and food was given two hourly.

On June 5th: her weight increased to 7st. 3lb. 12oz and on the 8th she said she felt much better.

On the 12th. She brought up an ounce of blood after breakfast and was sent to bed. Mx of Turpentine was ordered in a mixture 3 hourly.

On the 13th. Crepitations were audible at left apex — No blood but only discoloured spit had been expectorated during the night.

On the 14th. — None during the day of yesterday. In the evening however the temperature rose to 103°.4.

On the 15th. at 5.30 a.m. she brought up ℥ ii of blood. Temperature 102°. this morning: in the evening it rose to 103°.

On the 16th. Crepitations (very numerous) were audible from apex to base on the left side, also numerous crepitations over the right lung posteriorly especially at the base. The cheeks are very flushed and the skin dry. A little dark colour in expectoration. Evening temperature 104°.2.

On the 17th. Had a fairly good night at 9 a.m. the breath became very short and the lips and cheeks were cyanosed. Crepitations audible all over both lungs, back and front.

31st

The dyspnœa gradually increased and the heart's action grew weaker. She was slightly delirious in the afternoon, but was conscious up to 2 or 3 minutes before she died at 4.35 p.m. She had been restless and turned about in bed a few times and this seemed too much for her.

This is evidently another case of broncho pneumonia following hæmoptysis.

The following is the note of the post-mortem examination.

Left lung:- vomica at apex, also tubercles scattered throughout the lung: which was almost entirely consolidated and did not crepitate on pressure. The nodules were in relation to the bronchi.

There were also scattered tubercles throughout the right lung and evidence of old mischief at the apex.

Heart was distented and filled with clotted blood.

We now pass to Group II in which the temperature rose to between 101° and 103 after the Haemoptysis. This group consists of 15 charts (Numbered 14-18 + 29-38) among which are included instances, in which the temperature previous to the attack was firstly normal and secondly slightly elevated or unsettled and thirdly of a hectic character rising to 100° or slightly over.

Out of this group of 15 charts the end was fatal in three cases. (The mortality being only 20 per cent as compared with 69 per cent in group I.)

Instances are however met with in which though death did not rapidly supervene, the temperature after the bleeding lapsed into a regular hectic character decidedly worse than it was before the attack and continuing throughout the period of observation.

In some cases on the other hand after a varying period of hectic, the temperature eventually settled down and improvement took place, not only in the chart but also in the patients general condition.

In a few instances, the chart appears to have benefitted by the attack, for shortly after the bleeding had ceased, the temperature which had previously been raised settled down to normal.

Occasionally in cases of recurrent Haemoptysis, the incidence of an attack is reflected in the chart by a rise in temperature entitling them to be included in this group. The temperature after the bleeding resuming its formal condition.

It is proposed to consider a few of these types more fully.

The first case is an example of death from cardiac failure, following an attack of Haemoptysis with pyrexia of the type we are considering

Holdaway, a girl. aet 19, admitted March 16th 1894 (№29) Fairly well nourished, being only 12 lbs. below the standard. The physical signs on admission showed that the upper ½ of the right lung was infiltrated and that there was probably softening at the apex. She had no pyrexia and in the first month gained 3¼ lbs. in weight: on the 23rd of April she complained that her cough had been very troublesome: on the 25th she brought up about ℥ij of blood and ℥i the next day, on the 27th no more colour, but on examination, it was noted that a few crepitations were audible at the right apex and that a vomica had probably formed. On the 28th she brought up ℥v of blood at 7 a.m and ℥vii at 5.30 p.m. She had however no

more bright blood till May 2nd when she lost 3p at 6.30 a.m. The temperature on this evening was raised to 100° for the first time, the highest reached during the attack.
On the 3rd of May the expectoration was almost clear, but the vomica at the right apex was found to be much more evident and probably extending. After this there was no more colour till the attack which preceded her death and the temperature being normal for a week was stopped.
During this attack she lost 7¼ lbs in weight and in the month following 1¼ lbs.
On the 14th of June, she had a severe attack of Haemorrhage loosing 3XII of blood at 11.30 a.m. in a few minutes: the temperature in the evening rose to 100°.8: on the 15th at 3 a.m. she had 3IV of blood, the temperature rising to 102°.6.
During the night a few dark clots were raised with cough, but on the morning of the 16th the temperature was 102°.8 and at 8 p.m she lost 3i: the evening temperature was 102°.2.
On the 17th 3X of blood were lost & the temperature dropped to 99° in the evening. From this onwards, as shown in the chart, the minimum temperature fell lower each day till she died on the 23rd instant from cardiac failure.
The post mortem revealed a vomica at right apex filled with blood clot

and small miliary tubercles scattered throughout the left lung. It is probable that an infection of the left lung took place and to this the pyrexia is due.

The following is an instance of sudden death terminating a case shortly after recovering from an attack of Haemoptysis belonging to this group.

Sennard, man, aet 42. Very badly nourished, being 3 st: 9 lbs: below the standard weight for his height. (chart № 30.) On admission August 16th 1893, he was found to have — considerable disease of the right lung. Vomica at apex with crepitations. The left lung was only slightly affected and there were no crepitations. The temperature which rose after the journey on the 3rd evening to 102°, gradually improved and on September 1st was normal in the evening. The next two evenings it rose to 99°2 and 99°4 and on the 4th instant he had ℥ij of bright red frothy blood and temperature was 100°·2 in the evening

On the 5th there was very little colour and evening temperature fell to 99°·6. On the 6th he had ℥j of blood and temperature rose to 101°. The temperature continued at or above 101° in the evening for the next six days, as shown in the chart.

during which time the spit was streaked or discoloured. On the 13th there was no more colour and from this date the temperature gradually fell till it reached 98·4 on the 19th instant. On the 20th he said his appetite was better and that he felt stronger again. On the 23rd 24th and 25th the temperature rose to 100° - 99°·8 and 100·4 respectively but on the 26th was only 99° in the evening. On the 27th he was examined in the morning & a considerable vomica found at the right apex with crepitation reaching lower down than on admission in front, and crepitations all over the right lung behind.

At 4.45 p.m. he had a sudden attack of Haemoptysis while in the sitting room, bringing up ℥ viii of blood, which coagulated almost immediately: in a few minutes he became livid, the jaws tightly clenched, the breathing most difficult. He died within ten minutes of the onset of the bleeding of asphyxia.

On post-mortem examination, the whole of the upper lobe of the right lung was riddled with cavities, in several of which dark clotted blood was found. In the lower lobe numerous miliary nodules were seen. In the left lung miliary tubercles were seen scattered throughout and the apex consolidated.

The temperature again is this case is probably due to an extension of the tubercular process initiated by the Haemoptysis.

The immediate cause of death was undoubtedly asphyxia as the venae cavae and the right heart was distended with almost fluid blood which gushed out when the vessels were divided. The left heart was contracted.

The next case is Highley and is an instance of a marked and continuous hectic temperature initiated by an attack of Haemoptysis, and associated with an extension of the pulmonary disease. (Chart N° 31.)

Highley - man aet 23, admitted May 15th 1893, height 5ft 7 in: weight 8 st: 12 lb: -(1 st 10 lb. below the standard). No history of previous Haemoptysis. On admission, it was noted that there were signs of consolidation at the right apex and a suspicion appears to have existed of affection of the left also. There was very little cough and no spit. The sounds were quite clear.

During the first month, he progressed favourably and gained 4¼ lbs in weight, this was up to June 22nd. On the 25th however he had 3ji of Haemoptysis: on the 27th the spit was almost clear: on the

29th: a vomica was found at the right apex with a few crackles posteriorly: when he was next weighed on the 6th July, he had lost ¾ of a pound (He had previously been gaining) On the 7th, it is noted that he lost ℥ss of blood in previous night and the occasional crepitations were audible at the right apex in front. At 9 p.m he had ℥iii of blood, which probably came from the right apex. The temperature was normal, night and morning. On the 9th, the temperature rose to 100° in the morning and 101° in the evening. Only occasional dark clots since the 7th The 10th inst: the temperature same as yesterday. Scattered fine crepitations in left interscapular region – but no dullness nor increased vocal resonance, right side dry. The 11th, temperature 100°·6 and 101°·2. 12th – temperature rose to 101°·4 in the evening: spit almost clear. 13th – the temperature was 100°·6 and 101°·2 and on the 14th the morning temperature fell to 99°·2 and from this date till he left on the 4th August, the chart records a fairly regular hectic temperature, the evening temperature varying between 100° and 100°·2.

There was no more bleeding however, and it will be seen on referring to the chart that the continuous rise of the

temperature ceased very shortly after the colour stopped.

On the 2nd of August, he was examined and signs of a vomica recognised at the right apex back and front, on the left chest posteriorly the vocal resonance with harsh breathing and prolonged expiration, below the angle of scapula fine crepitations were heard at end of inspiration but vocal resonance not much increased nor expiration prolonged.

Since the first attack of the bleeding he lost in the six weeks he was under observation 14 lbs in weight. The left lung having become infected after the second Haemoptysis.

The temperature and weights here give a very clear indication of the progress of the case.

This is another instance of the temperature rising, during Haemoptysis, to between 101° and 103°, passing afterwards into a settled hectic type, which continued so long as he was under observation. As compared with the previous case the temperature during the attack is more marked, but afterwards the hectic range is a degree lower. Chart N° 32.

Payne - man - aet: 21. Admitted August 17th 1896. Height 5ft: 7in: Weight 9st: 13 lb: 8 oz: (8½ lbs below the standard)

On examination found consolidated right apex, with few scattered crepitations posteriorly. Infiltration of left lung with vomica audible under clavicle.

In the 1st nine days gained 1¼ lbs. The temperature as shown is chart (no: 32) not exceeding 99°.6 after the third day after admission.

On August 31st, had Haemoptysis loosing ℥ 4½ of blood, which clotted readily. On September 1st he brought up an ounce of coloured phlegm, the evening temperature reaching 101°. From this time he had no more bright blood and the spit was clear on the 4th. The temperature however on the 2nd was 101°4 in the morning and 101° in the evening. On the third, it was 100°.2 and 101°.2 and from this time forward was irregular as will be seen on reference to the chart. Its general character eventually became hectic with a maximum of 100°. From time to time however, intermissions may be recognised.

