On the so-called "Antagonism between Heart Disease, Pulmonary Tuberculosis" being a thesis for the Degree of M.D. by J.H. Frisc, M.B., C.M., Edin.
On the so-called Antagonism between Heart-Disease and Pulmonary Tuberculosis.

For a long time it has been recognised that certain diseases seem to be a protection to those suffering from them from certain other diseases. It is well known how rare it is to find a patient who is the subject to attacks of but developing Pulmonary tuberculosis, although bronchial catarrhs are of the commonest complications in that disease. So again with cancer, this disease is rarely accompanied or followed by tuberculosis.

Heart disease again has been said to occur very seldom in those suffering from tuberculosis, indeed some authorities have stated that they have never seen the two diseases in the same individual, and regard heart disease as conferring a complete protection from Pulmonary Tuberculosis. Others again have recognised that several diseases of the heart may and do occur in a person suffering from tuberculosis, but rarely, and have regarded one form alone viz. Mitral Stenosis, as affording a complete immunity
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On the so-called Antagonism Between Heart Disease and Pulmonary Tuberculosis.

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against Pulmonary Tuberculosis. But on the other hand several writers have pointed out that congenital forms of heart disease, as Pulmonary Stenosis, are often followed by Pulmonary Tuberculosis, and have also shown that Mitral Stenosis and Tuberculosis are not so infrequently associated with one another as has been supposed.

One of the earliest writers on the subject, and at the same time a strong believer in the immunity afforded by heart diseases against Tuberculosis, was Rotchansky, writing between 1842-1846, he first pointed out (Path. Anatomy, Vol. 7, p. 316, Edinburgh Society Trans.) that the following diseases viz.: Cyst formation, Barrenness, Leptons and Intermittent Fivers, Bronchocele, and Rheums rarely occur in the Tuberculous patients. Further with regard to the latter disease he goes on to say, that no clinical deformity and correlation of the disease are scarcely ever found complicated with Pulmonary Tuberculosis. And again, "even the arterial disease upon which spontaneous Aneurism depends, and which
consists in the endogenous exudation and stratification of a fibrinous substance upon the lining membrane of the blood vessels, i.e., its more highly developed grades rarely associated with tuberculosis." He also points out "the remarkable exemption from tubercle of those with fibroslythemic and that persons labouring under enlargement (dilatation, hypertrophy, and heart complications) of the heart, whether primary superadded by mechanical obstruction at its orifice, do not contract tuberculosis." "Nor does it exist with such congenital nodule of formation in the heart or the great arterial trunks, which, with their complications, result in fibroslythemia, and, as the anatomical measure of their significance, an augmented volume of the heart." He then goes on to say: "Resembling the series we have to mention the anomaly, afforded by many acquired anomalies of arterial trunks which resemble congenital nodule of formation, such as arteria from compression, obliteration or again by large aneurisms within vicinity.
of the heart. He says "the immunity is due to the mechanical impediment which the overpowering blood column in the dilated arterial trunk opposes directly to the impelling of the left ventricle, and indirectly to the influx of various blood into the right heart. The same immunity is attained in viscosity and opaqueness owing to hindrance to the pulmonary circulation more especially where the impediment reveals its serious character by a dilatation of the right heart."

Further on he says "that on account of the increased density of the lungs produced by coagulation of the thoracic spaces in lateral curvatures of the spine, and in the rickety chicken breast, these disease exclude tuberculosis and that pleural effusion, pregnancy, enlargement of the abdomen, expectant smallness of the pleural spaces with smallness of the lungs, confer an immunity from tuberculosis." And again "chronic catarrh, emphysema and bronchial dilatation, whose protective and curative nippers consist in their being attended with viscosity, were recognised by Lazee as conferring a
protection against Pulvisis. Again (pg. 319) he says "as to the exemption afforded by
vulnerity, to render it complete a high
degree is requisite." The degree of the
heart affection (dilatation) present,
furnishes a criterion of the amount the
impediment to the circulation, hence
to the viscosity.
In Vol. IV. p. 251, he writes as follows: "All cyanosis,
or rather all forms of disease of the heart,
vessels, or lungs, inducing cyanosis of various
degrees, kinds are incompatible with
lytoticosis, against which cyanosis offers
a complete protection, and here we find a
key to the solution of the uncertainty
against tuberculous afforded by many
conditions which at first sight appear to
be differ so widely from one another.

Briefly to summarize the above, it is
evident that Rotman's theory that in
addition to the various forms of heart disease,
all other conditions attended with
lumbarance to the passage of blood through
the lungs confered an immunity
against pulmonary tuberculosis, and
that the cause of it was the viscosity of amosis produced.

