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BRONCHO - PNEUMONIA .
IN CHILDREN.

A THESIS for the DEGREE of M.D.

by

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BRONCHO PNEUMONIA IN CHILDREN.

Conclusions drawn from the personal observation of forty one (41) cases at the Royal Hospital for Sick Children, Edinburgh, and from the study of some of the records of the hospital.

BRONCHO PNEUMONIA : also known as CATARRHAL or LOBULAR pneumonia is essentially the pneumonia of children. The great majority of cases of primary pneumonia occurring during the first three years of life are of this type, and so also are practically all cases of secondary pneumonia during the first seven or ten years. Broncho pneumonia is only a term used to describe the lesions associated with several different forms of bacterial infection of the lungs, and does not describe any one disease.

The mortality is extremely high, because the resisting powers are weak during infancy, and because the disease is so often secondary to the acute infective diseases.

ETIOLOGY.

The SEX of the child has little or no influence/

influence on this disease. Authorities differ, Goodhart claiming a greater frequency among females, Holt on the other hand states that the proportion is five males to four females. From the records with which I propose to deal carefully, and the cases I have had under my own care, I find that 87 males were affected against 83 females. During the years 1897-1906 there were treated in this hospital, 830 cases of broncho pneumonia; 420 of these were males and 410 were females. Thus a slightly greater proportion of male children suffer from this illness.

The SEASON of the year has little marked influence, as cases present themselves at all times. My figures show a greater prevalence in November than in any other month; and in early winter and late spring. This may perhaps be explained by the extremes of climate being most frequently met with at these times.

Jany.	Feb.	Mar.	Apr.	May	June
7	11	9	15	16	11
					Total 172.
July	Aug.	Sept.	Oct.	Nov.	Dec.
14	13	12	19	29	17

SURROUNDINGS: Broncho pneumonia is not confined to any one class or race of people. It is more commonly observed among the poorer classes, and, even among hospital/

hospital patients, it is noticed that the poorest of all suffer the most severely. This latter fact is to be explained by the poverty causing lack of the attention necessary to the child, and to the poor quality of the food which is provided for the family. The feeding question was graphically expressed by one mother, who stated that her baby had been brought up on "the rough of the house": closer questioning revealing the truth of the description.

The callous manner, in which children are regarded by such parents, is responsible for much of the severity of the cases seen, as so many are regarded as only a severe cold, and little notice taken until they are prostrated. Uneducated people again can not be brought to regard measles and whooping cough as dangerous diseases, and so they take practically no precautions to avoid the complications and after effects, of these illnesses. We see so many cases of broncho pneumonia, otorrhoea and its crippling effects, phthisis, and other illnesses all dating from attacks of these ailments.

DIRECT INFECTION also takes place, to judge by the number of cases seen, in which two or more members of/
of/

of a family are attacked within a few days of each other. Dr Ker mentions cases which have occurred at the City Fever Hospital, and which clearly demonstrate that direct infection must take place.

In L'Hospice des Enfants Assistés, Paris, the mortality among the children suffering from measles has been reduced by half, by isolating the cases complicated with broncho-pneumonia. This being so, it is easy to see how much more prevalent the disease will be in the crowded houses of the poor, where a whole family of even ten or twelve people are herded in one, or at most two rooms.

AGE: The condition is essentially one of early childhood.

The greatest number of cases occur in the second year of life; but the numbers during the first year are not very many fewer: although they have a much greater mortality. From the second year onward the number of cases rapidly diminishes and the severity of the disease is markedly lessened.

The following table is composed of the records of my own cases, of a table from Holt, and of the Hospital Records.

AGE/

HOSPITAL RECORDS
1897-1906

AGE	PERSONAL	HOLT	
0-12 months	47	202	281
12-24 months	58	102	317
24-36 months	29	33	232
36-48 months	21	6	
Over 48 months	15	3	
Totals	1170	346	830

Holt in his figures expressly excludes all cases secondary to measles, diphtheria, and scarlet fever. Measles very seldom attacks children under six months of age, and this may in some part explain the discrepancy.

When one considers the previous history, it will be found possible to divide nearly all cases into PRIMARY and SECONDARY.

PRIMARY are those, which give a history of comparatively good health during the period immediately preceding the onset.

SECONDARY are those, which give a history of some recent illness such as measles, or are at the time suffering from some other complaint.

PRIMARY cases may again be divided into those suffering/

suffering from Rickets or Congenital Syphilis, and those who are free from constitutional taint.

RICKETS: Is extremely prevalent amongst the class of people from whom the great majority of Hospital patients in Edinburgh is drawn, and it is stated that 50-60% are thus affected. I find that 92 or 54% of my cases of broncho Pneumonia showed well marked signs of rickets, and I think this proportion would be much greater if the minor symptoms had been considered.

CONGENITAL SYPHILIS on the other hand was noted in only one case. Of the cases in which no secondary cause could be traced, numbering 54, only 28 showed no signs of Rickets or Congenital Syphilis, and these constitute the true Primary cases, giving a percentage of 16.4.

FEEDING: I find it impossible to arrive at a satisfactory conclusion, as to how many children are brought up on the bottle. Of my cases of pneumonia, however, 59 or 34% were only three months or less on the breast, and 34 of these were entirely bottle fed. This proportion seems to be unusually large and is I think an important predisposing factor.

SECONDARY/

SECONDARY: -

BRONCHITIS often immediately precedes the onset of pneumonic symptoms and it must then be reckoned merely as an accompaniment. It is undoubtedly an important predisposing factor: but the way in which it is merged into pneumonia precludes the possibility of definitely reckoning the number of cases in which it is really causal. Many, however, have a definite history of having had previous attacks of bronchitis, sufficiently severe to impress them in the parents' memory, and some mothers state that every cold or chill immediately goes to the chest. 83 Cases were secondary in origin, and 32 of these or 32.5% had suffered from bronchitis on one or more occasions. One attack of broncho pneumonia does not confer immunity on the patient, and this is proved by 19 patients, or 11% having had one, or two previous attacks. There is lessening of the powers of resistance, rather than an increase as all these latter were severe cases, and none recovered who were attacked for the third time.

DIARRHOEA is a frequent precursor, and this is commonly accompanied by vomiting.

Of the secondary cases 33 (39.8%) gave such/

such a history.

MARASMUS: Marasmic children, who so commonly die from broncho pneumonia, can scarcely be placed among either primary or secondary cases, as the former are confined if possible to those who have been healthy previously, and the latter to those with some definite predisposing cause. Wherever put, they are almost invariably bad cases, and rarely recover.

INFLUENZA, though so common in American statistics and records, is rarely mentioned among my cases; in fact I have had only one which may have been secondary to it.

TUBERCULOSIS, or rather tubercular broncho pneumonia is in reality an entirely separate condition. Some, however, clinically group themselves with broncho pneumonia owing to the difficulty of diagnosis. I can instance six of these.

OTORRHOEA, SORE THROATS, and ENLARGED GLANDS in the neck apparently are not likely causes, but they appear often in the histories of patients, quite 12% having had trouble from one or more of these conditions.

INFECTIVE/

INFECTIVE DISEASES cause a very large proportion of the Secondary cases, but of course these are mostly treated at the City Fever Hospital. We get many, however, secondary to measles and pertussis. A common history is one of "ailing since the measles", or "dwining since the cough". We also admit, and treat at times, patients, who are probably suffering from pertussis and pneumonia. This is due to the suppression of the whoop, and to a paroxysmal cough not being in itself diagnostic of pertussis. A previous history of pertussis in 7 cases or 9%, and of measles in 22 cases or 25% was obtained.

Of broncho pneumonia as a complication of other acute diseases, I have had no practical experience, and will only quote from authorities when comparisons are necessary.

Overlapping of the above figures may be seen: but it is impossible to avoid, owing to the difficulty of saying which is the more important, if more than one of the above mentioned conditions is present.

PATHOLOGY/

PATHOLOGY.

The pathology will only be superficially discussed owing to many reasons. The chief reason is the difficulty in obtaining first hand Post Mortem data. In addition to the reluctance of the parents to give the requisite consent to the examination, there is the fact, that many are unable to pay the cost of the burial of their children. When the funeral is in the hands of the Authorities sections are only granted when the judicial Officer of Health is not satisfied as to the actual cause of death.

BACTERIOLOGY: is rendered difficult in children owing to the sputum being seldom expectorated before seven or eight years of age. This compels dependence on swabs taken directly from the region of the epiglottis, and results in my hands have been unsatisfactory.

The investigation must be difficult, and I cannot find many references, even in books devoted to children.

The most common organisms are the micrococcus lanceolatus of Fraenkel, usually known as the pneumococcus, streptococcus pyogenes, staphylococcus aureus, and the pneumo-bacillus of Friedlander.

The pneumococcus is found alone, or with a streptococcus/

streptococcus in the majority of Primary cases. M. Wollstein found that this organism was present alone in nine, with a streptococcus in seven, and with a staphylococcus in one out of a series of 19 Primary cases. A streptococcus, and staphylococcus were present in the other two cases.