On September 15th, a note of his chest condition records, that there was a vomica at the left apex in front with moist sounds below and moist sounds also at the

right apex in front, with harsh breathing all over the lung. Posteriorly a Sonica had formed at the apex.

On the 24th it is noted, that he had lost the 1¼ lbs he had originally gained and on the 19th of November, when he passed from observation, he had lost a further 1¾ lb.

It is interesting to note, that neither the loss of weight nor the pyrexia is as marked, as in the case of Highley, probably the pyrexic intervals prevented his loosing weight more rapidly

The case of Eyre, we are now about to consider is very similar to the preceding one, in as much as the temperature rose during the Haemoptysis to between 101° and 103° and passed afterwards into a hectic irregular type. (Chart N°. 33.)

In this particular instance however it eventually improved and settled down to normal, and it will be seen that the weight which was lost was more than recovered.

Eyre, aet 32, admitted November 16th 1896. Height 5ft: 10 in: Weight 8 st: 13 lb: (3 st: 2 lbs below the standard) A delicate fragile man.

On examination it was found

that the upper half of the left lung was infiltrated and that there was a tomica under the clavicle and a few crepitations over ~~the~~ affected area. The right apex was in the early stage and quite dry. He complained of weakness, cough and a little spit. In the first two days he lost 1¼ lb in weight (As is often the case after a journey)

On the 22nd November, he had at 9 p.m. ℥ii Haemoptysis. The temperature in the evening being 99°. On the 23rd, he had only one or two spits of colour but the temperature in the morning was 101°6 and in the evening 102°6. On the 24th, he had ℥i of blood and spit mixed, in 24 hours and ℥ss of blood in the afternoon. The temperature in the morning being 102° and in the evening 100°2. On the 25th, ℥ss of dark coloured tenacious spit. Pulse thumping (given aconite m iii, 3 hourly, till pulse quieter) Morning temperature - 100°8. Evening temperature - 100°2. On the 26th, had ℥i of thick dark coloured spit, began to have solid food as he was so emaciated. Morning temperature 100° also in the evening. For the next two days the temperature was better but on the third evening it rose to 101°. From this date the spit gradually cleared, the temperature continuing to be raised.

On December 4th however the spit was quite clear and not discoloured afterwards. The temperature from this time settled down and assumed the hectic type with a maximum varying between 99°4 and 101°, till the 21st, when it changed into a normal type, which was maintained till he left on February 12th.

The body weights as already mentioned are interesting. His weight on December 16th as compared with the weight before the attack, showed a loss of 2 lbs, as might have been expected, but during the next fortnight he gained 1¼ lbs and this improvement was slowly but steadily maintained till he left, when it was found, that he had put on 7½ lbs. since the attack.

This is an instance of a more favourable issue from an attack of Haemoptysis with elevation of temperature.

The next two charts are records of cases in which this is still more marked. (Nos 34 + 35.)

Challen, man, aet 40. Admitted September 28th 1896 – a case of partial Stenosis in addition to Phthisis. Height 5ft. 10 inc: Weight 10 st: 5 lb: 4 oz. (1st 9¾ lb. below the standard).

The chest examination showed slight affection of the right apex and considerable disease of the left lung, with cavity under the left clavicle

The right chest perfectly dry but crepitations were audible over the upper half of the left lung.

The temperature, as seen in chart, rose shortly after admission and continued between 99°6 and 100° for several days till October 11th when it dropped to 99.4° and 99°.

During the first nine days he lost 3½ lbs in weight. — On the 12th he had Haemoptysis loosing 4 oz of blood at noon, at 2 p.m, at 3.30 p.m and 10 oz at 4.45 p.m. (in all ℥22). The temperature in morning was 98°4 and in evening 100°. During the next five days he lost about ℥ix. The temperature on one occasion rose to 101°, but otherwise was much the same as before the attack.

The spit was quite clear on the 18th and continued so, the temperature however was unstable and rose on the 19th 20th and 21st to 101°.

From this date to November 8th it occasionally rose to 100° but was far more often below than above. After this it continued quiet & normal till he left.

Let us now glance at the weights.

It has already been mentioned, that he was loosing weight before the attack (3½ lbs). During the attack he lost 5¼ lbs. After the attack however he gained 1st 0lb. 12oz in nine weeks

This, the last case in the group, that I propose to describe, is an instance like the one we have just been considering, in which the temperature improved after Haemoptysis — but in this case, the attack was recovered from more rapidly.

Dane, woman, aet 22, Height 5 ft 4½ in: weight 7st 8lb 4oz {2 st: 6lbs about, below her standard} Admitted August 12th 1894.

Slight consolidation of right apex, more marked on the left side with Sonica under clavicle. Temperature before the attack varying between 99° and 100°.2 Lost half a pound in weight in first week. Had Haemoptysis ℥ XV at 9 a.m on the 24th instant. Temperature at 10 a.m. 97°.8: it rose in the evening to 101°.4 On the morning of the 25th it was 102° and in the evening 101°.4. There was no more colour after the first bout, and the temperature as seen in the chart fell below 100° on the 27th and on the 30th was normal and remained so. As regards weight it cannot be stated how much was lost during the attack, for she was not weighed tilt the 4th of September, when she had gained six ounces, in the next month however she put on almost 9lbs.

The improvement is thus again demonstrated both by the Temperature and the weight.

These seven cases may be taken as types of the results which may follow an attack of Haemoptysis associated with a temperature of from 101° to 103°.

It will be noted, in the 1st instance, that death may rapidly follow the attack, just as was the case in the group preceding, but in this group, more even than the last, other factors such as the extent of the disease, the patients general condition and the amount of the bleeding must be taken into consideration.

In the case of Holdaway, she was loosing weight and had not recovered from the effects of the previous attack, when the second came on, associated with a rise of temperature, which almost entitled her case to be included in the higher group. (Her temperature reached 102°.8). In her case not only did the chart, but also the clinical symptoms, bear a marked similarity to those of group I.

Lennards' case is an illustration of the uncertainty, which must always be borne in mind as a possibility, of the mode of termination in Phthisis.

He was apparently doing well and recovering from the former attack of bleeding associated with Pyrexia, when a recurrence producing asphyxia in a few minutes produced

the fatal result. This ofcourse may equally be the case in advanced Phthisis, quite apart from the circumstances under consideration.

Morgans case would have been a fairer one to take as an example of the group, as the temperature only reached 101°4 as maximum. I have not however quoted it as a type, because the course both of the chart and the case were in my opinion, modified by the frequent administration of antipyrin

As the initial temperature gives a reliable indication of the constitutional effects produced by the bleeding, the case is not entirely undeserving of consideration.

Morgan was a man, aet 34 geologist, height 5 ft: 9 in:, weight 7 st: 10 lb: 12 oz: (3 st: 11 lb: 4 oz: below the standard), admitted November 6th 1893 with extensive pulmonary disease.

The left lung was infiltrated throughout, with signs of excavations over the upper half of the chest. There was also a cavity at the upper part of the left lung.

Cardiac pulsation was visible nearly two inches to the left of the left nipple & syst: bruit audible above the left nipple. He improved steadily for 14 weeks, the temperature having

settled to within normal limits and gained 15 lbs. in weight. He was stronger and able to walk 2 or 3 miles.

On the 18th February, he had Haemoptysis, loosing about ℥ii ℈ of blood at 6 a.m. On the 19th, the temperature rose to 101° in the morning and 101°.4 in the evening He only brought up a few clots of blood during the previous night, but had a little more bleeding in the evening. On the 20th a little more bleeding in the morning. Temperature 100°, in the evening it rose again to 101°.4. On the 21st, he had ℥iv more blood at 9 a.m and ℥iv at 10.30 a.m. Temperature 101°, was given 20 grains of antipyrin and ordered 5 grains every 3 hours afterwards.

This is an interval in which the character of the chart must be regarded as disguising the real state of affairs, but there was no actual bleeding till March 1st when he lost ℥i ℈ of blood in the night. On the 2nd an antipyrin rash is noticed and the antipyrin stopped. During the night of the 4th, he lost ℥viii of blood and the temperature the next morning (the 5th) fell to 96°.2. During the day he vomited a good deal and felt very weak. The temperature in the evening only rising to 97°.6

On the 6th, he had vomiting again in the morning but retained some peptonised food during the day. In the evening he complained of shortness of breath, which came on in the morning. From this time the dyspnœa increased and the symptoms of heart failure advanced, till he died at 8.15 p.m on the 8th of March.

Here we have an instance of death occurring shortly after Hæmoptysis, in which the fatal result can neither be attributed to the amount of blood lost during the attack, nor the pyrexia associated with it alone

My grounds for making this statement are, that the Hæmoptysis altogether, only barely exceeded a pint, which is an amount frequently seen in cases making a good recovery, and the temperature is exceeded in height in three cases, we have considered in this group viz. Eyre, Payne and Deane, in whose cases it rose to 102° and over – two of whom improved after the attack both rapidly and efficiently.

Upon these grounds, the statement is made then, that neither the loss of blood nor the Pyrexia in themselves are sufficient to account for the death.

In this case, however, we have noted that previous to the attack, the patient had

extensive and advanced lung disease, that his heart was weak and that he was emaciated

His improvement for the first 14 weeks was most satisfactory. His temperature was considered normal. His strength was increasing and he gained 15 lbs in weight. Such a state of affairs would justify a very favourable report as to his progress while under observation and also as to the prognosis in the immediate future, but it would be wrong to say even so much, without qualifying it by providing that no untoward symptoms developed, for bearing in mind his pulmonary disease and general debility there could be but little reserve strength to draw upon, should any additional demand be made upon it.

This attack then, in itself usually insufficient to rapidly cause death in a case previously in a more satisfactory condition, must be regarded in this instance, of sufficient severity to turn the balance in the wrong direction and prove too great a tax upon his limited resisting power.

Having now dealt with the three fatal cases belonging to this group, it may

be well, at this point to consider the probabilities of a fatal issue following an attack of Haemoptysis and pyrexia, for as we proceed to the three subsequent groups in which the grade of temperature is lower, we meet with no further instances of a fatal result.

In the first place, it must have been noted, that in group I death rapidly supervened in nine out of the thirteen cases. Whereas in the group we are considering, death only occured in three out of the fifteen.

