Empyema in Children.

Robert Dundas Helm.

M.B. Cam. 1883.

2. Cecil St
Carlisle.

Empyema in Children.

Having seen during my tenure of office as Resident Physician in the Children's Hospital Edinburgh during the summer of 1885, several cases of Empyema, and being much struck with the good results of treatment as compared with that obtained in adults, I have written out notes of six of these cases so as to serve as a text for this Thesis on Empyema in children.

On the importance of the subject it is perhaps unnecessary to dilate, when we remember how common a disease Pleurisy is in the young, and how readily serous effusions become purulent, not only in the Pleural Cavity but in various other parts as well. The knee joint for instance.

As a proof of the frequency of pleural effusions becoming purulent I mention the fact that of 149 cases of Pleurisy occurring in the practice of Dr Goodhart of London in 71 the effusions were simple in their nature while as many as 78 were purulent. and of these Empyemata the left side was four times oftener affected than the right.

In the following pages I have first of all written out full notes of the cases I had under my charge in the Hospital concluding with some remarks on the Diagnosis and Treatment of Empyema generally.

Case I.

Susan Cunningham - aetat. 2 yrs. 3 months admitted to Children's Hospital June 18th-85.

History Patient admitted for pain in chest, short dry cough, rapid breathing and general weakness

Present Illness began at Christmas last, with Inflammation of the Left Lung - a month ago fluid formed in the chest and she was tapped twice. on the first occasion 5 oz of pus were withdrawn and a second time - a week ago 11 oz. were drawn off - She was much exhausted after the operations.

Previous illnesses. She had scarlet fever 10 months ago and also an attack of Pertussis which has left her subject to Bronchitis. She is reported to have had Inflammation of the Lungs several times.

Condition on admission. Patient is a pale, fairheaded child,

very anaemic looking, thin and flabby. Not well grown for her age. No sign of Rickets, no glandular enlargements

Respiratory System. Left chest bulges considerably in mammillary region. Intercostal spaces obliterated on the left side. and there is also less movement on that side during respiration. Some oedema of left side — Vocal fremitus absent; but little marked on either side. Half an inch difference in measurement of the two sides. the Left being larger.

Percussion — on Left side dull through out. the note being of a peculiar wooden character.

Auscultation — the respiratory murmur is weak and distant no accompaniments; While on the right side the breath sounds are much exaggerated.

Posteriorly on percussion of Left side the note also wooden from apex to base. Vesicular murmur weak and distant. Close to spine distant and bronchial - no accompaniments On Right side Respiratory sounds exaggerated but, no other abnormality Respirations on admission were 42. per minute.

Circulatory System. No apex beat visible. Faint pulsation can be felt in the Epigastric region at lower end of sternum, but at no other place. On auscultation heart sounds normal but more distinct to right of sternum. pulse. weak. compressible. rapid. 124. per minute.

Other systems presented nothing abnormal.

June 23rd. To day Dr Playfair incised the chest wall - 6. ounces of greenish thick pus evacuated

a preliminary puncture with the Hypodermic needle was made and the chest was incised between the 7th and 8th ribs at a point about one inch posterior to a line perpendicular to Inferior angle of Scapula. The Hypodermic needle had been first inserted about an inch anterior to where this incision was made, but no pus got. however on trying further back it was found. An incision 1½ in: long was made. the pus flowed very freely at first and breathing became somewhat embarrassed but soon became quieter. Child weak and low for a few hours after the Operation, but rallied in the evening and passed a good night. Dressings changed in the evening and a large quantity about ℥ii of pus found to have

escaped & saturated the dressings (of ~~wood~~ Salicylic wool only).
The incision was made under glycerine & Corrosive Sublimate solution. - and a good sized piece of red india rubber tubing inserted. - Chloroform was the anaesthetic used -

24th June. Patient very well this morning. Breathing quietly - Little or no discharge on dressings and tube pushed out considerably - On Examination with probe the opening between the ribs found to have closed. She was again put under chloroform, wound reopened and tube reinserted. Very little pus escaped, but a piece of firmly organised lymph was withdrawn. Heart no apex beat detected by inspection or palpation. Heart sounds still heard more to right of sternum.

25th. June. Passed a fairly good night Looks well this morning. sitting up in cot and breathing easily. Temperature subnormal. very little discharge on dressings. Tube removed cleaned and reinserted. No pieces of lymph could be grasped by the dressing forceps. On percussion over the Left side note very resonant throughout, varying but little from the note elicited on the other side. On auscultation vesicular breathing all over Left Lung and little different from Right side. Patient is getting full diet. Beat up egg. Cream. 3 ounces of Port. Malt and Cod liver oil.

26th. June. Dressed wound. discharge almost Nil.

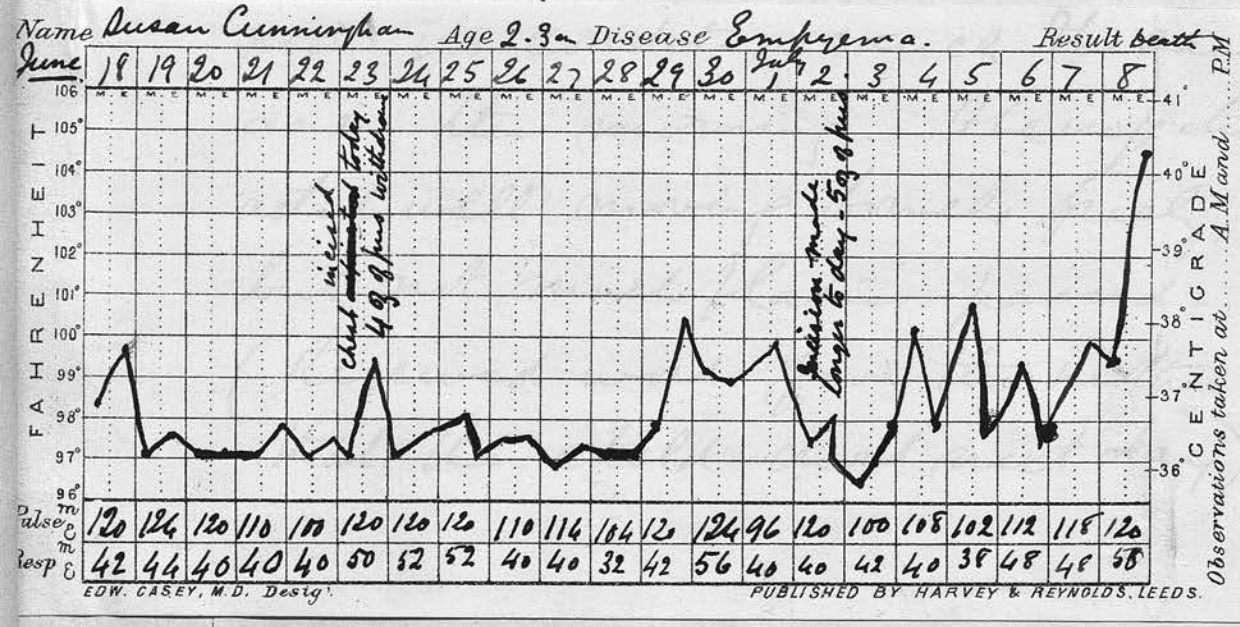
1st July. Went on well till 2 days ago. Temperature rose to rather over 100. discharge up to this time very small but, is now slightly foetid