In the 14 Secondary Cases the pneumococcus was found alone in two, with other organisms in nine. In the three in which it was not found a streptococcus was present.

To sum up records from West, Netter, Horton Smith, Weichselbaum, Mosny, and Wollstein.

One hundred cases recorded give the following results.

The pneumococcus was found alone or with other organisms in 52.

A streptococcus in 48, a staphylococcus in 20, Friedlander's bacillus in 8, and the tubercle bacillus in 7.

The pneumococcus was found alone in 30, streptococcus alone in 19, but none of the others were found unaccompanied.

The majority of Primary cases are thus due to the pneumococcus, and to a pure infection. The Secondary cases are seldom due to this organism alone and/

and a streptococcus plays the more important part especially in those following measles, pertussis, and such illnesses.

LESIONS: in considering these, difficulty arises from confusion between the various methods of classification, which have been adopted from time to time.

Both clinically and pathologically there are diverse ways of recording cases, and latterly another difficulty has been added by the attempt to make a separate disease of some border line cases under the heading of capillary bronchitis.

Post mortem there are no external signs to guide one to a diagnosis. Post mortem rigidity comes on early, and lividity is also marked early on the dependent parts of the body, more particularly in the lumbar region.

On opening the thorax, superficial examination of the lungs may show very little. There is, in some, a small amount of fluid in the pleural cavity but in uncomplicated cases the amount is never great: a fluid, if present may be a trifle bloodstained.

In the cases with acute onset and rapid course, the lungs may only show acutely congested areas, and the presence of pneumonia, though suspected/

suspected, must be proved by microscopic examination.

If the patient has been more resistant, or the disease less virulent, minute scattered affected area may be seen, and felt. A further stage has been reached and the affected lobules are no longer discrete, but some have become confluent; they then appear on the surface, as lighter coloured areas in the midst of dark bluish sunken tissue. This latter tissue is collapsed or acutely congested: being partly due to the inflammatory process present, and partly to the mechanical action of the blockage of the bronchioles.

If the nodules are numerous, and of some days development, raised patches of emphysema are seen, in addition to the sunken collapsed areas.

Over these projecting pneumonic portions of lung, which resemble often small convex islands, the pleura is not uncommonly adherent, or granular, demonstrating the presence of concurrent pleurisy.

The affected areas, if of moderate size, have a semi-solid feeling of consistency in the midst of crepitant lung tissue: if very extensive a lobe, or even lung may have a granular feeling.

ON SECTION: hyperaemia is always present and the cut/

cut surfaces drip blood. The lung cuts easily, though a slight grating feeling may be experienced. Reddish gray masses are seen projecting above the level of the surrounding tissues indicating the sites of the disease, and between these, if extensive, are seen solid firm depressed areas of collapse. The size of these areas both of disease and collapse show immense variations depending on the type, severity, and cause of the illness.

On closer examination of any of these projecting portions, a bronchus is found in the centre, and muco-purulent matter can be exuded from this. A fortunate section may show the described resemblance to a bunch of grapes. The bronchus, and its branches form the stalks and the affected lobules the fruits. The cut surfaces of these lobules is granular, but may be quite smooth to one's finger: the areas of collapse have always a smooth feeling. These lobules are commonly the terminal ones of a bronchiole: but it will be found, at times, that those immediately around the bronchi, have been chiefly affected.

Again, a whole lobe is found to have a solid feeling; and may be mistaken for a croupous pneumonia: but the feeling is not quite the same, and

small/

small dark bands of collapse can be seen running between the areas of hepatized tissues.

The grey hepatization of croupous pneumonia is, also, at times simulated. The nodules are a greyish colour, and are muco-purulent, pus flowing from the bronchi with gentle pressure; and the process may have proceeded so far that there are actual muco-purulent cavities in the lung itself.

EMPHYSEMA is also seen in many, especially the protracted cases of three to four weeks' duration. It is noticed in the lobules adjacent to the pneumonic ones, or towards the anterior and upper parts of the lungs.

MINUTE HAEMORRHAGES are seen from time to time, in the neighbourhood of the inflammation, just beneath the pleura.

THE BRONCHIAL GLANDS show no change in the rapid forms: but may be enlarged to the size of a bean in chronic cases, especially those secondary to pertussis.

The other organs of the body show no special characteristics:

THE PERICARDIUM may show a little effusion. The heart commonly is dilated with cloudy swelling of the myocardium.

THE/

THE LIVER is enlarged, and shows cloudy swelling as a rule.

The SPLEEN is a little enlarged, and friable, and the malpighian bodies are prominent.

The KIDNEYS usually show cloudy swelling: but acute parenchymatous changes are noted at times. After consideration of the various forms, and types seen "POST MORTEM", I think that Osler's classification is the most satisfactory.

I. Cases in which bronchitis is very marked, and in which no definite consolidation can be seen, but the presence of inflammatory products in the alveoli is demonstrated by microscopic sections. These cases are described as Capillary Bronchitis by Allbutt and others, but Osler, and most of the writers on the diseases of children do not allow this sub-division.

II. The disseminated form in which there are scattered peribronchial areas of consolidation, with patches of collapse, in the midst of crepitant lung.

III. The Lobar, or rather pseudo-lobar form, in which the greater part of a lobe, or lung is consolidated.

MICROSCOPICAL/

MICROSCOPICAL APPEARANCES.

1. In the first form, there are the usual appearances of bronchitis. The consolidated alveoli are found to be filled with altered epithelial cells, leucocytes, and sometimes a few red corpuscles. Fibrin is also frequently observed to be present.

The epithelial cells are derived from the lining membrane of the alveoli, and show swelling of the contents, and often rupture of the cell envelope.

2. In the second form, the smaller bronchi in the affected area are much thickened. The ciliated epithelium is replaced by rapidly proliferating embryonic tissue. The glands secrete very profusely, and much mucous is poured into the tubes. Leucocytes escape from the capillaries and are seen in the walls of the tube and entangled in the secretion. This combination of mucous, epithelial debris, and leucocytes forms the mucopurulent matter always present in the bronchi, and which, if viscid, tends to cause blockage of the smaller tubes, and the subsequent effects. It may, also, cause the irregular dilatation sometimes seen in the smaller tubes.

The peribronchial tissues show rapid proliferation/

proliferation of the connective tissue cells, more especially in the inter alveolar septa, thus often causing obliteration of adjoining alveoli. The blood vessels are distended and there is a marked leucocyte infiltration of all the tissues.

The alveolar contents are very similar to those described in the first form. The endothelial cells show fatty degeneration, and are cast off, being replaced by smaller nucleated cells. Leucocytes, a few red blood corpuscles and some fibrin form the rest of the contents.

3. The microscopical appearances of the last form are in no way different to the second, only being more widespread. The earlier stages of emphysema, and the various forms of collapse can be seen in the surrounding tissues, in the second and third forms.

TERMINATIONS/

TERMINATIONS.

- 1 RESOLUTION: is usually complete though the progress may be slow, extending over some weeks or even months. Complete Resolution never takes place, when there has been great proliferation of the connective tissue in the inter alveolar septa.
2. SUPPURATION: in very acute infections, the pus formed will infiltrate the surrounding tissues, and lead to abscess formation. This, however, is very rare.
3. GANGRENE may follow aspiration, or deglutition forms in strong children, or ordinary forms in those, who have been much debilitated by some acute predisposing illness, as measles.
4. ACUTE DIFFUSE INTERSTITIAL PNEUMONIA, due to the irritation of the absorbed products of the broncho pneumonic condition.
5. CASEATION: may follow long delayed resolution but, in almost every instance, it is tubercular in origin.

BRONCHIECTASIS: ulceration of the bronchioles, with formation of cavities in the lung tissue has been mentioned as a not unusual sequel, but I can find no record of such a condition.

The Areas of Collapse, and Emphysema follow the ordinary lines in these conditions.

SYMPTOMS/

SYMPTOMS.

These are very varied, and cases differ greatly, as is to be expected, after consideration of the etiology and bacteriology of the disease. Some show all the symptoms of an intense toxæmia; while others, with a similar or much greater amount of lung tissue involved, show few symptoms of illness. The symptoms are only the expression of the intensity of the intoxication, the physical signs being our best guide to the actual extent of the pathological changes in the lungs. The infection is a general one in nearly all, only a few of the secondary cases resembling a localised inflammatory condition, without general symptoms.

A great deal may be learnt, from the simple study of the patient as he lies in bed. The attitude may suggest nothing in the early mild cases: but in cases severe enough to cause prostration, the attitude is very suggestive. They are then seen to be lying on their backs with limbs weakly extended; or on one or other side with the legs flexed, and a general "curled up" appearance.

The head is rarely retracted to any extent, unless meningitis be present: but one often sees at the outset of pneumonia slight head retraction, and a more or less rigid condition of all the muscles—this stage is very transient.