Now I do not for a moment wish to assert that an attack of Haemoptysis of the first type is likely to prove fatal in 69 out of every 100 cases, and of the second type in 20 out of every 100 cases, for the numbers are far too small to justify such a statement. But I think these figures may safely be regarded as strongly indicating that death is far more likely to follow an attack of Haemoptysis with a high temperature, than one in which the temperature is only slightly raised, and further, that the prognosis must be regarded as decidedly grave in all cases in which the temperature after the attack rises to 103° or over and remains high for any length of time

I say, in all cases, because I have seen instances, in which such an attack has produced a rapidly fatal result when the previous condition was satisfactory and the prognosis to all appearences favourable.

It must be inferred then, that if the pulmonary and constitutional changes following Haemoptysis, are sufficiently severe to produce a temperature of the degree we are considering, they must be sufficiently serious to, in many instances, produce a fatal result in a short time, or even if this should not be immediately the case, to so stagger the patient that recovery if eventually, is only after a long and tedious convalescence achieved.

Where the pyrexia is less marked, (as in the case of Morgan) we have seen that the milder attack may be sufficient to produce a fatal result if the patient is previously in a less satisfactory condition

This is the only instance in the series, in which death has shortly followed an attack, the maximum temperature of which was under 102°. The single instance occurring in so small a series must necessitate the possibility being always borne in mind.

Before leaving this subject, it will be well to once more emphasise the necessity in all cases, before giving a prognosis, of paying full attention to the patients general condition and endeavouring to form a reliable estimate of his resisting power in reserve.

Having dismissed the cases in which death occurred shortly after the attack, we now propose to deal with those, in which the termination was not so immediately unfavourable.

Reconsidering for this purpose, the Types selected from this second group in illustration of the above, we are at once struck by the graduated series of results which the five types applicable for the purpose, present.

As it is generally recognised that the gain or loss of weight is a reliable indication of the favourable or unfavourable progress of the disease, it will be found interesting to consider these five cases in connection with the weights, as well as the temperatures and for convenience the following table is arranged.

Group II.

Table showing the influence exerted by the attack of Haemoptysis, upon the body weights

Name	Weights connected with the attack												
	Before			During			After			Total.			
	gain	loss	time	gain	loss	time	gain	loss	time	gain	loss	time	
	lb: oz:	lb: oz:		lb: oz:	lb: oz:		lb: oz:	lb: oz:		lb: oz:	lb: oz:	days.	
Morgan	15·0	.	14wks	.	.	.	.	.	.	.	.	.	died 18 days later.
Holdaway	3·2	.	4wks	-	7·4	4 wks	.	.	.	.	.	.	Lost 7¼lbs after 1st attack.
Heighley.	6·8		5wks	Included with:-			.	14·0	6 wks	.	7·8	81	Left loosing. Temp 101.
Payne	1·4	.	9days	.	1·4	4wks	.	1·12	8wks	.	1·12	64.	
Eyre	.	1·4	2days	-	2·0	wks 4	7·8	.	8wks	4·4	.	95	
Challen	.	3·8	9days	.	5·4	3wks	14·12	.	9wks	6·0	.	98.	
Dane.	.	. 8	1wk	. . 6	-	2 wks	8·14	.	4wks	8·12	.	51.	Bleeding only lasted 1 day. Temp: 8 days: Weight 14 days
Bruce	6·0	-	6wks	:	8·0	4wks	0·8	-	2 wks	.	1·8	85.	
Chambers	5·10	.	5wks	.	7·6	2 wks	0·14	-	18 days	.	0·14	69.	
Beacham	-	0·12	5days	Included with			-	5·10	6 wks	.	6·6	56.	
Batchelor	3·0	.	9days	0·12	.	4wks	5·10		4wks	9·6		66.	Haemoptysis only 6 days.

Lennard only one weight recorded.

Usher - the weights show nothing, for he had time to gain before bleeding & also after & was half starved before.

N. Beswick - Weight on admission 11 st: 10 lbs: (Oct: 24th:)

On Nov: 8th before bleeding 11 st: 9 lb: 2 oz Dec: 6th after 1st attack 11 st: 9 lb: 10 z: No other recorded.

This table includes eleven cases out of the 16, in which a single attack was passed through and the record of weights sufficiently complete to afford the information required.

In Lennard's case one weight only is recorded

In Ushers and Beswick's cases, the intervals between the weighings before and after the attack were sufficiently long for weight to be gained, lost and regained, they subsequently had to be rejected as valueless for the purpose of estimating the influence of the attack upon the body weight.

Nash and Blake were instances of recurrent haemoptysis, the attacks being marked by an alteration in temperature. A chart with the records of the weight is included (Nos 37 and 38)

On glancing over the table it will be seen, that in some instances weight was gained before the attack and it some instances it was lost.
It is curious to note also, that in three out of the four cases in which it was lost before the attack it was more than recouped afterwards.

The uniformity however with which weight was lost during the attack is the most decided feature of the table.

This may safely be regarded as being the case in every instance, though apparently Dane and Batchelor are exceptions.

The weights noted as being gained by them during the attack in these instances are almost certainly for in Danes case, the bleeding only lasted one day and the temperature had settled to normal in a week, whereas the interval between the weights from which the 6oz gained was obtained, was a fortnight.
It is further noted that after the attack she was gaining rapidly, for she put on 8 lbs 14 oz in the following four weeks.
This was probably I feel convinced initiated certainly as soon as the temperature fell to normal limits

The same thing applies to Batchelor, in which, the interval in which he is recorded as having gained 12 oz was four weeks: and he subsequently put on 5 lbs 10 z in the following four weeks.

The weights after the bleeding are also of interest more especially as they agree so consistently with the records of the charts.

5b

In some instances as before mentioned the deficiency noted during the attack is rapidly more than made up, in others the loss is continued and increased afterwards.

To prove the correctness of this statement we will now deal with the five typical case, whose histories have been sketched and whose charts are appended, upon the lines of the before mentioned table.

Heighley, it will be remembered had no pyrexia on admission, his temperature only rising to 99° or thereabouts. — It is noted in the table that he gained 6½ lbs in the five weeks preceding the bleeding. When the bleeding occurred, his temperature as seen in the chart rose to 101 and was raised day and morning for six days and then settled into a hectic type with an average maximum of about 101°. The table records that he lost 14 lbs: in the following six weeks dating from the onset of the attack. He was steadily going down the hill in every way.

Payne, gained a little weight (1¼ lbs in 9 days) before the attack, his temperature after the first day or two having settled down to 99 or a little over. During the attack the maximum temperature was 102°.

But it reached 101° off and on for nine days; eventually settling into a hectic chart with a maximum of 100°, a degree less than the last case, with more frequent intervals of apyrexia. He lost weight more rapidly during the attack, 1¼ lbs in 4 weeks, but the loss was also continued afterwards though more slowly — ¾ lb in eight weeks

These facts signify, that he also was getting worse but more slowly than in the preceding case.

I have since heard that he had a severe attack of Hæmoptysis after leaving the Hospital which soon proved fatal.

Eyre, lost 1¼ lbs in the first two days probably from the effects of the journey. During the attack the maximum temperature reached 102°6, gradually falling to normal in the course of five days, after which it rose again to 101°, the chart being irregular for 3 weeks, the maximum temperature varying between 99° and 101° — 100° being about the average. During this period the table shows that he lost 2 lbs in weight.

After this however the temperature settled to normal and he gained 7½ lbs in eight weeks.

In this instance the hectic temperature

lasted a month after the bleeding, during which time he lost only 2 lbs in weight. He afterwards improved both as regards weight and temperature, a more favourable ending than those we have hitherto considered.

Challen, the temperature shortly after admission and before the bleeding became of an irregular type swinging between 98° and 100°. The weights during this period are seen on the table to show a loss of 3½ lbs in nine days. During the next three weeks in which the attack of haemoptysis occurred the temperature continued irregular, rising a few times to a high level, usually 101°. — 5¼ lbs. of weight were lost while this was the case. Afterwards the chart improved and the temperature kept steadily at normal. A gain of 14¾ lbs in weight is recorded in the subsequent nine weeks during which time he improved in every way and was better after than before the attack.

Lastly we come to Dane. Her temperature for the first week and in fact till the Haemoptysis came on used to rise in the evening to 100° or thereabouts: half a pound in weight was lost in this week.

The next weighing did not take place

till the end of the 3rd week – a fortnight later, when a gain of six ounces is recorded. During the first week of this time, the Haemoptysis occurred (3xv of blood being brought up) and the temperature rose to 102°, soon however subsiding. During the second week of the fortnight the temperature was normal and the patient improving. The gain in this case as before remarked may be safely considered as made after the attack for in the four following weeks, she gained 8lbs. 14oz an average of over 2lbs. a week.

The improvement took place after the Haemoptysis and the patient was better both as regards temperature and weight.
In this case the improvement was the most rapid of the three.

We have now seen in seven instances all with differences in character, how very constantly the body weight varies with the temperature. In cases in which the temperature after the attack continues high, weight is lost, the amount even varying with the degree of temperature. The higher the temperature more rapid the loss of weight, on the other hand when the temperature falls after the attack, weight is

put on and the patient improves — the more settled the temperature, the more decided the gain.

These observations, to my mind, afford still further evidence of the consistence with which the severity of the attack is guaged by the thermometer.

Group III.

We must now consider this group in which the Haemoptysis was associated with a rise in temperature but not exceeding 101°.

The group includes 7 examples in my series.

Name	Stage	Amount of Blood	Weights connected with the attack											
			Before			During			After			Total.		
			gain	loss	Days	gain	Loss	Days	gain	loss	Days	gain	loss	Days
			lb: oz:	lbs oz:	m	lb: oz:	lb: oz:		lb: oz	lb: oz:		lb: oz:	lb: oz:	
Cohen	No: ex:	℥IV 2 days		· 12	7	1· 12		14	5·0	·	28	6·0	·	52
Ayris	do	℥i 3 days	1·4	·	47	·	· 8	14	1·4	·	8	2·0	·	70
Berry	Soft[n]	℥ii 4 days	3·0	·	22	·	3·8	12	4·8	·	59	4·0	·	93
Morofski	Exc.	few oz 8 days	3·12	·	31	·	1·12	29	·	·	·	2·0	·	62
Spencer.	Soft[n]	℥ii 5 days	·	·	19	6·4	·	19	4·4	·	15	10·8	·	52
Hargreaves	Exc.	℥i 5 days	12·12	·	77	·	·6	14	·	·	8	12·6	·	99
Ellingworth.	Exc.	℥x 20 days	·	·	5	·	3·8	31	3·8	·	28	·	·	70

61.