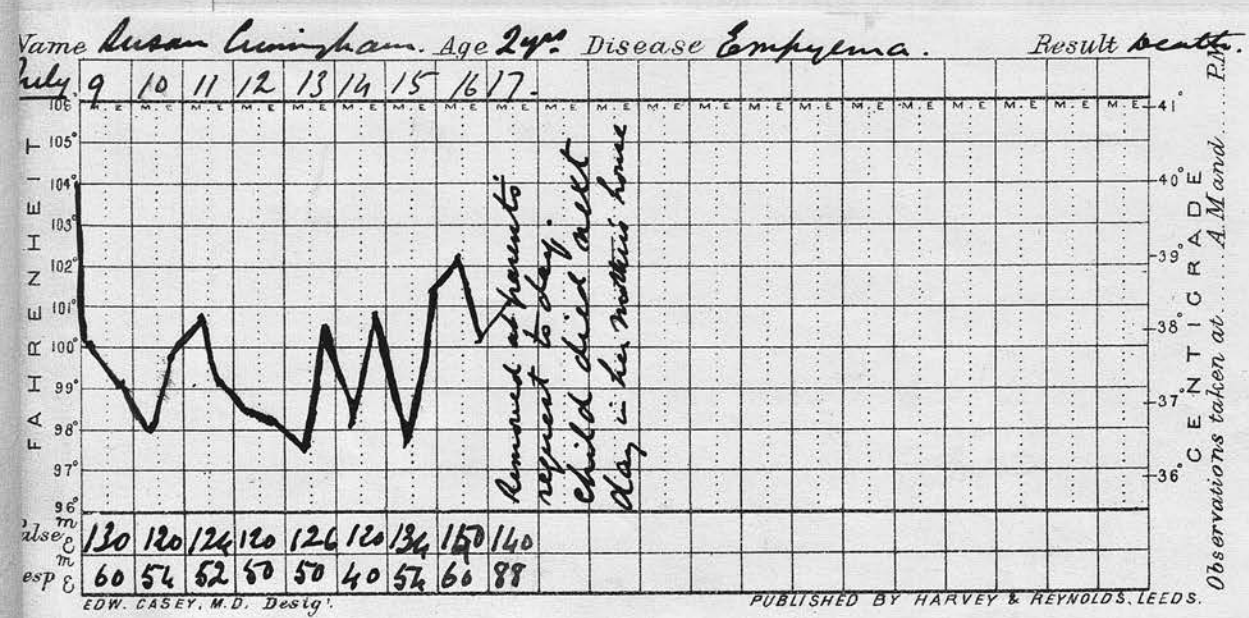
Yesterday ~~discharge~~ there was almost no discharge. It was thought that the tube, which a few days previous had been shortened did not now enter the pleural cavity. With a little manipulation a pair of Péan's forceps was pushed through opening and about 1 oz of grumous pus evacuated. A larger piece of tube inserted, air passing freely through tube in respiration. To day Left chest found to be dull on percussion from apex to base anteriorly. Hitherto note had kept remarkably good since incision was made. On auscultation distant tubular breathing. Posteriorly note not so dull as originally but less resonant than 2 days ago. Dressed to day, tube taken out. Cleansed and reinserted with some difficulty, hence child somewhat exhausted by the

necessary manipulations - There was not much discharge on the dressings but, pus flowed freely on replacement of the tube.
2nd - July. Tube found to have come out - on probing - the opening unsatisfactory and of a valvular nature - Chloroform was administered and the opening enlarged so that it now led directly in to pleural cavity, a much larger piece of tubing (about 4 inches) was placed in the cavity - about 8 oz of pus escaped - The physical signs much improved - note becoming resonant both anteriorly & posteriorly -
3rd - July. Improved - dressed last night and this morning - moderate amount of discharge on the dressings and no discharge welling out during dressing.
4th - July. still improving - dressed - considerable amount of discharge

of a thin watery character
Tube shortened 1/2 inch.
6th July. again dressed much
less discharge - further shortening
of tube (1/2 in). a good note on
percussion both Anter: & Poster:
8th July. - chest dressed daily.
1 gr: of Quinine ordered thrice
daily. also Port wine.
15th July. Discharge continued
much the same since last week.
about 3ii of healthy looking pus
gathering on each dressing (daily).
General health has kept fairly
good - taking nourishment well
- Physical signs much the same.
17th July - Not so well. Respirations
80 per minute. laboured & accompanied
with an expiratory moan. No cough -
great abdominal flatulent-
distension. No change in chest
physical signs - She has been
sick & vomiting - The bowels moved.

twice during the night - motions pale, but not watery - was ordered a Turpentine stupe to the abdomen and assafoetida injection - biel regulated It was thought better not to disturb dressing at present - To be dressed in evening - The mother insisted on removing the child this after-





twice during the night - motions pale, but not watery - was ordered a Turpentine stupe to the abdomen and assafoetida injection - diet regulated It was thought better not to disturb dressing at present - To be dressed in evening - The mother insisted on removing the child this afternoon - its condition much the same as in the morning. The injection acted well moving bowels freely, but not much flakes passed - (Received word from the mother that the child died next day)

Case II.

Alex^r Laidlaw. aet. 9. admitted July 16^th – 83. from Surgical Wards of Royal Infirmary to Dr Playfair's Wards. Children's Hospital.

History. Patient took ill six weeks ago with Inflammation of Left Lung was ill for 3 weeks, then fluid formed was sent to Infirmary where the Chest was aspirated twice. On the first occasion 35 oz of pus withdrawn and on the second aspiration 30 oz.

Patient had Scarlet fever 2 years ago. but no other illnesses. Parents both healthy. 7 of a family – 2 dead – one of Bronchitis, the other of Scarlet fever. Rest of family healthy.

Condition on admission. Is a pale ill nourished and small child for his age. Eyelashes long and downy. Finger nails slightly clubbed and bluish at tips. No signs of Rickets. no glandular enlargements.

Chest broad & well shaped. The Intercostal spaces not visible on the Left side - well marked on Right. Left chest almost immovable during respiration. Vocal fremitus absent on left but quite easily felt on Right side.

Left chest at nipple level measures 13 1/4 in. Right side measures 12 3/4 in.

Percussion - anteriorly on Left side note is dull throughout. ~~note~~ being high pitched wooden in character. resembles the note of pleuritic effusions on Right side. note somewhat hyper-resonant.

On Auscultation on Left side. at Apex & for about 3 inches downwards there is distant tubular breathing & in this area an occasional medium sized crepitation is heard. Below this area & gradually as you approach the base of the Lung the breathing becomes feebler, but nowhere is it absolutely absent

On Right side. Exaggerated puerile breathing only to be heard.
Posteriorly. On Percussion the note is of the same wooden nature over Left side as anteriorly — On Right side note hyper-resonant.
Auscultation — Distant tubular breathing all over Left lung, but especially well marked close by side of Spine from Apex to base. Vocal Resonance of a well marked Aegophonic character over the same area. No crepitations or other accompaniments.
On Right side. Exaggerated puerile breathing.
Heart. Indistinct pulsation seen in Epigastrium. Slight heaving pulsation to be felt immediately below lower end of sternum on deep pressure, but nowhere else. Percussion the dull note of the Left side of Chest is found extending 1/2 in. from Right edge of sternum just where 5th & 6th ribs meet

that bone. Dulness also in Epigastrium
Auscultation - Heart sounds weak
but otherwise normal. In Mitral area
they are distinctly less loud than
at lower end of sternum & over 5th & 6th
costal cartilages -
Digestive System - Lips dry & cracked
- Teeth very irregular & markedly serrated
- Tongue covered with thick white fur
moist. Liver & Spleen normal.
- Urine also normal.
July 19th. The chest aspirated bet:
7th & 8th ribs about 1 inch below lower
angle of Scapula of Left side and
9 3 dark coloured, aseptic, almost-
chocolate coloured pus drawn off -
The skin was previously frozen & patient
had no pain - After aspiration
posteriorly there seemed little difference
in physical signs but anteriorly
the note at apex & for 2 inches down
was distinctly more resonant - and
on Auscultation the breathing was

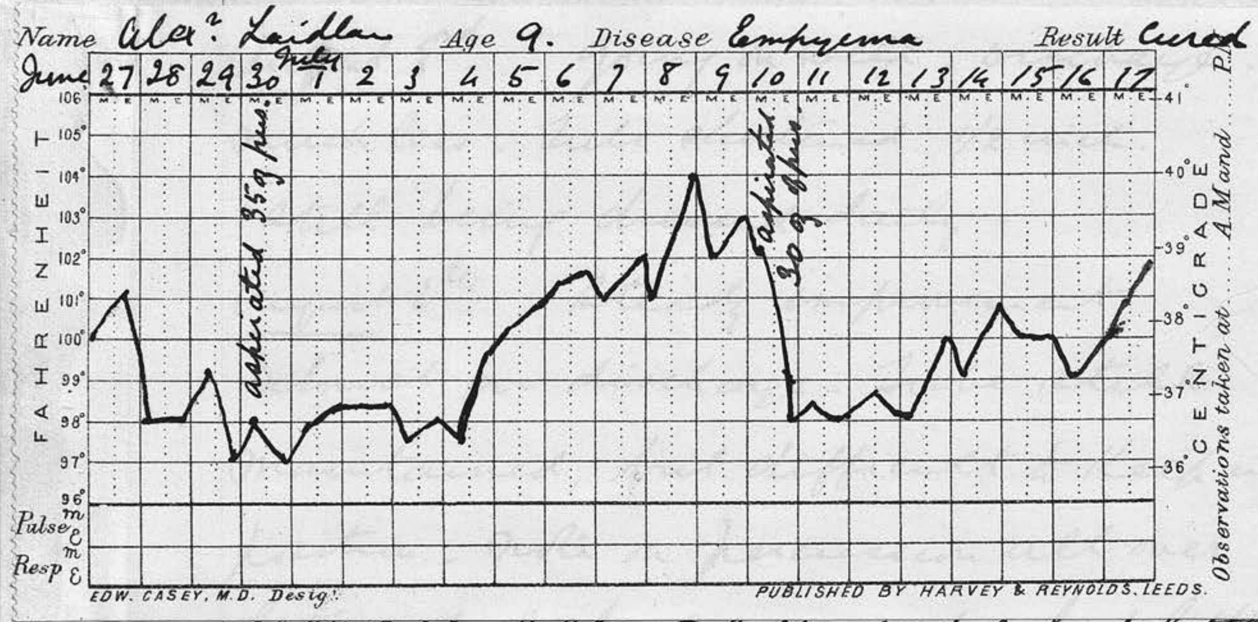
heard less distant and more of the normal puerile character. No change in heart sounds.