Early restlessness is of little significance: but when noticed late the import is serious. When in addition the patient is seen to be turning from side to side, constantly throwing about the arms, kicking off the bed clothes, and champing the jaws, we know that the intoxication is very great. Instead of being in this condition of great restlessness, other severe cases are markedly prostrated, and these if prolonged reach a typical "typhoid" state.

The expression of the patient is always very anxious. The face is pale, with little underlying colour. A flush is commonly noted in primary cases, and may be limited to one side of the face; but even if so the flush is never a guide to the lung affected. Children with a raised temperature often create a flush, merely by lying on one or other cheek.

Cyanosis is always seen in the lips in some degree: in an average case only a slight bluish tinge is seen: but in many the whole face is dusky, the lips dark, the finger tips bluish, and in extreme cases the whole body is affected. This cyanosis is accentuated by coughing, or by the effort of drinking or speaking, and demonstrates both the severity/

severity of the illness and the care which should be taken to avoid unnecessary exertion. Cyanosis always appears before death.

Oedema of the eyelids is seen when coughing is very severe and paroxysmal as in cases secondary to pertussis.

The hot dry pungent feeling of the skin in pneumonia of adults is not experienced, the skin being softer and moister. In exhausted patients, even with a high temperature, the body may be warm, but the extremities become cold and clammy. Perspiration is only seen in rachitic infants, and then is confined almost entirely to the scalp. Herpes is not at all a common phenomenon but when present is more often seen around the nasal than the buccal orifices.

Facial irritability has no great significance in this disease: but Chvostek's sign was elicited in several of the rachitic children.

As in all acute illnesses the hair loses its lustre, and becomes dry, harsh, and brittle.

EYES: The pupils show no constant condition, dilatation being more often seen than contractions. Reaction to light and accommodation is always un-affected by pneumonia itself. Strabismus has/

has never been noted, unless previously present, or as a symptom of meningitis: it may, however, be seen in the cases, which show meningeal symptoms at the outset. Some discharge may collect upon the eyelids when prostration is severe, and the patients rest with the eyelids incompletely closed. With this last condition a thin film may cloud the corneae; this is easily removed by movement of the eyelids, being merely a sign of exhaustion and consequent lowering of the activity of the corneal reflexes.

NOSE: a muco purulent discharge, of varying amount, is nearly always present; nasal catarrh of some degree, usually accompanying the lung condition.

THE VOICE becomes diminished in strength, and hoarseness may be caused by the catarrh affecting the larynx. Patients seldom cry out much, dyspnoea preventing any prolonged attempt. An increase in the strength of the voice, or the amount of crying is a satisfactory sign of diminution of the affected lung area.

COUGH: In Primary cases, there is usually little or no coughing. Commonly the cough is hard, constant and distressing, and may be almost incessant. It is rather paroxysmal in character, and disturbs sleep greatly: it is also a frequent cause of vomiting/

vomiting. With extreme dyspnoea the cough is very shallow, and is restrained by the patient as much as possible. Total suppression of the cough is always regarded with anxiety.

In prolonged cases, the cough assumes a hard hacking character: when pneumonia is secondary to pertussis the cough retains a paroxysmal character but the "whoop" is totally suppressed until convalescence has begun. Coughing causes the expulsion of the increased secretion of the bronchi into the trachea or pharynx, but children below the age of seven years rarely expectorate, so much of this material is swallowed, and contributes to the gastrointestinal irritation usually present.

RESPIRATION: /

RESPIRATION: The most important of all symptoms of broncho pneumonia. More knowledge of the intensity of the condition, and of the prognosis may be gleaned from a careful study of this than of any other symptom. The average rate per minute is stated to be (Thomson) :-

At birth	50-32
First year	35-25
Two to four years	25
Five to fourteen years	25-20

When pneumonia sets in the respiration is always quickened. The rise is rapid in primary cases, in secondary is more gradual, and in both is mainly dependent on the amount of lung tissue involved. A rate of 50 per minute is the most common figure during the height of an attack: but 120 may be recorded, or counting may become impossible. A rate of 70 per minute is not regarded with great anxiety: but any increase beyond is serious: 90 is always a dangerous figure, and I have only seen one recovery follow a rate/

rate of over 100 per minute.

The normal pulse-respiration rate in a child is $1:3\frac{1}{2}$ or $4:$ but this is greatly altered and may reach $1:1\frac{1}{2}$, though $1:2$ or $2\frac{1}{2}$ is more usual. This ratio is of great value, and will be spoken of again in connection with the prognosis.

The respiration when typical has a short sharp indrawing, a short pause, and more prolonged expiration. The expiration is accompanied by a low pitched sound best described as a moan, which is heard in all severe cases. Sighing is heard in a few, in place of the moan, but is less typical and suggests rather great general exhaustion. Mucous rattling is audible when the larger bronchi are implicated, and is one of the causes of coughing. This rattling, becoming obvious only in the later stages, is of much more serious import, being then due to increasing weakness, and inability to remove the excess of secretion. This excess forms a serious obstacle to respiration, and may, also, by gravitation and aspiration, be the means of infecting the unattacked portions of the lungs.

The alae nasi are observed to be in use in nearly all: the movement in children is more extensive, and/

and noticeable than it is in adults. The suggestion of pulmonary disease, conveyed by this symptom often ensures a very thorough examination of the chest, when abdominal or meningeal lesions are suggested by the other symptoms. The extraordinary muscles of respiration in the neck are seldom observed to be in full play. These muscles are relatively poorly developed, and are well hidden by fat in a child. By their action the chin is approximated to the sternum, causing nodding of the head. This symptom persists, in some, throughout the illness but it is more usual to have it present for only a few hours at the height.

The Thorax always shows exaggeration of movement. The abdominal type of breathing is replaced by costo abdominal, with accentuation of all thoracic movements. These movements retain their symmetry, and diminution of movement in the affected side is rarely seen, unless fluid is present in the pleural cavity.

The action of the diaphragm is exaggerated, before the extra muscles of auscultation are brought into use, and this exaggeration is retained throughout. Indrawing of the intercostal tissues is invariably present, the degree varying with the amount of dyspnoea. The/

infection/

The lowest two or three interspaces may show slight indrawing, or all may show retraction with each inspiration.

With urgent dyspnoea, or the complication of laryngeal obstruction there is also lateral retraction of the ribs themselves. Rachitic children chiefly show this, and in the worst cases, the gladiolus and xiphisternum are retracted as well as the ribs.

TEMPERATURE: the separation of cases into PRIMARY and SECONDARY is almost possible from the study of the temperature charts alone. In primary pneumococcal infections of the lung, the chart has all the characteristics of one of an adult lobar pneumonia. The acute onset, sustained temperature, and fall by crisis are all demonstrated.

In secondary cases, great variations are seen, and no one chart can be called typical. I will, however, show some illustrative charts of the more common types later on.

A swinging temperature, with a daily variation of about three degrees, is most frequently seen. The swing is usually highest in the evening, but irregularity is characteristic. A regular daily rise, and fall always leads to a suspicion of tubercular infection/

infection.

The duration of the fever is indefinite, and may be any period, from one to fifty days or more, and is reported to have extended to one hundred days. The fall is by lysis and extends over several days. A series of cases, carefully examined, gave the following figures, beside which are some from Holt for comparison.

50 RECOVERIES.

Fever lasting	1- 7 days	-13	or	26%	Holt	11.5%
"	"	7-14 "	-19	"	38%	66.6%
"	"	14-21 "	-11	"	22%)	21.9%
"	"over	21 "	- 7	"	14%)	

30 FATAL CASES.

Fever lasting	1- 7 days	- 7	or	23%	Holt	25%
"	"	7-14 "	- 5	"	16.6%)	55%
"	"	14-21 "	- 7	"	23.3%)	
"	"over	21 "	-11	"	36.6%	19%

The Height of the temperature is also variable, and is no sign of the acuteness of the disease.

Consulting/

Consulting again the above series of cases it was found that.

OF THE RECOVERIES.

3 or 6%	reached	105°	or higher
6 "	12%	"	104-5°
18 "	36%	"	103-4°
12 "	24%	"	102-3°
6 "	12%	"	101-2°
5 "	10%	"	100-1°

OF THE FATAL CASES.

5 "	16.6%	reached	105°	or higher
8 "	26.6%	"	104-5°	
10 "	33.3%	"	103-4°	
3 "	10. %	"	102-3°	
4 "	13.3%	"	101-2°	

I have only once seen 106° recorded, and that in a case which terminated fatally.

These figures demonstrate, to a certain extent, the small value, which is to be placed on the height of the temperature alone.

Once the disease has been overcome, the temperature persistently remains below normal for some days, and any rise at all should cause extra care in/

in examination of the patient, as it definitely shows that all is not yet settled. This negative phase lasts from a week to ten days.

Relapses, or rather infection of another area are sometimes shown, by a sudden rise: these seldom reach within a degree of the greatest height attained during the primary attack, and have an average duration of five days.