In reviewing this group as a whole, it is more difficult to come to a decision as to the exact influence exercised by Haemoptysis upon the chart. A glance is sufficient to show that it is quite different to that seen in the two previous groups.

In no instance is the temperature above 99°.4 both morning and evening, consequently there is no approach to the continued fever we have already seen in groups I and II: again the incidence of the attack is not nearly so distinctive

In five out of the 7 charts another exacerbation is seen unassociated with bleeding of a degree equalling if not exceeding that due to the Haemoptysis.

In 3 out of the five cases, the temperature was raised on the night of admission or that following it; but it eventually settled down until disturbed by the bleeding. The preliminary rise in temperature might very well be accounted for by the fatigue and excitement of the journey, but it points to the fact that the temperature equilibrium in these cases can easily be disturbed and that the rise seen later in association with Haemoptysis can scarcely be considered either characteristic

or remarkable. This fact is again supported by the body weights.

In three of these cases, the patients were weighed the day after admission and on comparing these weights with those obtained at the second weighing, a loss is in each case found

	lb.	oz	
Morofski	2.	4.	in 2 weeks
Hargreaves	1.	0	in one week
Cohen	-	12	in five days

The constitutional effects thus observed after the journey, as demonstrated by the weights, quite equal those observed in connection with the subsequent Haemoptysis.
For in Morofski's case a loss of 1lb. 12 oz only is recorded in the month during which the bleeding occurred. In Hargreaves' 8 oz in the fortnight and in Cohen's a gain of 1lb. 12 oz.

It is interesting to note that the variations in weight, following the two causes have a similar ratio in the three cases

The 4th case was not weighed until a week later and consequently is not eligible to be included in this comparison.

The remaing case of the five in which an exacerbation is seen apart from

Haemoptysis is Illingworth, but in this instance it occurred just as he was recovering from the attack and was probably owing to his getting about again, after having been confined to bed.
Under these circumstances my notes as to his weight render no assistance.

It is well to mention here, that all these cases gained weight on the whole during their stay at the Hospital, which varied from 10 to 14 weeks and in no instance were there any marked changes for the worse recorded.

In these cases at all events I do not feel justified in attributing the rise in temperature, particularly to Haemoptysis, as we have clearly seen that a similar rise associated with similar constitutional effects may occur in connection with other disturbing circumstances quite apart from Haemoptysis.

When however the temperature previously has been perfectly normal and of a uniformly stable and reliable character – a rise of temperature of this description must be regarded as being of more serious significance and perhaps an indication of the development of a new though probably limited focus of activity (were it extensive

the temperature would assuredly be more seriously affected)

This particularly applies to cases in the early stages of phthisis or where the disease has been very satisfactorily arrested (This must obviously be the case in order that the conditions regarding the temperature may be fulfilled) and if promptly attended to further progress may be checked before much harm is done.

As an instance, illustrative of this, the case of Mrs Ayris may be brought forward.

In her chart No 20. the temperature which had previously been perfectly normal, rose to 100:4 on the 3rd evening after the Haemoptysis but rapidly subsided afterwards, there being no immediate recurrence of the bleeding.

Mrs Ayris, aet 26 Admitted Oct 5th 1896. Height 5ft: 4in: Weight 9st: 9lb: 12oz: well nourished only 3¼ lb: below the standard for her height. Complained of slight cough with only a very little spit in the morning. She improved generally and was very well up to December 6th when she had a few spits of bright colour. On December 8th, she was weighed on the regular day and it was found she had lost half a pound as compared with the weight of a fortnight

before. On the 10th, she brought up ℥i of blood at 12 noon, was sent to bed.

On the 11th the spit was brightly coloured during the night, but nearly clear during the day. On examination a few crepitations were heard in the left interscapula region. On the 12th, the spit was nearly clear but frothy and the temperature rose to 100·4 in the evening. From this, to the time she left five days later, the spit was clear and the temperature improving till it was quite normal on the 16th.

On this, she was weighed and found to have gained 1¼ lbs. since the last weighing.

The seventh and last case in the group (Berry) is similar to Ayris in so far that there was a rise of temperature to 100° associated with slight bleeding (℥ii to ℥iii with discoloured spit in 5 days) and loss of weight. The latter however he soon recovered again (gaining 4lbs in his 10 weeks) and the Temperature also returned to its former type of normal in the evening and subnormal in the morning.

Before bringing the record of cases to a close, it should be noted, that weight was gained on the whole by all the seven patients during their stay at the Hospital.

and in no instance did death occur, while they remained under observation. Still in five instances it is definitely recorded that weight was lost during the attack and in the instances in which that was otherwise, it is probable that the loss was made in the interval between the bleeding and the subsequent weighing.

The results therefore seen in the three groups, we have now considered bear a very definite similarity to one another differing only in degree, that degree being very consistently represented by the temperature and the weights, the symptoms and the physical signs.

In this, the third group, they are all of a decidely milder type and much more rapidly recovered from. In three instances, we have seen that an exacerbation quite equalizing that associated with haemoptysis, occurred quite independently in the course of the chart. This, taken in conjunction with the fact, that in no instance did death or even a marked change for the worse follow an attack of the description we are considering, leads me to believe that if Haemoptysis is to be followed by disasterous results and considerable extension

of the pulmonary disease, a higher temperature will be produced than is seen in this group.

As we have just decided that the results in all these groups are similar, showing a difference only in degree, it is fair to infer that the cause is likewise so. Consequently we are justified in interpreting the rise in temperature associated with Haemoptysis as an indication of increased activity of the pulmonary disease, but (in the cases included in this group,) confined to a very limited focus.
This is supported by the evidence obtained from the case of Mrs Ayris, which has been quoted before.

It is quite possible though, for the equilibration of temperature in certain cases of Phthisis to be disturbed by slight, and what would generally be considered, causes, such as mental excitement, slight unusual exertion or even constipation, for example. An event such as Haemoptysis might, I think, be entitled to a position equal in importance to the above and in a similar manner, which it is beyond the scope of the Thesis to attempt to explain, be regarded as accounting for a slight rise of temperature

in some of the cases, quite apart from any actual changes in the lungs.

In conclusion, it may safely be stated, that the prognosis in cases belonging to this group is far less unfavourable than in cases where the pyrexia is more marked, but for reasons just given, Haemoptysis associated with even slight rise of temperature most be regarded as being of more serious import than cases in which it is absent.

Group IV.

Descending a grade lower in the temperature scale, we come to a series in which Haemoptysis is not associated with any decided deviation from the normal.

I have at hand, three examples in which this is the case. As they take a place in the sequence we are considering they are well worthy of attention:-

Name	Stage	Haemoptysis.	Weight gained before - during - after Haemoptysis			Total gain
			lb. oz	lb. oz	lb. oz.	lb. oz.
Harrup	No exc:	℥ IX 2 days ℥ IV 3 days	–	2.8	4.4	6:12 in 23 days.
Johnson	No exc:	℥ I bright colour in 5 days.	3.4	6.12	2.8	12:8 in 70 days.
Weller.	No exc:	Colour off & on Feb: 23 to Apl 8th	4.4	6.0	4.8	1st +12 oz in 70 days.

On glancing at this table it will be noted, that weight was gained in two cases, before, during and after the attack. [In the other case as the bleeding occured the evening after admission there was no previous standard to make comparison from]. indicating in conjunction with the temperature charts, that the progress of the cases was uninterupted by the incidence of the bleeding

The Haemoptysis in two cases was considerable; in Harrups' ℥xiii and in Weller's an ounce or two from time to time during six weeks. In Johnson's though the amount was not great still it was sufficiently definite to render it considered advisable to keep him in bed and bright colour was brought up for five days.

The cases are of value, as being instances in support of the statement previously made, that bleeding from the lungs need not necessarily be productive of a rise in temperature.

The results it is evident are far more satisfactory than any we have hitherto observed in the groups we have considered. The prognosis may therefore be looked upon as correspondingly more favourable.

Before leaving this group, I give a short summary of Harrups' case as a clinical type of the group.

Harrup, aet 36. Admitted October 26th 1896. Cooper. (Had a bad attack of bronchitis three years ago - was in his usual health till 16 weeks ago, when on going to work in the morning had a bad pain in the right side, worse on breathing was treated for pleurisy and in bed a fortnight, then sent to City Road Chest Hospital and operated on for empyema. Had rapid convalescence and was removed to this Hospital. Has had a good deal of cough in the mornings for six months but together with the expectoration, diminished after the operation. No haemoptysis.)

History of empyema operated upon, 14 weeks previously, now has small tube with very little discharge, also cough, spit and night sweating. On examination, slight consolidation of apices, more marked on right side. Quite dry. Heart in normal position. No murmur audible. Weight 10 st: 0 lb: 4 oz: Height 5ft 5½ inc: (about 3 lb: below the standard)

Complains of cough and spit in morning. No palpitation nor faintness. Tongue slightly coated.

On October 27th had an attack of Haemoptysis at 6 p.m. while sitting at the table reading. Had rather a hard fit of coughing and brought up ℥ix of blood, which stopped

after MX of Inject: Ergotin: B.P. was given. As cough was troublesome Morphia 1/4 grain was given.

On the 28th a few pieces of dark colour were raised with the spit during the night but was quite clear by the evening.

On the 29th, Spit quite clear. Temp^ture raised to 99° 8 unaccountably.

31st. Allowed to sit up in afternoon and while at tea, had ʒIV of blood.

Nov^r 2nd Some dark brown colour in spit but no fresh bleeding. Since the 31st cough quiet.

Nov^r 7th No more colour, allowed to sit up in the afternoon.

Nov^r 10th No more colour, but about ʒIV of frothy spit. Weight 10st: 2lb: 12oz:

Nov^r 17th A good deal stronger, feels better generally: Spit clear.

Nov^r 19th Weight 10st 7lb:

Here observations cease owing to his returning home.