July 20th. Although the Temp: had fallen to 99. last night the chest is found to have filled up again. Dulness absolute from apex to base both back & front & the breathing at apex again of the distant tubular nature

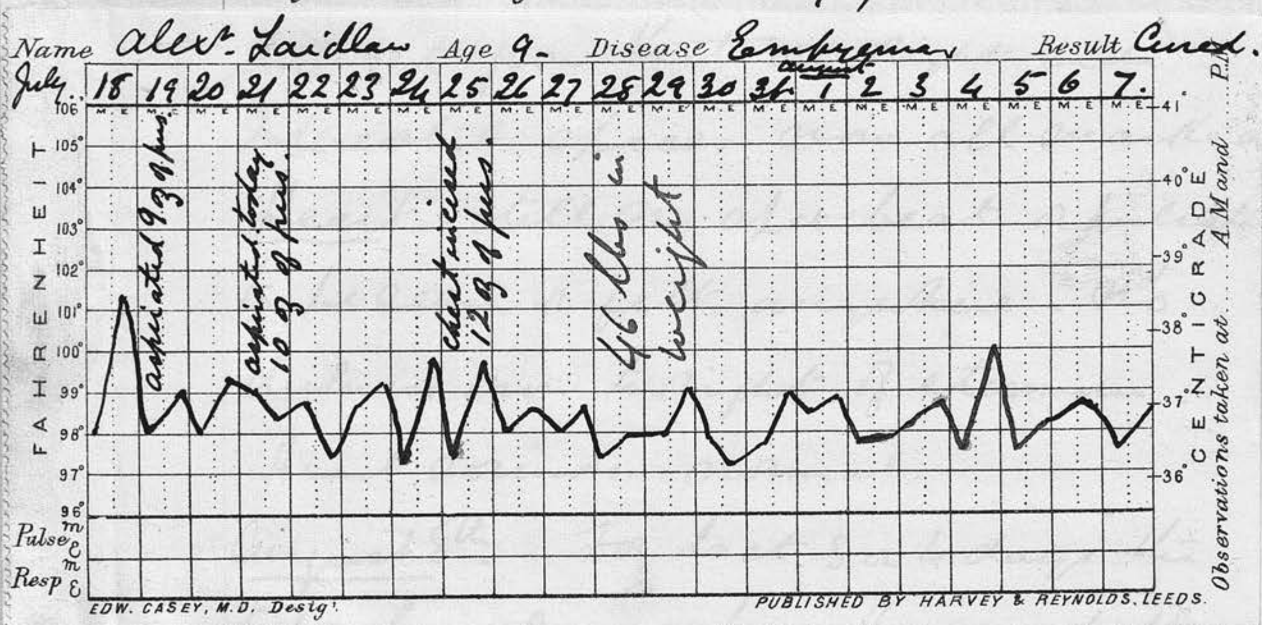
July 21st. Aspirated again and 10. oz of greenish coloured sweet smelling pus drawn off. After aspiration chest found to have cleared on percussion down to level of pectoral muscles. Posteriorly lower than this almost to level of lower angle of scapula. On auscultation breathing puerile over the cleared area. Sp. gravity of pus 1040.

July 22nd. Chest evidently filled again. Physical signs identical with those before aspiration.

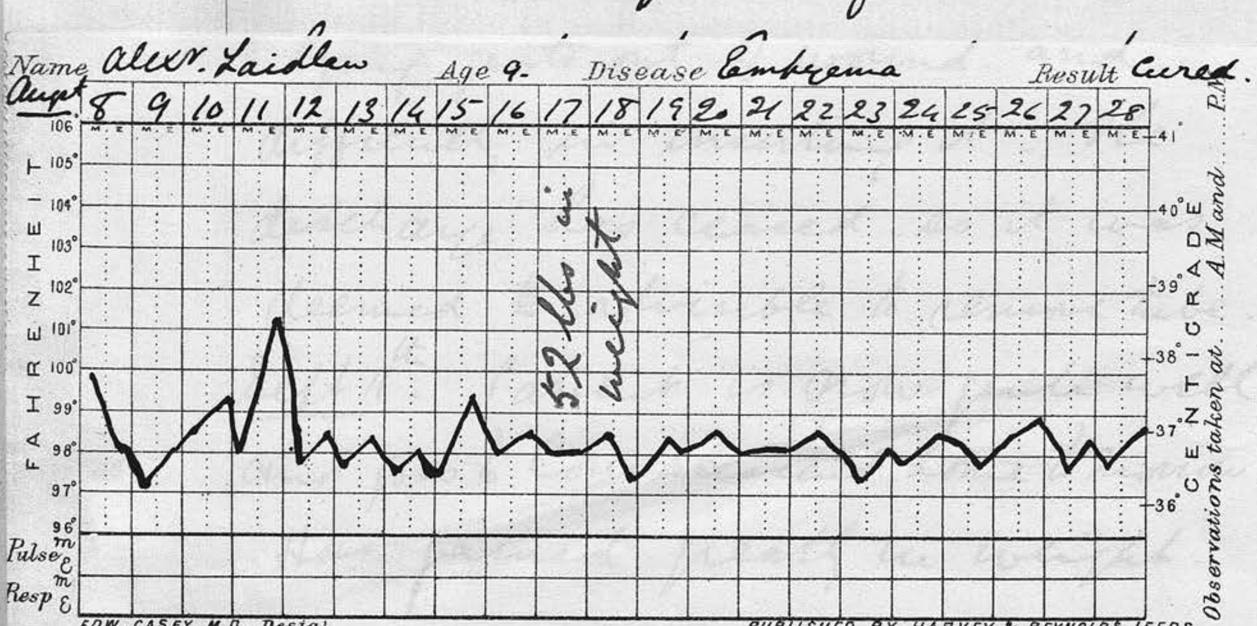
July 23rd. measurement of Left chest.
13 1/4 ins. Right. 12 3/4 same as on admission. Aspiriated again today but no pus drawn off evidently owing to Canula becoming blocked.
July 25th. chest incised to day. Incision made between 7th & 8th ribs just below Inferior angle of Scapula. about 14 ozs of perfectly sweet pus came away. Patient stood the Operation well. about 4 inches of large sized drainage tube inserted into pleural cavity.
July 27th. Patient doing well. was dressed twice yesterday. To day decidedly less discharge and the tube was shortened 1/2 an inch. patient now to be dressed once daily.
Percussion note now resonant all over the chest & the Respiratory murmur is almost normal in character over the Left side.