Amongst the writers who have pointed out the rarity with which Mitral Stenosis is associated with Pulmonary Tuberculosis, are Huckle and Saggie. The former, (writing in Hornsby's Cyclopaedia, Ingl. Trans. p. 307) says. "Valvular diseases of the heart are regarded as antagonistic to Phtisis, and Mitral Stenosis of these, is the one probably most rarely complicated by Pulmonary Tuberculosis. In lesions of the Aortic Valves Phtisis is less frequent. On another page he says "In the case of Mitral Stenosis, the antagonism may perhaps be explained in accordance with Grambs view that by the more copious effusion from the pulmonary vessels, the desiccation and cessation ofurbed products are prevented.

Saggie, in his Principles and Practice of Medicine, Vol. I. p. 994, says, "It appears that one form of heart disease is an almost complete bar against the development of Phtisis. Mitral Stenosis is excessively
Common in young persons, and it often fails to affect the general health to any marked extent. That this should be found rarely in those who die of phthisis is a remarkable fact. And again, "Whatever be the explanation of the rarity of phthisis in those who have central stenosis, it can hardly depend on the viscosity of the blood as Rottemburg thought; as now it is well known that those who have congenital narrowing of the Pulmonary artery, are exceedingly apt to die of tubercular disease of the lungs."

I will not at present consider whether central stenosis and Pulmonary Stenosis are so rarely met with in the same person, as Richele and Tagge consider, but with regard to the latter's objection to Rottemburg's explanation, would mention that Liebert has called attention to the fact that in Pulmonary Stenoses the lungs are often small and underdeveloped, and the Pulmonary circulation irregular. He regards these two factors as predisposing to the development of phthisis.

With regard to the Association of Congenital...
forms of heart disease as Pulmonary Stenosis with Pulmonary Tuberculosis. He finds that Peacock ("Deformations of the Heart," 2nd Edition, page 159) writing as follows: 

"Death sometimes occurs in heart disease from tubercular affections of the lungs, especially when life is maintained to the age of ten or fifteen years. He also refers to a patient, case XVIII, who lived to the age of 30, where the Pulmonary artery was contracted, and the tricuspid valve largely open, and to several cases mentioned by various authors where the Pulmonary artery was either inspissated, or contracted, and where death occurred from tubercular disease of the lungs.

He also draws attention particularly to these cases because Rothstein regarded these conditions as being a factor to the development of Pulmonary Stenosis. In all the cases he collected the Oxyanosis was most marked. He then says "it is possible that the former condition may, as is supposed by some degree of occurrence of tubercular affection, but this is supported in his degree accounts"
to an incompatibility as asserted by Boitansky.

Dr. Pollock (in his Elements of Prognostics on
Rheumatic, pg. 272,) says, "A disease of the
heart, whether of the walls or valves, is by
no means an infrequent concomitant
of pleurisy. The disorders of the ventral
valves were slightly in excess of those of the
atrium. Dilatation of the cavities of the
heart was far more frequent than hypertrophy.
Further he says, "both these conditions
(dilatation and hypertrophy) retard the
progress of tubercle, and nearly all the
cases I have seen have been slow, the
tubercular disease has not advanced to
that extreme disorganization of both lungs
which is the common end of ordinary
pleurisy." Death has generally taken place
from the cardiac rather than from the
pulmonary disease.

Leibert. (The usen's Cyclopædia, Vol. IV.,
p. 279,) points out "the remarkable
tendency to Pulmonary Tuberculosis which
in cases of Pulmonary Seminaries hastens
the end, and shows that in the last twenty
five years it was present in one third of all
The cases of structure of the Pulmonary artery, so that there is hardly any disease so often followed by Tuberculosis. He also lays great stress upon the fact that, in Pulmonary stenoses, the Pulmonary circulation is irregular, and greatly disturbed, and hence, predisposes imperfect development of the lungs.

A more recent writer on the subject, Dr. Piercy Kidd, Assistant Physician and Pathologist to the Brompton Consumption Hospital, in a paper (which appeared in the St. Bartholomew's Reports, Vol. XXI), mentions nine cases of heart disease, out of some twenty-six cases, associated with pulmonary tuberculosis under his care at the Brompton Hospital. Two of these, who were men, were suffering from Aortic valvular disease. Five were the subjects of mitral stenosis, and four of these were women. Two were cases of mitral incompetence, one being a man, and the other a woman. There was some doubt, however, as to the former, whether there was not mitral stenosis present as well. Dr. Kidd also gave particulars of twenty-four cases of heart disease, and of five cases of
Aneurism of the aorta, out of 500 post-mortem, where he found tubercular disease present in one or both lungs. Of the twenty-five cases where heart disease was associated with pulmonary tuberculosis, nineteen were men, and the remainder women. This is rather remarkable as in many more women suffering from phthisis than men are seen in the out-patient rooms of the Brompton Hospital. The age of men was not obtained, but the mean of the other eighteen was thirty-four and one third, whilst that of the eight women was twenty-eight and three fourths. Of the twenty-five cases thirty-four and sixty-three hundredths. This may be regarded as a somewhat high mean as a large proportion of the deaths in phthisis certainly occur between twenty and thirty, but it is quite possible may be due to the fact that there are no cases of congenital heart disease amongst them. As to the history, leaving out of account the case from whom the history was obtained, there was a distinct history of rheumatic fever or rheumatism in like-like cases nearly half. Eighty of these
were men and the other four women. Three men had had two attacks, and likewise one woman.