Group V.

This group, it has been found necessary to add after the original scheme had been worked through, the reason for this is stated after the table following:-

Name	WEIGHT ← Before		During		→ After		Total.	
	gain lb: oz	loss lb: oz	gain lb: oz	loss lb: oz	gain lb: oz	loss lb: oz	gain lb. oz	loss lb: oz
Vignes	3.8	-	-	6.12	5.0	-	1-12	-
Skaife	-	0.8	-	5.0	-	-	-	5.8 ※
Fernbach	3.8	-	-	6.8	7.0	-	4.0	-
Minnard	-	-	-	7.0	9.0	-	2.0	
Beasley	1.4	-	-	0.8	-	0.4	0.8	-

(※ 1st loss in 88 days - 2nd in 30 days.)

The first three cases now included in this group, were at first, placed in group IV, which included cases of Haemoptysis in which the temperature was not raised above normal.

On studying the charts grouped in that way with reference to the weights etc. it was found much to my suprise, that in several instances a decided loss of weight was associated with the attack.

On examining these cases further, I discovered that where a loss of weight was associated with bleeding without a rise of temperature, there was a sub-normal record seen in the chart

I then remembered, two other cases, in which there had been Haemoptysis without fever and promptly looked them up

in the weight book, there I found that weight was again lost and on referring to the temperature found a similar sub-normal temperature in the morning.

I consequently decided to eliminate them from group IV, in which we have seen the progress of the case was quite undisturbed by the incidence of Haemoptysis.

I quote the case of Fernbach (Chart N° 26) as an example of this group.

Fernbach. man æt 22. Watchmaker. Admitted June 9th 1896. History of cough with slight expectoration for last three years. Haemoptysis, first time 3 years ago, and four or five times since. The spit has lately been coloured. Has had pains in chest also sweating at night but not for the last nine months. Weight 10st: 7lb: Height 5ft: 8in: (six pounds below standard) On examination it was found that there was consolidation of the upper half of right lung, with crepitations extending also below the area of impaired percussion, and of the left apex also with a few crepitations.

The temperature at first rose to 100° at night, but soon quieted down.

On August 1st his weight was 10 st: 10 lb: 8 oz: (a gain of 3½ lbs).

On the 12th he had ℥j of blood in the night and on the 13th at 1.30 p.m. another ℥iv — On the 14th only three spots of colour were raised during the day and from the 15th to the 19th only a few dark clots were brought up, on the 20th the spit was almost clear and on the 24th he was allowed downstairs His weight on the 27th however was reduced to 10 st: 4 lbs: On the 29th he was examined and it is noted that there were a few scattered crepitations over the right lung & left apex posteriorily: very much the same as found at original examination.

During the next fortnight, he decidely improved. His weight on the 13th of September being 10 st: 11 lb: 4 oz a gain of 7 lbs. He left on the following day.

Having now completed our study of the five groups of cases arranged — according to the degree that the temperature was affected by the incidence of an attack of Haemoptysis, it will be well to review the observations that have been made as a

whole, in order to ascertain what practically useful information can be derived therefrom.

We have seen in the first place, that Haemoptysis may occur and even be considerable in amount, without the temperature being affected in any way: we have on the other hand, seen that it may be associated with a rise of temperature, the degree of which may vary very much.

We have also observed, that other conditions being equal, the attack in which the temperature is affected has a far more decided influence upon the progress of the case, than the attack in which the temperature is not interfered with.

We may, from what we have seen, go yet a step further and say that the higher the temperature is raised and the longer the rise is maintained the more serious is the effect upon the patient.

In the first group in which the temperature rose to 103° and over and the rise was maintained for more than a transitory period, we saw that the effects of an attack of Haemoptysis were very disasterous Out of the examples

thereon included, far more ended fatally in a short time than recovered, and those that got over the attack were so staggered by its incidence, that even though they were able to leave the Hospital, they never completely regained the ground that was lost while they remained under observation.

When the temperature shortly after an attack of Haemoptysis then rises to this extent, the prognosis may be regarded as decidely unfavourable; if the patients general condition is poor before the attack and if the disease is advanced, death is very likely to follow rapidly.
If the patients condition is good and the disease is not very advanced, he may recover, but will be probably greatly weakened and the convalescence will be a long and tedious one: on the other hand death may even in such a case result.

In the 2nd groups in which the temperature rose to between 101° and 103° we see that far more cases survived than succumbed to the attack. We decided in this connection that as regards a rapidly fatal termination much depended upon the resisting power of the patient.

An attack of this kind might be regarded as being quite sufficiently severe in an emaciated case, with advanced disease, to turn the balance in the wrong direction, but with a patient previously in satisfactory health, a more immediate favourable result might be expected, as to the more remote prognosis the temperature we have seen gives a very reliable indication. If it gradually falls and settles to normal, the effects of the attack are comparatively soon recovered from and in several instances we saw that actual improvement upon the previous condition was possible. On the other hand, when the temperature lapsed into a hectic type, we saw from the evidence of the body weights, that the patient went down the hill and the rapidity with which this was the case, corresponded with the range taken by the temperature.

A prognosis based upon these lines, may, in my opinion be given with considerable confidence in a similar case of Haemoptysis

When the temperature following Haemoptysis rises but does not exceed 101°

as was the case in the 3rd group, it was noted that weight was generally lost during the attack, as was the case in the first two groups, but more rapidly gained after the attack.

In several instances another exacerbation of temperature was recorded on the charts due to other causes which lead us to infer, that in these cases the temperature equilibration could easily be disturbed and that, even a slight attack of Haemoptysis, would be quite sufficient to effect. If rapidly disasterous results were to follow haemoptysis we further decided that the temperature would probably be elevated to a higher degree for no instance of a fatal issue is recorded is this group.

With reference to the prognosis then it may be looked upon as decidely more favourable both as regards the immediate and more distant future than in cases, which would be included in the two previous groups, in which the temperature rose higher.

Death, we have some grounds for believing, seldom shortly follows an attack of this description & a continued

hectic temperature is less frequently met with as a sequel than in the preceding groups.

The fact however, of the temperature being affected at all, indicates that something more than the actual bleeding has to be taken into consideration

In cases in which (the temperature previously was quite normal and steady,) a rise of temperature of the type we are considering, associated with Haemoptysis should be regarded as of more serious significance than a similar rise in cases in which the fluctuations are more common. Prompt attention to this indication may often prevent or delay more serious results from following.

The prognosis though favourable as regards the immediate issue from the attack, should always be qualified as regards the more distant future, provided the temperature after the attack does not settle down to quite as satisfactory a type as was the case before the attack

It must be borne in mind as recorded by Williams, that extension of the disease in the early stage need not

necessarily be associated with a temperature.

Haemoptysis with a slight rise of temperature, is frequently the first indication met with of the development of the disease.

Prompt realization of its significance both on the part of the Physician in advising his patient, not only as regards the attack itself but also as to the precautions that should be taken in the future conduct of his life and on the part of the patient in carefully attending to & carrying out the instructions given, may be the means of arresting the disease before very serious damage has been done.

In the IVth group we saw examples of Haemoptysis unaccompanied by a rise of temperature. In two instances, the amount of blood lost was considerable. It is also especially worthy of note, that weight was gained in all these cases while, as well as after, the attack, and the progress of the cases while under treatment appears to have been uninterrupted.

These facts are especially of value in connection with the subject we are considering as accentuating the difference in results observed when the bleeding was associated with more or less marked pyrexia.

{ We see therefore that the patients general health is not greatly interfered with unless the temperature is affected. In giving a prognosis in such a case, this should be borne in mind }.

As we have seen that when Haemoptysis occurs in the course of Phthisis, without producing any rise of temperature, the patient is not constitutionally affected to any serious extent, we may therefore in considering the prognosis praticallly eliminate the indirect effects of the bleeding upon the lungs. The question consequently resolves itself into an estimation of the direct effects of the bleeding upon the patient.

In the first place it must be borne in mind that death may result from pulmonary haemorrhage, quite apart from any association with temperature, the attack proving fatal almost instantaneously by causing asphyxia or syncope.

The probability of such an event occurring is impossible to predict, but as has been shown elsewhere, it rarely if ever occurs unless the disease in the lungs is advanced and there is extensive excavation present. At all events in the 18 cases of sudden death following Haemoptysis that I have seen, this was the case

It is further of interest to note in this connection that in twelve of these cases, the fatal attack came on quite unexpectedly and was not preceded by any signs of bleeding of a milder type and in four of these, the fatal attack was the first and only one that occurred.

On the other hand in six cases, asphyxia or syncope did suddenly terminate an attack of Haemoptysis for which they were at the time under treatment, but in all the six cases the Haemoptysis was associated with pyrexia.

These facts give us some grounds for believing, that the sudden fatal attacks of Haemoptysis are things apart from and in no way connected with the smaller attacks that occur so commonly in the course of Phthisis and the difference in these cases is of Kind and not degree.

In the fatal cases, death is due to either ulceration of the walls of the pulmonary artery or rupture of a pulmonary aneurysm. If anything therefore a previous attack of bleeding uncomplicated with pyrexia would on theoretical grounds render rupture of the artery or aneurysm less likely to occur, owing to the lowering

of the pulmonary blood pressure due to the local depletion and also to the patient being on his guard and less likely to exert himself for fear of bringing on the bleeding again

This theory is supported by the fact, that I have seen no instance of sudden death terminating a pre-existing attack of haemoptysis unassociated with a rise of temperature.

As already stated, in the six cases of sudden death occurring in the course of an attack, the temperature was previously raised, indicating activity of the disease, in these instances probably in relation to the artery causing further erosion of its walls and eventually its rupture. These cases however being associated with pyrexia do not apply to the point we are considering.

From these observations we are justified in stating, with regard to the prognosis, that in the case of Haemoptysis unassociated with a rise of temperature, death directly due to the bleeding is practically never met with if the disease in the lungs has not reached the stage of excavation. If it has reached

this stage, then the chances of sudden death occurring are, if anything, slightly less than they were before the milder attack came on, providing that no rise in temperature developes subsequently.