left side of chest very good & but little

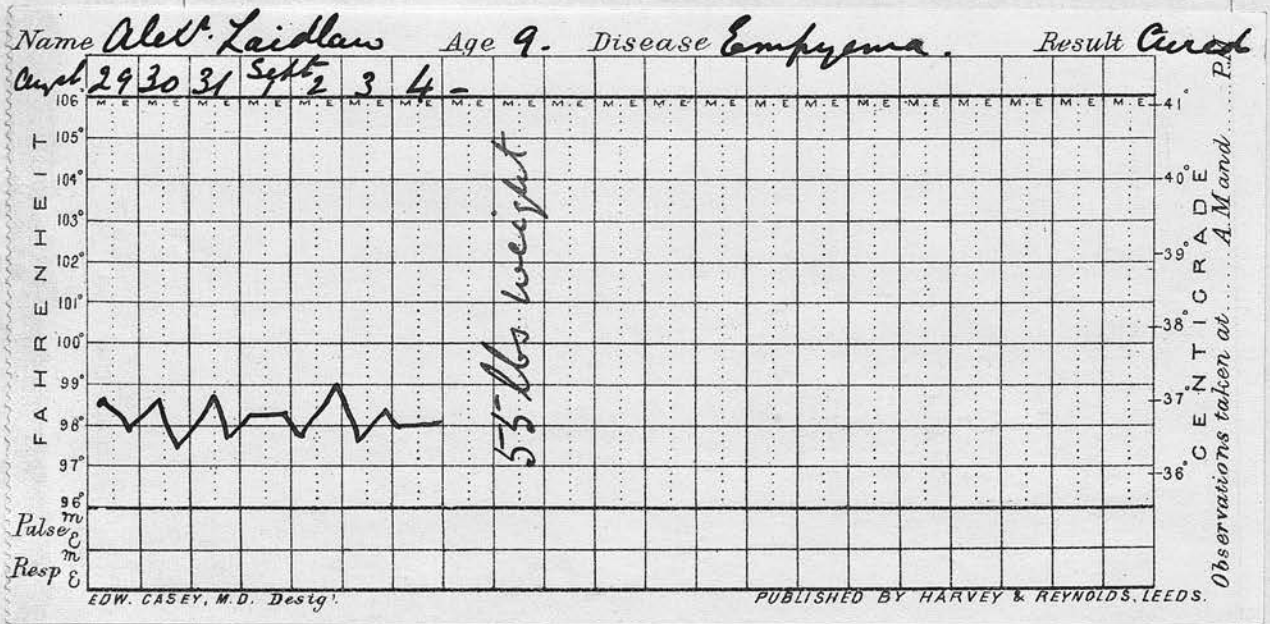


tube has always been found displaced



August 5th. Going on well - discharge much less - Tube shortened 1/2 inch. still being dressed daily -
August 6th - Steady improvement. almost no discharge - Tube still maintained, but difficult to keep in position - note on percussion all over left side of chest very good & but little different now that on Right side Intercostal spaces now all marked. Heart still no apex beat or pulsation to be seen or felt anywhere - No dulness now to right of sternum - Heart sounds normal.
August 8th. For last 3 or 4 days the tube has always been found displaced & lying quite out of wound. and difficulty in inserting it - The discharge has ceased - so it was deemed ~~&~~ advisible to remove tube.
Sept 11th. Patient is now quite well and goes to Convalescent home to morrow. Has gained greatly in weight.

Chest measurements. Left side 12½ in.
Right side 12¾. The Left side
having fallen in ¾ of an inch.
On palpation. Expansion seems about
equal on both sides. Vocal fremitus
fairly well marked on either side.
On percussion. Note is rather hyper-
resonant over Left apex anteriorly —
somewhat ~~dull~~ impaired over lower
third of Left Lung posteriorly. On
auscultation anteriorly breathing rather
feeble over Left apex. Posteriorly rather
feebler over Left base than Right base.
Heart. No apex beat to be seen
or felt — sounds normal.
Percussion now normal —



Case III.

Agnes Bypart. aetat. 4½. admitted to Dr Underhill's ward. Children's Hospital August 21st. 85. suffering from Old standing cough & swelling of the legs.

History. Last October patient had Bronchitis & Pleurisy which kept her in bed for 6 months. Child sweats a great deal. Abdomen & legs much swollen. Urine scanty. She has never been strong. No history of Measles or Pertussis. Parents & 3 other children healthy.

On admission. patient fairly well nourished and looks comparatively comfortable in bed. Chest seems well formed. Right side more prominent than Left. Abdomen distinctly distended & oedematous. especially the lower part which is pendulous. No ascites. Posteriorly there is considerable oedema. Legs also oedematous. Abdomen at level of umbilicus measures 24½ inches. Apex beat cant be felt or seen.

Examination of chest. At lower border of sternum chest measures 22 1/4 inches. at level of nipple 20 3/4 in. Right side 10 3/4. Left side 10. The Right side anteriorly appears the more prominent. Percussion anter: on Right side note fairly resonant while on the Left it is decidedly dull. Cardiac dulness merges with the Pulmonary dulness is imperfect to level of nipple but below that it is absolutely dull. Auscultation anteriorly - on Right side normal on the Left exaggerated breath sounds to level of nipple, below this they are feeble, distant & bronchial. occasional friction sounds over half of the chest, most marked at level of nipple ~~bra~~. Percussion Posteriorly on Left side note all over is quite flat, while on Right it is about natural. On palpation the vocal fremitus can readily be made out, more distinct on Left.

Auscultation Posteriorly - Left side - the breath sounds appear to be almost entirely abolished - While on the Right they are quite evident, having an inclination to be harsh in character - There is pitting on pressure of dorsal aspect of chest - Patient coughs a good deal.

Circulatory System - Heart sounds normal. Dull Cardiac dulness begins 3/4 of an inch to the Right of Right edge of the sternum - the dulness merging with the pulmonary dulness.

Apex beat at ensiform process of the sternum.

- Urine contained a little albumen. - It was difficult to make out any fluctuation in the abdomen but there was dulness in both flanks - An enlarged Spleen could be easily felt under edge of the ribs.

ordered Dr. Hydrag subchl. gr ii
Pulv Scamm Co gr v

to be taken to get rid of dropsy.
also a mixture of acetate of potash
and Tincture of digitalis as a
diuretic. Warm wet pack and
milk diet.

August 26th The Hypodermic needle
having been inserted the presence
of pus ascertained. An chest
was aspirated today and 6 oz
of extremely foetid pus with
some blood mixed drawn off.
The trocar inserted below angle
of Left scapula.

Sept. 11th - Aspiration being of little
avail. the chest was incised
today and about 5 oz of most
horribly stinking pus evacuated
the chest was afterwards washed
out with a weak solution of Boracic
acid. a large sized drainage
tube inserted and the wound
dressed with Corrosive wood
wool wadding. The incision

was made just below the Inferior angle of Left Scapula. Chloroform was the anaesthetic used.

Sept. 14th. as discharge from chest still continues very foetid, the Boracic acid injection changed for a corrosive sublimate solution 1 - 3000.

Sept. 28th. discharge from chest quite sweet now since the corrosive solution has been used. The drainage tube was cut short too soon with the result that a free exit of pus was prevented - a longer piece of tube inserted to day - Washing out of the chest stopped -

Sept. 30th. Temperature normal now. For the last 5 or 6 days it had gone up owing to non escape of pus - The dulness posteriorly much improved - patient's general health good - is getting Cod liver oil.

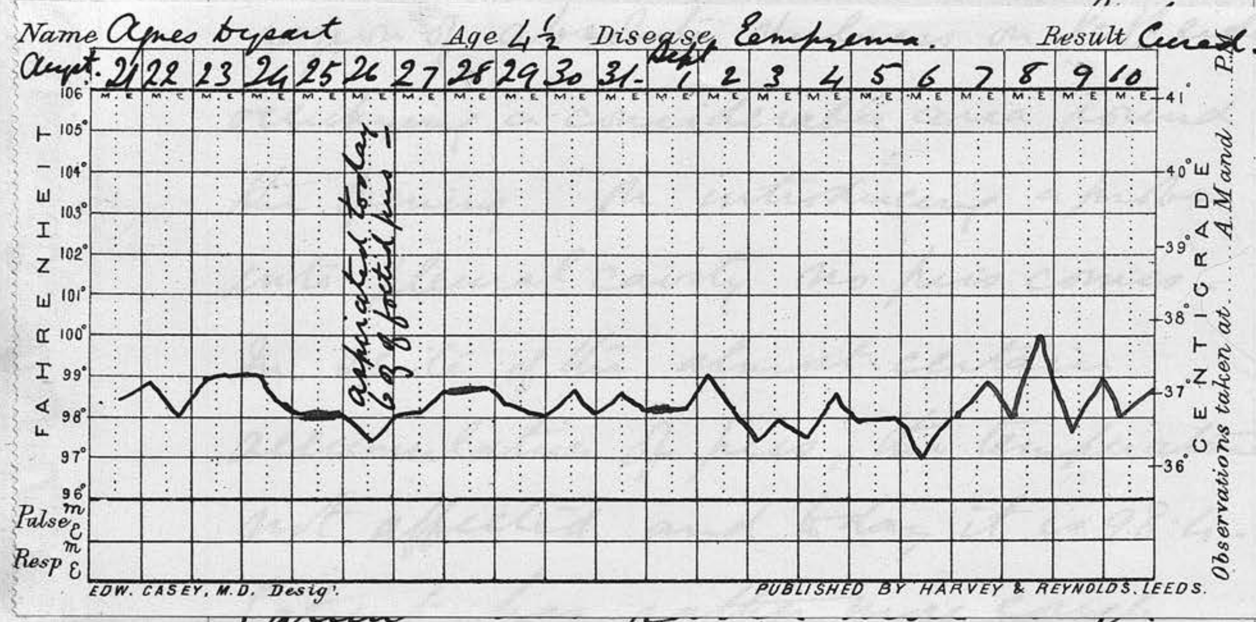
and chemical food. No albumen in the urine.

Oct^br 15^th. Temperature 102. To day chest again washed out with Corosive Sub: Chest still dull on percussion. On auscultation breathing not bronchial but is weak over all dull area - Chest expands to some extent & is about natural in shape, neither contracted nor extended.

Nov. 6^th - Patient has been going on well. dressed daily and discharge being but slight and not smelling. Last night at 8 P.M. the temp: rose to 101 - but this morning it was again normal.

Nov^br 17^th - Patient up and going about the ward. Temperature has fluctuated between 97-2. & 98-4. Last night 100-8. Since the 7^th dressed every day and discharge decreasing.

