F. W. Hope Robson

THESIS

ON

MALIGNANT MEDIASTINAL TUMOURS.

BURSCOUGH BRIDGE,
LANCS.

April 30th, 1900.

Preface.

In the following pages are embodied the records of a series of very interesting cases which I have observed during a residence of nearly three years in the Bradford Royal Infirmary.

During my stay in the infirmary I devoted considerable time to the pathological department where tumours removed in the operating theatre and in the post-mortem room were submitted to me for examination, the growths recorded in the following pages were among their number. The scarcity of literature on growths of this nature led me to believe that the notes of these cases would be of some value.

Having had several cases of malignant disease occurring in the mediastinum brought under my notice within the last few years, and having had the care of a number of these cases, I propose in the following pages to give an account of the clinical history during life, and of the appearances found on post-mortem examination where such examination was made; in the hope that it will help in the earlier diagnosis and clearer appreciation of the conditions which give rise to such various and perplexing symptoms associated with this disease.
The difficulty of arriving at a diagnosis in these cases is generally admitted, and it is only by a careful study of the various symptoms of each individual case that this can be accurately made.
Physical signs are in themselves often mis-leading enabling us to recognise con-ditions which exist as the result of the growth and pressure of the tumour on the important structures situated within the mediastinum; conditions which are however much more frequently present in connection with other diseases.
I have often noticed that the most obvious and troublesome symptoms arising in a case of this nature are

by no means those that would at first sight suggest mediastinal tumour in fact they are apt often to suggest some more common disease.
In three of my cases the patients were admitted into the Infirmary for paralysis in another the skin was dark resembling Addison's disease and in another vomiting and gastric symptoms were alone complained of. After examining some of my cases I have felt undecided whether or not the patient was the subject of two diseases occurring together; in others again the nature of the case was only revealed at the post mortem examination
The possibility of arriving at a diagnosis of mediastinal tumours during life was discredited until a comparatively recent date. I think however it unnecessary to go into the records of early cases as a considerable amount of confusion is evident as to the conditions found.
Dr. Walshe in 1868 published his treatise on diseases of the lungs he collects fifty-eight cases of mediastinal tumour which he classifies under the heads of Scirrhus, Encephaloid, Mixed, haematoid and doubtful and Dr Cockle in his book on intra-thoracic Cancer 1868

adopts this classification but a study of his cases convinces one that many of them were typical cases of what is now generally known as lympho-Sarcoma. More recently many cases of lympho-sarcoma were regarded as cases of Hodgkin's disease occurring in the mediastinal lymphatic glands; but the two diseases are now known to be quite distinct, and such terms as "malignant-lymphoma" are now falling into disuse although many writers continue to describe lympho-sarcoma and lymphadenoma as one and the same variety of new growth. I however prefer to consider a lympho-sarcoma as a true neoplasm, that is a sarcoma originating in connection with lymphoid tissue, distinguishing it from the progressive enlargement of the lymphatic glands in such a disease as Hodgkin's disease which if regarded as a new-growth may be more properly termed lymphadenoma.

Of the varieties of malignant tumours that arise in this region the Sarcomata are the more important and call for special mention being responsible for some of the most interesting cases met with in medical practice; the Carcinomata perhaps more frequently fall within the range of the

surgeon being generally met with in connection with obstruction in the oesophagus Primary carcinoma except in relation with the oesophagus is I believe rare in this situation.

Varieties of Sarcoma:-

By far the most common variety of sarcoma occurring in the mediastinum is that known as the Lympho-sarcoma. originating as it does in the mediastinal lymphatic glands it retains a structure somewhat similar, consisting of lymphoid tissue containing small round and spindle cells with a fine intercellular reticulum and numerous thin walled blood vessels running throughout the tumour. The sarcomatous elements may be composed entirely of round cells or spindle cells or they may be mixed in either case the lymph glands form their seat of origin; these enlarge and coalesce so that their original outline is entirely lost.

* Some writers describe these tumours as small round celled sarcomata but in many cases that I have examined I have found both round and spindle cells present. and on examining secondary deposits from these growths the same arrangement was

* Bland Sutton on Tumours.

found to obtain.

These tumours grow to an enormous size filling up the mediastinum and invading neighbouring organs; they form large white masses which may come to weigh several pounds, they are soft on section and exude a creamy juice; the surface is often mottled with points of haemorrhage. In places they may be found broken down forming cavities similar to abscess cavities which contain brown pus like material.

From its original focus it spreads in all directions, commonly outwards along the bronchi to the lungs, the entire lobe of which may be converted into a solid mass of growth. It extends upwards into the neck and may at times be found appearing above the clavicles; backwards to the spine filling the mediastinum with a mass of new growth.

Its method of growth is interesting and instructive extending along the paths of least resistance it moulds itself to the tubular and vascular structures situated within the chest, in the first case recorded the aorta was found surrounded and lying in a tunnel of growth the vessel wall was however unaffected the growth being easily separated from the coat of the artery. Arteries may of course be compressed by

the tumour but the walls are rarely ulcerated into.

The veins suffer more than the arteries their thin walls being unable to withstand the effects of pressure to the same degree, and it may happen that the sudden onset of oedema may be the first indication of disease

The bronchi are also frequently found surrounded and embedded in a mass of new growth, the action of the growth on their walls being peculiarly destructive.

This may in part be due to the fact that as a rule a considerable mass of growth is found situated at the roots of the lungs and the walls of these structures may be subjected to more prolonged irritation.

The bronchial walls may be quite disintegrated nothing being left but a narrowed channel running through the tumour.

As can easily be understood the condition of the bronchi will often determine the nature of the physical signs present in any particular case.

The result of pressure on nerves may be noticed in alterations in the voice, paralysis of the vocal cords, inequality of the pupils and pain; but I am inclined to think that vomiting and gastric disturbance may often be attributed to interference with

the nerve trunks and plexuses situated within the thorax.

In two of my cases paralysis of the lower extremities resulted from direct pressure on the spinal cord.

This form of sarcoma is very liable to form secondary deposits and these may be found in any situation and must be looked for in any suspected case as they often form an important guide to diagnosis. When first a case comes under notice the lymphatic glands above the clavicle or in the axillae may be found enlarged and tender.

The liver frequently is the seat of metastatic deposit but as a rule this only becomes manifest towards the later stages of the disease; when the irregular surface of the liver may be felt through the abdominal parietes.

The kidneys, spleen, pancreas have all been found to contain deposits although not so frequently. The lungs are as a rule involved by extension of the growth from the mediastinal lymph glands

The course of the disease is exceedingly rapid and the manner in which fresh symptoms make their appearance is very striking acute pleurisy and acute pericarditis may

come on quite suddenly as the result of the extension of the growth to these membranes and may be of some help in establishing a diagnosis.

The disease is usually fatal in a few months in the cases recorded it ranged from three to nine months from the onset of the initial symptoms. Nothing is as yet known as to its causation, heredity appears to play no part. In two of my cases an injury was sustained shortly before the onset of the disease, but I think it is very doubtful if this can in any way be laid down as a factor in the causation.

Sarcomata may also arise in connection with the sub-pleural connective tissue sarcomata of this nature are rare and are found in children. I have never met a case of this nature a case of the * kind was reported by Dr Thompson in the Glasgow Medical Journal. the tumour occurred in the anterior mediastinum of a child 10 years of age the mass was heart shaped weighed 3 lbs 5 ozs and measured 7½ inches in its greatest length and 5-½ inches in its greatest width within the thorax it occupied very much

* Glasgow Medical Journal. vol XXX 1888 page 483.

the position of the heart, but projected considerably towards the left side. The left lung was greatly collapsed, and the heart and vessels were carried over to the right side, so that during life the greatest impulse was felt below the right nipple. The signs closely simulated those of extensive pleuritic effusion on the left side; and on tapping a small quantity of serous fluid was removed, but without causing any appreciable change in the signs. Throughout the case the tubular breath sounds were very distinctly heard over the whole of the left back, which was dull to percussion but only very feebly over the situation of the tumour in front.

A glandular tumour of the mediastenum was diagnosed

Microscopic Examination showed the tumour to be composed of small spindle-celled sarcomatous tissue, combined with a large amount of very dense fibrous connective tissue.

Dr. Joseph Coats said that as the tumour was entirely covered with pleura being perfectly smooth on the surface, he thought that it must have originated either in an organ lying free in the pleura or in

else behind the pleura. In the former case there would probably have been such pressure on the trachea and roots of the lungs as to have led to definite symptoms he was therefore more inclined to regard it as originating in the subpleural tissue. He was reminded of a case of retro-peritoneal tumour which had occurred to him many years ago, the tumour was a very large one and consisted of small spindle cells similar to those in this case Such retro-peritoneal tumours are not very rare but a subpleural one is apparently very uncommon.

A case that may possibly have had a similar origin was reported by Dr Angel Money in the British Medical Journal. The case was that of a sarcoma in an infant age fifteen months growing from the posterior mediastenium it was the size of a mans fist and projected into the right side of the thorax, it extended from the fifth dorsal vertebra down to the diaphram it was one fourth the size of the thoracic cavity and caused extensive collapse of the lungs; it pushed the heart, aorta, and vena cava in front of it and displaced the liver downwards, it did not.

* British Medical Journal November 1868. page 1046.

grow from the vertebrae, and the spinal column was not eroded.
During life the symptoms resembled those found in extensive collapse of the lungs. The physical signs were extensive dulness of the right lower half of the chest, with absence of breath sounds, elsewhere bronchial râles obtained.
An exploring needle thrust into the dull area felt as if held in a dense solid tissue, no fluid could be withdrawn.
Microscopic examination proved the tumour to be a round celled Sarcoma without any non striped muscular fibre.
With regard to the microscopical appearances of this case I would like to point out that it is often an extremely difficult matter to find non-striped muscle fibres, and may require repeated examinations of various portions of the tumour. I remember a case of Sarcoma of the kidney in a child in which these fibres were only to be found in a very limited portion of the tumour, and although afterwards I made several sections of the tumour for this express purpose I was not successful.
Sarcomata occasionally arise in connection with the thymus gland. I have recorded a case which I believe to be of this

Nature. The microscopic appearances of this case were apparently somewhat similar to those recorded by Dr Thompson.
These tumours have rarely been recorded and must be very seldom met with.
Melanotic Sarcoma: Melanotic sarcoma may originate as a primary growth in connection with the mediastinal lymph glands, and I have recorded an interesting case which may have originated in this way.
Melanatic sarcomata arise especially from structures in which pigment naturally exists, namely the skin and choroid coat of the eye. Primary melanotic sarcomata arising in the lymphatic glands and in the liver have also been noticed
It is one of the most malignant of all forms of sarcomata and may be propagated by both the vascular and lymphatic system
This form of sarcoma will be much more frequently found as a metastatic deposit in the lungs than as a primary growth in the mediastinum
In the case recorded the course of the disease was decidedly more prolonged than that of the lympho-sarcomata.

Secondary Sarcomata :-

Secondary Sarcomata are frequently found in the lungs, but from the present standpoint they are Comparatively unimportant; it is therefore unnecessary that they should be discussed at any length. Secondary Sarcomata of the mediastinum are much less frequent than similar tumours in the lungs, the lungs in most fatal cases of Sarcomata will probably be found to contain deposit, it is however more with the obscure symptoms that arise in connection with the primary tumours with which we have to deal in this essay.

Secondary Sarcomata Microscopically will be found to reproduce the characters of the primary growth and may therefore contain, osseous and Cartilaginous elements in their substance

From what has been written it will be seen that I regard the mediastinal lymph glands as the structures most likely to be the starting point of Sarcomatous disease within the thorax and that their Extension is usually through the lymphatics, this opinion is perhaps

somewhat at variance to that generally held as to the prefernce of Sarcomata to extend through the blood stream. This may be so generally but it is certainly not the case in the Mediastinum, and although no lymphatic vessels have been demonstrated to exist in Sarcomata, the extension of the growth here is mainly by the lymphatics, as is shown by the fact that the lymph glands above the Clavicles and in the axillae may often be found infiltrated early in a case.

Sarcomata so far as I am aware do not show the same prefernce for lymph glands in other situations, and as a cause for this preference I would suggest with considerable reserve, the prolonged irritation which these glands are subjected to as the result of particles of dust and soot. often in healthy, long lived individuals after death, the lymphatic glands of the mediastinum may be found quite black, and it is well known that carcinoma may arise in Chimney Sweeps as the result of the irritation of soot.

* Erichsen says perhaps the most marked instance is that of Cancer of the Scrotum

* Erichsen's Surgery Vol I page 1054.

in chimney sweeps, developed by the irritation of the soot lodged in the rugae of the part.

Butlin brings forward three reasons for believing that in this case the soot itself is really the determining cause of the tumour.

Firstly:- That in two recorded cases cancer had occurred on the hands in persons habitually handling soot.