A four hourly chart must be kept in addition to the morning and evening one, owing to the rapidity with which changes follow each other.

Rigors at the outset are never seen as in adults, and the only condition in children in which they are seen is in pyelitis.

PULSE: The pulse shows a decided increase in rate. This is always to be recorded, and must be carefully compared with the respiration rate, owing to the importance of the ratio between them. The average rate is (Thomson).

At birth	140-120
Six to twelve months	115-105
Two to six years	105- 90
Eleven to fourteen years	85- 75

In broncho pneumonia the average rate is

140 beats per minute: this, however, may be greatly exceeded. A child's pulse can, with accuracy, be counted to 180 per minute, 200 is possible; but beyond this point, accuracy cannot be expected. Any figure above 160 is serious, over 180 is dangerous, and if uncountable the outlook is very uncertain.

The regularity of the pulse is retained throughout, unless complications are present; but some irregularity is often recorded in the early stage of convalescence, and should not, then, be regarded as of serious significance.

Irregularity is seen in severe cases, where the heart is giving way under the strain: but is a secondary, not primary condition.

The volume of the pulse is well maintained, increasing with the rise of temperature, and diminishing with the fall. Tension is raised during the first few days, and then gradually falls, until the chief difficulty in examining the pulse, is the ease with which pulsation is obliterated.

Microtism has been observed in one or two of the older patients; but never in an infant.

ALIMENTARY/

ALIMENTARY SYSTEM.

The lips rarely show an herpetic condition, though the angles of the mouth may show it, in a minor degree.

The lips themselves are hard, and dry, with scaling of the superficial layers: slight haemorrhage is often seen from the cracks, and fissures left by this desquamation, and dryness.

The teeth show nothing at the time: but, when growth has proceeded sufficiently, a transverse groove may demonstrate the previous occurrence of a severe illness.

The tongue is dry, and hard, and has a coating of white "fur", which is adherent, and difficult to remove. If there is much intestinal catarrh, this coating is thicker, softer, and easier to remove. The papillae of the tongue are a little more prominent than is usual. The secretion of the buccal glands is lessened.

The tonsils, and pillars of the fauces are reddened, if coughing is excessive, but are not primarily affected.

Food is not well taken, and solids are rejected: the natural craving is for fluids, and easily absorbed foods.

Thirst/

Thirst is excessive, as is to be expected from the dryness of the mouth, and the febrile condition. There is a constant appeal, when awake, for a drink. from those old enough to ask.

The stools demonstrate the diminished absorptive powers, curded or unaltered food, being often seen in them. There is a marked tendency to looseness of the motions, the colour is pale, and the odour is offensive.

URINE: Is of high specific gravity. Is rarely below 1020, may reach 1035, but is usually 1024-7. The reaction is variable: but more are acid than alkaline. The deposits most frequently observed are urates, phosphates, and mucous. The first are very commonly deposited. in large amounts.

The total amount of urine passed each day is appreciably lessened. Of abnormal constituents, albumen is very important; but is only found in less than 1% of cases, and I have never seen it persist after convalescence set in.

The great difficulty of procuring regular samples, and of measuring the total amount excreted, almost precludes any methodical attempt to examine a series of cases. I have kept careful records of Sahli's method of testing the urine for the presence
or/

or absence of chlorides. It was found that they are always diminished, or absent, during the febrile stage, and that the return will sometimes demonstrate an improvement, before the other signs do so; and conversely, on two occasions, a diminution predicted a relapse which followed in due course. These results are, however, founded on too few cases to be relied upon.

HAEMAPOEITIC SYSTEM.

The red blood corpuscles show no real alteration, though their number is increased during the early stages, and diminished during convalescence.

The Haemoglobin index shows no regular variation.

The White blood corpuscles are increased in numbers, except when onset is very sudden, and acute, when there may even be a diminution for a few hours.

My own cases have shown extremes of 8,000, and 213,000 per cubic millimeter. This latter figure was observed in a case, which was most probably complicated by pertussis.

The average commonly noted was about 25,000, and it was rare to see any case below 15,000 or over 40,000 per c.m.m. Apart from the case mentioned above, I have no record of any figure above 62,000 per/

per c.m.m.

Leucopenia does not always indicate a fatal result, as a count of 5,000 per c.m.m. was recorded once in a severe case, which eventually recovered.

A rise in the leucocyte count, at times demonstrates a fresh invasion of lung tissue: but may, if the previous count be low, be caused by a diminution of the intoxication, and advance towards convalescence.

Films have demonstrated no change in the relative proportions of the different forms of leucocytes.

The glycogenic reaction, also has proved of little real value, and has only been marked in one or two cases, and then for only a few days.

NERVOUS SYSTEM.

The patient is very irritable in the early stages, but later becomes listless, and much less resistant to handling: the irritability appears in a modified manner again, during the early days of convalescence.

The fontanelle is often a little more tense than is usual, and pulsation in it may be readily noted: /

noted: the size, and shape of the fontanelle are dependent on previous health. Retraction of the head, with some rigidity of the muscles of the neck, is fairly common in all acute infantile disorders, and this must be remembered in differentiation from meningitis.

Mentally, the child may become dull, and stupid very early: but, as often as not, this is preceded by a hyper-sensitiveness of both mind and body.

Sleep is much disturbed, and broken throughout. Cough causes some of the early restlessness; but dyspnoea is far more serious in this way later on. Fever, vomiting and many trivial things aid this disturbance of rest.

Delirium has been noted, in older patients: but, in infants, the difficulty of differentiating between irritability and delirium is insurmountable. Delirium when noted is usually of the low muttering, or "typhoid" type.

The attention of all is lacking in power, and is distracted by any very slight occurrence. Memory and intelligence are attributes of older children.

Speech, if the talking age has been reached, is/

is affected only by the dyspnoea, and by the dryness of the mouth.

REFLEXES: The knee jerks are the only reflex I have found any alteration in, and, even then, the change is confined to those of primary origin. The reflex is a little more brisk than usual for a couple of days, and then the activity diminishes quickly: ultimately the reflex is lost. This is not a constant phenomenon in my hands, though it is stated that both diagnosis, and prognosis may be assisted by the study of this fact. The loss is never experienced in bronchitis, or in secondary pneumonias due to other organisms than the pneumococcus, and thus may help diagnosis. Loss of reflex, before the third day of illness, is said to often herald a fatal result.

CONVULSIONS: are seen occasionally at the beginning of the illness, but only in primary cases with an acute onset and with a high temperature. As a terminal phenomenon they are more often met with, and convulsions during the second week or later almost invariably end fatally.

SIGNS./

SIGNS.

The appearances of the thorax have already been mentioned: at this stage in the examination, it is usual to confirm observation by measurement. The equality of movement of both sides, the amplitude, as well as the circumference, must all be measured accurately.

Palpation is next proceeded with, and our routine method is to now examine the position, and characters of the apex beat of the heart. In rachitic, deformed children one may gain no information by this palpation, but usually some very useful information is obtained.

Symington demonstrated that the heart of a child lies in a more transverse position than it does in an adult. Consequently the apex is always slightly outside the mammary line during the first three years.

If more than $\frac{1}{4}$ of an inch beyond this line it may be considered enlarged.

From the 3rd. to the 9th. year the apex is usually on the mammary line, and after the 9th. is found within it.

In infants the apex beat is found in the fourth intercostal space: in the second and third years more commonly in the fourth, and after the fourth/

fourth year always in the fifth space.

Other signs, which demonstrate the possibility of enlargement of the heart, observed on palpation, are pulsation in the epigastrium or to the right side of the sternum.

However, I cannot fully discuss the signs of enlargement of the heart, important as it is in broncho pneumonia.

FREMITUS:- Rhonchial Fremitus is an attribute of bronchitis, but this is so frequently an accompaniment or precursor of pneumonia, that it must always be sought for. It is not caused by pneumonia alone, but its presence is important, as showing an accompanying condition adding to the difficulty/

difficulty of respiration.

VOCAL FREMITUS: is only altered if the area of consolidation is large, and it then shows a definite increase.

AUSCULTATION: is always performed before percussion, and sometimes even before palpation. An infant is very little disturbed by auscultation, and though a moderate amount of crying is helpful, a thoroughly aroused and angry child can not be auscultated with any certainty. Percussion is more painful, causes more disturbance, and should always be left to the last.

BREATH SOUNDS: All variations between simple puerile and high pitched bronchial breathing are met with.