Nov. 18^th - discharge still small: but


Name Agnes Dysart
Age 4½
Disease Empyema.
Result Cured.
Augt. 21 22 23 24 25 26 27 28 29 30 31 Sept 1 2 3 4 5 6 7 8 9 10
aspirated today
FAHRENHEIT
CENTIGRADE
Observations taken at A.M and P.M.
Pulse
Resp
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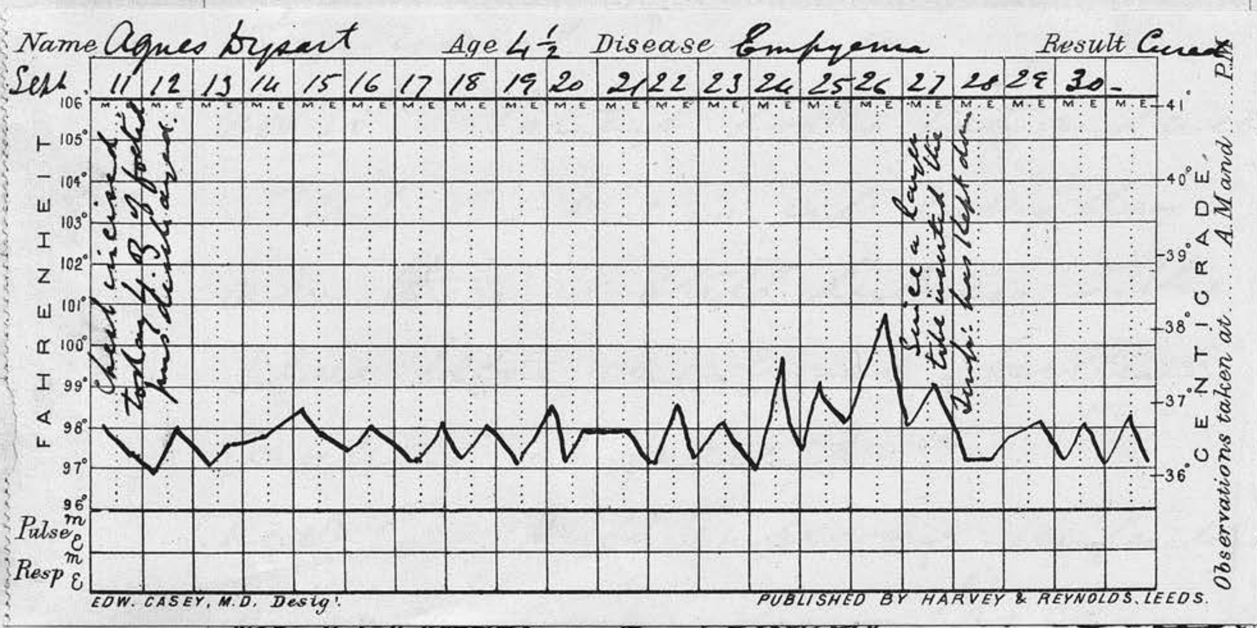
Name Agnes Dysart
Age 4½
Disease Empyema
Result Cured
Sept. 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Chest incised today
FAHRENHEIT
CENTIGRADE
Observations taken at A.M and P.M.
Pulse
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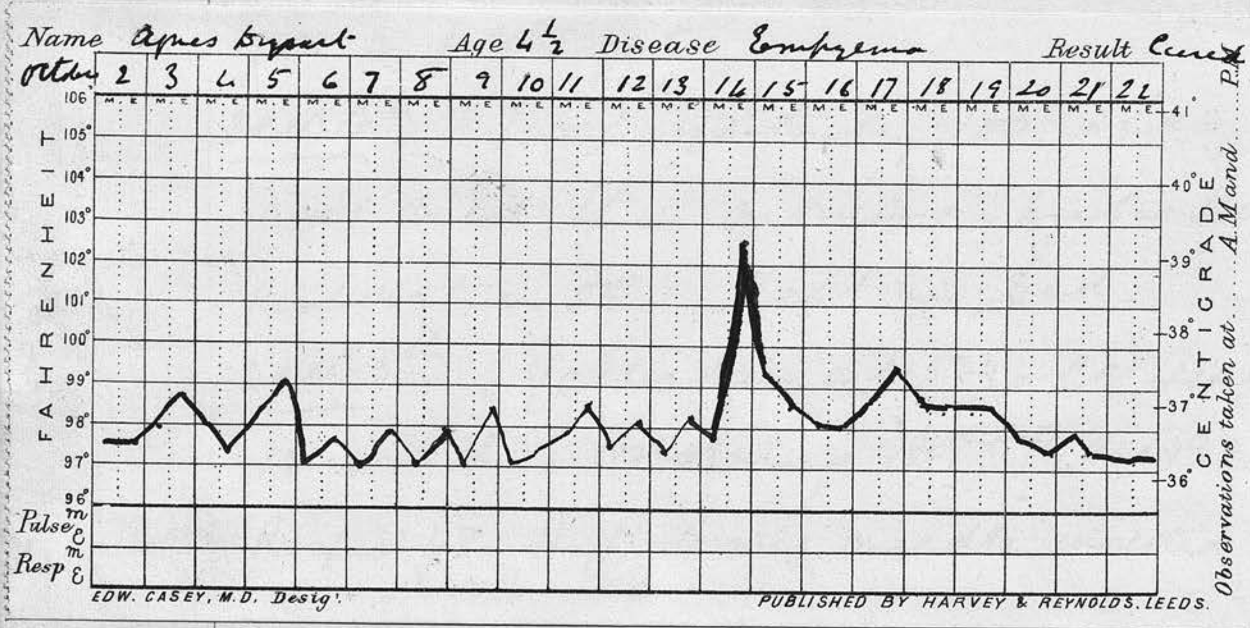
Name Agnes Dysart
Age 4½
Disease Empyema
Result Cured
October 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
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Observations taken at A.M and P.
Pulse
Resp
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region of absolute dulness on left side occupying a considerable area round the opening. On introducing a probe into pleural cavity no pus comes. In spite of the almost certain accumulation of pus, the temperature not affected and today it is 98·4. Patient has rather more cough than usual.

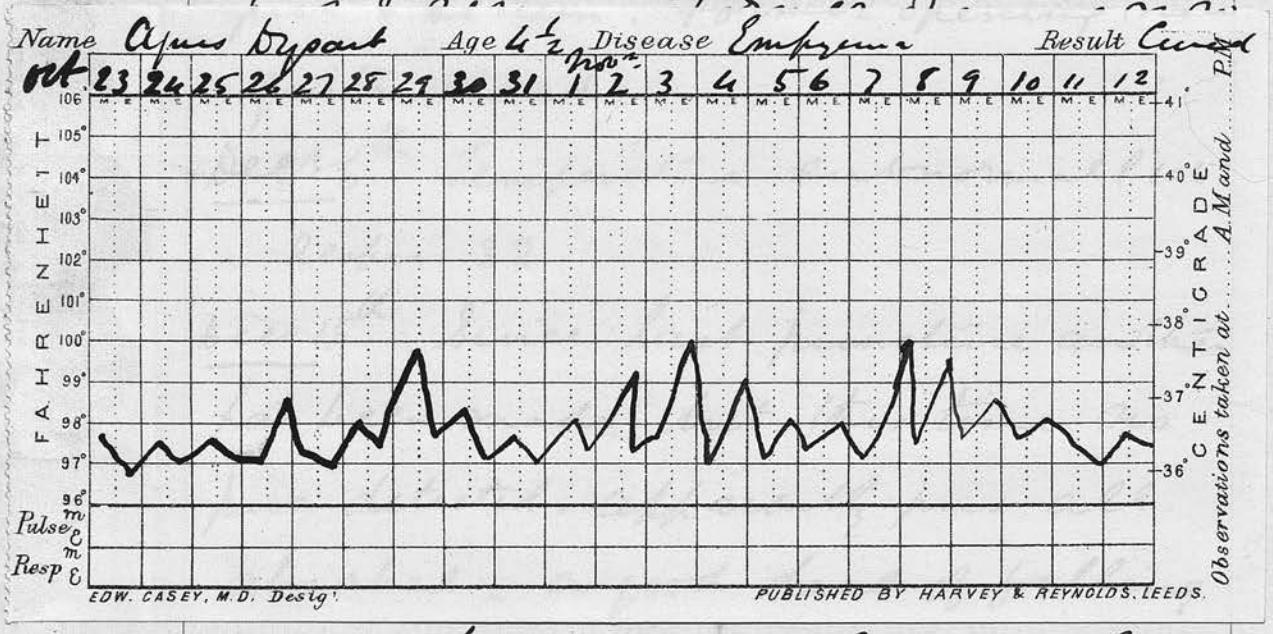
Nov. 20th. Patient looks fat and well - Temp: 98. she is out every day now. there is still dulness in the place before mentioned. Getting Maltine at present.

Dec. 1st. Still improving. Temperature subnormal - discharge has ceased for a fortnight.