Secondly:- that other equally dirty trades do not cause it

Thirdly:- that a warty condition of the skin is often met with in parts with which the soot comes in contact.

Workers in crude tar and paraffin also show some liability to the same disease.

I now propose to give an account of some cases of sarcoma of the mediastinum which have come under my notice during a residence of some years in the Bradford Royal Infirmary. The symptoms and physical signs are recorded as they were found on admission and during the stay in hospital and it will be seen that they generally represent what one would have expected to be present from the condition of the parts found post-mortem.

Case 1

Lympho-Sarcoma of the Mediastinum involving the Right Lung in which the Aorta was found surrounded by new growth.

George Colley age 64 years
Patient was admitted into the Bradford Royal Infirmary on March 27th 1898 with the following history. He had been ill for four months previously, before which time except for an accident two years ago he had enjoyed good health.
Four months ago he first noticed that his face was swollen, then swelling appeared in his left arm he was troubled also at times with shortness of breath and cough.
On two occasions he had had a slight haemoptysis but this had never been very severe and soon ceased.
Two months ago he first noticed that he had some difficulty in swallowing solid food but the attempt was unaccompanied by pain.
On admission he showed considerable dyspnoea and cough. The face was greatly swollen so that he could hardly see out of his eyes; there was oedema over the sternum and the veins here

were found distended
The patient seemed poorly pulse 114 per min
respirations 48 per min and laboured
he however prefered to lie flat in bed
An enlarged lymphatic gland could be
felt in each axilla which was tender
when manipulated; but with this
exception he experienced no pain.
Examination of chest:- Percussion over the
manubrium sterni showed marked dulness
but below this the percussion note was
resonant.
The movements of the chest was laboured
on account of the dyspnoea. Anteriorly the
apices of both lungs showed impaired
resonance on percussion, and on auscultation
in these areas the breath sounds were
feeble and distant until the lower lobes
were reached when the vesicular murmur
was well heard.
Posteriorly on the right side the percussion
note was dull from the apex to the angle
of the scapula, and the breathing was
feeble, distant, and bronchial; no
crepitations were heard at the apex;
at the base the note was resonant but
the breath sounds were not well heard.
On the left side the note was
impaired at the apex and the

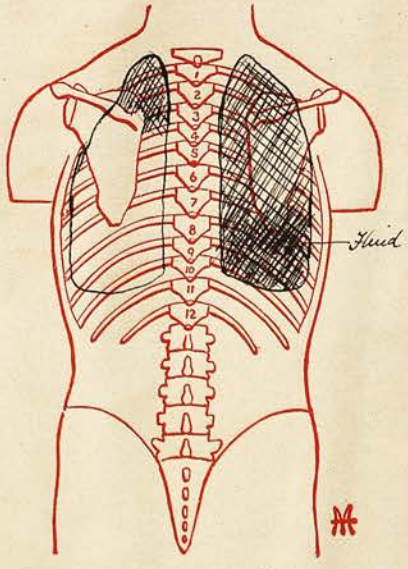
breathing bronchial, below the spine of the scapula the breathing was natural.

The heart was normal; the left pulse was a trifle weaker than the right.

Abdomen:- The epigastric veins were found distended otherwise the abdomen showed nothing abnormal.

The patient got rapidly worse and sank into a semi-comatose condition rambling day and night; he was difficult to manage, constantly trying to get out of bed.

On april 2nd signs of fluid were evident at the right base so that the right side was now quite dull. The left base remained clear.



The shaded parts denote the areas of dullness on April 2nd

Marked cyanosis was noticed about the ears and lips. Both arms were oedematous but no oedema occurred in the lower extremeties.

The glands referred to as existing in the axilla were now decidedly larger.

The patient continued to get weaker and died on April 18th after an illness of five months.

Post Mortem. April 19th 1898.

Body Spare, oedema of both arms.

On opening the chest a slight effusion of yellow serum was found in the left pleural cavity, considerable effusion of serum on the right side

The mediastinum was occupied by a large mass of new growth, most of it lying between the aorta and trachea; one portion of the growth was found lying in front of the arch of the aorta. The aorta therefore passed through a tunnel of growth corresponding to the point of origin of the carotid and innominate arteries.

The growth was not firmly adherent to the aorta and could be easily dissected from the wall of the vessel.

The growth extended outwards on each side of the sternum and was.

adherent to the pleura at the right apex.

The growth on section was firm with some mottling on the cut surface from haemorrhage. The right lung was somewhat collapsed a large mass of growth occupied the base of the organ but did not reach the pleural surface, the apex was free from invasion.

No extension of growth occurred into the left lung.

Heart normal; no atheroma of the aorta the mucous membrane being smooth and healthy. The other organs were free from disease with the exception of the thyroid gland which contained a few cysts containing cretaceous matter.

Microscopic examination of the tumour showed it to be composed of a delicate stroma containing numerous round and spindle cells.

The clinical symptoms in this case were I think fully borne out by the post-mortem appearances and accounted for the following points of interest noted when the case was taken.

1/ Dulness to percussion over the manubrium.
2/ Inequality of the radial pulses
3/ Oedema of the head, neck and arms owing to the close proximity to the superior-vena-cava of the mass of growth found surrounding the aorta.

Of very great interest is the manner in which the growth moulded itself to the arch of the aorta without in any way eroding the coat of the vessel. This feature of the growth is quite different to that of a carcinoma which ulcerates into those structures in its immediate neighbour-hood.

Haemoptysis although present prior to admission in this case does not appear to be a very frequent accompaniment of mediastinal sarcoma.

The lymphatic glands in sarcomatous disease coalesce to form a large mass at once distinguishing it from lymph-adenoma in which they remain discrete

Case II

Lympho-Sarcoma causing constriction of the Oesophagus occurring six weeks after an injury

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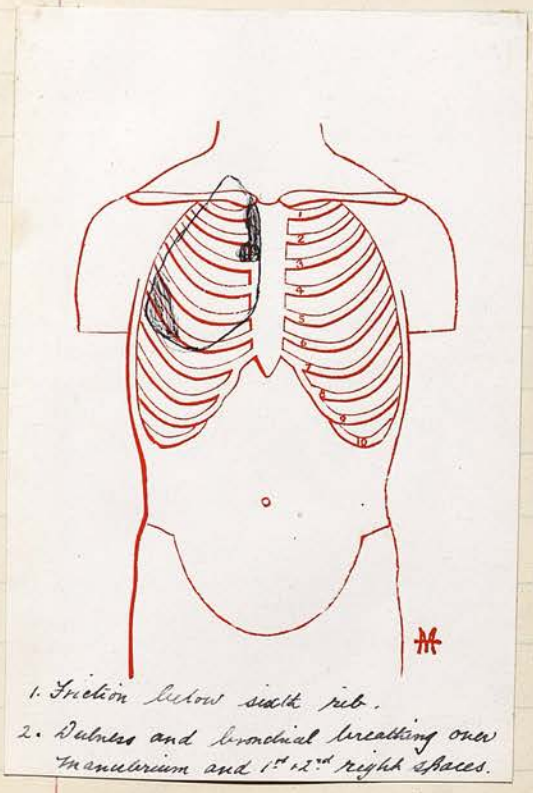
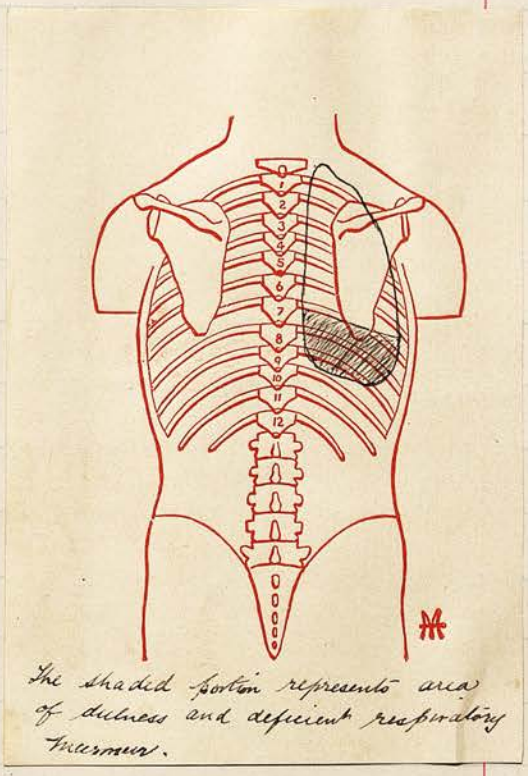
Jane Wilkinson age 53 years.
Admitted into the Bradford Royal Infirmary April 17th 1898.
At Christmas 1897 patient had an attack of influenza associated with pain on the right side ? Pleurisy this pain continued at intervals and she lost flesh.
Patient had an attack of rheumatic fever when 16 years of age.
Six weeks previous to admission she had a fall and struck the epigastrium with a stone which was lying on a heap of earth, she had severe pain in the epigastrium after the injury, and this pain has continued up to the present time. The pain is unaffected by breathing or on taking food, but if she should happen to stoop it is very severe.
A few days before her admittance into the Infirmary she began to reject all food which was on one occasion noticed to be mixed with a little blood.
The vomiting was unaccompanied by pain; since the onset of the vomiting she has wasted rapidly

Present Condition: Patient now complains of pain in the epigastrium with inability to swallow solid food. She is wasted and weak and has a cough which becomes troublesome if she attempts to lie on the right side.
Extreme tenderness is complained of in the epigastrium, the tongue is dry and furred and the patient pyrexial temperature 101° F.
The abdomen on examination was flat no enlargment of the liver could be made out, and the stomach showed no signs of dilatation
Examination of the chest. The right side of the chest showed impaired movment on account of pain resulting from pleurisy. Pleuritic friction was distinctly audible below the sixth rib anteriorly; posteriorly the percussion note was impaired at the base and the respiratory murmur was almost absent. below the angle of the scapula, above this point the breathing was vesicular.
The left lung was apparently healthy
Mediastinum:- The front of the chest showed a few dilated veins but no oedema was present over the sternum The percussion note over the manubrium sterni was distinctly impaired and

this was also noted in the first and second spaces close to the sternum on the right side. Loud bronchial breathing was heard over the manubrium
No thoracic pulsation or tenderness could be made out.



1. Friction below sixth rib.
2. Dulness and bronchial breathing over manubrium and 1st & 2nd right spaces.



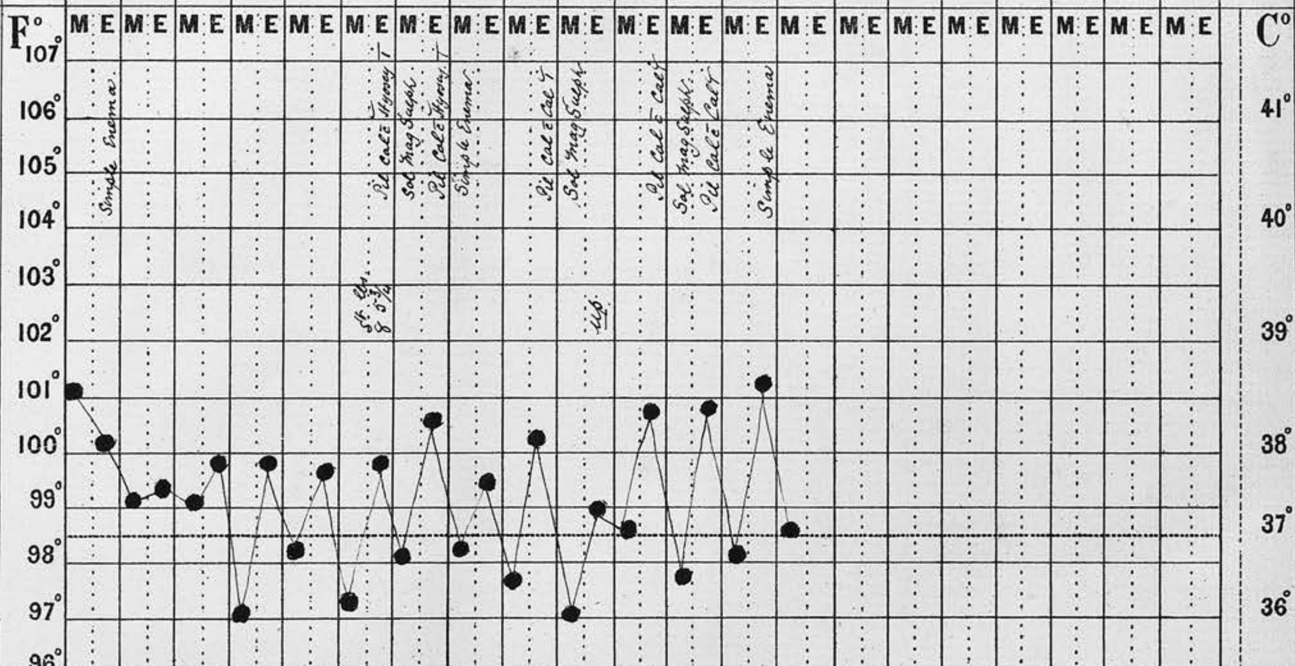
The shaded portion represents area of dulness and deficient respiratory murmur.