Another woman had only had rheumatic pains. There was no history of supplicative intrathoracic affection, although it was thought that the pain of the chest which was present in one woman ought to have had a specific origin. The cases where the rheumatic fever had occurred some years before were the ones where the changes in the valves and chambers of the heart were most marked, and I think we may conclude that these cases the valvular disease was present before the pulmonary. In the lungs the lupus conditions were much the same in both sexes, being generally excavation in one or both lungs, as a rule limited to the apices. In eight cases it was localised in the left apex, and in five cases in the right. Other conditions were, scattered fibro-casous ulcers, most marked at one or both apices, fibrosis, and emphysema of the opposite lung. In three cases there was effusion in the pleura, the fluid containing tubercle bacilli in all cases. From what these states it will be seen that in nearly all these cases there was good
reason to suppose that from the conditions found in the lungs, the disease was of a chronic type. This coincides with what may be regarded as the generally accepted opinion as to the course of the lung disease, leaving out of account the cases where congenital heart disease was present.

The most common condition found in the heart was either thickening of the Aortic or Mitral valves or fibrous thickenings in them. Both the Aortic and Mitral valves were affected in ten cases, the latter alone in five. In two men the Mitral valve was dilated, but there was also disease of the Aortic valves. In two other men there was Aortic Incompetence, but here again there were other changes. In another man there was sclerosis and Incompetence of the Aortic valves, but there was also a bicuspid Mitral. In all these three cases there was a distinct history of rheumatism. In two women, Aortic Sclerosis and Incompetence was found, but in one the Mitral valves were also diseased. In only one case, a woman, was there any change in the pulmonary valve, and then
It was debated, but here were also vegetation and perforation of the anhe valves.

In only one case, also a woman, was there distinct stenosis and incompetence of the mitral valves, and this was the one where there was only a history of rheumatic fever.

As to the complications - Tubercular disease of the intestines was present in eleven cases, tubercular ulceration of the trachea, diphtheria in four, tubercular ulceration of the mesenteric glands in five, and of the mediastinal glands in four. In two cases there was pneumatic disease. Of the twenty-five cases, signs of phthisis or admission were present in four.

The five cases of aneurysm of the aorta associated with pulmonary tuberculosis all occurred in men. Their average age was thirty-four and four fifties. There is nothing noted as to the history. The lungs were diseased in four, and in the other case the mediastinal glands beneath the bifurcation of the trachea were enlarged and caseous.

The most frequent conditions in the lungs were fibro-caseous inclusion at one or other apex, or
scattered through the lungs. In two cases the
Amerusian pressed on the Trachea, and in one
on the left Brachium. In one case it perforated
the Esophagus, and in another the Trachea.
The mediastinal glands were affected in two
cases, containing tubercles, tubercules, and
being easior in another. In three of
these cases there were no signs of phthisis
during life, and the other was died whilst
being examined.
Dr. Kidd, referring to the clinical cases
while he mentions in his paper, says, "these
cases show that the diseases, heart disease
and Pulmonary Tuberculosis are not
incompatible," but at the same time he
believes that the importance of the argument
of persons suffering from Congenital
Pulmonary Tendens to contract phthisis
being considered fatal to RoRitanskiy's
explanation has been exaggerated. It then
points out that in these people the lungs
are small and undeveloped, and inadequately
supplied with blood, and the defective
nutrition of the pulmonary tissue must
render it less capable of resisting phthisis.
of the tubercular virus.

I shall try to effect by these extracts which I have quoted from some of the writings on the subject, that there have been great differences of opinion, not only as to the association of heart disease and phthisis in the same individual, but also as to the form which is most frequently met with, and as to the cause of the so-called anaphylaxis. From the evidence I have brought forward we may now conclude that the two diseases not infrequently do occur in the same person. But before going on to discuss the general and kind points, I will give an account of a few cases of heart disease associated with Pulmonary Tuberculosis that I have met with during a few years' attendance at the Beaumont Hospital, as showing the conditions most commonly met with. I have been unable to find an example of congenital disease of the Pulmonary-artery associated with Phthisis.

Case I. Acute Phthisis of Phthisis.