Dec. 4th. Temp. yesterday 100. she was sick this morning - pulse 160. Respiration 55. Kept in bed.

Dec. 5th. Yesterday at 5-30 P.M. Temp: 101-6 - This morning 98-8. Pulse 132. Respi: 48. Hypodermic needle inserted

this morning, when it was found that pleural cavity still contains



in of Left side. Patient looks very well indeed.

Dec. 28th. Going about for some weeks apparently in the best of health.

January 2nd. Patient was dismissed today cured of Empyema - Weight 26 lbs. Chest measurement on Left at level of nipple is 9 inches. on Right 9 3/4 inches.

this morning, when it was found that pleural cavity still contains pus & serum. Former opening now quite closed.

Dec. 6th. Temperature subnormal P. 105. Respir: 32

Dec. 15th. Since last puncture another has been made, but this time no pus detected. apparently pus all absorbed - a good deal of falling in of Left side. Patient looks very well indeed.

Dec. 28th. Going about for some weeks apparently in the best of health.

January 2nd. Patient was dismissed today cured of Empyema - Weight 26 lbs. Chest measurement on Left at level of nipple is 9 inches. on Right 9 3/4 inches.

Case IV.

Janet Hogg. aet. 9. admitted to Dr Andrews ward. Childrens Hospital 19th. June. 85. (Report sent in by medical attend).

History "Patient got a chill 18 days ago, followed 2 days later by bilious vomiting, after which she was seen by doctor. Appearance then suggested Pneumonia strongly. Face flushed Temp: 103-5. Resp: 50-60. Pain Right base laterally intense cutting pain aggravated by a short cough. No marked physical signs on percussion or auscult: - 7 days from commencement of illness Temperature fell to normal. and there was very little rusty sputum? Since, the dulness of the R. Lung posteriorly has developed & within the past 3 days has progressed from below angle of Scapula to its present limits & the Temperature has shown a tendency to rise especially towards evening. "

- She had measles & pertussis when an infant - Otherwise always healthy - Father killed in an accident - Mother & rest of family healthy

Condition on admission. She is a delicate, anaemic looking girl. Fair complexion - fine skinned finger nails clubbed and she has a Tubercular look.

Respiratory System - Chest elongated & narrow - marked flattening of Chest as a whole - Left side expands more than Right - Vocal fremitus absent on R: ~~side~~ axillary region & posteriorly on R. side - Percussion Hyperresonant note in R: Infra-clavicular region - on L: side note resonant. On R: side in axillary region down to level of 6th rib the note is of a hyper-resonant character - below this it is absolutely dull - on Left side breathing is vesicular

no accompaniments - On the Right side breathing broncho-vesicular.

Posteriorly Spine is curved with its convexity towards the Left side. distinct flattening of R. side & the vocal fremitus is absent.

Right side dull from level of 5th dorsal spine downwards, this dulness extends into axilla, its upper border corresponding there to the 6th rib. On the Right side in lower part the breathing is distant & tubular - In upper part it is vesicular & somewhat staggered.

- Left side. note resonant and breathing vesicular.

- Circulatory & Urinary systems normal.

- On day of admission a hypodermic needle inserted posteriorly on R. side and pus withdrawn.

Diagnosis. Empyema - was ordered M. Syp. Ferri Phos
Syp Ferri Iodid aa ℥ii
dig ℥i ter in die -

June 29th. To day Dr Andrew aspirated the chest & drew off about 3 oz of pus.

June 30th Patient much better Temperature lower, hitherto it has varied much - from 98. in the morning up to 101 - 102 in the evening -

July 8th since 1st July. Temperature has varied from 98. in the morning to 102 in the evening - Chest filled up again - so Dr Andrew incised the chest on right side just below angle of Scapula and 6 oz of perfectly sweet pus evacuated - a large drainage tube inserted - & wood wool dressing applied -

July 30th Patient has made an excellent recovery - Temperature has been normal since the Operation and the dulness is much improved - Breathing not quite so

distant as previously - The wound was dressed daily and the tube was taken out on July 25th. She has gained considerably in weight. She has been taking 4 grms of the Iodide of Iron with Parrishs syrup since admission and since July 21st. 1 grain doses of Sulphate of Quinine thrice daily -

August 23rd. Up to present date there has been no return of the fluid in the chest - Note quite resonant posteriorly - The temp: has shewn a tendency to rise in the evening, but she is still getting the Quinine.

October 9th. Patient was discharged to day perfectly well - gained considerably in weight - and examination of Chest reveals no abnormality -

Case V.

Michael MacFarlane aet. 6.
admitted to Dr Underhill's ward in the Children's Hospital - Augt-11th-83.
History. Illness began 7 weeks ago. set in with vomiting & feverishness afterwards sweating at night.
loss of flesh. Has no definite complaint except general malaise - Had measles & Pertussis 2 years previous
Condition on admission - Face pale, no lividity but is an ill nourished child - has a slight cough there is no dyspnoea; breathing quietly and looking quite comfortable in his cot.
Respiratory System. Chest is well formed - Right side expands freely while the Left is nearly motionless.
Percussion of Left Apex reveals a hyper resonant almost tympanitic note - dulness begins at 4th rib on Left side anteriorly and is absolute below this level.

Posteriorly there was complete dulness
dulness below middle of the Scapula.
On auscultation the breath sounds
distant and feeble, but not
bronchial over the dull area
posteriorly - On Right side the
percussion note was resonant,
and on auscultation the breath
sounds normal but not
exaggerated -

August-13th. The chest was aspirated
to day. The trocar inserted just
below the inferior angle of the
Scapula - 5 oz of pus stained with
blood drawn off.

August. 19th. as a result of the
aspiration patient has improved
wonderfully, his general condition
being good - taking his food
well. Temperature normal.
On examination of the chest
the dulness has cleared up on
the left side. the air entering

the lung freely - there has been no return of the fluid

August 29th - Patient was sent to Convalescent home to day

Sept. 24th - Patient returned for further examination -
Both sides expand equally.
At left base there is if anything a slight impairment of the resonance - The Breath sounds are audible to the very base and no accompaniments.
- This has been a very successful case of Empyema cured by a single aspiration.

Case VI.

Thomas Jamieson aet. 6 years. admitted. February 5th. 85. to St Underhill's ward. Childrens Hospital. complaining of pain in the left side and of a short dry cough which has troubled him for a month or two.

History Patient till lately enjoyed good health. He took ill about 11 days ago with a chill accompanied by vomiting which continued all night. he also complained of headache. bowels were much constipated, not having moved for a week but 2 days before admission they had freely moved after an aperient. Family history good.

Condition on admission. patient is a delicate looking boy. fair complexion. long eyelashes. is not well grown for his age. no signs of Rickets. He lies on his left side and complains of pain in his left chest and has a short, hacking cough.

- On Inspection of the chest. it is found that there is considerable bulging of the left side and the intercostal spaces are obliterated - there is almost no movement of the left chest on respiration.
- On Percussion Ant. of the Left Lung there is tympanitic resonance for 2 inches below the clavicle. with this exception dulness is absolute over the whole lung. And on Auscultation over the dull area the breathing is distant & tubular in character while in the supra clavicular region it is vesicular but exaggerated.
- On the Right side anteriorly the note is full resonant and the breath sounds normal.

Posteriorly - The left side is dull almost from the apex right down to the base. the breath sounds are very distant and tubular in their nature. On the Right

side the note is resonant and the breathing vesicular and somewhat exaggerated

- Circulatory System. Apex beat seen to be pulsating under the right nipple. and there is also a diffuse pulsation to be felt under Xiphoid cartilage - Heart sounds normal. The Cardiac dulness merges with the Pulmonary

- Other systems normal.

February 10th. The chest was aspirated today and 7 oz of moderately thick pus withdrawn

- February 18th. - dulness absolute over whole lung. no change in the position of the Apex beat.

- February 19th. It was intended to incise the chest today, but it was found that there was tympanitic resonance also on axillary line.

February 21st. Tympanitic resonance extends to 1/2 an inch above nipple. There is then dulness for one inch below this. Over upper area of resonance breath sounds are heard but, none over lower area. Posteriorly absolute dulness over whole lung.

February 24th. Tympanitic note can be heard down to 1/4 of an inch below spine of Scapula on the left side. Below this point it is quite dull.

March 15th. A free incision was made ~~today~~ on left side posteriorly in the 7th interspace and a large quantity of fluid evacuated. A drainage tube inserted. Chloroform was the anaesthetic used.

April 6th. Patient has made an uninterrupted recovery. Is looking well and has

gained in weight. Temperature normal. The drainage tube acted well and was shortened after a week. To day the discharge is so trifling that the tube was ordered to be discontinued, and patient allowed to get up. A moderately resonant note can be heard all over the Left Lung and the breath sounds can be distinctly heard accompanied at different points by friction sounds.