During the process of auscultation, the great conducting power of all the structures of the thorax, must never be forgotten. The sounds from the trachea and bronchi, are very clearly transmitted, and cause more confusion than in adults. The breathing in the clavicular fossae, over the apices of the lungs posteriorly, and in the interscapular regions, is commonly/

commonly broncho-vesicular, or even bronchial in character. This is most noticeable of all in the right interscapular region, for which fact the anatomical relations are responsible. Another place, which may cause mistakes to be made, about the character of the breathing, is a small area over the seventh rib, about half an inch internal to the posterior axillary line: the main bronchus of the lower lobe of the lung, is near the surface at this point. Puerile breathing, the usual type of infant breathing, is heard unaltered on auscultation of those patients, in whom the amount of consolidation of the lung is small, or in whom it is widely disseminated in small discrete nodules. Also, if the consolidated area is situated deeply, it may be of moderate size, and yet show no change in the type of breathing, the lung tissue intervening between the consolidation, and the nearest point on the surface of the thorax, acting as a non-conductor. The lung substance, in itself, has little conducting power. As consolidation increases in amount, or more nearly approaches the surface, the breath sounds become higher pitched, but lose a little of their intensity. Careful comparison, over similar portions of each lung, is necessary, as this change is often very slight.

A little later, if consolidation still increases, the breathing becomes yet feebler, but alters its character: the expiration is lengthened, a pause is noticeable between inspiration and expiration, and the pitch becomes higher.

The final, most definite, and almost diagnostic stage, is reached when consolidation is sufficient to cause bronchial breathing. This is characterised by apparent conduction to the ear of the examiner, no other type of breathing giving this sensation of nearness. It is also "whiffy", than which word I can give no better explanation. The expiratory equals the inspiratory sound in length, and there is a definite break between them.

ACCOMPANIMENTS: Consolidation in broncho pneumonia is characterised by the presence of fine resonant sounds, arising in the terminal bronchioles of the affected area. These are in reality only fine râles, but their resonance is altered by the surrounding tissue, until they gain some resemblance to the dry musical rhonchi of bronchitis. They are thus best described, as sub-crepitant râles. These sub-crepitant râles are almost invariably found, though their absence does not negative the presence of pneumonia/

pneumonia.

With definite areas of consolidation, these accompaniments are heard at the end of the inspiratory sound, and when bronchial breathing is also present, they, together, are very similar to the signs heard in the engorgement stage of lobar pneumonia. If bronchitis accompanies, all the varieties of râles & rhonchi may be present; but sub-crepitant râles alone are to be looked for, if pneumonia is suspected. These latter persist throughout, thus differing from lobar pneumonia.

When resolution sets in, they are replaced by moister, coarser sounds, of a less resonant character.

Accompaniments are not always audible during quiet respiration, and it is often necessary to induce a cry or cough, in order to ascertain their presence.

VOCAL RESONANCE shows a definite increase when there is a moderate amount of consolidation; this increase may usually be detected, when the changes have been sufficient to cause bronchial breathing.

One characteristic of the vocal sound when increased in intensity, which it has in common with bronchial breathing, is the alteration of the carrying power./

power. Instead of being heard, apparently at the chest piece of a stethoscope, they appear to be heard just at the observer's ear.

PERCUSSION: The presence of dulness is the most elusive of signs in a child. Alterations of position cause alterations of the percussion note, and the conducting powers of the tissues of a child, also necessitate great care in forming conclusions.

Very careful comparison of both sides is necessary. When the disease is disseminated, no change of the note is obtained: but when there is a small area, one may get a slightly higher pitched and less resonant note. If lobar consolidation, or a condition approximating be present, dulness is quite evident, and there is a feeling of resistance to the pleximeter finger. An attempt was made to draw up tables representing the position of the areas of consolidation, and one hundred/

hundred and fifty cases with fairly definite localisation gave the following results.

1 Lobe was affected in 80 cases.

2 Lobes were " " 49 "

3 " " " 13 "

4 " " " 6 "

All " " " 2 "

Both lungs were affected in 41

Right Upper Lobe	43	Left Upper Lobe	29
" Middle "	28	" Lower "	32
" Lower "	65		

Thus it appears that the lower lobes are most frequently attacked, and that the right lung suffers more often than the left. Though this is the case, it is most important, in all cases, that the greatest care should be taken to examine every part of the lungs: a small patch of pneumonia may be very easily overlooked and every examination must be complete, and thorough/

COMPLICATIONS.

Numerous complications may arise but the ones which are most often seen are as follow:-

PLEURISY is, probably, much more often present than is thought. Post mortem examination generally reveals the presence of some localised areas of pleurisy, but these have seldom been large enough to give rise to physical signs. Clinically pleurisy is recorded as a complication, in only two cases of my series.

Of a dry type usually it is not a dangerous complication, though painful; if, however, an exudate is present, the prognosis is not so good, especially if the amount of fluid is large or becomes infected with organisms. One of my cases was accompanied by simple effusion.

EMPHYEMA, or purulent pleural effusion, has only been noted twice, as a complication of broncho pneumonia, but examination of the records of empyema cases showed, that 62% were preceded by pneumonia of either the lobar or catarrhal type.

ABSCCESS/

ABSCESS or GANGRENE of the lung are stated to occur in a small percentage of cases, but I can find neither clinical nor post mortem records of either of these as a complication.

COLLAPSE of the lungs, is a complication to which the extremely rachitic children are subject. The copious secretion in these, with the feeble expulsive power, rendered less effective by the prostration of pneumonia, tends to blockage of a bronchus. Air is prevented from entering the alveoli, and collapse follows.

Many small areas of collapse may be present without causing any change in the symptoms, and cannot be demonstrated clinically. A certain amount of collapse takes place, in all cases of broncho pneumonia.

The severe form due to aspiration of food, or of tough secretion from the larynx or pharynx, is more sudden in onset.

The presence of small areas of collapse so simulate consolidation, that they were more often suspected than diagnosed: but the sudden collapse of a large area was seen once, shortly before death.

EMPHYSEMA/

EMPHYSEMA is not common clinically, and is of little importance in infants, as recovery from the primary cause is, almost invariably, followed by the total disappearance of the emphysema. It is to be expected in cases of long duration, and in those secondary to pertussis.

TUBERCULAR INFECTION is very likely to follow broncho pneumonia in those with any phthisical tendencies.

Pneumonia secondary to pertussis is most subject to this complication, as four, out of seven such cases, eventually showed signs of tubercular infection of the lungs. Only three other cases aroused suspicions that tuberculosis had supervened.

STOMATITIS is common among hospital patients; but as a serious, and troublesome complication, it was met with three times and, in one, assisted very much to the death which ensued.

DIARRHOEA is the worst of complications. It is so common, and, also, its infective nature leads to endless trouble in a hospital ward. Vomiting may or may not accompany the diarrhoea. Twenty-six of my cases or 15%, suffered severely from this complication.

LARYNGISMUS/

LARYNGISMUS STRIDULUS or SPASMODIC LARYNGITIS is a grave, though fortunately, a rare complication. It is seen in some very rachitic patients, always under the age of three years. This superadded obstruction, to the already embarrassed respiration, causes alarming cyanosis, and perhaps death. I have only seen the condition once with a very slight attack of pneumonia, and think that it must be very rare in prostrated patients, as they are not likely to perform any action, which will induce "crowing".

TETANY is said to accompany spasmodic laryngitis: but my experience was to find them as separate conditions. The attitude of the hands and forearms was very typical, and Chvostek's sign easily elicited in the three cases, in which tetany occurred as a complication, but the pedal contractions were much less evident than usual.

CONVULSIONS are not so often seen as one is led to expect, except as an immediate precursor of death. As a complication, I find them recorded in six cases, and in all death ensued within thirty-six hours of the first convulsion observed, and, with one exception, the actual termination occurred during a convulsion.

MENINGITIS: /

MENINGITIS: the two most common forms met with as complications, are the pneumococcal and tubercular.

The observation of the onset is difficult: but will be discussed with the diagnosis.

Six cases suffered from meningitis before death, two were probably acute tubercular, two pneumococcal, one meningococcal (Weichselbaum) and one indefinite: but the diagnosis was not confirmed by post mortem examination, except in one of pneumococcal origin.

ENDOCARDITIS has once been recorded in my series, but no evidence of its presence was found in the post mortem records of broncho pneumonia.

RHINORRHOEA has been noted as a complication, and in the three cases in which I have observed this, it has also been recorded that the nasal discharge was excessive and foul.

PNEUMOCOCCAL ARTHRITIS (multiple), and PERITONITIS have been seen in single instances; but were transferred to other wards for surgical treatment.

The acute infective diseases are all liable to arise in the course of such an illness as broncho pneumonia. The vitality of the patient is so lowered that exposure to any infection is dangerous, & the results/

results of such exposure are rarely evaded.

However carefully a hospital such as this is guarded, infection cannot be excluded, and some of these complications must have been contracted before admission.

Fifteen of my series developed one or other of these diseases, and the following table shows them, and the probability of infection having been incurred in or out of hospital.

DISEASE	NUMBER of CASES.	STAY in HOSPITAL.	INCUBATION PERIOD.
Chickenpox	1	3 days	14 days
Scarlet Fever	1	9 days	1-7 days
Measles	3	1, 6, and 10 days	10-14 days
Diphtheria	4	3, 10, 13, and 21 days	1-4 days
Pertussis	6	1, 2, 5, 7, 12 and 13 days	4-12 days

DIAGNOSIS/

DIAGNOSIS.