The pulses were equal as were also the pupils. Optic discs healthy.
The most troublesome condition present was vomiting which occurred a few seconds after taking food. Milk was returned almost unchanged, mixed with a little mucous, but not curdled.
As it was found impossible to get any food into the stomach rectal feeding

was resorted to.
On april 21st patient managed to swallow some bread and milk but complained of it sticking in the throat. A bougie was passed and was stopped 11¼ inches down the Oesophagus.

No	MONTH	April. 1898.
	DAY OF MONTH	17. 18 19 20 21 22 23 24 25. 26 27 28 29 30.
	DAY OF DISEASE	

NAME Jane Wilkinson
AGE 53 years.
DISEASE Mediastinal New Growth.



	17	18	19	20	21	22	23	24	25	26	27	28	29	30
PULSE M	114.			100.			122			110.				
PULSE E														
RESPIRATION M	26.			32			30.			28.				
RESPIRATION E														
VOMIT	v						v	v v						
AMOUNT OF URINE	×	×	6+	7+	29	20+	8+	22+	25	18+	20	14+	12+	
MOTIONS	/ 1	2 / 2	2 / 1	2 / 1	0 / 0	0 / 0	0 / 0	1 / 0	0 / 0	0 / 1	0 / 0	0 / 0	2 / 0	2.
MEMORANDA	Rectal feeding. Peptonised milk 3oz	Beef Tea. 3i Egg. ½.	4 hourly. Brandy 3ii	ʒi Enema.	Omit rectal feeding.		Porridge			got up.				went home.

These Charts are now kept in stock by Messrs. Lowe Brothers, 157, High Holborn, London, W.C., and will be supplied to Affiliated Homes or Queen's Nurses at the rate of 100 for 2/9, 200 for 5/-, 500 for 11/3. delivered free on receipt of a Postal Order for the amount accompanying order.

The pain in the epigastrium continued very severe and some resistance on palpation was noticed in this region.

The patient continued to get worse and went home on april 30th.

The post mortem examination was conducted at the patients home on May 24th.

Jane Wilkinson date of Post mortem May 24th 1898.

The body was found to be extremely wasted. On opening the chest a mass of new growth could be at once felt filling the mediastinum and invading the root of the right lung.

The growth extended upwards behind the manubrium on the right side, a considerable mass of growth was situated behind the second right costal cartilage.

No fluid was found in the right pleural sac, the lung was however found to be firmly adherent to the chest wall, and the lower lobe was converted into a solid mass of growth which had extended from the root outwards.

The main bronchus was completely enveloped in growth its walls being disintegrated on opening up the tube it was found to be full of a brown pus like material.

The left lung was slightly adherent but otherwise healthy. The heart was unvalued and the values competent.
The oesophagus was found to be obstructed for two inches and would only admit a fine cone of half an inch diameter
The right wall for two inches was invaded by the growth which appeared to be extending from without, for on opening the tube the bulk of the growth was found to be submucous.
The mucous membrane was ulcerated at one point only. The left half of the oesophagus was free from growth.
Abdomen:- The stomach was empty and small it contained no growth; a gland the size of a walnut was found at the cardiac extremity of the stomach.
The uterus was globular the size of a cricket ball and contained a firm tumour in its wall.
Microscopically the tumour proved to be a small round celled sarcoma.
The uterine tumour was an ordinary uterine fibroid

The persistant Epigastric pain noted in this case was probably due to the presence of the enlarged gland

found at the cardiac end of the stomach at the post-mortem.

I would also draw attention to the destructive action of the growth on the bronchial wall.

The case also illustrates the manner in which the oesophagus may be obstructed by the pressure of a sarcoma from without.

Case III Lympho Sarcoma of the Mediastinum in which effusion occurred in both Pleural Cavities

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Spring Wright age 28 years
admitted into the Bradford Royal Infirmary
July 19th 1897.
Patient was quite well until five weeks ago when he was reading stones in a field, his master came to him and asked him if he had been fighting. He told him that his eyes were puffed up, and he felt himself as if his eyes were swollen. The swelling got a little worse during the next day but improved again during the course of a week and has since varied in intensity. He found also that his neck was swollen so that he could not button his shirt at the neck.
The swelling was always worse in the morning, sometimes he could hardly see out of his eyes No swelling occurred in the arms.
Patient is a strongly built man sits up in bed, cannot lie down at all. Veins of the forehead distended, face flushed neck very swollen, ears are dusky and the eyelids full. No oedema of the chest or arms.

He has been troubled with a cough for a fortnight and complains of a dull aching pain under the sternum
Enlarged lymphatic glands can be felt above both clavicles and in the axillae
Urine:- Acid spg 1031 No albumen no sugar.
Examination of chest:- The veins at the rib margins on the right side were found distended. The lungs expanded equally on the two sides
The sternum was tender on percussion and the note was impaired
The right lung anteriorly showed impaired percussion resonance and feeble breath sounds below the third rib; posteriorly there was absolute dulness from the spine of the scapula, with diminished vocal fremitus and distant bronchial breathing.
The left lung showed some impaired resonance at the base posteriorly and the breath sounds were weak. At the apex the vesicular murmur was well heard.
Heart:- No valvular trouble was present the pulses were equal, no tracheal tugging or abnormal pulsations.
Pupils equal, vocal cords unaffected
Examination of other organs negative.
On July 29th the patients condition was unchanged the chest on the right side

was aspirated and two pints of clear fluid withdrawn; after the removal of the fluid the left side of the chest measured 17½ inches and the right side 18½ inches; the percussion note on the right side continued impaired after the removal of the fluid.

August 18th The right side of the chest was again full of fluid, at this time the patient complained a good deal of haemorrhoids but was otherwise in much the same condition; the swelling of the face and neck were however not so marked

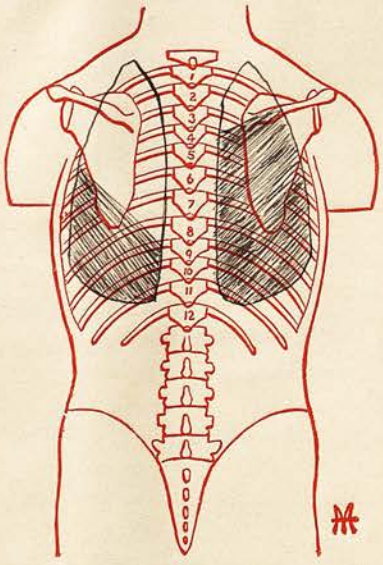
On September 2nd the fluid was again removed from the right pleural sac 26 ozs being withdrawn. The fluid continued clear and free from blood.

The note on September 8th reads as follows. Patient loosing weight progressively when in bed he breaths in a wheezy manner and generally prefers to lie on his face.

Examination of the right lung shows continued presence of fluid and physical signs as before noted.

The left lung was now quite dull below the middle of the scapula, with absence of vocal fremitus and breath sounds.

above the middle of the scapula the breath sounds were harsh. Fluid was therefore certainly present at the left base also.



The shaded portions correspond to the dull areas.

The patient went home on September 9th and was visited from the Dispensary.
I saw the patient on several occasions at his home. On November 20th on account of the urgent dyspnoea present the right chest was again aspirated two pints of fluid being withdrawn.
The liver was now found to be decidedly enlarged and the surface irregular, some ascites was present.
If the patient sat with the legs over the end of the bed the ankles began to swell.

his general condition being distressing in the extreme.

In the middle of December the right side of the chest was again quite full of fluid the oedema had become general the legs and thighs were enormous, and the abdomen contained a considerable amount of ascites. The skin was somewhat jaundiced and he complained latterly of haemorrhoids, his condition was such as to make it certain that he would not live long. He died on January 5th.

A limited post mortem was made on January 6th

The body showed general oedema the abdomen was distended from the presence of ascites.

Thorax: The right pleural cavity was full of fluid, also a considerable quantity of fluid was present on the left side. The fluid was clear yellow serum and contained no blood.

The mediastinum was occupied by a huge mass of growth which extended outwards towards the root of the right lung and upwards and to the left being in close relationship to the pericardium.

The lower lobe of the right lung was

occupied by a mass of growth which had extended outwards from the root.
The left lung showed a smaller mass of growth situated also in the lower lobe.
The liver was greatly enlarged and contained several nodules of growth, the largest being about the size of an orange. Some of the nodules projected from the surface of the liver corresponding to the right lobe of the organ.
The other organs were not examined.

The mode of onset in this case was very suggestive of venous obstruction as the result of a growth.
When fluid accumulates in the chest in cases of malignant disease it should I think certainly be evacuated, as considerable temporary relief can by this means be rendered, although its reaccumulation is often very rapid. The fluid in cases of malignant disease will I believe be found clear and free from blood unless the pleura is itself the seat of malignant deposit.
Microscopically the tumour proved to be a round celled Sarcoma.

Case IV Lympho Sarcoma of the Mediastinum which Ulcerated into the pericardium

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Luke Sharpe age 34 years. admitted May 28th 1898

The patient was brought into the Infirmary moribund and died almost immediately owing to his condition no physical examination could be made.

He had been ill for about three months one month prior to admission he had attended as an out-patient

Post. Mortem May 29th 1898.

The Examination was limited to the Chest. Body thin and washed; marked post-mortem lividity.

On opening the thorax a large quantity of blood stained fluid escaped from the upper and posterior part of the left pleural cavity. The pericardium contained about four ounces of similar blood stained fluid The heart walls were thin, but the valves were found competent and free from disease.

The posterior surface of the pericardium showed several masses of growth projecting on its surface, one of these had broken down into the pericardial sac, forming an ulcer from which no doubt the blood stained fluid had

arisen. The mediastinum was quite full of growth extending to the spine posteriorly; a large mass of growth was found lying in close relationship to the oesophagus which was pressed upon by the tumour On section the mass was soft and exuded a creamy juice; in the mediastinum the tumour was three to four inches in thickness. The growth of the mediastinum spread from the root of the lef lung outwards along the interlobular septa with finger like processes which invaded the lower lobe. The upper lobe of the left lung was free from growth.
The lung tissue was in a state of necrosis in the lower lobe between the processes of growth, it was friable and of a blue-black colour. In the upper lobe it was blackish-grey and airless exuding a brownish fluid on pressure, it was however free from smell.
The root of the left lung was embedded in growth, the pulmonary vein being narrowed and the walls of the left bronchus disintegrated and broken down
The right lung was free from growth.

Microscopic Examination of the tumour showed it to be composed of small

round and spindle cells with a delicate fibrous stroma and presented all the typical appearances of what is usually described as lympho-sarcoma.

This case must have run a very rapid course as the patient was able to attend as an out-patient a month before his death

The rapidly fatal termination in this case was evidently due to infiltration and subsequent ulceration into the pericardial sac.

The necrotic condition of the left lung was probably the result of compression at the root of the lung. The destructive effect of these growths on the walls of the bronchi may again be noted.

Case V. Lympho-Sarcoma of the Mediastinum with extensive infiltration of the right Lung.

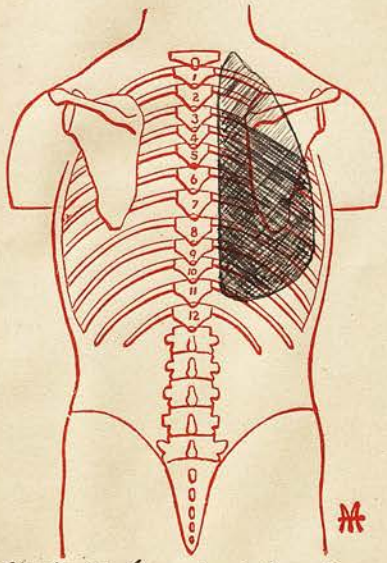
Mary Ann Prior age 56 years.
admitted into the Bradford Royal Infirmary October 12th 1898.
Patient had been ill for six months suffering from cough and shortness of breath. In July last she attended as an out-patient when she was found to be suffering from emphysema and oedema around the ankles.
Six weeks before admission she complained of pain between the shoulders of a dull aching character which became much worse when bending backwards.
For the last three weeks she has been obliged to remain in bed as when moving about she experienced considerable difficulty in breathing, when in bed the breathing was much easier when sitting upright. She says she has lost about a stone in weight, her appetite is failing and although she has no difficulty in swallowing her throat feels dry, she also complains of some pain at the root of the neck.
Her general health up to the present

illness has been good, she has never been troubled with winter cough and always been strong and able to follow her employment.

Present Condition:- Patient is very wasted and has a weak, cachectic appearance mucous membranes anaemic, some oedema around the ankles.