C.H. age 33. First came under Dr. Peele's care in June 1887, complaining of cough, hoarseness
of breath is. There was no history of pulmonary
chronic or scarlet fever. Her father died of
heart disease, and one brother died of rheumatic
arthritis began two or three years ago
with cough, shortness of breath, expectoration, and
occasional hemoptysis (but this only tinged
the sputum), and night sweats.
Patient is a tall, fine woman, whose
general nutrition is good. The chest is well
formed and the movements are good.
Heart—The impulse is increased, diffuse.
The cardiac dullness is increased upwards
and outward. There is a doubtful praecordial
thump. A slight, sharp praecordial rumble
is heard at the apex.
Lungs—At both apexes there is dulness on
percussion, tubular breathing, bronchophony
in the right side at the apex, flaky crepitant
rales are heard, auscultation.
Tubercle Bacilli were found in the sputum.
April 16th 19
Her general health and nutrition
are keeping good. Appetite is rather poor.
says she feels tired easily. Night sweats and
cough are less. The physical signs are
like of central syphilis and small venereal
Case II. Mitral Stenosis and Pulmonary Stenosis.

A.D., age 25, admitted into the hospital March 1st, 1874. One brother dies of phthisis, had entered fever when four years old. No history of bronchitis or rheumatism. Present illness began four years ago, owing to some cause, of unknown etiology. She first complained of cough, shortness of breath, but no expectoration. Two years ago, she had an attack of anemia, and another again last January, when she brought up about a tea cupful of blood. Has been losing flesh for the last four years.

Patient is a thin, anaemic woman, with a narrow chest.

Heart. No increase in the cardiac dulness. The pulse is feeble and irregular. A murmur praepulsorial thrill is felt at the apex, and a rough praepulsorial murmur heard. Both sounds at the base are clear, and the pulmonary second sound is not markedly accentuated. The pulse is small, weak, regular, and easily compressed.

Lungs. On the right foot the percussion note is good, but the breath sounds are weak.
On the left front resonance breathing are normal. Right back resonance poor, weak breath sounds, and at the angle of the scapula a few dry crepitations are heard. Left back resonance are normal.

March 21st. The condition of the heart remains the same. The lungs, moist crepitations are heard on coughing in the upper half of the right chest anteriorly, and in the supra-axillary fossa posteriorly.

April 18th. There is still more impairment of resonance on the right side, and the crepitations are now heard with quiet breathing. The precordial murmur is heard as before.

Case III. Ventral Venous and Phthisis

C. Ht. age 25. Lithographic Printer. Was admitted on March 18th 1887. His father died of Phthisis. Patient had no illness until two years ago with the exception of what he calls Blood poisoning and which he accounts for by drinking much from cows suffering from the foot and mouth disease. No history of Rheumatism.

Present Illness. Two years ago he caught a...
had cold, and has had a cough ever since. Was under Dr. Abelland last summer for cough, night sweats, and shortness of breath. He now complains of these symptoms, and in addition the expectoration of blood tinged sputum. Dyspnoea increases on slightest exertion.

Patient is very thin, slightly built man, and looks ill. The lips are blue. Chest narrow. The left front expands less than the right. Heart. The apical beat is not felt. A praecordial thrill is feeble, and a praecordial murmur heard at the apex. The aortic second sound is rather accentuated, and the pulmonary very slightly. A systolic thrill murmur is heard. The pulse is weak, and easily compressed.

Lungs. On the left side anteriorly percussion gives the cracked-pot sound. The breathing is cavernous, resonant, and pectoriloquy are heard. In the left back there is dullness in the supra-epaunous fossa, cavernous breathing, and pectoriloquy. The breathing at the left base is harsh on the right side, both anteriorly and
posteriorly the breathing is bronchial, but there are no adventitious sounds.

**Case IV. Mitral Insufficiency, Thrusitis**

Y. T., age 26. Came under Dr. P. R. P. Reid in December 1895. Had rheumatic fever (rheumatism) about fourteen years ago.

Present illness began a year ago with cough, expectoration, shortness of breath, loss of flesh, and pain in the side.

Patient in an anaemic, debilitated state, whose general nutrition is poor.

**Heart.** At the apex a mitral systolic murmur was heard.

**Lungs.** There was dulness on percussion at the apex on both sides anteriorly, and on the left side signs of diffuse infiltration with a sibilant rale at the apex. Behind, in the same side, there was dulness, tubular breathing, and some crepitant rales in the supraclavicular fossa. Some crepitations were heard in the left axilla.

(The notes of this case are rather brief, as these were not seen until since December, but Mitral Insufficiency and Thrusitis were diagnosed.)
Case IV. Mitral Insufficiency and Right Atelectasis.

J. M., age 20. Light work. Admitted during March 1879. His complaints of cough and shortness of breath. Father's brother died of phthisis. Had rheumatic fever when 10 years old. Is subject to colds and cough as writer.

Present Illness. Two years ago he began to suffer from shortness of breath following a cold. Then from cough and expectoration. Three years ago he brought up about two tablespoonsful of blood.

Patient is a fairly well nourished man, though he says he has lost weight lately. The chest is barrel shaped, and moves very little with respiration.

Heart. The cardiac dullness cannot be made out on account of emphysema.

At the apex, a mitral systolic murmur is heard which is conducted towards the aortie. Some pulsation in the epiastrum.