Before proceeding to the differential diagnosis, I will try to give a short summary of a typical case of broncho pneumonia.

An acute onset with cough, dyspnoea, and high temperature are suggestive, and when in addition it is noted that there is an expiratory moan, cyanosis of the lips, a quickened pulse and a general appearance of prostration; one expects to find an area in the lungs, which gives a change of percussion note, broncho-vesicular or bronchial breathing accompanied by subcrepitant râles, and an increase in the vocal fremitus.

Few cases, however, offer such a clear clinical picture, and every one of the signs and symptoms may in turn be lacking, and yet the diagnosis be quite clear.

The diagnosis is usually easy, but the chief difficulties I have found will be now discussed.

BRONCHITIS: /

BRONCHITIS: The simple form, so well exemplified in rachitic children, confined to the larger bronchi, offers little difficulty in diagnosis. The temperature is little raised, dyspnoea is never urgent, there is little or no prostration, and the cough is loose, and causes little discomfort.

The more severe and acute form of bronchitis affecting the smaller bronchi as well as the larger divisions, causes dyspnoea, a raised temperature and some prostration. This latter is seldom great, the temperature rarely remains elevated more than one or two degrees, though it may be 103-4 F. for a short time, and the dyspnoea is seldom urgent: the physical signs also show coarse and medium râles and rhonchi, and no appearance of consolidation.

The chief difficulty with an acute attack of bronchitis, is to determine if pneumonia, as it often does, has supervened. The temperature will probably rise and remain elevated, or will show a higher extreme to the daily swing, dyspnoea becomes more urgent, pulse quickens, and the patient lies much more quietly, showing more prostration and irritability if approached. The examination of the chest, even if no definite signs of consolidation are present, will show the presence of some finer râles/

râles at one point of a subcrepitant character: but if bronchitis has been general, one is more dependent on symptoms than signs, for a day or two, until consolidation shows itself. If the temperature remains above 102° F. for more than three days, and medium râles are generally heard, it is wiser to assume the presence of pneumonia.

Localised signs of bronchitis of one lobe, or even of one lung, are to be looked upon as diagnostic of broncho pneumonia, if tubercular infection can be excluded. Capillary bronchitis, or catarrh of the terminal bronchioles, cannot be classed as a separate condition in infants, as there is always some exudate into the alveoli forming minute pneumonic areas; but must be regarded and treated as broncho pneumonia.

EMPHYEMA: The primary form is so similar in signs and symptoms, that a diagnosis is scarcely possible, without the use of an exploring needle. This I have learnt, as one case was treated throughout his illness as broncho-pneumonia, and the post mortem demonstration of a large empyema was entirely unsuspected.

One symptom should always lead to increased care in examination, and that is pallor of the face. In all empyemata seen, the face has been very pale, and/

and flushing was rarely or never seen. Temperature is no help to diagnosis, but the respirations are usually slower than one expects from the general appearance of the patient. Displacement of the heart is always significant of fluid in the pleural cavity; the affected side of the thorax is less mobile, shows less indrawing of the intercostal spaces, and may have a full rounded appearance.

The great conducting power of the structure in a child's thorax must again be remembered. Bronchial breathing, increase of vocal resonance, and crepitations, may all be clearly transmitted, though the lung be small and compressed in the midst of several ounces of pus.

Dulness on percussion, is the sign which gives most information in this case. The percussion note over fluid in the pleural cavity is lower pitched, and less resonant than that obtained over consolidated lung tissue: also there is a sense of resistance to the pleximeter finger, which is really the main help in arriving at a conclusion.

If any suspicion of the presence of fluid, in the pleural cavity, is aroused by physical examination, an exploratory puncture must be done at once. A serum syringe and needle are the most satisfactory/

satisfactory, as any smaller needle such as a hypodermic one will not permit of the passage of thick pus.

If fluid is not obtained by one puncture, others must be performed, until there is little doubt left that the suspicion entertained was wrong.

The blood, in suspected cases, may aid in diagnosis. The leucocyte count is of little value, unless a sudden definite increase is noted. The glycolytic reaction is seldom obtained in broncho pneumonia, but is given by most empyemata.

PLEURISY with effusion, gives rise to the same signs and symptoms as empyema, and the use of an exploring needle is again necessary. The temperature/

temperature is lower, dyspnoea less urgent, and prostration less evident, than in broncho pneumonia,

The friction of dry pleurisy creates sounds, very similar to the small crepitations heard in pneumonia: but there is no alteration of the breath sounds, or of vocal resonance, no dulness on percussion, little dyspnoea, the temperature is rarely high and the general condition of the patient is much better.

LOBAR PNEUMONIA: It is a much discussed question whether a definite line of demarcation can be drawn between this and broncho pneumonia in children. S. West states that primary broncho pneumonia in infants is the same disease as lobar pneumonia in adults: but Osler thinks that true lobar pneumonia is very rare in infants.

Holt gives the following table of the relative frequencies, classing most of the doubtful cases as broncho-pneumonia.

Age	Broncho pneumonia	Lobar pneumonia
Under 6 months	73	11
From 6-12 months	96	29
Second year	73	40
Third year	19	23
Totals	261	103

I do not think that the proportion of lobar pneumonia is as great as these figures show in the first two years, but I am unable to quote sufficient data to be positive on this point.

The Secondary cases of broncho pneumonia rarely bear any resemblance to the lobar form: but in some primary cases diagnosis is very difficult and perhaps impossible. Usually it is found that the area of consolidations is not definitely outlined, accompaniments are never entirely absent, and usually more than one lobe is affected. The many minor points of differentiation are scarcely worth full discussion in this paper.

ATALECTASIS: if of congenital origin it only causes doubt in infants. If the child has been strong, and healthy beforehand, atelectasis may safely be excluded. In weakly infants, it is more difficult, but atelectasis causes no temperature, deep cyanosis, and little prostration.

Acquired atelectasis or collapse is rare except as a complication. Both this, and an unresolved area of pneumonia left by a previous illness, may be excluded, by careful inquiry into the previous history of the patient. Both collapse, and unresolved pneumonia generally show a subnormal temperature.

MENINGITIS/

MENINGITIS may simulate pneumonia very closely. An abrupt onset, delirium, and prostration are found with both of these conditions, and it is always wise to wait for a few hours, until further symptoms develop, before giving a definite opinion.

If physical signs are absent one may be helped by the temperature being usually lower and less steady. With meningitis, the respiration is not extremely rapid and the pulse is irregular: the latter fact is never seen at the commencement of broncho pneumonia. Also the stupor is profound, and localised paralyses may be present.

Meningitis as a complication is even more difficult to diagnose, and the duration of the mental symptoms is always to be considered. If the mental symptoms began with onset of pneumonia and have persisted, there is usually no meningitis.

The only absolute sign is the result of lumbar puncture, and this must be done in all doubtful cases. The procedure causes little pain, and no risk if ordinary precautions are observed.

In broncho pneumonia there is a slight increase in the cerebro spinal tension, the fluid is quite clear, and only a few lymphocytes are found on staining/

staining a film.

The marked increase in the tension, may in these cases, always be taken as indicative of Meningitis. The fluid is clear in tubercular, cloudy or purulent in cerebro spinal or pneumococcal infections and the microscopic appearance also show changes. Lymphocytes and very few polymorphs are found in the tubercular form; in the other two there is a great increase of the polymorph leucocytes and the organism of Weichselbaum, or of Fraenkel are easily demonstrated according to the cause.

MALARIA is rarely seen in children in this country, and I have only seen one, while in Liverpool, which simulated pneumonia in the slightest degree. Careful inquiry into the previous history and routine examination of the blood will avoid any mistake of this kind.

PULMONARY TUBERCULOSIS in children takes a form very similar to broncho pneumonia of a septic character. The family history again is of importance, and so is the previous history of the patient as regards tuberculosis of bones, joints, skin, and lymphatic glands. The history also of chronic bronchitis, or of several previous attacks of pneumonia is suggestive, and if these date from an attack of pertussis, suspicion is aggravated.

When/

When the patient is seen for the first time with symptoms of broncho pneumonia, it is impossible to be certain of the cause. With tuberculosis the onset is insidious, there is a history of general malaise for some time past, the wasting is disproportionate, and the loss of strength greater than is expected. Add to these marked anaemia, and a regular swinging temperature, and one will hesitate in forming an opinion. Distribution is suggestive, as tubercle most frequently attacks the apices, mammary and interscapular regions, and broncho pneumonia the bases of the lungs. Sputum is rarely available, and I have not obtained tubercle bacilli in any swabs from the epiglottis.

Calmette's ophthalmo-tuberculin reaction was given a fair trial, but its use has practically been abandoned as a diagnostic aid. A positive result is given by clinically cured tubercular lesions in any part of the body, and prostrate cases fail to re-act, even if the subjects of acute general tuberculosis. This reaction was of assistance in one or two cases, but is not sufficient to base a diagnosis upon.

In fact, the diagnosis of tubercular broncho pneumonia can only be proved by waiting.