Having now considered the probabilities of sudden death resulting directly from pulmonary haemorrhage, occurring in a case suffering from Haemoptysis, with no rise of temperature, we must now endeavour to ascertain whether death can indirectly result from it by anaemia, cardiac failure or exhaustion, without any indication of the unfavourable progress of the case being given by the Thermometer. In order to arrive at an opinion upon this matter, I have carefully reviewed the 22 cases of death, indirectly due to Haemoptysis that I have seen. Unfortunately in several instances, the temperature chart has been mislaid, but in no single instance that I can recollect, and in this, my memory has been confirmed by that of the nurses, did death occur unassociated with a rise of temperature.

We are therefore enabled, with some confidence, to predict in the cases we are considering that the chances of an indirectly fatal issue, as well as a directly fatal issue

from the bleeding are very slight so long as the temperature remains unaffected.

We have now some definite grounds both on the favourable and unfavourable side, upon which to base our prognosis in a case of Haemoptysis unassociated with pyrexia. From them we are enabled to state, that provided the disease of the lungs has not reached the stage of excavation, death is exceedingly unlikely to occur either directly or indirectly from the bleeding, and that it practically never does occur without some indication being afforded by the thermometer: the chances are far more in favour of a recovery being eventually made and provided the loss of blood is not excessive, that the convalescence will be rapid and satisfactory.

On the other hand, if there is extensive lung disease with excavation the possibly of a sudden fatal Haemoptysis always exists but according to our theory, the probability of its occurring shortly after a moderate attack, such as we are considering is if anything less than before the attack, for reasons already given. Putting this single possibility aside, a very favourable prognosis can also be given in this type of case provided there is no alteration in the temperature.

In this group again the the thermometer may be relied upon as giving a prompt and valuable indication of approaching danger.

Having now discussed hæmoptysis associated with a rise of temperature, it remains for us to consider it associated with a fall of temperature.

In the 5th group, five examples of Hæmoptysis, being associated with a lowering of temperature either during or shortly after the attack, were quoted. In these instances there was no previous elevation of temperature so the subnormal condition cannot be regarded as reactionary in character. The absence of pyrexia further indicates that no increased activity of the disease has resulted from the bleeding. It seems probable therefore both from the records of temperature and loss of weight, that the attack has a general depressing influence upon the patient, quite apart from the actual loss of blood.

In many instances even a slight attack of bleeding is a great shock and disappointment to a patient, who has been congratulating himself upon his progress, and causes him to worry a good deal over it, this in itself is sufficient to disturb the

appetite and digestion, but in addition, being kept in bed when he feels fairly well and being afraid to eat for fear of bringing on more bleeding and being put on a lighter diet, as part of the routine treatment, are factors which when combined are, I think, quite sufficient to account for the expression of depression we have been considering.

This theory is again supported by the record of improvement after the attack which occurred in all four cases, that remained sufficiently long under observation.

The prognosis in these cases I think may confidently be regarded as favourable.

When however the temperature drops to a subnormal range in the course of an attack of Haemoptysis and pyrexia and remains at that level for more than a transitory period, the complexion of the case alters entirely.

It is obviously impossible for the exciting cause of the pyrexia to be suddenly removed and the change must be looked for in the constitutional powers of the patient.

This failure to respond to the

pyrogenic factor must be regarded as an exhibition of prostration and collapse on the part of the patient, and the longer its duration the more serious must its significence be regarded.

In the chart of Dif (No 6.) such a rapid fall of temperature is noted, but the re-action quickly followed and the temperature rose and continued high until she died. In the charts of Griffen and Barnhouse, (Nos 8 & 9) a much longer period, during which the temperature remained subnormal, is recorded. In Griffen's case lasting 20 hours and in Barnhouse's 52 hours

Consequently in both cases a re-action took place, but in Barnhouse's case, the temperature again became subnormal twelve days later and though the chart shows evidence of an attempted re-action, his strength proved unequal to the occasion and he died.

A fall of temperature before death followed by no re-action is also noted in the charts of Davies (in which case it preceded death by 10 hours) and Morgan (Nos 7 & 36)

We thus see, that even though such a collapse may be temporarily recovered from, the very fact of its having occurred

must be taken as an exceedingly unfavourable indication and necessitate a very guarded prognosis being given: if a re: action rapid and sustained does not very shortly follow a step further may be taken and a positively unfavourable prognosis stated.

In connection with these subnormal temperatures, it is interesting to note, that during the period of depression, the bleeding usually stops, but that it is likely to recur with the re: action. This is observed in the cases of Dix, Barnhouse and Giffin.

In the case of Dix, the temperature fell from 103°.4 at 6 p.m to 97°.4 at 2 a.m. the next morning, followed at 5.30 a.m. by Haemoptysis ʒ ii.
The temperature was probably rising at the time for at 6 a.m, it was found to be 102°, remaining above 101° till death.

In the case of Barnhouse, on the 6th of March, the temperature at 2 a.m. was 97°.6: at 3 a.m he had ʒ iiii of bleeding and at 6 a.m. the temperature was 100°.2.

It then dropt to subnormal as shown in the chart at 10 a.m., and no further bleeding is noted for 68½ hours - during the period of depression - but it came on 1½ hours after the temperature had risen for the first time to 99°. —

In the case of Griffen, no recurrence of the bleeding was associated with the re-action from the twenty hours of depression, but no bleeding occurred during that period. — She had however a second attack of bleeding six days later and the bleeding on that occasion in relation to the temperature is of interest as illustrating what we are considering. The temperature at 10 a.m on that day was 97°, a degree lower than it had been since the re-action At 1.30 p.m. she had Haemoptysis loosing 3x of blood, the temperature at 2 or shortly after, rising to 100°.

It is further noted that during the periods of depression terminating in death there is no record of bleeding after the fall of temperature.

All these points, in connection with a depression of temperature, favour the idea, that it may for practical purposes be regarded as a reliable expression of constitutional weakness on the part of the patient.

A sub-normal temperature unassociated with or following gradually a previously high temperature has been shown to have a markedly different significence from a sub-normal temperature, rapidly following a pyrexic condition.

In the first instance it could be looked upon as indicating weakness, debility, lowered vitality or constitutional power, pure and simple, which careful dieting and treatment might reasonably be expected to improve. The condition is evidently straightforward.

In the 2nd instance on the other hand, the fall, even if it does not descend much below normal has a more subtle meaning.

At first sight it appears eminently satisfactory, that the pyrexia should disappear, the bleeding be discontinued and often as was the case with Griffin and Barnhouse, the patient assert that he feels much better in himself, but on further consideration, the possibility of such a state of affairs being far too satisfactory must be recognized

On reviewing them carefully a feeling of distrust cannot fail to be awakened in the mind of the observer — "Timeo danaos et tum dona ferentes" is a quotation that has often arisen in my mind, on such an occasion and much the same feeling that Laocoon had towards the gift presented by the Greeks, has been mine.

on glancing at such a record.

There is a feeling that something is being disguised, that there is a hidden influence at work, which only requires the patient to regain a little more strength in order to be openly demonstrated, and if this strength is not forth-coming to ignominiously terminate the case by exhaustion and collapse.

We have now completed our study of a long series of phthisical temperatures in connection with an attack of Haemoptysis.

We saw in the first instance, that pulmonary hemorrhage, even though considerable in amount, need not necessarily be associated with an alteration of temperature, and if the temperature was normal and continued so, the progress of the case might continue without interruption. Here was a definite fact, which ofcourse admitting of innumerable variations, both as regards the temperature, the bleeding and the effect upon the patient, could serve as a standard for comparison of any deviations that might occur in either of the three directions

On examining the temperature charts, which had been selected simply as fulfilling one condition, namely that they should include record of the temperature during an attack of Hæmoptysis of which the notes were sufficiently full to render them of value, it was at once evident that great variations in this direction were possible.

From experience, it was already known that the amount of blood lost in an attack, had in itself comparatively little to do with the issue of the case.

For instance, it was noted, that some of the cases, which made the best recoveries lost a large quantity of blood, and some of the cases that ended fatally lost only a very little. Though it was recognised that great variations in this direction also were possible still they bore a very uncertain relation to the results afterwards observed. This being the case it was very evident, that a study of the amounts of blood lost in an attack would afford very little practical information as to its probable effects upon the patient.

The temperature charts were next approached with an entirely open mind. In order to deal with

them, it was thought advisable to sub-divide them in some way.

In the first instance it was decided to arrange them according to the condition of the temperature previous to the onset of the attack, but this was soon found to be unsatisfactory.

Out of 50 charts the temperature in 42 cases was either normal or only slightly irregular and though it was possible to sub divide: the lines upon which the sub-division could be made were not sufficiently definite to serve any useful purpose.

This arrangement having been dismissed, it was next resolved to attempt a classification based upon the degree of pyrexia reached during the attack. Accordingly groups were formed as they at present stand. They appeared in the first instance, suitable as the numbers were fairly well balanced, the small numbers in the lower groups being probably accounted for by the lessened care with which the records were preserved owing to their apparent unimportance

On inspecting these groups it was quickly observed that the

cases in the higher groups either died or did badly and that those in the lowered groups recovered and did well.

Upon these broad lines then the idea originated of endeavouring to work out the co-relation between the temperature associated with the attack and its effects upon the patient.

Shortly afterwards, the possible value of the results of this investigation as a guide to determining the prognosis in a case of Haemoptysis, was recognised and as no definite indications in this direction have ever to my knowledge been laid down their study appeared to be a particularly appropriate theme for the present thesis.

The task has now been completed as far as the material at my disposal admits and from the facts recorded and the consistent manner in which the results afterwards observed have been found to tally with the indications previously given by the thermometer, I feel justified in asserting that in an attack of Haemoptysis, the most reliable ground upon which a prognosis can be based, will be found in careful study of the temperature.

No one factor in medicine can be depended upon alone, but due weight having been given to other outstanding indications, the thermometer will, in the long run, be found the most trustworthy guide.

Prognosis

From our study of the subject of Haemoptysis, we have seen that the attack may cause death suddenly from asphyxia or syncope or more remotely from heart failure, pneumonia or rapid extension of the tubercular process.

The question of prognosis therefore must be considered with reference to the immediate issue of the attack and also to the more remote results that are liable to follow.

In dealing with this matter it must be borne in mind that haemoptysis is not in itself a disease (even though it may be the immediate cause of sudden death) but the sign of the presence of disease in the vital organ, the lung.