Lungs. General hyper-resonance percussion. Breathing: expectoration generally prolonged, being harsh in quality at the right apex, deficient at both bases. Fine respiration...
are heard with inspiration and expiration at the right upper chest, down to the fourth rib, and larger sounds lower down.

Case VII. Aortic Insufficiency (Pulsus Stenosis).

P. S., age 62. Butler, was a sailor for some years. Came under Dr. Acland in March 1890. There is no history of rheumatic fever, though he says he had rheumatism in the right knee some years ago, when at sea. The knee was very swollen. Nonspecific symptoms of pheumonia.

Present illness began in 1895. He was in St. George's Hospital for three weeks before coming to the Brompton Hospital as an out-patient. He then complained of cough, hoarseness, and loss of voice.

He was described as being a tall, thin, anaemic, and distressed looking man. Chest. There was no dullness over the sternal. Marked pulsation in the supra-sternal notch and in the epigastrum. Pupils are unequal, but there was no other sign of aneurism. At the base of the heart in the aortic area, a loud diastolic murmur was heard, being conducted down
the right edge of the sternum. There were signs of enlargement of the left ventricle. The apex beat was displaced downwards and outwards.

No mention of any physical signs in the lungs.

Larynx: The voice is rough. The cords move well, but the right one is slightly thickened posteriorly.

December 1876. In the aortic area a long, rolling, diastolic murmur, with marked rounding of the first sound, is heard. A slight trill is heard. A systolic murmur is also heard, with reduplication of the second sound at the apex. The apex beat is in the ninth space.

A few crepitations were heard at the right apex of the right lung posteriorly.

February 1877. The heart condition is much the same.

Lungs: There is dullness on the right side, more marked anteriorly, with some impairment of resonance at the left apex. Some crepitations were heard at the right apex, with prolongation of expiration.

Larynx: Centralis of the left cord, the processes vocalis is very plump and
April. Heart condition the same.

Lungs. The dullness on the right side and the impairment of resonance on the left side are more marked. There is distinct cavernous breathing at the right apex, prolongation, and a few raucoy crepitations larynx. The mucous membrane over the arytenoids cartilages and of the sub-arytenoid fold is greatly swollen. In account of defective movement of the epiglottis, it is difficult to see the cords, but both are ulcerated posteriorly. The left one more so than the right.

**Case III. Acute Incompetency of Plethysis**

A.P., age 30. The sister dies of plethysis.

His history of rheumatic fever and rheumatism was admitted in January of this year, remaining in hospital for six weeks, the then went to Sandgate returned in April. He complained of cough, expectorates, loss of flesh and appetite.

Patient is a tall, thin, weakly looking man, with a thin and wasted chest.

Heart. There is a diastolic murmur
heard in the aortic area, in the third and fourth spaces to the right of the sternum.

On the left side, anteriorly and posteriorly the percussion note is normal, but the breath sounds are weak at the apex, and a few rales are heard on coughing.

On the left side, anteriorly, the percussion note is unimpaired down to the cardiac area, and firm between the upper border of the second rib and the lower border of the third rib, at about an inch from the mid-sternal line to two and a half inches inward. The breathing is laboured, with well marked pleurisy. Above and below this for a short distance the lungs are less involved. Below, the cavitors' lungs are not so distinct, but fine crepitations are heard in the upper part of the left chest.

I now pass on to discuss the clinical history of these cases of heart disease and pleurisy.

First as to the Pathology. It will be most convenient I think to divide the cases met with into those of congenital heart disease, and to those of non-congenital
heart disease

(a) With regard to the cases of Congenital Heart Disease there can be no doubt that the commonest condition met with is stenosis of the Pulmonary artery. This is often associated with some defect in the interventricular septum or non-closure of the Foramen Ovale, as has been pointed out by Dr. Byron Bramwell, in his book on Diseases of the Heart. It is usually the result of some intra-uterine defect rather developed. Libert pointed out that defective development of the Pulmonary artery may follow defective development of the lungs and in these cases the defect in the lungs leads to unequal distribution of blood, and this being also poor in quality, the nutrition of the lungs suffers in consequence. Capillary hemorrhages are also very frequent, from the great overfilling of the veins. The lesions is said to be the one most often affected (Libert).

The Pulmonary Disease, which consists of disseminated tubercular patches, surrounded by patches of pneumonia, usually
caries at one or other apex with adherent pleura, is of a more progressive type than, in the
non-congenital forms of heart disease.
To the non-congenital forms of heart disease, are mainly those due to disease of the
aortic and mitral valves, with their complications, as hypertrophy, dilatation, i.e. to disease of structures on the left side of the heart. When the aortic valves are
affected the more common condition appears to be for the valves to be thickened or
for them to be covered with granulations. In a certain number of cases one gets distinct
stenosis or incompetence of these valves, with
hypertrophy or dilatation of the left ventricle.
One generally finds a certain amount of
stenosis with the incompetence, but when
they occur separately, incompetence is the
commoner condition.
Mitral disease is much more frequently
met with, and here again the changes found
very, very much. The valves, as in the case
of the aortic, may be thickened or covered
with granulations, or there may be either
distinct stenosis or incompetence. In the
In post-natal cases, to which I have already drawn attention, the latter condition was more common, and he says that of the cases of heart disease and Pulmonary Tuberculosis which he has seen during life, it was most frequently present. Stenosis was present however in sufficient cases to show that it is not so infrequently associated with Pulmonary Tuberculosis as it has been thought to be. In the cases which have been during life, Stenosis has been the more common condition. There is usually hypertrophy or dilatation of the right ventricle.