Great difficulty in breathing is complained of and she requires to lie propped up in bed and even when in this position the breathing is laboured and noisy, a sense of suffocation is experienced if she should lie flat in bed.

Examination of the Chest. The right side of the Chest is absolutely dull from apex to base posteriorly



Lower 2/3 of right lung dull to percussion absence of vocal fremitus + breath sounds. Upper 1/3 dull but faint wheeze heard.

The movement of the right side of the chest is very deficient. Vocal fremitus is absent over the lower 2/3 of the lung over the upper 1/3 it was indistinctly felt.
The vesicular murmur was absent a faint wheeze could be heard over the upper 1/3 of the lung posteriorly. The breath sounds in the axillary region were replaced in a similar manner a faint distant wheeze being alone audible.
Anteriorly the percussion note was decidedly impaired but alone the 4th rib breath sounds could be indistinctly heard.
The left lung was apparently healthy
Heart normal, a needle was inserted into the right side of the chest but no fluid could be withdrawn. "Solid mass."
The patient was troubled by a hard cough accompanied by frothy expectoration.
Pupils and pulses Equal no local oedema.
Urine acid 1009 trace of albumin no sugar.
The patient died on October 18th six days after admission.

Post mortem October 19th 1898.
Body emaciated, post-mortem rigidity well marked.

Thorax:- On opening the chest, the right lung was found firmly adherent to the chest wall. No fluid was present in the right pleural sac.
The mediastinum contained a large mass of growth which extended to and surrounded the root of the right lung. The right bronchus and pulmonary vein were partially occluded.
The right lung was nearly a solid mass of growth, processes from the growth at the root extended nearly to the apex of the lung; the lower lobe was occupied by growth which was in a process of disintegration and had in places completely broken down forming cavities similar to abscess cavities
The left lung was healthy. The trachea at its point of bifurcation was found surrounded by growth. The heart was healthy. The oesophagus was free from growth. The other organs were Examined with a negative result.
Microscopic Examination of the tumour proved it to be a small round celled Sarcoma. whose appearances were similar to those already described in former cases.

The value of an explaratory puncture was well borne out by this case the physical signs present might well have been interpreted as those of pleurisy with effusion, and in this case no doubt it aided materially in the diagnosis

I have never seen harm result from the introduction of a clean needle into the chest even on repeated occasions.

Case VI. Lympho-Sarcoma of the Mediastinum ulcerating into the Spinal canal and causing paralysis of the lower extremeties.

Hubert Shackleton age 23 years Coachouseman.
Patient was admitted to the Bradford Infirmary on March 29th 1898 with the following history. Nine weeks ago he complained of pain in the side which was very severe and of a shooting character, so much so that he was obliged to remain in bed, the pain lasted only a few days and then improved but returned every now and then.
He has not been well since this time; as a rule he could walk about in his room but often on account of the pain he was quite helpless.
Until four days ago he could walk about the house but at this time he complained of aching pains in the loins and weakness of the legs. He was also troubled with headache, and was unable to obtain sleep at night; the bowels were confined and the appetite failing.
The patient is the youngest of five Mother still living, father died of Chronic bronchitis; No history of phthisis in the family.

After admission to the infirmary he appeared to become much weaker and never attempted to help himself. He could only be made to sit up in bed after great difficulty. He complained of severe pain in the back and said that his legs were stiff.

On examining the back no tenderness could be made out on percussion, and the spine appeared to be natural in every way. The legs likewise except for some weakness appeared to be natural; he said that he was unable to lift the legs from the bed, but with very little assistance from the hands placed under the thighs he was able to do so. Sensibility to touch and pain were present everywhere and no hyperaesthetic areas could be made out, so that it appeared as if he did not try to move the legs.

Lungs:- At the right apex the percussion note was impaired as low as the third rib, and the air entry was diminished anteriorly; the breath sounds being indistinctly made out. Posteriorly the same signs were noted at the apex. Over the remainder of the right lung the breathing was harsh. No crepitations

could be heard over the right lung.
The left lung was resonant to percussion and on auscultation the vesicula murmur was quite distinct.
Percussion over the manubrium sterni showed marked dulness as compared with other parts of the sternum and on heavy percussion the patient complained of pain.
The urine was acid specific gravity 1020 and contained no abnormal constituents.
On April 2nd the patient was decidedly worse and the condition of the legs was noted as follows. The patellar reflexes somewhat exaggerated, ankle clonus present on both sides, plantar cremasteric and abdominal reflexes absent.
The muscles reacted to Faradism and the grip was powerful, Mental condition sound, no affection of the Cranial nerves.
Heart beats 120 per min Apex in 5th inter-space inside the nipple line. On auscultation a slight roughness precedes the first sound at the apex.
April 4th Patient had incontinence of urine and on examination it was found that the legs had become anaesthetic to touch and also to pain; the knee jerks ankle

clonus, and plantar reflexes had disappeared and in addition there was complete motor paralysis of the lower extremeties. Sensation had disappeared from just below the Ziphisternum, No hyperaesthetic zone was complained of.

The same evening April 4th he had retention and the urine had to be withdrawn with the catheter. On examining the urine now it had materially altered it was acid specific gravity 1018 and contained blood. On account of the rapidly appearing spinal symptoms patient was placed on a water bed and a mixture containing Potassium Iodide was prescribed.

April 5th The catheter was again required on account of retention, he had now also lost control over his bowel, and the finger passed into the rectum was hardly grasped by the sphincter.

Severe pain in the back was now complained of and on percussing the spine marked tenderness was present corresponding to the spinous processes of the 4th 5th 6th dorsal vertebrae, on each side of the spines in this region a slight fulness was noticeable.

April 6th Urine withdrawn and found turbid, so that the bladder was irrigated

with boric acid lotion.

The condition of the lungs remained the same, respiration was hurried and there was slight cough and a small amount of expectoration which was examined for the tubercle bacillus with a negative result. There was no haemoptysis and no night sweating.

No.	MONTH																																
	DAY OF MONTH		29		30		31		1		2		3		4		5		6		7		8		9		10		11						
	DAY OF DISEASE																																	
NAME		F°	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	C°
Hubert Shackleton		107°																																
AGE 23 yrs.		106°																																41°
DISEASE		105°																																
Mediastinal growth		104°																																40°
causing paraplegia.		103°																																
		102°																																39°
		101°																																
		100°																																38°
		99°																																
		98°																																37°
		97°																																
		96°																																36°
PULSE		M																																M PULSE
		E	110				120						140						136															E
RESPIRATION		M											30		28		32		28		26													M RESPN
		E											31		26		31		28		38.													E
VOMIT																																		VOMIT
AMOUNT OF URINE			20		21		29		30		19		48		87		98		103		107.													AMT. OF URINE
MOTIONS			0	0	0	0	0	0	1	2	0	1	1	1	2	2	2	3	3	2	2	2	2											MOTIONS
MEMORANDA			Weight:- 8 st. 4½ lbs.																															

April 7th patient continued to get worse he complained of thirst respirations were 36 per minute; and he now complained of a girdle sensation at the level of the fifth intercostal space.
The fundi were examined with the opthalmascope and found to be normal he died the following day.

Post Mortem April 9th 1895.
Body poorly nourished, limbs somewhat wasted post mortem rigidity present.
Spinal column:- On exposing the spinal column the spine of the sixth dorsal vertebra was found to be fractured and on each side of the fifth spine a whitish lobulated growth could be seen on opening the spinal canal similar growth was found in the canal opposite the fifth dorsal vertebra. Masses of new growth of a similar nature were found in the spinal canal at the level of the 11th & 12th dorsal vertebrae.
The tumour was compressing the spinal cord at both these levels, and when the cord was removed it was found soft and fluid corresponding to the points of compression.
The intervertebral foramina were found.

full of growth which was evidently issuing from the chest.

Thorax:- On opening the thorax a mass of growth was found lying in close relationship with the root of the right lung, extending round the pulmonary artery, and then passing directly into the right lung forming a large mass in the upper lobe. The right lung was firmly adherent to the chest wall.

The left lung was slightly adherent at the base of the organ but was otherwise healthy.

The tail of the pancreas was found to contain a nodule of growth, and the lumbar glands were enlarged and cancerous.

The microscopic examination of the tumour proved it to be largely composed of spindle celled sarcomatous elements

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The case has many points of interest; the difficulty of arriving at a diagnosis arose from the fact that the pulmonary symptoms were quite masked by the rapidly appearing spinal symptoms.

The case was considered to be one of Phthisis with secondary tuberculas deposit in the spinal canal, and the physical signs noticed at the right

apex would at first sight lend support to this view, but the course was I think decidedly too rapid for one of tuberculous disease.

In connection with the physical signs noted when the case was taken, dulness to percussion over the manubrium sterni is important and has been repeatedly noticed in the cases which I have observed.

In making sections of these tumours for diagnostic purposes I find that formalin 4% forms a good hardening medium. The tissue requires to be well hardened as it is rather friable; it is allowed to remain in the formalin solution for five days, from which it is transferred to a solution of gum and syrup and after a day to gum alone when it may be cut on a Cathcart's microtome. Much better sections may however be obtained by embedding the tumour in Celloidin.

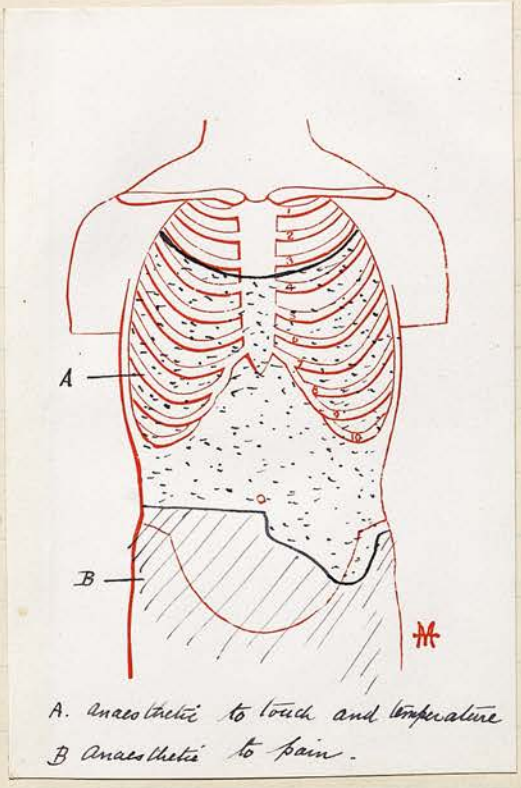
Case VII

Sarcoma of the mediastinum ulcerating into the spinal canal and causing paralysis of the lower extremeties.

Adam Ogden age 32. Joiner
Patient was admitted into the Bradford Infirmary on the 15th July 1896. having lost the use of his legs for one week.
Patient has been ill since Christmas complaining of pain between the shoulders and cough, pain at first was intermittent coming on for two or three days at a time, but five weeks ago it became almost continuous, and a month ago it prevented him from following his work; and he has been confined to the house since that time. The pain was situated between the shoulders, rather more on the left side sometimes it is felt in the left clavicle and down the left arm, it is very severe at night and often prevents sleep; coughing makes it severe and causes considerable distress. For the past six months he has been troubled with cough accompanied by yellow frothy expectoration but never any haemoptysis or night sweating
A fortnight before admission he experienced some weakness in the legs, he found that he had difficulty in walking

straight and staggered during the attempt
he also noticed some numbness of the legs
and difficulty in passing urine.
The weakness in the legs became worse
until seven days ago when he became
quite paralysed.
In addition to the paralysis of the legs
he suffered from retention of urine and
incontinence of faeces; there was also
loss of sensation below the waist and a
girdle sensation perhaps due to the
bladder distention.
Four years ago he contracted a chancre
followed by sore throat.
Present Condition:- Patient is thin and
washed lies flat in bed and is quite
unable to move his limbs. Below the
third intercostal space sensibility to
touch is quite lost sensibility to variations
in temperature is also lost from the same
level; loss of sensibility to pain extends
downwards, from two inches below the
umbilicus on the right side, on the
left side from below Poupart's ligament.
Anaesthesia and analgesia complete in
the legs, above the third rib sensibility
is unaffected no zone of hyperaesthesia.
There is complete motor paralysis in the
legs, the intercostal muscles below the

fourth rib are paralysed, the diaphragm and upper intercostal Muscles alone acting during respiration.
Patellar reflex absent. No ankle clonus.
Plantar reflex exaggerated and when excited causes spasm of the legs.
Abdominal and Epigastric reflexes absent.
retention of urine and incontinence of faeces; some numbness has been noticed in the left arm.
Cranial nerves unaffected, Mental functions clear, No optic neuritis or other changes in the fundus detected.



A. anaesthetic to touch and temperature
B anaesthetic to pain.

Examination of Spine:- No undue prominence of the spinous processes, but on heavy percussion some tenderness is

complained of over the upper dorsal spines from about the second to the sixth.