The first point then, that requires consideration in order to form an opinion as to the prognosis, is the actual condition of the disease in the lungs at the time of the occurrence of the haemoptysis

An exhaustive physical examination is ofcourse out of the question, shortly after the attack has come on. Still if the patient is seen for the first time an attempt should be made with great caution to obtain an approximately correct idea of

the extent and stage of the disease.

The valuable information that can be derived from inspection and palpation should be made the best use of, for these methods have the advantage of not disturbing the patient and minimising the amount of auscultation subsequently necessary.

In our previous study of haemoptysis in relation to the stage of the disease we saw that there was only a single instance in which death was recorded as occurring from haemoptysis before the stage of excavation was reached. and in this instance the case was not a simple one of phthisis but was complicated by mitial disease. Death in this case was eventually due to heart failure which occurred nineteen days after the onset of the attack.

If therefore, the disease in the lungs in the case we are considering was in the early stage and had not reached the stage of excavation, we should assuredly have some grounds for anticipating that the immediate issue, as far as the attack was concerned, would probably be favourable provided nothing could be discovered of a serious nature to complicate matters.

If, on the other hand, there was extensive excavation present, the unfavourable possibilities would be very much greater, for under these circumstances we have seen, that all the fatal complications that have just been mentioned are liable to occur.

Other matters therefore, must be taken into account, and given their proper value in order to arrive at an opinion

Some of the most important and reliable of these we now propose to consider.

The state of the nutrition of the body is a fact which is obvious as soon as the chest is exposed.

This at once conveys a general effect upon the constitutional powers that the disease has exercised and gives an indication of the highest importance as to the resisting power still possessed by the individual. It will be remembered that in cases of sudden death from haemoptysis, the average deficiency in weight below the standard was 2 st: 7 lb: 7 oz: and in deaths indirectly due to haemoptysis 2 st: 5 lb: 6 oz. Whereas

in cases with haemoptysis over 5 oz: that recovered, the average was nearly a stone less namely 1st: 8 lb: 6 oz below the standard.

These figures, confirmed by personal experience are quite sufficient to justify an inference being given, that emaciation renders the prognosis very much more unfavourable, both as regards the immediate and remote results.

One sudden death did occur in a man, who was up to the average weight for his height but in the majority of instances the patients were more or less markedly emaciated.

The temperature previous to the attack, we have seen was raised in nearly all the cases in which sudden death occurred, and it has also been mentioned that when haemoptysis does occur in the course of phthisis with pyrexia, it must always be regarded as a serious matter even though in some instances the temperature does improve & appear to be benefitted by the attack.

A point of some importance may well be introduced at this stage namely, that, in these cases in particular

it is important to know, what was the exciting cause that brought on the bleeding.

If the cause was a trivial one and the temperature previously high, it justifies the supposition that the haemorrhage was due to the activity of the disease, and if the amount was considerable, in the neighbourhood of an artery or arteriole. This of course renders the prognosis less favourable than if a severe strain or unusual exertion had been necessary to bring it on.

The amount of blood lost must not be ignored, even though we have seen that a large quantity is not as essential for a fatal termination in the immediate or more distant future and conversely that a small quantity only, may be brought up and death result in a very short time from syncope or later from pneumonia.

It is needless to say that a profuse haemoptysis is a more serious matter, than a slight one, but still the amount of blood lost unless it be excessive is not in itself sufficient to render the prognosis of recovery from the attack hopeless.

Taken in association with other matters it will be found to have an influence on the result.

The condition of the heart is a matter of very great importance and the presence of valvular disease as a complication has already been alluded to and in one instance it appeared to accelerate the fatal termination; in three out of four cases however, recovery from the attack was most satisfactory

Judicious treatment, I am inclined to think is of especial importance in modifying the result in these cases and its existence therefore is important not only for the purpose of prognosis but also for the purposes of treatment.

Apart however from valvular disease, the condition of the heart itself is a matter that must carefully be considered, as so much depends upon its staying powers. in these cases. A heart that is easily excited and acts forcibly and tumultuously upon slight provocation must always be looked upon with suspicion and is a complication that is liable to be followed by a recurrence of the attack (as is the case when there is a liability to bleed elsewhere.)

Before deciding on the prognosis, the state and condition of the heart should always be regarded as of importance.

The age is also a matter that we have seen has an influence upon the result. We saw that the majority of the sudden deaths were in cases in which the disease had reached the stage of excavation and the patient was over 30.

We also noticed, that the duration of life was shorter, when the bleeding occurred after 30, than when it came on at an earlier period.

It was noted on the other hand that death from pneumonia occurred more often in the younger cases.

The age therefore must be allowed its influence in the decision as to prognosis.

Lastly we may include the sex of the patient for we have seen, that though women are almost equally as liable to haemoptysis as men, still it is not so frequently a cause of death in the former as in the latter.

Consequently the prognosis in a particular case of Haemoptysis would be rather more favourable if it were a woman (by reason of her sex) than a men.

These are points that are worthy of attention on first seeing the case and upon a thoughtful consideration of their significance must the first opinion as to the probable issue of the attack be based.

It is impossible however to speak with certainty upon the matter so early in the case, especially as to the disease if advanced and the patient very weak. The prognosis must therefore be given with caution.

It is from this stage onwards that I would wish to lay stress upon the value of the thermometer as an indication of the progress of the case and would venture to recommend, that in all anxious cases the temperature should be taken every four hours.

If this is done, the chart almost without exception is able to furnish a warning of approaching danger, whether it be the fall that is associated with heart failure or the almost continuous fever of pneumonia or the increased hectic of active tuberculosis.

I have endeavoured but without success to find a case in which death

connected with haemoptysis proved fatal without the chart being affected or more correctly speaking, the temperature being raised. This subject has been very fully entered into else where.

During the course of the as supplementary to the temperature, the recurrence of the bleeding must be carefully watched. Recurrences are unfavourable from every point of view, especially if they are severe and frequent, for in addition to their other bad effects they make the patient nervous and disheartened and in several instances, I have found patients afraid to eat or go to sleep for fear of the bleeding coming on again as it had done on a previous occasion.

If the attacks are severe and repeated, death from cardiac failure is particularly liable to occur.

The occurrence of marked dyspnœa associated with recurrent attacks, we have seen in several instance is an unfavourable indication. It may be due to difficulty in getting up the blood or to blood being insufflated into distant parts of the lung, where if it carries irritating or infective material it is liable

to set up irritation or inflammation and be followed by very serious consequences.

The dyspnœa also, may be the first symptom of cardiac failure and this should lead us to an examination of the pulse; the heart and also the bases of the lungs.

Should this examination confirm the theory derived from the observation of the breathing, the prognosis must be regarded as likely to be very unfavourable.

The physical signs of the lung condition should be ascertained from time to time and the information therefrom obtained will be found of great service in supplementing that obtained from the chart with reference to the progress of the disease.

If Arnica, it will be remembered, developed after Holdaway's first attack of bleeding and not long afterwards was followed by the haemoptysis, which a little later on proved fatal.

This possibility must be borne in mind with regard to cases in which no excavation could be detected at the first examination.

These are the chief points that will be found of service in enabling us to anticipate correctly if not the ultimate result, at all events any serious change for the worse, that may occur from day to day in the course of the attack.

After the attack is over, the Temperature again comes to our aid in giving an opinion as to the future.

As we saw in its own section if the temperature settles down to normal or thereabouts the body weight is almost sure to increase and the patient improve in every way, recovering more or less rapidly according to the severity and duration of the attack.

If, on the other hand, the temperature lapses into a hectic type the higher the maximum temperature in the evening and the lower the minimum temperature in the morning, the more surely & rapidly may the case be expected to go down the hill. —

— Pathology. —

Before turning our attention to the subject of treatment, it is necessary that we should consider what are the pathological conditions which give rise to haemoptysis occurring in phthisis.

Firstly, as to the origin of the bleeding. It might originate from either the pulmonary or bronchial circulations in the lungs.

Considerable stress is laid upon the bronchial origin of the bleeding by Laennec. and also by Niemeyer, apparently because the bronchial mucous membrane is impregnated with blood and starved and generally slightly softened as ascertained by post mortem examination in cases of death from haemoptysis.

Reginald Thompson in his monograph on pulmonary haemorrhage (pp. 10) draws attention to the fallacy of regarding this as sufficient evidence for believing that the source of the haemorrhage was bronchial for he states, that he has found blood in the bronchi in cases

of fatal haemorrhage in which the blood had been traced to rupture of a pulmonary vessel, eroded or in a state of aneurism - to the bursting of an aortic aneurism into the trachea or to aneurism of the coronary artery of the stomach.

I have myself found blood in the bronchial tubes of both lungs in at least two fatal cases in which the bleeding point - a ruptured pulmonary aneurism - was definitely fixed by injecting the pulmonary artery with gelatine and carmine.

Thompson further remarks that it is difficult to determine from which lung the bleeding has started, by a simple inspection of the bronchial tubes and this I have also experienced.

He goes on to state, that in no case of profuse haemorrhage was he able to decide that the blood proceeded solely from the bronchial vessels.

He records a case of profuse haemorrhage due to a general tendency to haemorrhage in which the bleeding proceeded partly from the pulmonary and partly from the bronchial vessels and

Dr. Church in the Pathological Transactions records a case of haemorrhage from a bronchial aneurism.

These however are so very rare that haemorrhage from the bronchial vessels may be excluded from our present consideration.

It therefore follows, that in by far the majority of cases the source of haemoptysis must be looked for in the pulmonary blood vessels.

Williams emphasises this very decidedly by saying, that when haemoptysis exceeds one ounce in amount and other causes of pulmonary haemorrhage (which have already been enumerated) including bronchiectasis have been excepted it may be laid down as a law that the bleeding is due to changes in the pulmonary vessels due to phthisis.

We must now endeavour to find out what these changes are.

The following is a summary of Williams' statement on the matter.

First - Fatty degeneration in the small blood vessels is liable to occur in the earliest stage of phthisis

To this Dr Radcliffe Hall, who first demonstrated this condition is inclined to attribute the occurrence of haemoptysis occurring as the first sign of phthisis

Second:- Ulceration & erosion of the pulmonary blood vessels, take place during the tubercular changes. This is no doubt the cause of the early haemoptysis of phthisis and is probably due to the infiltration of the walls of the blood vessels with tubercle and ulcerative changes taking place in them subsequently.