In the lungs, cavities are usually found, at one or both apices, with fibro-caseous nodules, fibrosis, and emphysema of the opposite lung. Indeed all the evidences of a chronic tubercular process.

Causation: Of the Congenital form, as Pulmonary Stenosis. It is due to an arrest of development during intra-uterine life. Peacock explains it as follows: that within the foetus the circulation in the descending aorta and umbilical arteries is in communication with the Pulmonary artery.
and right ventricle, and hence these parts must be subject to greater variations of pressure than the left ventricle and upper part of the aorta. He also states that in the later life an important factor in the development of aortic valvular disease is the varying pressure in the arterial system, and that if this less similar causes acting on the pulmonary valves during febrile life would not likely be attended with similar changes.

In most of these cases the parents and other children are healthy, as very rarely is there any history of inherited tuberculosis.

Of the non-congenital forms of acute rheumatism or rheumatic fever, is the commonest known cause of endocarditis. Valvular disease is said to occur in about half the cases affected. It is also well known that the mitral valves are more frequently attacked during the disease than the aortic, but when the latter are diseased in a woman there is generally a history of rheumatism.

In mitral stenosis, which is uncommon in women, than men, there is often no
lucky of rheumatic cases. In some of these cases
there is good reason to suppose that the disease
may be congenital. There had been no
rheumatic fever in the two cases of acute
disease, the particulars of which I have
mentioned, nor in the cases of urinary disease;
yet one may obtain a distinct history of
an attack in either.

With regard to hereditary predispositions,
Dr. Todd (p. 272) regards this as rather to
philiasis than to rheumatism. He says
"the parent may have had one disease and
transmit the other." He also regards the
rheumatism as the direct forerunner
of philiasis (p. 273), and says that in
many cases the two affections are associated
in the same individual. We know from
experience that this is so, a phthisical patient
not unfrequently gets an attack of rheumatism
though this is rarely an acute one. Further
in the same he says: "It does not appear that
rheumatic fever leads to tubercle, but the
two temperaments are often seen in the
same person: phthisical patients have
attacks of rheumatism and rheumatic
patients failing into phthisis.

If so, is rarely met with in phthisical
patients, though some writers have described
a certain form of phthisis. And others have held
that the children of such patients are
liable to develop phthisis and that distinct
attacks of phthisis occur in not a few phthisical
patients. At any rate the two diseases
are very rare but in the same individual
amongst hospital patients.

E. Tuberculosis, caused by poor, old age,
Syphilis, and abuse of alcohol, most often
affects the aortic valves; it may extend
to them from the aorta.

D. Strain: is a more common cause of
valvular diseases of middle and late life.
And hence usually occurs in men, and
affects the aortic valve. When it occurs
in youth, the mitral valves are more
often affected.

Symptoms: 1. Of the congenital form.

2. Pulmonary Emphysema, Cyanosis has
been regarded as one of the chief symptoms
of this disease, but it was pointed out by
Stern that it might be absent, and when
It was present. The case was usually a very grave one, in account of the great disturbance of the blood supply, compensation being also absent. If the latter takes place cyanosis may not occur until late in the case, and then only to a very slight extent.

The patient usually complains of great thickness of the pulse, with the ordinary symptoms of miliary cataract intensified by the heart condition. Albuminuria, enlargement of various abdominal organs, dropsy, pleurorrhagia, may take place. In many cases the patient presents an intensely cyanosed appearance, the lips, ear lobes, and nose being in this case almost black. The hand and feet are cold, and the fingers usually clubbed. The pulse is often very prominent. The impulse of the heart may be diffused, but is often indistinguishable. The hairs are discolored. In many cases a thrill can be felt at the base of the heart, usually most intense over the third cartilage. The cardiac dulness is generally increased to the right of the sternum from hyperplasia of the right ventricle. As a rule the systolic
Murmur is heard either near the precordia, at the base of the heart, or along the course of the pulmonary artery. The Second Sound at the base is often loud and ringing. The frequency of the pulse is not as a rule increased, as long as the compensation is maintained, but when that fails, it becomes smaller, quicker, and often irregular.

In addition to these symptoms there are superadded those which are usually associated with progressive pulmonary disease. More or both sides of the chest there may be found signs of infiltration, of softening, or the presence of a cavity in the lungs. Pulmonary haemorrhages are very common in this form of the disease.