Examination of the Chest:- The movement on the left side is decidedly deficient, on percussion the left lung anteriorly was resonant, but on auscultation the breath sounds were found to be weak and in marked contrast to the loud vesicular murmur heard over the right lung. Posteriorly the left lung was dull to percussion at the base and the breath sounds were entirely absent. No abnormal accompaniments were detected.

Right lung resonant anteriorly and posteriorly and the vesicular murmur loud and well heard.

Heart normal. Abdomen distended, tongue furred. Urine clear, acid, no albumin has to be withdrawn with a catheter.

On July 20th the dulness to percussion on the left side had increased, a needle was inserted but no fluid could be withdrawn.

July 26th The left side was now quite dull to percussion anteriorly and posteriorly except for a resonant area at the apex; the breath sounds had also disappeared and vocal fremitus was very indistinct apex beat not displaced, patient has

a troublesome cough and is feverish; his general condition is decidedly worse.

August 7th Bed sore appeared on the back, urine became foul so that the bladder had to be washed out.

August 19th. Patient is getting rapidly worse temperature runs up to "102° F" at night, he is often very restless and requires hypnotics The signs in the left lung remain as

No.	MONTH																										
	DAY OF MONTH		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
	DAY OF DISEASE																										
NAME		F° 107°	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E				C°
Adam Ogden		106°																									41°
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DISEASE		104°																									40°
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Causing paraplegia		102°																									39°
		101°																									
		100°																									38°
		99°																									
		98°																									37°
		97°																									
		96°																									36°
PULSE	M E																										M E PULSE
RESPIRATION	M E																										M E RESPN
VOMIT																											VOMIT
AMOUNT OF URINE			41+	38½	25½	36	32	34	24	36½	27½	37½	36½	31½	36	40	32	26½	22	24+	7	14+	12				AMT. OF URINE
MOTIONS			2/1	0/1	2/3	3/2	2/2	3/1	0/3	0/1	1/1	2/0	1/1	1/1	0/2	2/1	0/1	1/1	2/0	1/2	1/0	0/1	1/				MOTIONS
MEMORANDA																											

before no signs of disease are evident on the right side.
A huge bed sore is present over the sacrum with a deep sloughing base which in spite of careful treatment continues to increase.
On examining the abdomen the liver was now noticed to be decidedly enlarged extending to below the umbilicus, its surface could be felt to be irregular from nodules of growth. The cutaneous veins on the abdominal wall were dilated but no ascites was present in the abdominal cavity. The patient continued to get worse and died on August 30th.

Post Mortem August 31st 1898.
Body emaciated, rigor mortis present in all extremities, a large sloughing bedsore situated over the sacrum.
Spinal column:- on each side of the second dorsal spine a soft white growth was found this could be seen extending into the thorax by removing the transverse processes of the first and second dorsal vertebrae.
On the left side the transverse processes were softened by the growth.
The spinal canal was largely occupied by similar growth at the same level

The growth was found adherent to the dura-mater but did not appear to penetrate the membrane. The tumour caused constriction of the cord opposite the second dorsal vertebra and softening of its substance was advanced. At the point of constriction and immediately above and below this point the cord had been severely damaged, and on section no differentiation could be made between white and grey matter below the level of the third dorsal vertebra the appearances of the cord were healthy.

In the lumbar region nothing could be found to account for the marked signs of lumbar cord disease noted during life.

Thorax:- No fluid was found in the pleural sac on either side. The lymphatic glands at the root of the left lungs were greatly enlarged. The left lung was found adherent to the chest wall especially toward the apex; the upper 2/3 of the lung was occupied by a large sarcomatous growth which had evidently extended from the root; the remaining portion of the left lung was dense, slate-grey colour resembling grey-hepatization.

The main bronchus was patent but was surrounded by a mass of growth.

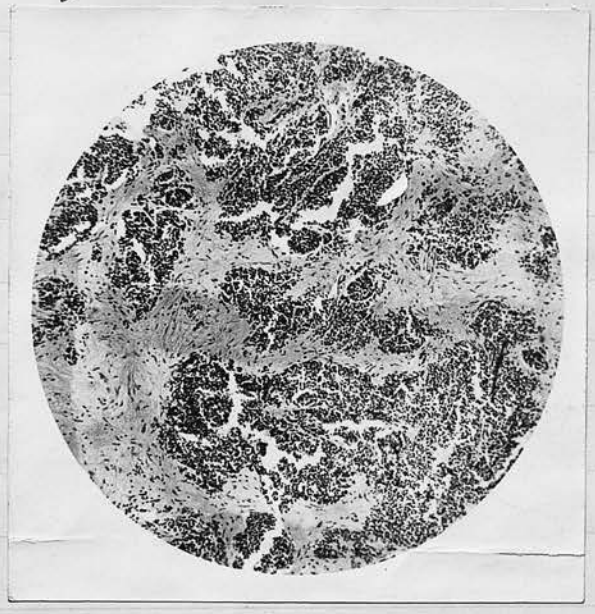
The right lung was oedematous but free from growth. A large sarcomatous lymphatic gland was found situated between the first and second dorsal vertebrae on the left side.

The liver was of immense size weighing 6 lbs 2½ ozs presenting on its surface numerous white nodules which penetrated deeply into the organ, one mass on the upper surface of the right lobe was two inches in diameter.

The other organs were examined but found to present no special abnormal appearances.

The great similarity between this case and that of the preceding led me to expect a similar cause, and even before the condition of the liver made the diagnosis evident I felt certain that the patient was the subject of a mediastinal new growth. The conditions present would closely simulate a case of phthisis with tubercular deposit in the spinal canal, the dulness over the left lung was however too extensive to be attributed to this, and on the absence of fluid after the introduction of a needle the diagnosis

of new growth was decided upon.
The bed sore over the sacrum and the bladder symptoms pointed to a deposit in the lower dorsal or upper lumbar region, but although the cord in this situation was examined microscopically nothing was found to account for these symptoms.
Microscopic examination proved the growth to be a spindle celled sarcoma
The growth in the liver was of the same nature, but the general arrangment closely resembled the grouping seen in Carcinomatous tumours. A section of the growth from the liver was shown by me at the Bradford Medico-Chirurgical Society's meeting on January 10th 1898.



Micro-photograph of section of the liver showing the arrangment of the sarcomatous cells. × 60. diam.

Case VIII. Case of Malignant growth in the Chest. in which gastric symptoms were the prominent feature.

Alfred Eccles age 56 Years. Coachman.
The following case came under my notice some months ago, when I saw the case in consultation with another medical man Patient had been ill since the begining of June 1899 before which time he had enjoyed good health.
In august when I first saw him he was weak and wasted and stooped forwards when he walked he complained of pain and distention after food and had frequent eructations, Vomiting was also of common occurrence so that he was afraid to take any solid food as it increased the pain and was often returned.
He said he had lost weight rapidly of late and attributed it to the fact that he was unable to take solid food, his appearance was strongly suggestive of a person the subject of malignant disease.
On examining the abdomen I discovered a small ventral hernia which I returned with the result that the pain almost entirely disappeared, otherwise the abdomen appeared to be natural.
Examination of Chest:- The air entry was

equal on the two sides, the percussion note was impaired posteriorly at the left base and the vocal resonance in the same area was distant and indistinct. Above the angle of the scapula the breath sounds were well heard.
The right lung was healthy, the heart was normal; the patient was troubled with a slight cough and some expectoration. The urine was acid 1020 and contained no abnormal constituents.
I saw the patient again about the middle of September, vomiting and gastric disorders were still the symptoms that caused him most trouble. On deep pressure in the epigastric region some pain was complained, but he had experienced considerable relief from pain generally since the reduction of the hernia. The physical signs noted at the left base were still present, patients' general condition was much the same, he could walk about but was not fit to carry on his occupation. I now decided to try the Effect of washing out the stomach, this I did on several occasions, the tube passed easily and a considerable amount of glairy mucous was evacuated but the patient derived no benefit.
I saw the patient on one or two occasions

during the course of the succeeding month
He had lost a few pounds in weight and
on examining the epigastrium an indefinite
sense of resistance and pain on deep palpation
were noticed. The left lung was decidedly
dull to percussion below the middle of the
scapula as compared with the right side,
vocal fremitus was present but the breath
sounds were very indistinct.
On October 26th he complained of rather
severe pain in the epigastrium and on
palpation what appeared to be the depressed
left lobe of the liver could be indistinctly
felt, it was smooth and rounded and
tender on manipulation.
The left lung continued in the same condition.
Although the vomiting and gastric symptoms
were now less severe, and patient was
still able to walk about the house, it was
evident that his strength was failing.
On November 7th he was confined to bed
on account of troublesome cough, and
difficulty in breathing. On examining the
chest the left lung as high up as the
spine of the scapula was quite dull
with absence of vocal fremitus and
breath sounds. A needle was inserted
into the left pleural cavity and some
turbid serum removed which on

Microscopic examination contained red blood corpuscles. The right lung continued healthy. The hearts apex was displaced inwards by the fluid, the pulse beats 100 per minute were feeble and irregular Abdomen:- A distinct mass could now be felt corresponding to the 7th + 8th Costal Cartilages on the left side and projecting downwards and inwards evidently a mass of new growth projecting from the left lobe of the liver. There was no Ascites present and the patient was free from jaundice. Patient continued to get worse, he became restless and at night muttering delirium was often noticed. Dyspnoea on account of the fluid in the left side of the Chest was severe, and his relations would not consent to having this withdrawn. He died on November 23rd

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The case was I think one of Sarcoma of the mediastinum with extension to the lower lobe of the left lung with subsequent secondary deposit in the left lobe of the liver. At first I fancied that the patient might be suffering from obstruction to the oesophagus as the result of the growth of an epithelioma, but this was disproved by the easy manner in which the

Oesophageal tube was passed into the stomach on several occasions without any obstruction being noticed.

The patients general appearance accompanied by the physical signs noted at the base of the left lung caused me to believe early in the case that mediastinal tumour was the probable explanation.

The implication of the pleura accompanied by the rapid exudation of fluid which under the microscope was found to contain blood, lends support to the supposition that the case was one of sarcoma.

The marked gastric symptoms during the early course of this case may have been due to implication of some of the nervous structures situated within the mediastinum.

Case. IX

Case of Melanotic Sarcoma which pressed upon the Spinal Cord and caused paralysis of the lower extremities.

Alice Swinton age 36 years.

Patient was admitted into the Bradford Royal Infirmary on July 24th 1899 with paralysis of both lower limbs, loss of sensation in the lower limbs and incontinence of urine.

Two years ago whilst going downstairs she fell and hurt her back, she was laid up in bed for some time afterwards but gradually got better. Six months after the injury she began to notice weakness of the legs, with some alteration in sensation. At the begining of June 1898 the paralysis was complete and she became an inpatient of the Leeds General Infirmary this was therefore just a year ago, since this time she has entirely lost the use of her legs.

On admission patient had complete paralysis of the lower extremities with loss of sensation of the lower limbs and of the abdomen and chest as high as the sixth rib. Plantar reflexes were present, patellar reflexes absent.

No wasting had occurred in the muscles

of the leg. A constant spasm was present in the left great toe which however was not noticed by the patient.
On examining the spine in the region of the 5th 6th & 7th dorsal vertebrae a marked projection of the spinous processes was evident, and on percussion over the spines in this region tenderness was complained of.
A large bed sore was present over the sacrum with a black sloughing base and over the heels the skin was broken
Lungs:- Respiration feeble very slight movement of the intercostals, breathing being mainly diaphragmatic. The lungs were resonant on percussion and vesicular murmur distinct.
Heart. beats. 90 per min. apex 6th intercostal space no valvular trouble.
The case was transferred to the surgical wards with view to operation as it was decided that the patient was suffering from the effects of pressure from a tubercular deposit in the spinal canal. Although after so long a history very little hope of success was upheld.
On August 24th patient was taken to the operating theatre, Laminectomy having been decided upon

An incision was made over the spines of the 5th 6th 7th dorsal vertebrae when almost immediately a dark mass was exposed which closely resembled blood clot, lying on each side of the spinous processes.

A portion of this substance was handed to me for microscopic Examination, I was fortunate in being able to procure a fresh section which proved to be a Melanotic Sarcoma, in consequence of this the operation was abandoned. The wound was stitched up and the patient sent back to the ward, she however got rapidly worse and died on August 28th

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Post Mortem August 29th 1899.

Body emaciated, large bed sore over the sacrum, a number of small pigmented spots noticed in the skin. Angular curvature of the spine in the mid-dorsal region.

On cutting down to the spine an irregular mass of deep black tumour presented in the area of the operation and extended into the bodies of the 5th 6th 7th dorsal vertebrae and also into the corresponding ribs on the left side.