ENTERIC/

ENTERIC FEVER has had to be excluded once or twice: but a negative re-action to Widal's agglutination test, has been sufficient to do this: as symptoms were never very suggestive. There is always leucopenia present in enteric fever.

TYPHUS FEVER was the cause of a mistake in diagnosis, while I was resident in a Liverpool Hospital a patient, aged two and a half years, was admitted in a prostrate condition, with a high temperature, rapid pulse and a history of only two days illness. As there were many fine râles over the bases, pneumonia was diagnosed, but next morning the skin was dusky, conjunctivae injected, limbs painful to touch, and prostration very marked. The diagnosis of typhus fever was mainly based on these latter points, and was confirmed by the authorities of the fever hospital.

PERTUSSIS is stated by Goodhart, to be the most commonly overlooked disease in the diagnosis of pneumonia. We are as careful as possible to avoid the risk of infection, but several cases of broncho pneumonia have, when convalescence set in, proved to be suffering from pertussis. The "whoop", though it persists with bronchitis, is suppressed at the onset of pneumonia, and does not re-appear until resolution has set in.

A paroxysmal cough is not diagnostic, however much suspicion it may arouse. Leucocytosis may prove the conjunction of pertussis and broncho pneumonia. One of my cases, with an extremely suspicious paroxysmal cough, showed a leucocytosis of 213,000 per cmm. with a slight relative increase of the lymphocytes. Other two, under the care of one of my colleagues, showed 223,000 and 184,000 leucocytes per cmm. of blood. My own case was removed by the parents; the others only lived a few hours in hospital and the post mortem examinations could not prove the presence or absence of pertussis.

SCARLET FEVER, and acute inflammatory conditions of the tonsils, may be difficult: but a careful examination of the throat, and delay of a few hours will usually clear up the diagnosis.

GASTRO ENTERITIS is peculiarly difficult in a few cases, as rapid respiration, a high temperature, and prostration are all seen: the facies of this condition is characteristic: and the entire absence of physical signs is usually sufficient, though again delay may be advisable before giving an opinion.

UNEXPLAINED PYREXIA is the only description applicable/

applicable to some infant illnesses.

Ashby calls attention to the possibility of some of these being pneumonias without physical signs: this possibility is supported by observation of the rapidity, with which physical signs of consolidation have disappeared, and sometimes they cannot be traced, though well marked a couple of hours earlier.

PROGNOSIS.

BRONCHO PNEUMONIA is always dangerous, and is particularly so, during the first two years of life. The surroundings of the patient, the previous health, and the cause of the disease all influence the prognosis. There is no illness in which hope may be more legitimately maintained, as the most surprising cases recover; but one must be prepared for many failures.

The mortality has been stated as 10-30% of private, and 60-70% of hospital cases. Of the former I cannot speak, and fortunately, our records are much better than the latter figures.

In the Bathgate Ward of the Royal Hospital
for/

for Sick Children, there were treated during the years 1899-1907, 403 patients suffering from broncho pneumonia. 106 or 26% of these terminated fatally. The omission of those cases dying within 24 hours of admission to hospital would reduce this mortality to 20.6%. The figures compiled from the records of the same hospital for the years 1897-1906 show a mortality of 28.8% as seen in the tables below.

Year	Admitted	Discharged	Died	Mortality %
1897	100	70	30	30.0
1898	120	80	40	33.3
1899	150	100	50	33.3
1900	180	120	60	33.3
1901	200	140	60	30.0
1902	220	160	60	27.3
1903	240	180	60	25.0
1904	260	200	60	23.1
1905	280	220	60	21.4
1906	300	240	60	20.0
1907	320	260	60	18.8
Total	2000	1400	600	30.0

Year.	Under 1 year				1-2 years				2-7 years				Over 7 years				Totals				TOTAL IN PATIENTS DURING YEAR			
	CURED	RELIEVED	I.S.Q.	DIED	CURED	RELIEVED	I.S.Q.	DIED	CURED	RELIEVED	I.S.Q.	DIED	CURED	RELIEVED	I.S.Q.	DIED	CASES	MALES	FEMALES					
1897	9	1	0	6	25	2	8	7	16	6	6	3	2	1	0	0	57	10	14	16	87	36	51	1154
1898	7	1	0	8	18	0	0	8	16	1	3	4	3	2	0	0	44	4	3	20	71	42	29	1219
1899	9	1	0	14	19	1	1	8	24	1	2	2	4	1	0	0	56	4	3	24	87	48	39	1361
1900	20	5	6	19	19	3	2	6	7	1	1	2	2	2	0	0	46	9	9	27	91	38	53	1398
1901	13	2	1	8	19	2	1	4	8	1	1	1	1	1	0	0	40	5	3	13	61	28	33	1085
1902	13	4	0	19	23	1	2	7	12	0	3	4	4	1	0	0	48	5	5	30	88	45	43	1163
1903	5	1	0	14	12	0	2	10	19	0	0	3	3	0	0	0	36	1	2	27	66	26	40	1064
1904	9	0	1	12	22	2	2	5	28	1	5	0	0	0	1	0	59	3	8	17	87	45	42	1115
1905	19	1	0	19	22	2	2	18	20	1	5	0	0	0	1	0	61	4	7	38	110	69	41	1188
1906	17	1	0	16	18	5	2	7	12	3	0	1	1	1	0	0	47	9	2	24	82	43	39	1300
Totals.	121	17	8	135	197	18	22	80	157	15	26	20	9	4	0	1	484	54	56	236	830	420	410	12,047

PERCENTAGE TABLE FROM ABOVE

	1st year	1-2 years	2-7 years	Totals
Recovered	43	62.1	72	58.3
Relieved	6	5.7	7	6.5
In Statu Quo	3	7.0	12	6.4
Died	48	25.2	9	28.8

(The total number of cases of broncho pneumonia formed 6.89% of all admissions to the medical wards of the hospital, during this period.)

The mortality is thus greatest in the youngest, as is more clearly shown by the next figures compiled from my own series of cases.

AGE	RESULT.
0-6 months	76.5% died
6-12 months	36% "
12-24 months	23.5% "
24-36 months	22% "
36-48 months	0 "
Over 48 months	5% "

Thus under six months of age a grave, almost hopeless prognosis must be given, but from then onwards the prognosis steadily becomes more hopeful.

The/

The average of the cases who recovered was 25.6 months, and of those who died was 14.2 months, demonstrating again the influence of age on the prognosis.

The division of cases into Primary and Secondary, must always be arbitrary, and the following table again compared with Holt's is as accurate as possible.

	R.H.S.C.			Holt.		
	No of.deaths.	% of	mortal-ity	No of.deaths.	% of	mortal-ity
Primary	87	19	22	194	96	49.4
Secondary to Bronchitis	35	7	20	29	19	65.5
Diarrhoea and vomiting	29	9	31	19	18	94.7
Measles	23	6	26	89	56	62.9
Pertussis	10	5	50	66	54	81.8
Scarlet Fever	3	1	33	7	7	100
Varicella	1	1	100	2	2	100
Diphtheria				47	47	100

These figures speak for themselves; but I should like to draw attention to the high mortality shown by Holt's figures, as these may be taken as typical of New York hospital results.

The/

The general condition of the patient requires attention. The prognosis in marasmus children is always very bad, and broncho pneumonia is the most common terminal factor in such cases.

Children debilitated by any previous illness are also ready victims. The best class of patients are those of a thin, wiry type, who do not carry a great excess of fat. Soft, fat, flabby children succumb very readily to this disease, and the more nearly the so called lymphatic type is approached, the worse is the prognosis.

The mental state also has a great influence, a spoilt petted child is a bad patient, as a contented mind, even in an infant, is of importance; rest is very valuable, and struggling over the administration of medicine or food is exhausting.

One of the most important general factors, to be taken into consideration, is the presence or absence of Rickets. This disease predisposes to a catarrhal condition of all mucous membranes, and this catarrh affecting bronchi so readily, increases the congestion in them, and thus forms a serious additional obstruction to respiration. The removal of this excess of secretion, is also a heavy extra tax/

tax on lungs already overworked.

When lung changes due to rickets are advanced, the lateral flattening, protrusion of the sternum, and eversion of the lower ribs thus caused, decrease the capacity of the thorax, and seriously limit the space for the increased expansion of the lungs, made necessary, by the presence of pneumonia. The influence of Rickets on the prognosis is shown by 35 out of 47 fatal cases, or 75% showing well marked symptoms of this condition.

The pulse rate has already been considered but I may repeat that if 200 per min. is exceeded, recovery is exceptional, and any figure beyond 180 per minute is to be regarded very seriously.

The volume of the pulse and the general tone may help, as a pulse which is full, strong, and easily counted, yields a much better prognosis than one which is easily compressed and difficult to palpate. Regularity or irregularity have their usual prognostic value; the latter, however, is not to be regarded at all seriously, during the first few days of convalescence.