2) Of the Non-Confluent forms — (A) of Aortie Valvular Disease. This form of heart disease appears late the one most rarely associated with Pulmonary Tuberculosis, although one Author (Ruddell) has regarded it as the condition most often found with phthisis. When it does occur, it may take the form of either Stenosis or inscrability, yet the many cases as have already pointed out...
The valves may be seriously diseased without there being a murmur present. But as a rule we generally finds unmistakable signs of stenotic disease present, either a systolic murmur at the aortic orifice projected into the vessels of the neck, or a double diastolic murmur extending down the right side of the thorax, with signs of hypertrophy or dilatation of the left ventricle. We may find the Systo-diastolic murmur of double aortic disease. In either condition we usually finds the characteristic pulse.

There are also the symptoms of chronic lung disease, we usually find evidence of the presence of one or more tumors at the apex.

In cases of mitral disease, the patient generally complains of the well known symptoms of either stenosis or incompetence of the mitral valves, and superadded to these those of a slowly progressing pulmonary tuberculosis. In the more severe cases a systolic murmur is heard at the apex of the heart, conducted round into the axilla.
And towards the angle of the scapula. The heart impulse is depressed, and the dullness increases downwards and outwards. In other cases the cardiac dullness is increased, with or without a preapical murmur. A preapical murmur is heard at the apex, often loudest within the nipple line, varying intimately, but often very sharp and short. Haemoptysis is a very common symptom here, and where it is absent the sputum is generally intermixed with blood. In addition no fundi evidence of either infiltration, caseation or fibrosis of the upper part of one or both lungs.

Diagnosis: (i) Of the Congenital form: Here is not as a rule which difficulty in the diagnosis of Pulmonary Phlebothrombus, as in addition to the symptoms already mentioned attended with more or less cyanosis here is a well marked systolic murmur to be heard at the Pulmonary orifice, and marked signs of pulmonary disease. These are usually progressive, and more diffuse than in the non-congenital forms. It is rare for the disease to
remain stationary, and much more rare for its progress to be arrested.
In some cases however, where the lungs are flabby and where compensation has been established, the diagnosis may be difficult. Between here there is usually a systolic murmur heard at the base of the heart, near, if not in the pulmonary area, not conducted along the aorta. With this there has been some cyanosis, dullness, and dyspnea from birth, there can be little doubt as to the disease present.
Other conditions may however give rise to a systolic murmur at the pulmonary orifice, excluding those of anaemia, they are other cases where, owing to previous pulmonary disease, the heart becomes uncovered by retraction of the lung, and the heart when it contracts compresses the pulmonary artery and sets up vibrations in it leading to the production of a murmur. Other cases, are those, where pain and pleurisy, adhesions have formed in the pulmonary artery. With care these conditions can usually be excluded, as in
them we can generally get a history of a previous pleurisy or of lung trouble, with the absence of signs of congenital heart disease. They arise too late in life than the one depending on stenosis of the pulmonary artery.

2. Of the Un. Congenital forms - As to the heart condition, one may have either a systolic or diastolic murmur at the base in the Aortic area, associated with signs of hypertrophy and dilatation of the left ventricle. When this is so it may be considered as due to stenosis and incompetence of the Aortic valves. A murmur louder may result from other conditions, as changes in the lungs due to pre-existing disease causing retraction, or depending on stretching of adhesions which may form between the Pericardium and the Pleura. Those due to the latter are modified by respiration, either becoming in character or ceasing altogether. With these conditions of the heart there are also those of well marked chronic lung disease.

A murmur at the apex will be initial
area may be either Præcisely, Systolic or Diastolic in time. The two sounds two murmurs are the common ones.

A Systolic murmur at the apex, conducted both as into, and accompanied by signs of hypertrophy and dilatation of the right ventricle, persisting, and not due to anaemia, may be regarded as caused by incompetence of the Mitral valve.

And again: A Diastolic systolic murmur at the apex, with a thrill, and attended with signs of hypertrophy and dilatation of the left auricle and right ventricle, may be regarded as due to Stenosis of the Mitral valves orifice.

The Pulmonary signs are those of secondary, limited to one or both auricles, and fibrosis. Haemoptysis most frequently occurs in cases of Mitral Stenosis.

Here are known a certain number of cases where the diagnosis is not at all easy. These are certainly, C. where there are marked signs of heart disease, but the lung condition is doubtful. This must at all be uncommon, as in many cases
The lung condition is not diagnosed before death. The difficulty will be more likely to arise in the chronic cases, where the evidence of lung disease may be very slight, there being perhaps only fibrosis with a small cavity or no at one or both apices. In these cases, for the examination of the sputum may be negative, as the tubercle bacilli are often absent very early in the chronic cases. Hence it is most important to examine the apices of the lungs very carefully, as to movement, flattening, and acraulions in the breath sounds.