Two smaller portions of growth were

found in the lower dorsal and lumbar regions.
The dura mater was nowhere invaded by the growth, but on opening the dural the cord opposite the sixth dorsal vertebra was found compressed. Considerable thickening of the cord was evident above and below the point of compression, and faint tracing of ascending and descending degeneration could be made out.
The dorsal nerve roots from the 4th to the 7th were pressed upon by the tumour.
Brain normal. Heart normal.
Lungs:- Right lung non-adherent, pleural surface studded at intervals with black spherical masses of growth varying in size from a pins-head to a small walnut. The substance of the lungs contained a few nodules of growth which were most numerous near the root.
Left lung firmly adherent to the ribs and spine. The lower lobe was almost entirely converted into a mass of growth which was semi-diffluent and in parts necrotic and foul. The upper lobe was only slightly invaded by the growth.
The costal pleura showed several black points of growth near the spine.
The other organs were examined and

found in the lower dorsal and lumbar regions.
The dura mater was nowhere invaded by the growth, but on opening the dural the cord opposite the sixth dorsal vertebra was found compressed. Considerable thickening of the cord was evident above and below the point of compression, and faint tracing of ascending and descending degeneration could be made out.
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The costal pleura showed several black points of growth near the spine.
The other organs were examined and

found to be in a healthy condition.

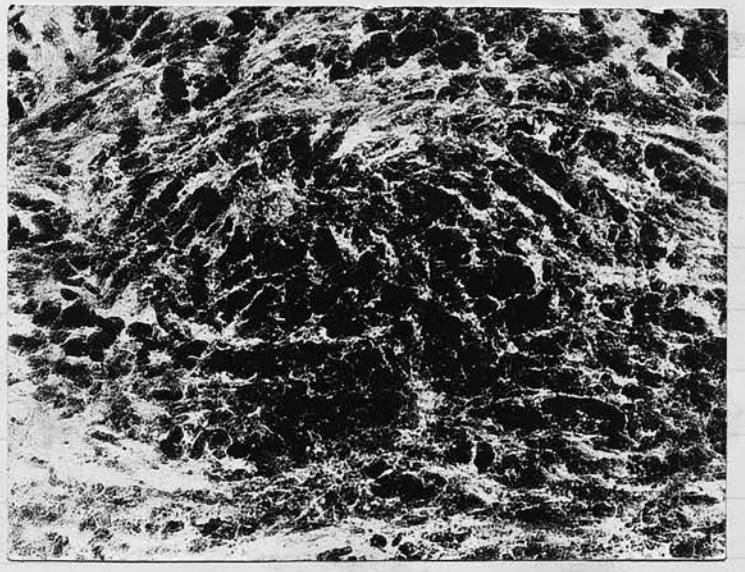
The seat of origin of the disease in this case is not easy of determination but I see no reason why the disease may not have arisen in the lymphatic glands of the posterior mediastinum. I can find no authority stating that melanotic sarcoma may arise in connection with bone but they all agree that the seat of origin may be situated in the lymphatic glands.

At the post-mortem Examination on cases of this nature it is often impossible to recognise the position in which the tumour originated.

It seems hard to believe that the extensive changes in the left lung came on subsequently to the operation, and I am inclined to believe that the condition of the lung was not detected during life, although no cough or pulmonary symptoms were complained of, and her general condition before the operation was such as to warrant a serious operation of this kind.

Two other points in this case require further notice; first the injury six months before the onset of the weakness in the legs, second the very lengthy history.

The patient had been ill for 18 months this is a decidedly longer period than any of my cases of Lympho-Sarcoma Microscopic Examination proved the growth to be a melanotic Sarcoma below will be seen a micro-photograph of the section made during the course of the operation it however fails to reproduce the character of the cells in a satisfactory manner



Microphotograph of Melanotic Sarcoma
× 150 diam. Unstained.

Case X. Sarcoma of the Mediastinum in a boy age 6 years probably originating in the thymus gland.

George Ambrose age 6 years.
Patient was admitted into the Bradford Royal Infirmary on December 2nd 1899. suffering from severe dyspnoea.
He had been ill for three months previously and was supposed to be affected with whooping cough
A fortnight before admission his mother noticed that his shirt would not fasten at the neck, and on looking at his neck she found it to be swelled. His breathing also was noisy and difficult and he had severe attacks of coughing.
On admission he was suffering from dyspnoea respirations were 28 per minute with a long drawn and stridulous inspiration; considerable excursions were made by the larynx.
He also suffers from very severe attacks of coughing which if prolonged cause his face to become cyanosed, the neck is swelled generally but on each side of the trachea the enlarged lobes of the thyroid gland can easily be made out, the neck measures 11 1/4 inches in circumference.

The lungs were healthy, the laryngeal stridor could be heard all over the chest. Laryngoscopic examination negative. The voice was quite natural.
The child took his food well and experienced no difficulty in swallowing.
During the course of the next few weeks the child had two or three very severe attacks of spasm of the glottis, and as it was thought that anyone of these attacks might prove fatal from asphyxia it was decided to divide the isthmus of the thyroid gland.
The operation was successfully performed under Chloroform on December 20th.
The child after the operation seemed to be improved the breathing being easier and the dyspnoea less marked, though not absent.
On January 2nd whilst asleep the child had a sudden attack of spasm of the glottis, became cyanosed and convulsed and died in five minutes.

Post mortem January 2nd 1900.
Body fairly well nourished, rigor mortis present. Operation wound two inches long in mid line of the neck over the larynx and trachea.

On separating the skin from the chest wall the right pectoralis major muscle was found to be infiltrated with new growth of firm consistance.
The sternum and costal cartilages were with difficulty separated from the mediastinal contents, being held down by similar new growth adherent to them
On removing the sternum the anterior mediastinum was found occupied by the tumour, which spread upwards into the neck infiltrating the whole of the thyroid gland and extending alone it to infiltrate the glands at the angle of the jaw; this was more especially the case on the left side.
Downwards the growth extended to and became attached to the right auricle, the lymphatic glands in the posterior mediastinum were enlarged and evidently the seat of similar infection.
On section the growth was firm and of a greyish white appearance. The lungs were healthy, no marked constriction was found on opening up the larynx or trachea all the other organs were healthy.
Result:- New growth pressing on trachea from appearance the thyroid gland was involved only secondarily by the spread

of the growth upwards from the anterior mediastinum, where it may have originated in the thymus gland, this structure could not be differentiated from the mass of growth.

The microscopic examination shows the growth to be a small round celled sarcoma divided up into alveoli by a fine meshwork of connective tissue.

These appearances are somewhat similar to those found by Dr Thompson in his case (reported formerly) The pathology of tumours of the thymus gland is not well known but the tendency of pathologists generally is to regard foetal structures with suspicion.

The case is certainly a very uncommon one and the diagnosis of whooping cough during the earlier stages was quite natural.

In discussing the symptoms met with in a disease of this kind it is obviously impossible to give a detailed description of the very numerous conditions which arise, nor will this be attempted, as no combination of symptoms may be considered at all characteristic of the disease, and a train of symptoms present in one case, may all be absent in the next case met with. I however propose to mention a few points which have attracted my notice.

1) Pain this varies considerably in different cases and is frequently entirely absent. In my experience it is decidedly less severe than would have been expected and I find that on going through my cases it has never been so severe as to require Morphia. When present it may be referred to any region frequently to the side, when such is the case it is often the result of pleurisy.

2) Haemoptysis this symptom also I find is not of very frequent occurence and in my cases was almost uniformly absent. In Case II it was present on two occasions but never to any serious extent.

In this Connection it may be mentioned that the sarcomata have very little destructive action on blood vessels, which may be found coursing through the tumour

and surrounded by growth post mortem without their coats being in any way damaged.
Red currant jelly sputum is described by some authors but I have no experience of this sign.
Dyspnoea: Dyspnoea is usually present in cases of mediastinal sarcoma and from the conditions found it was certainly to be expected. It may arise from many various causes, and the cause such as pleuritic effusion, displacement of the heart pericarditis etc should if possible be determined.
Acute Pericarditis and acute Pleurisy. A very important symptom of mediastinal sarcoma is the manner in which they cause acute inflammations of the pleura and pericardium these arise as the result of extension of the growth to these membranes.
Case V illustrates the manner in which the pericardium may become involved. The sudden onset of acute inflammatory conditions such as these would be strongly in favour of malignant growth.
Local oedema. This of all I consider a most important symptom and can perhaps be said down as the only symptom which is at all characteristic; most characteristic when it occurs is the oedema

of the head and neck. and has been previously referred to. Oedema may also be present over the Sternum and in the arms.
In many of my cases it was the presence of such oedema which led to a correct diagnosis.
Effusion into the Chest. may often be found as the result of pressure of the tumour round the root of the lung, and as I have before pointed out it may be clear and free from blood and in the great majority of cases will be found to be so.
I have never found pus present in the pleura in cases of Sarcoma, a case in which pus was found with an exploring needle has been recorded by Mr. Mott in the
* British Medical Journal. The case was operated on for empyema but no pus was found at the operation, so that the presence of pus originally is rather doubtful. the case died and proved to be a lympho-Sarcoma.
Engorged and dilated veins are frequently met with when present on one side only such as engorgement of the veins at the rib margins this sign is suggestive, dilated veins over the Manubrium and in the Epigastrium are also frequently to be noticed.
British Medical Journal. November 1888. page 1045.

Enlarged lymphatic glands are a very great help in assisting in the diagnosis of these cases as they may be found quite early in the case, they must be looked for above the clavicles and in the axillae and are usually somewhat painful on manipulation. Sometimes portions of the tumour may itself be found appearing above the manubrium sterni. Many other symptoms may be found but have no special features characteristic of this disease such as Cough, Expectoration Emaciation, inequality of the pulses, Coma delirium etc.

The pressure effects on nerves are however of considerable value Causing alterations of the voice, paralysis of the vocal cords, spasmodic cough and inequality of the pupils etc. the effect of pressure on nerves causing vomiting and gastric troubles have been already referred to. vide case III

Physical signs :- The most important sign is dullness to percussion when this is observed over the sternum the possibility of sarcomatous growth should be borne in mind; absence of vocal fremitus and inaudible respiratory murmur would be present either from pleural effusion

or from the presence of a solid mass in the lung or to some serious obstruction to the main bronchus. This last must always be kept in mind as the condition of the bronchus will certainly often be responsible for the physical signs observed, and during the course of a case if this structure should become involved a corresponding alteration in the physical signs must be expected.

The physical signs have been so frequently referred to in the record of cases that it is hardly necessary to specify further; suffice it to say that they must not be looked upon as characteristic signs of the disease but as accidental accompaniments, which will be the better understood if the histological characters of these growths and the manner in which they invade neighbouring organs is borne in mind.

In considering the diagnosis of mediastinal sarcoma many other diseases may be found to simulate it very closely. a few of these will be very briefly noticed.

Pleuritic Effusion:. This affection is probably most likely to be confounded with that of mediastinal sarcoma

but considering how frequently the two are associated together the diagnosis of the former does not exclude the latter.
At the same time a diagnosis of pleurisy with effusion is very commonly made.
In nearly every case recorded it was found necessary to explore the chest, and this in itself indicates that the signs present might have correctly been attributed to the presence of fluid.
Exploratory puncture is the only reliable method of distinction, and although fluid is absent it may help in the recognition of a solid mass in the lung.
Aneurism will certainly in some cases simulate mediastinal sarcoma very closely and great difficulty will be experienced in distinguishing between the two. The presence of limit or abnormal pulsation would be in favour of aneurism but a careful study of the collective symptoms present in each case must be relied on.
Tubercle:- The frequency with which the cases recorded were mistaken for tubercle has been pointed out, in one case it led to a very unnecessary operation.
I find also in my notes that the

Sputum has in many cases been examined for the tubercle bacillus.

The general history and course of the case must be taken into account.

A mass of tubercular mediastinal lymph glands would probably cause symptoms identical to those of some cases of sarcomatous growth.

A disease which has of late been exciting general interest and on which a series of articles have appeared in the "Lancet" would appear to be easily mistaken for mediastinal tumour, I refer to Chronic Mediastinitis or mediastino-pericarditis; and a case of this nature recorded by Dr Whipham in the "Lancet" has many points of similarity. I have never met a case of Chronic Mediastinitis which I believe is a very uncommon disease.

Other diseases with which these tumours have been mistaken are Chronic interstitial pneumonia; collapse of the lungs & whooping cough.

The diagnosis will have to be arrived at by a process of exclusion, and this implies a very intimate knowledge of the diseases referred to, and as is seen in some of my cases, although the signs present

* Lancet April 1st 1899. page 882.

who correctly noted a proper interpretation of the signs was less fortunate, but I trust that some of the prominent features of the cases recorded in this essay will be of assistance when an obscure intra-thoracic condition is met with, and assist in solving one of the most difficult varieties of Chest disease.

Treatment must be entirely symptomatic unless indeed something of the nature of Colley's fluid be attempted.

Aspiration for the relief of pleuritic Effusion will give temporary relief and has been previously referred to.