April 22nd. The patient was discharged to day cured. The heart is still a little displaced but not much.

Empyema means literally a collection of pus in the Pleural cavity, which may either be general, filling up one or other side of the chest, or it may be localised, being bound down by adhesions.

It may occur at any age but, is especially common in children.

Causes. It may ~~be~~ arise as the result of some injury to the chest wall. I saw a lad lately who was suffering from a serous effusion in his chest as the result of a kick, and we can understand how readily this might have become purulent had the condition not been recognised.

The most common cause however is when an Empyema is the outcome of a simple serous effusion which has

been set up in the course
of some acute illness such
as Scarlet fever or Acute
Rheumatism, or as the result
of exposure to cold & wet,
or when the effusion has
followed an attack of Pneumonia.
An Empyema may arise as the
result of the presence of a foreign
body which has become impacted
in a bronchus - or again it may
arise as the result of an abscess
connected with disease of the
ribs or sternum, or from disease
of the cervical or dorsal vertebrae.

Symptoms. The first thing that strikes one on looking at a child suffering from Empyema is the pallor of the face which is not unlike that seen in Bright's disease. Dr Eustace Smith lays great stress on this, he says "that the straw like colour of the countenance is extremely suggestive of the presence of pus in the chest." Unless there is a history of an acute illness at short time previous there is usually an indefiniteness about the symptoms. The child may lie quietly in bed, breathing easily, even although there may be a considerable quantity of pus present and with its heart displaced, and it may be able to lie on either side — As a result of the continued presence of pus a well marked

lateral curvature is commonly
met with, this being found
in Alex. Laidlaw. Case. II
and Janet Hogg. case. III.
The temperature is generally
raised somewhat, especially
in the evening — but in chronic
cases not unfrequently it may
even be subnormal, as in Aggie
Bypart. Case III.
As the case goes on the child
becomes gradually emaciated
appetite variable. complains
of pain in the side and there
is usually a slight cough
Pulse quickened. Night-sweats
are common and diarrhoea
is also of frequent occurence
in Empyema.
When the disease comes on
after an acute illness such as
Pneumonia then the symptoms
are more marked.

The child looking flushed and ill - breathing quickly - temperature remaining high after the subsidence of the Pneumonic attack - sweating at night - the dull area of the Pneumonia instead of clearing up becomes more marked than before. And then as the case progresses there will be seen the bulging of the chest wall with diminished movement of the affected side. - There may be oedema of the legs and not unfrequently a trace of albumen in the urine which however soon clears up.

Physical Signs must be carefully gone into for they are much more perplexing than in the case of adults, for instance the vocal fremitus is such an uncertain quantity that the absence of it must not be too much insisted upon, for at best of times it is very variable in the child. And again, although we find in the adult absolute loss of the breath sounds on the affected side, we often get bronchial breathing all over the dull area in children. So that to come to a correct diagnosis of the presence of fluid in the chest the different physical signs along with the symptoms must be taken together..

By <u>Inspection</u> much may be learned.
In a typical case we find that there is an impairment of movement on the affected side which is somewhat distended, and the intercostal spaces obliterated. Dr Gee has pointed out that the affected side is more circular than normal — If the fluid be in great quantity then we shall find that the adjacent organs are displaced. Liver & Spleen pushed downwards; and if the effusion be on the left side the apex beat may be seen pulsating over to the right of the sternum. or it may be a right sided effusion when the apex beat may be seen at a great distance to the left of the mid sternal line than usual. In Dr Eustace Smith's experience displacements of the heart are quite as common in children as in adults.

Palpation of the chest is not of much use in helping us to a diagnosis in the child.
Percussion on the other hand is of the greatest moment.
There is complete dulness on the affected side, with increased sense of resistance - this dulness varies with the position of the patient unless of course the pus be circumscribed by adhesions.
The percussion should be done very gently for on account of the resiliency of the chest wall the fluid is apt to be displaced, so that a resonant note is got when in reality the note should have been dull.
Another point to be attended to is to carefully examine the apex of the affected side for what is known as Skoda's tympanitic note, this is a high pitched, hyper-

resonant note and is often perplexing unless one knows about it.

As fluid tends to fall to the most dependent parts the dulness is commonly at the base and the alteration of the percussion note on change of position is a very valuable sign.

If Percussion presents difficulties in the child much more so does Auscultation. For while in the adult on the affected side the breath sounds are weak and distant and sometimes quite inaudible with an absence of vocal resonance, and although in some cases in children we get the same signs, yet it is more common to find bronchial breathing all over the affected area; ~~but~~ which, however, it is well to notice is almost always weaker and more distant than on the opposite side.

The auscultatory phenomena however vary so constantly, sometimes being bronchial at others vesicular and are so puzzling that too much reliance should not be placed on them. This variation in the breath sounds I found very frequently in the cases in the Children's Hospital.

Progress of the Case. Pus in the chest is very slowly absorbed and only if it be small in quantity but, if be large in amount and unless we remove it several things may happen. The Pus may by its continued presence in the pleural cavity so irritate the lung substance that it burrows its way to a bronchus and thus is expectorated and several cases are recorded in which a cure has taken place in this way.

But a much more common condition
is when the pus points externally in
one or other of the interspaces
. The 5th Interspace anteriorly just
below the nipple is a common
place for Empyemas to burst.
. The contents of an Empyema vary
much in their nature
. The pus may be thick or again
it may be thin and watery or may
be mixed with blood. In
an ordinary unopened Empyema
the pus is sweet but when there
has been a communication with
a Bronchus or if it has burst
externally then the discharge
may be extremely foetid.
In those cases of Empyema which burst externally
after the first discharge of a large quantity of
pus, the case tends to become chronic &
may extend through a long course of years,
discharging a variable quantity of pus
through one or more sinuses

In many cases cure of the disease takes place by a natural process. The pleural cavity becomes lined by a layer of granulation tissue and the contraction of the fibrous tissue thus formed draws together the walls of the cavity and tends to obliterate it. The chest wall falls in to its fullest extent, the spine curves in, the apex becomes drawn in, the diaphragm rises and the heart with the opposite lung are to some extent drawn over to the affected side. The cavity is thus encroached on from every side and the formation of fibrous often completes the obliteration. It will be easily understood how much more likely this cure will take place in children than in adults. In some cases however after a long course the end is unfavourable The usual consequences of long continued suppuration supervene. Progressive emaciation, lowering

rises of temperature, diarrhoea and night sweats indicate the presence of hectic fever. The Liver, Spleen, Kidneys & Bowel becomes affected with Waxy disease and we get Ascites and increasing albuminuria. These along with the continuous purulent discharge rapidly wear away the strength and hasten on the end.

Other dangers may also occur in the course of the case. The entrance of Septic material in such a large cavity may set up irritative fever and even a general Septicaemia.

At any stage of the disease Tuberculosis may arise, the general condition of the patient predisposing to it.

Diagnosis. In coming to a diagnosis we have to weigh thoroughly the various physical signs - such as the help gained by inspection, the deficient expansion of the affected side, the bulging of the intercostal spaces, - the pasty look of the patient & the marked dulness on percussion - But to decide whether the effusion be simple or purulent is often a matter of great difficulty - we must go into the history of the case, whether the illness has come on after an attack of fever - such as Scarlatina or measles or after a Pneumonia and attention should be paid to the general symptoms - night sweats, diarrhoea - and the clubbing of the finger nails. Information is sometimes to be gained from the temperature, but too much reliance is not

to be put on the an elevation of
the temperature for we may
get it raised in ordinary
serous effusion and many
purulent effusions have a
subnormal range.
Dr Wilks says "that local dulness
with distant tubular breathing or
absence of the breath sounds
persisting after an inflammatory
attack in the chest indicates
the presence of a local empyema"
— The only way to settle definitely
whether the fluid in the chest
be serous or purulent is
by inserting a hypodermic needle—
This was done systematically in
the cases in the Childrens
Hospital

Prognosis. The presence of pus in the chest is a much more serious condition than when the fluid is simply serous, but although in the adult an Empyema is always a cause for much anxiety and the results of treatment not [redacted] generally very satisfactory, it is otherwise in the case of Children;- several causes operating to such a result. The recuperative power is much greater in the child than in the adult, the tissues seem to have a greater power for absorbing not only serum but pus, as for instance [redacted] certain cases of Empyema being cured by absorption without any interference either by aspiration or incision- Another cause also is the fact that the chest walls are less rigid than in adults and the lungs

very ethausible.
The prognosis however depends on the extent of the effusion. whether it be foetid or not and also the length of time the pus has been in the chest.
Localised empyemas are more favourable than general ones.

Treatment. This is usually very successful, provided the child be not too much exhausted before it comes under our care.

Having diagnosed the case to be one of Empyema by previously inserting the hypodermic needle and making out the character of the fluid. The question comes how shall we treat the case?