(2) Cases where the lung disease is marked, but the heart disease doubtful. He knew that marked disease of the valves may exist without giving rise to a murmur, in some cases even if there be one, and that only a slight one, it may be wasted by the rules, if the lung disease be acute. In these cases, it is therefore all the more important to carefully examine for hypertrophy or dilatation of the valves, or difficulty of closing their resistance, when there is emphysema, may make the diagnosis very
different, and if at the same time there
be no history of Rheumatism or any
of the other known causes of heart disease, it
may be impossible to decide for some time
at any rate.

Prognosis — That of the congenital forms is
as a rule very bad. Many cases die whilst
quite young, but if they live for a few years,
they usually die of about the age of puberty.
Of pulmonary tuberculosis which
rapidly runs its course, and which nothing
does to check. Pulmonary haemorrhages
are very common, and these haemorrhages
further weakening the already exhausted
patient, must further disintegrate the lung.
In some cases where compensation has
occurred, the disease may remain latent
for some time.

Of the non-congenital forms. As far as the
lung condition is concerned it is rather
favorable, as that rarely kills. They usually
die of the heart disease, the already
over-worked heart breaks down under the
greater strain which upon it. In many
cases, more especially in central disease,
as the lung condition passes into a more chronic stage, the general health of the patient improves, though this only lasts for some time.

In central stenosis lungier during to the frequent hemorrhages leading to laceration of the lung, fresh disease must often be started, or to disease lighted up.

Emphysema is said to be antagonistic to phthisis, and when it does occur to be regarded as a favorable sign as leading to delay its progress.

Asthma and chronic bronchitis have both been regarded as antagonistic to phthisis. As to pregnancy, if phthisis be labut, it usually shortens itself after labor, but rarely develops or runs its course during pregnancy. Lactation has a still more unfavorable influence on the progress of the disease.

Having already shown that the two diseases, heart disease, pulmonary tuberculosis are not infrequently met with in the same persons, I propose to consider which form of heart disease is the most frequently met with. It will have been
It is evident that there have been great differences of opinion about this, but leaving out of
account those who deny their occurrence,
I think most are agreed that diseases of
the aortic valves are the rarest. There can
also be no doubt that congenital forms of
heart disease, as pulmonary stenosis are
very frequently associated with pulmonary
stenosis. Coming now to diseases of
the mitral valves—stenosis of incompetence;
whilst I believe the latter is the form most
often recognised, yet I wish to draw attention
to the fact that mitral stenosis is much
more frequently associated with pulmonary
stenosis than it has been considered.
Sagar regarded it as offering an
almost complete bar against the development
of phthisis. It is also remarkable how
frequently granulations are found in the
mitral valves after death, even where there
was no recognisable heart disease present
during life, yet in some of these cases there
must be a certain amount of stenosis.
As to the Cause of the Autopsy, many
objections have been brought against
Rotterdam's explanation, I believe, that it is the best one, though perhaps not holding good to spread an element as he maintained. Dr. Bigel has shown that the chief objection urged by Fagge and others, viz. the presence of pulmonal stenosis with phthisis, against this explanation, is not an insurmountable one, as in these cases, the lungs are poorly developed, and from the irregular distribution of blood, the irritation of the pulmonary tissue suffers, and hence the tubercle bacilli are more likely to gain a resting place. In favor also of this view that passive congestion of the lungs is antagonistic to pulmonary tuberculosis, is the fact that those suffering from emphysema and chronic bronchitis rarely develop phthisis.

I think that the frequency with which Untral stenosis is associated with pulmonary tuberculosis may be explained by the frequency with which repeated haemorrhages occur into the lungs in that disease, from the great overfilling of the air. This must lead to laceration of the lung structure, and hence bring about a condition
more favorable for the action of the Bacillus. In almost half of the cases there appears to be no history of inflammation or ulcerative fever. This is most often the case in Pulmonary Tuberculosis. In regard to this fact it is interesting to observe, as their histories before, how often pseudocarcinomata are found in the Pulmonary and Aortic valves in these cases. In most of them the lung disease is of the chronic type, and probably in some was present before the condition of the heart.

The following are the conclusions above arrived at:

1. That though there is a certain antagonism between the two diseases, heart disease, and Pulmonary Tuberculosis, yet they do occur in the same individual, and that not uncommonly.

2. That of the various diseases of the heart, those which are due to congenital conditions, as Pulmonary Stenosis, are most frequently associated with Pulmonary Tuberculosis, and that of the non-congenital post-infection diseases of the Aortic valves are the rarest, and those of the Pulmonary Insufficiency and
3. That Urtural Stenosis can in no way be regarded as a bar against the development of phthisis, as has been thought by some.
4. That the viscosity produced by these various conditions is the main cause of the antagonism between the two diseases, and that the occurrence of Pulmonary Stenosis and to a less extent Urtural Stenosis may be explained in other furnaces, and need not be an objection to this view.
5. That the lung disease is a very strong brake advancing me (except in the case of Pulmonary Stenosis), and that the heart conditions retard its progress.