Carcinomata :—

Primary carcinoma occurring within the thorax is an extremely rare affection with one exception, that is an epithelioma arising in connection with the mucous membrane of the oesophagus, with this exception it is difficult to find records of undoubted primary carcinoma occurring in this region most writers agree that such tumours are found within the chest but such growths on account of their extreme rarity are generally dismissed without further remark; similarly a primary Carcinomatous tumour is recognised as arising very rarely from the surface of the pleura but no description of the nature or characters of such tumours is ventured upon.

Carcinomata except under exceptional circumstances originate from epithelial tissues and for this reason is most likely to be found in the posterior mediastinum where we have the epithelium of the trachea, bronchi and oesophagus to form a starting point for the growth.

Secondary carcinomatous growths may of course often be found as metastatic deposits in the lungs and mediastinal

lymphatic glands, after similar growths have made their appearance in other organs such as the mamma, liver, stomach etc; but it must also be remembered that a carcinoma of the breast may infect the mediastinum by direct continuity. * Dr Coats in his manual on Pathology writes in connection with metastatic deposits in the mediastinum and lungs as follows. As the cancer is usually arrested in the lymphatic glands it happens that in all forms of cancer secondary tumours in the lungs are of late development. As the secondary tumours are in the lymphatic glands we may regard these in the lungs as of a tertiary order. Further the material which produces these tumours often passes to some extent through the wide capillaries of the lung and on into the systemic arteries so that we may have tertiary tumours occurring at the same time in a variety of organs. The tumours in the lung are multiple and they repeat the structure of the primary tumour whatever be the variety of cancer which has formed it.

Secondary and tertiary growths of this

* Coats Manual of Pathology. page 563.

Nature are so various, and so frequently met with, and obviously the same interest does not attach to them, as does to primary tumours that they will not again be noticed.
Occasionally however growths with appearances and characters similar to those of carcinoma have been found occurring in situations in which Endothelium and not Epithelium forms the surface of origin such growths have been designated as endothelioma. They have therefore been found in the membranes which line the large cavities of the body, namely the pleura and peritoneum
Dr Payne in his Manual of Pathology says Endothelioma is a name sometimes given to this and other growths originating in and composed of Endothelium.
The name is also applied to Sarcoma with alveolar structure where the cells contained in the alveoli resemble and are derived from endothelia.
If the Endothelium of the serous membranes lining the great cavities of the body be regarded, in accordance with modern Embryological views as derived from the hypoblastic Epithelium, the distinction intended by the word Endothelioma

becomes unimportant.
Carcinomatous tumours in the mediastinum do not form the huge masses of growth that are found in the sarcomata, and are often quite small and insignificant causing symptoms almost entirely confined to their seat of origin.
The only form of primary carcinoma met with in the mediastinum that is at all well recognised is the epithelioma arising in connection with the oesophagus. Epithelioma of the oesophagus is a disease which as a rule occurs in persons over 40 years of age. It is always a primary growth and as a rule does not grow to any great size. Such forms a hard nodule of growth from one to three inches in length situated in the wall of the oesophagus. It occurs chiefly in three situations at the upper end of the gullet implicating also the lower part of the pharynx behind the larynx, about the middle opposite the bifurcation of the trachea and at the cardiac extremity but it may be met with in any part of the canal. In at least 70 per cent of the cases the disease assumes the form of squamous epithelioma and this is almost invariably the case when the growth is situated at the upper part. At the lower

and glandular carcinoma is more common. Cancerous growths in the oesophagus are especially liable to ulceration and ulceration into the trachea or other structure may be the direct cause of death.
The mediastinal lymphatic glands as a rule become secondarily enlarged and cancerous.
A case of Epithelioma of the oesophagus is as a rule easy to recognise, it so very generally gives rise to dysphagia that when this symptom is complained of in a person of advanced age, Epithelioma is at once thought of. Difficulty in swallowing solids is at first complained of while liquids may be easily taken, afterwards the patient is quite unable to swallow solid food. Cases of Epithelioma of the oesophagus perhaps most frequently fall to the lot of the surgeon on account of the dysphagia present. The signs and symptoms of this disease are so well known and can be found described in any text book on Medicine or Surgery that I will not pursue the subject further.
Primary carcinomatous growths may also arise from the epithelium lining the trachea and bronchi I have no experience of these cases which I believe are of

extreme rarity

Primary carcinoma of the pleura is also very rarely met with. I have recorded a very interesting case which I believe to be of this nature, and I have found another case recorded in the Lancet which has many points of similarity.

These tumours form dense white growths which spread over the surface of the pleura, and give rise to secondary deposits in the mediastinal glands and other organs. Under the microscope they exhibit a considerable amount of fibrous tissue, and in some places may be entirely fibrous, flattened cells are found in the tumour which lie in spaces surrounded by fibrous tissue giving an alveolar arrangement.
Such tumours must be distinguished from a pure fibroma which is occasionally met with in the mediastinal space and also from the dense thickening found in persons of the rheumatic diathesis and in chronic mediastinitis.
I will now proceed to give an account of a few cases of primary carcinoma as it has occurred within the thorax.

Case 1 Epithelioma of the oesophagus perforating into the trachea

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John Smith age 67 years admitted into the Bradford Royal Infirmary October 17th 1898.

Patient was admitted practically moribund with a history of oesophegeal Stricture, he was given nutrient enemata and brandy per rectum but died on the day of admission.

Post mortem October 18th 1898.

Body very much wasted no subcutaneous fat remained.

On removing the oesophagus a growth was found surrounding the tube situated about one inch above the bifurcation of the trachea from this point the wall of the oesophagus was invaded with growth for one and a half inches up the tube.

The lumen of the oesophagus was not greatly constricted but the tumour was undergoing ulceration and this had extended deeply causing a perforation the size of a shilling between the oesophagus and trachea, the perforation was found situated immediately above the point of origin of the

right bronchus. The mucous membrane of the oesophagus was ulcerated and in a sloughy state; the oesophagus and trachea were bound together by firm adhesions.

The interior of the trachea was congested and covered with pus around the position at which the ulcer had perforated.

The lungs were congested and showed some bronchitis but were fairly healthy.

The heart showed nothing abnormal

The abdomen was not examined.

Microscopically the growth proved to be a squamous celled Epithelioma

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The ulcerative effects of these growths is well seen in this case and was evidently the immediate cause of death as the constriction in the oesophagus was not very great. The condition of the lungs also proves that this perforation must have occurred shortly before the fatal issue.

Case II

Malignant growth of the oesophagus ulcerating into the right lung.

William Watson age 52 years Quarryman admitted into the Bradford Royal Infirmary March 16th 1898.

Patient has been ill for nearly eighteen months with pain in the stomach accompanied by constipation and headache He attended as an outpatient in November 97. and since that time has gradually got worse.

Three months ago he passed a number of round worms like earth worms and was also at this time troubled with pain in the Epigastrium after taking his food. For three weeks prior to admission he has been troubled with diarrhoea, and his appetite has failed round worms were again passed three days after coming into hospital.

He has never been troubled with vomiting and before the present illness had enjoyed fairly good health except for a slight cough during the winter months.

Patient is a tall thin man Extremely wasted, Cheeks prominent and Eyes sunken. He appears to be in a very

weak state, the temperature is elevated at nights and his breath is most offensive Tongue moist coated with a white fur he experiences no pain and has no difficulty in swallowing his food. Abdomen soft not distended No enlargment of the liver or spleen can be detected and on palpation in the Epigastrium pain is not complained of nor can any thickening be found in the region of the pylorus. Examination per rectum negative.

Pulse 72 regular fair size arteries atheromatous Heart sounds normal. Lungs:- Resonant, no dullness or bronchial breathing heard but general Rhonchus over both sides of the chest is easily made out.

He spits large quantities of frothy Sputum having a musty smell similar to his breath. Sputum Examined for the Tubercle bacillus negative numbers of cocci were however noticeable having taken up the stain of the methylene blue.

The urine was high coloured muddy and contained urates.

A week after admission he appeared to be much easier and looked less emaciated

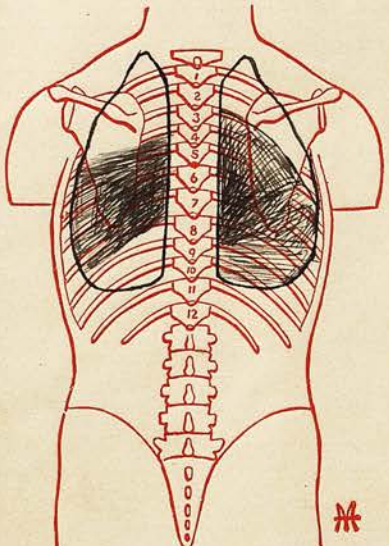
He was however disturbed with a troublesome cough and considerable expectoration which was examined a second time for tubercle bacilli with a similar result.

On april 2nd some change was noticed in the physical signs present in the lungs. The percussion note on the right side was impaired the dull area being most noticed over the middle lobe, at the base the percussion note was also decidedly impaired and the air entry was weak. Anteriorly the right apex was somewhat dull to percussion. General rhonchi were still present.

The left lung remained resonant, rhonchi were heard as before.

On april 12th it was still noticed that the middle lobe of the right lung was quite dull and at the base posteriorly the percussion note was impaired but not to the same degree as the impaired resonance noticed over the middle lobe. On auscultation Crepitations accompanied by weak bronchial breathing were now noticed. The patient was on fish diet which he took fairly well, but he mentioned occasionally that this food was

difficult to swallow, and slight pain on taking solid food was complained of.
No local oedema was present.
On april 14th he regurgitated all food the food was returned immediately it was taken The breath and sputum were most offensive.
The signs in the right lung on april 18th were found to be the same, but corresponding to the position of the root of the left lung a dull area was noticed over which bronchial breathing was audible and below this point the air entry was feeble and indistinctly heard so that some pressure on the bronchus was suggested.



Right lung. Dull over position of root Impaired resonance lower lobe.
Left lung. Dull over position of root.

an exploring needle was thrust into the right middle lobe and half a dram of blood withdrawn.
The patient gradually lost ground he had occasional attacks of vomiting, the signs already noticed in the lungs did not undergo any marked change The patients breath and sputum were so very offensive that it was found necessary to place him in a ward by himself. He died on May 10th

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Post Mortem May 11th 1898.
Body emaciated, slight post mortem lividity present.
Thorax. The left lung was free.
The right lung was extensively adherent over the upper and middle lobes of the organ.
Heart:- Some excess of fluid was found in the pericardial sac, the organ was small and the muscular substance dark and firm, the valves were healthy.

In the middle of the course of the oesophagus there is an ulcerated opening which communicates directly with the right lung close to its root. The wall of the oesophagus at this part is slightly puckered by a hard firm band which causes a constriction of the tube the band is apparently of fibrous structure, but on cutting into it vertically a mass of growth the size of a hazel nut was found lying beneath the mucous membrane.

The right lung was solid posteriorly and on section was dark and on pressure exuded brown foetid fluid on pressure. The bronchi were dilated and from their cut ends the brown fluid was seen to exude.

Left lung; lower lobe partially solid, the substance of the lung was friable and oedematous; the upper lobe was healthy. No cavities were found to exist in the lungs.

Liver congested and fatty, Spleen normal

Kidneys: Capsule slightly adherent in both Kidneys no other change. Stomach small no pyloric thickening observed.

Enlarged mediastinal glands were found situated near the cardiac orifice which contained cancerous deposit.

Result. Malignant Stricture of the Oesophagus ulcerating into the lung. with bronchiectasis, oedema and consolidation of the lung.

Microscopical Examination: Stricture largely composed of fibrous tissue but in places cancer cells were seen lying between the bands of fibrous tissue. Section of the growth showed a structure similar to Scirrhus Cancer.

The occurrence of Scirrhus Cancer in the Oesophagus is not very frequently noticed, the seat of origin of such growths is generally supposed to be in the Mucous glands, and this is certainly I think the true explanation.

The diagnosis of this case presented considerable difficulty and on admission he was considered to be the subject of phthisis, but the dull areas noted in the lungs accompanied by the other physical signs present led me to think that it was probably a case of new growth. Dysphagia was never a prominent symptom and this perhaps with drew my attention from the Oesophagus, but I thought the growth might be of a Sarcomatous nature with subsequent extension to the lungs.

Case III

Primary carcinoma of the pleura with secondary deposit in the left supra renal body accompanied by bronzing of the skin similar to that noticed in Addisons' disease.