Third. Aneurism of the branches of the pulmonary artery is perhaps the best ascertained cause of fatal haemoptysis. Its rupture frequently but not invariably is followed by death.

These are the principal pathological causes of large haemoptysis in phthisis; the smaller quantities of blood expectorated are probably due to congestion or inflammation of one or other of the two systems of vessels existing in the lung similar to what occurs in

heart disease or pneumonia.

For slight oozings of blood, it is not necessary that there should be any rupture of vessels, as it has been ascertained that red corpuscles can like white corpuscles migrate through the vascular walls but it is extremely improbable that any considerable haemorrhage can take place in this way.

These pathological conditions affecting the pulmonary blood vessels have been regarded throughout as the essential causes of haemoptysis in phthisis, the various events we have clinically observed as initiating the bleeding have only been looked upon as exciting, and from their absence in many instances, consequently only accidental factors in its production.

Regarding haemoptysis from this point of view, it is obviously necessary that some definite conception should be obtained of the principal cause of its occurrence, before attempting to enter upon the question of the measures that can be made use of in order to bring about its arrest.

Treatment.

Dr James Andrew in the Hawaiian Oration of 1890, draws attention to the eminently unsatisfactory nature of the treatment of haemoptysis.

He goes so far as to express as his opinion that "beyond a few general" "measures and simple remedies all tending" "to reduce blood pressure in the vascular" "system as a whole, it was very doubtful" "whether our present supposed knowledge" "enabled us to do any good at all to our" "patient"

He quotes a long array of remedies recommended in the treatment of haemoptysis, 39 in all, taken from a standard work on pharmacology therapeutics and materia medica, as a very good illustration of the truth of the old axiom, that when many drugs are supposed each to cure one and the same disease, we may safely hold that few, if any of them, have the least influence over it.

He further emphasises the difficulty of deciding, when the arrest of the

bleeding can really be attributed to the remedy that is being used, for it is a well known fact that haemoptysis very often stops of itself, without any treatment at all.

After this, a series of investigations by Doctors Bradford, Dean and Mr. George Henry Lewes upon the relations between the pulmonary and systemic circulations are recorded and also a research that was partly undertaken at his request by Doctors Rose Bradford & Mr. Boderham with reference to the action of certain drugs upon the pulmonary circulation, with reference to this however the observers themselves state that we have no right to assume that the results of experiments on animals performed under conditions very different from those of healthy life would hold good in the case of man.

We thus remain in much the same position as before and for the present, continue to rely upon methods of treatment, that experience in the past, has lead us to believe were of service in dealing with a case of a similar nature.

In the first place, there are a certain number of cases, that may at once be placed out of account with regard to the question of treatment.

When haemorrhage takes place into a cavity of considerable size from rupture of a pulmonary aneurism or from erosion or ulceration into a large branch of the pulmonary artery, there is obviously nothing that could be done artificially to arrest the bleeding, even if we were able to see the case at the time the attack came on.

In some instances even, when rupture of an aneurism occurs spontaneous arrest may take place firstly from clotting of the blood before it leaves the cavity and secondly from temporary weakening of the heart's action from loss of blood, causing a slowing of the circulation and a fall in blood pressure, thus affording a better opportunity for a firm clot to form.

In other and less severe cases, which are of infinitely more common occurrence, I think most observers will be inclined to consider that Dr. Andrew has

been somewhat unduly severe in his wholesale condemnation of the methods at our disposal. When it is borne in mind, that in these cases, disease is actually present in the vessels themselves it seems very questionable whether any really great advance can ever be made in the treatment of haemoptysis, unless some means can be devised for preventing the vessels becoming affected in the first instance. As this is of course impracticable, we must now turn to the serious consideration of the subject and endeavour to find out how we can best assist nature in bringing about an arrest of the bleeding.

Let us first consider how the attack is brought on.

In health the elasticity of the walls of the vessels enables them to accommodate themselves to considerable variations of blood pressure. If there is a local weak point in the vessel wall, it may be sufficient to retain the blood so long as the tension is low. Should however the patient exert himself much and the blood pressure be raised above a certain

point, which is greater than the resisting power of the vessel wall, then rupture occurs which causes haemoptysis.

During the attack the first thing to be arrived at, is to arrest the bleeding. In order to effect this, the patient must be instructed to lie down and keep as quiet and as calm as possible: this, is the first and simplest method of quieting the hearts action and lowering the blood pressure.

In order that this should be as thoroughly effected as possible, all muscular movements should be prohibited, he should not even be allowed to move his arms to reach his spit cup, it should be held conveniently for him. If ice can be obtained, it often proves of great service in checking the bleeding, the patient should be allowed to suck it freely. Should this simple treatment not prove effective a hypodermic injection of ergotin is often rapidly followed by an arrest of the haemorrhage.

This is the practical experience of many and much stress is laid upon its value by Dr. Vincent Harris

in a paper on the treatment of haemoptysis in St Bartholemew's Hospital reports.

If the patient is of an excitable temperament and very nervous or if the cough is troublesome, an injection of morphia, is perhaps the best remedy that can be employed and should be given in the first instance, it has also the advantage of quieting the hearts action.

Ergotin and morphia given together often are successful where one alone fails.

Recently, I have generally tried the morphia first and if the bleeding has persisted, then given the ergotin.

In one case, I had to give three injections of ergotin amounting to ℳ xxxv of the official injection, in addition to grain ½ of morphia, before the bleeding stopped.

Where there is much "rattling" in the chest as previously described, an ice bag over the place, appears to give the patient relief, for he often asks for it a second time, should it recur.

Turpentine on a handkerchief or on lint is sometimes recommended as an inhalation, and a large dose internally

is often of value in checking the bleeding during an attack.

Should the patients breathing become embarrassed, he should be propped up and instructed to bring up anything he may feel ought to come, and not restrain the cough too much.

He should be carefully watched and any sign of cyanosis developing must be regarded as serious.

Should he show signs of choking, time should not be wasted and the fingers (the 1st and 2nd) should be introduced into the larynx, and clots if present, should be removed.

If the patient definitely shows signs of asphyxia, there is very little chance of pulling him round. I have twice however done so, but death followed a day or two later. In these cases I induced emesis by stimulating the pharynx and under the surface of the epiglottis with the finger and this helped the patient to clear some of the blood away

Artificial respiration was then resorted to and a strychine injection followed by an ether injection was given.

I have several times seen tracheotomy performed upon a patient almost moribund from asphyxia, but as might have been expected, it was not of the slightest avail and only tended to make a ghastly sight yet more ghastly.

These are the principal means at our disposal for treatment during the attack. The value of hypodemic medication is especially evident in these cases in which a rapid action is so essential and also where absorption of drugs given by the mouth would be retarded owing to the almost invariable presence of blood in the stomach.

When the bleeding has once been satisfactorily arrested, the next indication is obviously to prevent its recurrence.

This, in the first instance, is best done by keeping the patient at rest in bed, and here he should remain till several days, 2 or 3 at least after the bleeding has ceased. The diet should be a light one & everything cold.

Next, comes the question of medicinal treatment. Supposing the patient is comfortable, with the bleeding

arrested, the cough easy and the pulse quiet, I have lately been wondering whether it is not better treatment to put medicines aside and leave the completion of the arrest to nature, rendering assistance only by regulating the general management of the case in accordance with her indications.

This method certainly succeeds well in certain instances.

If the attack has been a severe one, and from the history, it is thought that there is a likelihood of a recurrence taking place, I think morphia is likely to be of service and is best given hypodermically every six or eight hours and gradually reduced in frequency.

When the heart is acting rapidly and forcibly and the pulse is thumping and of high tension, aconite in several cases lately has acted in a most satisfactory manner. This is a drug that has experimentally been shown by Rose Bradford and Dean to produce a marked fall in both the pulmonary and systemic arteries.

One case, I have a record of in which ergot was given and during its adminstration, the bleeding frequently recurred. When the ergot was stopped and aconite substituted the haemoptysis almost immediately ceased & the patient rapidly got better.

Aconite appeared to do well in two cases in which phthisis was complicated with mitial stenosis.

In cases of haemoptysis in which large amounts of blood have been lost or where there appears a probability of heart failure coming on, perchloride of iron with or without digitalis has some times been followed by arrest of the bleeding and it has the advantage of having a beneficial action on the cardiac muscle.

Turpentine is a remedy about which there appears to be much difference of opinion. Personally, I think it is perhaps the most useful drug we have for the treatment of the milder forms of haemoptysis. It undoubtedly is of especial value in cases in which dark and ill smelling clots of blood are

brought up after the major attack is passed It is very efficient in removing the odour.

Turpentine should be given in fairly large doses in order to obtain the best results, the only danger is, that it appears in some cases more than others to produce haematuria.

It is interesting to note that in the cases in which haematuria was brought on the haemoptysis simultaneously stopped. This is recorded in three out of the 100 cases, but I have observed it in several others.

Calcium Chloride has been given a fair trial since Professor Wright of Netley drew attention to its power of increasing blood coagulability.

In some cases it has appeared to do good, given in conjunction with some other remedy such as morphia, turpentine or ergot, but alone, except in the very slight cases, I have not found it of signal service. It has however the advantage of being a step in the right direction towards rational treatment for it aims at fulfilling a definite indication

that has been afforded by research in the sister department of physiology.

Wright speaks highly of its value in the treatment of haemophilia, so in cases of haemoptysis in which the blood is slow in coagulating the use of calcium chloride is decidely indicated.

It must be borne in mind that after it has been administered for a day or two its influence in this direction ceases and so should be discontinued for a while.

Acids are often recommended and they appear to be suitable in certain cases. In one case in particular I have noticed that aromatic sulphuric acid, checked the bleeding on two occasions. (with an interval of over a year between) when other means previously adopted had failed.

Salines are useful in bleeders cases and are probably the best aperients to use in the treatment of haemoptysis should this be required.

Counter irritation is a therapeutic measure that should always

be borne in mind, probably its best representative is the fly-blister.

It is especially indicated when there is discolouration of the expectoration and a localised focus of activity can be detected.

One blister should not be regarded as sufficient, it should be repeated frequently until the purpose for which it is applied is achieved.