Now! there are several methods by which we can get rid of the presence of pus in the pleural cavity.

Firstly we may aspiriate the chest. and this is well to do in all cases of Empyema before doing anything more radical. Dr Bowditch has had good results from this method of treatment so also has Dr Barlow, and Goodhart

had 5 successful cases by aspiration and in one of mine. Case V (Michael MacFarlane). after a single aspiration and when 5 oz of pus were withdrawn – a very successful cure resulted, the pus not being reproduced.

Aspiration is most successful when the Empyema is localized and the pus is small in quantity in young children.

Aspiration is indicated when the symptoms are very urgent.

The operation is a simple one but there are several precautions to be taken. It is recommended that the patient be placed in a semirecumbent position.

The back should be thoroughly washed with some antiseptic solution and the site fixed for the insertion of the needle.

Dr Bowditch who is a great

authority, recommends that the needle should be inserted in the interspace just below the angle of the Scapula unless of course the Empyema be loculated - A very convenient plan for preventing any pain on the introduction of the needle, and which I found very useful in my cases in the Hospital, was to freeze the skin with a mixture of ice and salt. This rendered the subsequent passing of the instrument absolutely painless. Cocaine would also be very useful but I have not had recourse to it -

The aspirating apparatus must be thoroughly clean, and it is well to see that it is acting properly before the needle is introduced into the chest. The needle ought to be lubricated with Carbolised oil.

An aspirator made by Dieulafoy of Paris is the one I have seen most commonly used.

The Now in aspirating we must be careful not to draw off the fluid too quickly nor should we endeavour to withdraw all the fluid at the one aspiration. On these two points all authorities agree - Fatal cases are recorded in which death has resulted from the aspiration being done too hurriedly, death occurring from Syncope. Death has also resulted from asphyxia, for when the fluid is drawn off from the chest there is an afflux of blood to the capillaries not only of the affected & compressed lung but, also in those of the sound side thus leading to a sudden oedema which has not unfrequently proved fatal. Again a cerebral embolism may

occur due to a sudden disengagement of fibrinous clots which have formed in the pulmonary veins of the affected side the clots being liable to become detached as a consequence of the expansion of the lung. (Eustace Smith. page. 458.) I have never seen any such dreaded results but still I have thought it right to mention them to shew that aspiration may not be such a trivial operation as some would have us believe. Aspiration tends to prevent the collapse of the lung, and as I have before said it is right that we should always give it a trial, but if after one or two aspirations we find the chest rapidly filling again, then it is useless to waste time, for the longer the illness has lasted the smaller is the chance of the lung

standing fully when we have ultimately to incise the chest, the long continued presence of pus destroying the elasticity of the lung. Having thus spoken of Aspiration I pass on to the second method of treatment viz Incision of the Chest wall and the insertion of a drainage tube. This is a method of treatment which in children has yielded most satisfactory results.

By incising the chest we give free vent for the escape of pus, treating the pleural cavity on the same principles as we would an abscess.

If precautions were needed in simple Aspiration not to withdraw the fluid too quickly for the reasons I have already stated, much more are they applicable and necessary to remember when

the chest is incised; for when the opening is made and if pus be present in any quantity it at once rushes out, thereby bringing about a great difference in the intra-thoracic pressure; and for these reasons Dr Goodhart very wisely I think, recommends a preliminary aspiration before the chest is incised -

Some authorities recommend that in addition to incising the intercostal space, a portion of a rib should be excised so as to facilitate free drainage and to permit of the finger being introduced into the pleural cavity and thus the better able to make out its condition.

Mr Rickman Godlee, who has written much on the surgical treatment of Empyema, advocates this procedure.

I have not seen this operation performed nor was it done in the cases under my charge in the Children's Hospital. It might perhaps have been useful in the case of Agnes Bryant (Case III) who had such a protracted stay in Hospital, and in whom it was necessary to wash out the Pleural Cavity on account of the foetor of the discharge. By excising a portion of one of her ribs a larger opening would have been made ~~xxxx~~, thus enabling the canula connected with the douche to be easily passed. In the case of Janet Hogg too (Case IV) the ribs were so closely apposed to each other before the chest was incised that it seemed as if she would have been a suitable case for the excision of a portion

of a rib to allow of a larger drainage tube ~~to~~ being inserted — Yet, when the incision was made and pus escaped it seemed quite surprising when we were able to introduce a tube of the largest calibre, the intercostal spaces beeming as a result of the escape of the pus quite distinct.

I met with a similar condition in a case I saw lately in practice in Carlisle.

Details of the Operation.

The patient being put under an anaesthetic — (Chloroform being the most suitable to use in cases of Empyema as Ether is apt to set up excessive bronchial secretion from its irritating effect on the Lungs ~~AAAA~~ which would not be a pleasant complication to have in the Surgery of Lungs)

The child should be turned over on its sound side - the skin thoroughly cleansed & the arm raised but not at too high an angle as after it is depressed the opening may be valvular. The site usually recommended for incision is the interspace between the 7th & 8th ribs posteriorly, but of course this entirely depends on the nature of the Empyema.

The incision should be freely made right down to the intercostal fascia - then a smaller opening made in the fascia which is enlarged by expanding a pair of dressing forceps inserted into it - When the chest is opened the pus rushes out and it is at this stage considerable care ought to be taken. The pus should be allowed to ooze underneath a carbolised rag

placed over the wound,
Then a large sized piece of
drainage tube with a flange
at the end to prevent it being
lost in the chest is inserted
into the wound which is then
dressed with an antiseptic
dressing. Some use Carbolic gauze
others absorbent wool. Moss fabric.
I think wood wool wadding
is as good a dressing as any.
The treatment should be carried
out with full antiseptic precautions.
The wound should be dressed
twice the first day and at
least once daily after that.
depending however on the amount
of discharge. The tube requires
to be shortened in a few days
but of course it depends also
on the amount of discharge, it
is a mistake to keep the tube
in the chest too long as by its

presence it is apt to keep up
suppuration.
. The temperature chart indicates
with remarkable precision the
effect of the free drainage of pus,
. the first effect being that the
temperature falls and keeps
down as long as the tube keeps
patent. Should the temperature
however shew a tendency to
rise then we may suspect
that the tube is not acting
properly and it will be necessary
to insert a longer one.
It is usual ~~#~~ at the first
to introduce a good length of
tubing - about 4 inches long is the
average -
In extremely foetid Empyemae
it may be necessary to wash
out the pleural cavity with some
antiseptic solution.
Richman Godlee in his article in

"Lancet" of January. 1886. mentions several cases of death as a result of the washing out of the chest. a comatose condition setting in shortly after the injection and ending fatally. Such conditions are said to be due to Embolism by some, and by others as being the result of a reflex nerve storm but the matter is not definitely proved.

In Aggie Bryant (case III) much benefit was derived from the injection of a weak Solution of Corrosive Sublimate. (1 - 3000).

But as a general rule the Washing out of the Pleural cavity in ordinary cases is not advisable —

In the operation for excision of a portion of a rib the incision is made as before but at a higher level. and it is well to make

another cut vertical to the parallel one thus ⊥ — the periosteum is raised and about 1½ of rib removed — the continuity of the rib is soon re established. ("Godlee")

In addition to this Operative treatment the general health of the patient is to be attended to by means of Good food, Tonics such as Iron & Quinine, Codliver oil, Maltine &c. And the child should not be kept too long in bed for change of position by allowing the chest to expand freely, aids the expulsion of the contents of the Pleural Cavity.

In chronic cases of Empyema in which a fistulous opening exists and has discharged for a long time shewing no indication of closing up an Operation (Estlander's) has been devised by which portions of several ribs are

excised so as to facilitate the falling in of the chest wall
This method has not been very generally successful and I have not seen it performed in children. It will be rarely necessary if by the early recognition of the presence of pus in the Pleural Cavity we are prompt in our treatment. For in simple incision or by the excision of a portion of a rib we have an operation which has yielded the very best results.

It is sometimes necessary to make a second opening after a time when it is found that pus continues to collect, & this can readily be done by passing a probe from the first one up to the selected spot and cutting down upon it, and then passing a tube

through -

The other methods of treatment of Empyema by means of ~~tapping~~ with a Trocar & Canula or by passing a tube through the canula and draining by syphon action are so seldom used that I have simply mentioned them. They will not had recourse to in the Children's Hospital - In conclusion it seems to me that in few diseases of Children do the results of treatment afford so much satisfaction as in Empyema and repay to such an extent the care and attention of the Medical attendant -

In reading up this subject I have consulted the following works -

Eustace Smith's and Goodhart's "Diseases of Children"
Hilton Fagge's Text book of Medicine & Quain's Dictionary of Medicine
Holmes & Erichsen's Systems of Surgery.
and Godlee's articles in the "Lancet" January - 1886 -