Bridget Durkin age 38 years housewife admitted into the Bradford Royal Infirmary November 5th 1898.
Patient was first taken ill eleven weeks ago having as she supposed caught cold, since that time she has been troubled with cough and shortness of breath and has had occasional attacks of haemoptysis.
About a fortnight before admission she experienced very severe pain in the side of a stabbing character and since this time she has never been free from pain.
Ten years ago patient underwent the operation of laparotomy for the removal of a compound cystic ovarian tumour, left from that time up to the present illness

She has enjoyed good health.
Eleven weeks ago she got wet through
and was afterwards attacked with
cough accompanied by pain in the
side, the cough and pain continued
up to a fortnight ago, when the
pain became very severe, preventing
sleep at nights, coughing rendered it
extreme. Patient also complains of
sweating at nights and says she has
lost two and a half stone in weight.
No history of phthisis occurring in
the family could be obtained.
On admission; she lies flat in bed. a
few dilated veins were noticed situated
on the left side of the chest.
The hair is black and the skin of
the body generally is dark.
Examination of the Chest:- Impaired
movement of the left side of the
Chest was quite noticeable, and
on palpation a friction rub
could be felt below and to the
outer side of the left breast.
Below the angle of the scapula

the vocal fremitus was absent and the percussion note here was quite dull, above this point posteriorly the note was resonant to the apex.
Anteriorly the percussion note was resonant. On auscultation over the dull area the breath sounds were found to be absent. and immediately above this the breathing was of a bronchial character. Below the left breast friction sounds were heard; but in other situations the vesicular murmur was distinctly audible and no signs of disease could be found in the apex.
The right lung was healthy.
Abdomen. Scar seen on abdomen in the middle line no evidence of recurrence of the tumour
Heart:- normal.
Urine:- Clear acid. 1022 and contained a trace of albumin.
On November the eleventh the signs had nearly cleared up and patient was allowed to get up. The cough was still present though not

so severe and was accompanied by a small quantity of blood stained sputum. The sputum was examined for the tubercle bacillus with a negative result.
Weight increasing. Patient continued to improve up to December 3rd when she was discharged from the infirmary greatly relieved.
Diagnosis Tubercular pleurisy.

On april 11th 1899 patient was re-admitted into the infirmary and the following notes taken.
Patient was an in-patient before Christmas for about a month since this time she has not been well suffering from cough and pain in the left side, she now complains of acute pain in the left hip joint
Present Condition:- general pigmentation of the skin is noticed which is especially well marked in the flexures of the joints, no pigment could be seen inside the cheeks

over the lips. On the abdomen and back patches of white ordinary skin could be seen which stood out in marked contrast to the general pigmented surface.

She complains of acute shooting pain in the left hip joint which shrikes down the front of the thigh No signs of fulness. or swelling of the joint were evident and no signs of psoas abscess could be found; no other joint pains were complained of.

Lungs:- The left lung on respiration was hardly noticed to move, on palpation below the left breast pleuritic friction could be distinctly felt. Posteriorly the left lung was absolutely dull at the base the dulness extending as high as a point just below the angle of the scapula, above this point it was resonant until you reached the apex where the note was again impaired.

On auscultation posteriorly the breath

the breath sounds were absent at the base over the dull area but above this point they could be heard, at the apex the expiratory murmur was prolonged.

In the axillary line and below the left mamma coarse friction sounds were heard, at the apex anteriorly the percussion note was impaired and on auscultation expiration was somewhat prolonged.

Right lung. The percussion note at the base posteriorly was impaired and the breath sounds indistinct otherwise the right lung was healthy.

Heart percussion dulness extends right across the sternum no signs of valvular disease could be detected.

Abdomen: Scar of old operation, on deep palpation in the ovarian region no pain was complained of and no undue resistance could be felt. The left kidney was easily palpable.

April 19th She complains of pain

in the left hip joint, pain most severe at exit of sciatic nerve, but not along the course of the nerve, No thickening of the bone, No hernia, and No distention or pain over the front of the hip joint was complained of this pain was as a rule most severe at night.

April 21st Impaired movement on the left side of the Chest, all over the front of the Chest. loud respiratory rhonchi can now be heard; the dull area at the base is still quite evident Sputum frothy and fairly abundant yellowish greenish in colour.

The pigmentation is marked in flexures of the fingers and wrists and along the furrows in the palms, Elbow flexures pigmented.

No vomiting or nausea has been complained of.

April 23rd Patient died rather suddenly although for a few days she has been decidedly worse.

Post. Mortem April 23rd 1899.
Body fairly well nourished. Rigor
Mortis well marked, the surface of
the body generally is dark in colour
the greatest pigmentation being present
about the groins and axillae.
Thorax. On opening the thorax adhesions
were found behind the pericardium
and parietal pleura on the left side;
the pericardium is bound down by firm
adhesions to the left pleura, but at the
base of the pericardium in front and
behind these are of more recent date.
The pericardium contains one and a
half pints of serous fluid, the
surface of the pericardium is however
smooth without any indications of
acute inflammatory condition.
The parietal pericardium presents
towards the base two or more white
areas of a different nature and
quite distinct from the general surface
of the membrane evidently masses
of new growth. The visceral
pericardium is covered with white

dense firm carcinomatous Nodules.
The cavities of the heart contained
blood clot, the valves were Competent.
The muscular substance of the heart
was slightly invaded by growth
corresponding to the right auricle.
but in other respects it was healthy.
Right Lung was slightly adherent
it presents externally on its pleural
surface a few small Nodules hard
and white of the same nature as
the pericardial growth. The lung
generally is oedematous frothy serum
being exuded on pressure it is
however free from deposit internally
Left Lung was found considerably
adherent to the chest wall the lower
half of the visceral pleura is
covered with dense white thickening
apparently of the same nature as
the right side. The lower lobe
of the lung is disorganised and
necrosed apparently from infiltrated
growth which has broken down
Bronchial glands slightly enlarged

a small nodule of growth was found in the wall of the superior vena cava.

Abdomen on opening the abdomen evidence of old peritonitis was noticeable.

Liver 3 lbs 14 ℥ presents externally over the lower portion in front white dense nodules slightly raised above the general surface of the organ. Evidently secondary deposits of the same nature, a nodule of growth was also found projecting from the under surface of the organ, and a well marked mass of the same nature was found at the neck of the gall bladder. The organ was not extensively involved the substance generally being friable and showed evidence of fatty change.

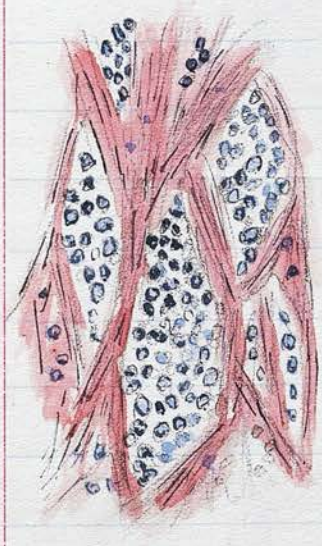
A few lymphatic glands in the abdomen were found to be affected notably those at the bifurcation of the aorta.

Right Kidney:- Capsule somewhat adherent

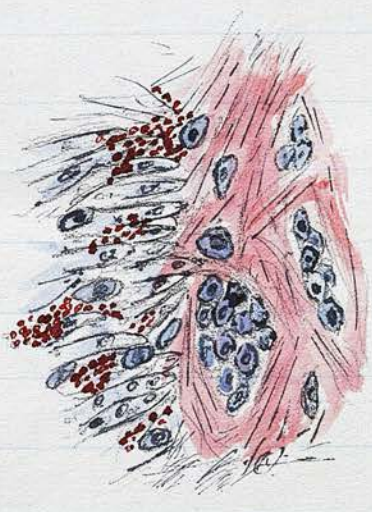
and surface granular, No deposit of growth.
Left Kidney surface irregular on section a large cyst the size of a marble was found at the upper pole, Cortex is thin and surface granular and pale Capsule adherent.
The left supra renal body contains a hard nodule of growth. Kidney and supra renal together weigh 6 ozs.
No deposit found in Spleen. Ovaries, Uterus or throughout the intestinal track.
Note by Dr Crowley a most instructive case felt fairly sure of diagnosis of tuberculus pleurisy. This admission patient seemed more ill & pigmented. signs left base much increased Supposed tubercular affection of the supra renals. then developed pain down the left leg could find no cause tubercular deposit suggested itself.
Result of Post Mortem Carcinoma of the pleura with metastatic deposits on pericardium, heart, liver and supra renal

body on the left side.

Microscopically the growth was of a cancerous nature. The growth in the pleura was composed of fibrous tissue in great quantity enveloping clusters of small irregular shaped cells. In the supra renal body the carcinomatous cells were much larger and of a spheroidal type with a considerable amount of fibrous tissue stroma surrounding them. The appearances here were somewhat similar to those of an early scirrhus of the breast. I will endeavour to reproduce as faithfully as I can the appearances of the sections which I have before me.



Section of Pleural growth consisting of small cells and dense fibrous tissue showing alveolar arrangement.



Section of growth of left Supra renal at its growing margin, haemorrhage has taken place in the gland tissue

Case IV.

Case of primary Malignant disease of the Pleura

This case was recorded by Dr Wollison Collier in the Lancet. November 21st 1885. Page 945.

A. W. a wheelwright aged 43 years was admitted to the Radcliffe Infirmary on april 11th and died June 7th 1886.

His illness commenced towards the latter end of December 1884 with shortness of breath slight difficulty in swallowing and occasional pain of sharp stabbing character over the base of the right lung, the dysphagia increased markedly during the six weeks previous to his admission and was accompanied by rapid loss of flesh and strength; with the exception of a slight injury to the right side of his chest five years ago he had throughout life enjoyed good health. Family history satisfactory

Condition on admission:- He was a tall strongly built man with an anxious expression and markedly emaciated

Temperature and respiration normal
pulse 72. He had great difficulty in
swallowing the smallest portions of
solid food.
Right lung expansion diminished tactile
fremitus diminished with almost absolute
dulness and distant feeble breathing
over the lower half of the lung back
and front.
Left lung loud pleuritic friction heard
at the base on the anterior aspect
On measurment the circumference of the
right half of the thorax one inch below
the nipple was three quarters of an inch
greater than the opposite side. A small
No 8 bougie was passed into the stomach
without difficulty and without meeting
any obstruction.
On May 13th a month after admission
the man had lost one and a half stone
in weight his dysphagia had slightly
increased and his breathing was
daily becoming more embarassed.
The dulness on percussion loss of
tactile and vocal resonance and

distant bronchial breathing were more marked and the right half of the thorax an inch below the nipple now measured an inch more than the left. An aspirating needle introduced in the fourth interspace in the axillary line withdrew about half a dram of blood which when examined microscopically exhibited nothing abnormal. From this date the patient steadily lost ground and died on June 7th.

Post Mortem:- On the under surface of the diaphram a few small hard white nodules were seen. The right pleural cavity contained about two pints of encapsuled blood tinged serous fluid, the lung itself being pushed upwards and to a great extent collapsed. The pleura lining the lower half of the right side of the thorax the diaphram and a small portion of the pleura on the left side of the thorax was enormously thickened being from a half to three quarters of an inch in thickness smooth and hard so that on section it resembled

cartilage. The lower part of the oesophagus was slightly thickened and as it passed through the opening in the diaphram it was so much pressed upon by surrounding thickened tissues as to admit with difficulty the tip of the little finger; its endothelial surface was throughout smooth and healthy. The glands in the posterior Mediastinum and the deep abdominal glands were enlayed and hard. Other organs were examined and found to be healthy.

Stained sections of the thickened pleura were composed almost entirely of fibrous tissue scattered throughout which were numerous collections of flattened epithelial cells concentrically arranged in alveolar spaces.

Sections of the abdominal glands Exhibited all the Characters of Colloid degeneration

Remarks:- From the onset it was regarded as a case of malignant intra thoracic growth. The fact of an oesophageal tube being passed into the stomach without encountering any obstruction suggested

a growth external to and pressing on the oesophagus. The signs at the right base pointed to pleural effusion. After the introduction of the aspirating needle with a negative result the physical signs were thought to be those of growth in the lung or pleura The needle probably failed to reach the fluid owing to the extreme thickness of the pleura The fact that the abdominal and mediastinal glands were the only other structures in which malignant change could be discovered would point to its being a primary epithelial cancer of the pleura In any case the extraordinary and uniform thickening of the pleura with an absence of nodulation would I think make the case worth recording It might have been a malignant infiltration of a previously thickened pleura but the fact that only a small portion of the left pleura lining the diaphram being involved and that in direct continuity with the right would render this doubtful

The symptoms occasioned by these growths would appear to be somewhat similar to those already noted and here again is seen the difficulty of distinguishing growths of this nature from tuberculous affections and pleuritic effusion. These tumours do not grow to form the huge masses of the sarcomata and therefore the effects of pressure are not to be expected to the same degree.

In conclusion I would remark that this branch of chest disease offers a large field for original investigation, and I think that intra-thoracic new growths are deserving of more notice than is usually allotted to them in the best recognised text books on medicine. It is in the hope that this thesis will somewhat increase the present literature on this subject, that the notes of the foregoing cases have been placed before your notice.

Index to cases:-