A careful record of the respiration rate must be kept. A figure below 80 per minute is not regarded as very dangerous, but any figure higher than this is, and the nearer 100 per min is recorded, the/

the worse is the prognosis, while beyond this, is almost hopeless. I have only seen one case recover, in which over 100 respirations per minute were counted, during quiet breathing. The rate should always be taken during sleep if possible. Rickets normally causes some increase in the respiration rate.

An increase in the figure recorded, without a corresponding rise in the temperature, is very serious; this usually indicates cardiac failure and general exhaustion, and often precedes death, by a short interval of time. However, if the temperature rises at the same time, an extension of the disease is suggested, and the out look is less ominous.

The respiration rate takes a longer time than the temperature and pulse, to come down to a normal figure, and no alarm need be felt, if some increase remain after these other symptoms settle.

The pulse respiration ratio is less valuable in those under one year, than in those older: but alterations must be considered. A ratio of 1 - 2 is serious and of 1 - $1\frac{1}{2}$ is very bad.

The temperature influences the prognosis by the greatest height obtained, and by the duration of the pyrexia. A continued pyrexia is more favourable/

favourable than a chart showing marked remissions: this may be due to the pneumococcus being the causal organism in the former and to a mixed infection in the latter.

Any temperature within one degree of 105° F. is very dangerous, as out of 22 cases which showed a maximum height of 104° or more. 13 or 59% died; while only 35% of these with an extreme point between $103-104^{\circ}$ terminated fatally.

Temperatures which do not show these extremes, influence the prognosis favourably.

Attention here may be drawn to the fact that atrophic weakly children may suffer from a severe attack of pneumonia ending fatally without any rise of temperature being recorded. Great stress must be laid on the manner in which nourishment is taken. Many of my patients had not been weaned, and this added greatly to the difficulties: the feeding of such children is a handicap, much increased by the smaller value of the food given. As long as food is eagerly taken and retained the prognosis is good.

Great thirst is expected, and is favourable unless due to or a cause of vomiting.

The onset of vomiting, is in many, the turning point of the illness and the mortality of those/

those, thus suffering, has been mentioned. (46%)
 Even vomiting does not render the case hopeless, but when food is returned very shortly after feeding the future is dark, though as long as some food is retained sufficiently to be absorbed we are hopeful.

Diarrhoea alone, adds greatly to the gravity: and worst of all, are those with vomiting in addition.

Weigh all patients carefully, every second or third day: some loss is bound to take place. If the loss is excessive, be guarded in prognosis: but even a high temperature, marked dyspnoea, and a quick pulse lose some of their gravity if the body weight is fairly maintained.

Extreme flatulent distension of the abdomen, is a very grave complication, serious in itself, and interfering greatly with expansion of the lungs.

Sleep is a necessity in children, a very little interference with it will materially increase the prostration, and as sleep somewhat restores strength, a good prognosis can be given, while the patient is getting an average amount.

The possibility of secondary tubercular infection must be thought of, in all long continued cases.

When complications arise, they influence the prognosis according to their own gravity; but I should like again to remark, that all complicated by tetany/

tetany died, as did a large proportion with pertussis.

The remote prognosis is fair, a certain number suffer from recurrences, and these are usually severe. Some patients with tubercular disease of the lungs, date this illness from an attack of broncho pneumonia, otherwise complete recovery is usual.

To sum up: The prognosis is bad during the first year, but improves with age.

It is grave in very rachitic children, in cases secondary to the acute infective diseases, and in marasmus. Any complication is serious, but the most common is gastro intestinal disturbance.

A temperature over 105° F. a pulse rate over 200, and respiration rate over 100 per minute very rarely are seen in those who recover.

TREATMENT/

TREATMENT.

PROPHYLAXIS scarcely enters within the scope of this paper, but I have noted several facts which may help to explain the prevalence, and the remedy of which might diminish the frequency of broncho pneumonia. The first of these is, the number of layers of clothing, which have to be peeled off before a child can be examined. Beside the amount of dirt present on the articles, they must in themselves obstruct the excretory functions of the skin, and no child has the muscular power necessary to obtain full expansion of the chest, when the natural difficulties are increased, by the additional weight and constrictive action of such clothing.

Many infants are only taken out of doors to the mother's working place, and otherwise get little fresh air, until they are old enough to play alone.

The histories of the feeding are also at times atrocious, and so we impress on all mothers, the necessity of light but warm clothing, the value of sunlight and thorough ventilation, and the necessity of suitable feeding.

The frequency of broncho pneumonia after measles, /

measles, pertussis and similar complaints, can be greatly lessened by ordinary precautions.

SURROUNDINGS: Whenever possible, all cases should be isolated, as undoubted cases of direct infection have been noted.

The patient should be kept in a well ventilated room, maintained at a temperature of 65°F. When isolation is impossible, every precaution must be taken to ensure the purity of the atmosphere, by efficient ventilation. In institutions for the treatment of children, at least 1000 cubic feet of space is necessary to each patient, and in this hospital 1,215 cubic feet of air space, and 81 square feet of floor space is allowed to each.

The clothing must be light, loose, and warm. These requirements are met by the use of a "pneumonia" jacket, and a soft woollen sleeved garment above it. The "pneumonia" jackets consist of a layer of non absorbent wool, about half an inch in thickness between layers of gauze.

No covering is ever put on the head, but the limbs are swathed in cotton wadding if chilled. All garments must be changed when damp, and a complete change should be made night and morning; even children realise the "freshness" obtained by this.

Binders/

Binders must be applied and changed, as occasion arises. The bed-clothes must be light; a sheet, one or two light blankets, and a coverlet suffice. In sudden collapse these may be added to, but always remember the influence of weight on the respiration. The pillows, also, must not be too soft, as perspiration on a head buried in a pillow, rapidly causes irritation of the scalp. Careful outlook for the earliest indication of bed sores, is to be kept, and the various devices of air and water pillows requisitioned as occasion arises.

Hot water bottles are almost essential, and are best made of heavy pottery. A cover of scouring flannel retains the heat, and prevents burning of the patient, but in all cases one blanket at least in addition should intervene between the bottle and patient; burning so readily taking place.

Lifting the patient from his bed, and nursing for short periods, is an essential of treatment and must never be omitted. A sick child lies as placed by the nurse, and the risk of passive congestion being quite as serious as in old people, everything must be done to prevent its occurrence. Even if this treatment is resented, struggling and screaming help expansion and clearing of the lungs. A few minutes nursing is often soporific, and there are/

are many other minor advantages.

The advisability of using tents has been impugned, but I believe them to be of great assistance. In this hospital, "half" tents are preferred: these extend around the head of the bed, halfway down either side. The roof is nearly four feet above the bed enclosing a space of about 30 cubic feet. The open front allows free circulation of air, and does not prevent the use of aerial medication. The main purpose in erecting the tent, is to use this form of medication. Ordinary hand towels are wrung out of a one in five solution of eucalyptus oil in hot water, and three of these are hung inside the tent. The volatilization of the eucalyptus oil has a powerful stimulant effect on respiration. The oil diminishes the bronchial secretion, and in addition, reflexly stimulates the heart. Children never resent the powerful odour, often being quietened by a renewed application. The antiseptic action of the drug, may help to lessen the risks of infection spreading to other patients. Steam is advocated when accompanying bronchitis is acute, but the only cases in which I would suggest its use, are these suffering from severe laryngismus. If steam is used the addition of Tincture Benzoini Compositus is advisable/

advisable.

FEEDING:

can not be discussed at length as all one's knowledge of infant feeding is necessarily employed in dealing with an illness, which is so often complicated by digestive troubles.

No one method of feeding can be regarded as suitable to the majority. The only rule applicable to all, is to have no limit placed on the amount of water given.

One must spare no effort to find a food or foods suitable to each individual, as recovery is entirely dependent on the maintenance of nutrition.

EXTERNAL/

EXTERNAL APPLICATIONS: The use of poultices forms another much debated subject, but I thoroughly believe in their use. One variety is best, those known as "flying" poultices. One part of mustard with four or five parts of linseed are mixed with a sufficient quantity of boiling water to form a thick paste, which is then spread on lint. Apply at once to the affected area, and keep in apposition for four minutes. Be careful to avoid burning of the child; this may be safeguarded against by rubbing olive oil over the skin, immediately before the application. Slight rubefaction of the skin should follow, and the application must be renewed in four hours time.

The advantages claimed for this application are, the slight disturbance of the patient, non interference with respiration, as is caused by a jacket poultice, the marked effect in relieving pain, in addition to the usual results of mild counter irritation. The use of poultices is recommended as soon as any pneumonia area has been localised, to be continued until resolution has set in.

Antiphlogistine, a proprietary substance, has been used, in prolonged cases, where flying poultices/

poultices have lost their potency, with very satisfactory results.

Ice applications are extravagantly praised by Lees, but I have not ventured to make use of them.

BATHS: The ordinary warm bath of the morning need not be admitted, but it is wiser to give a "blanket bath". This consists merely in a thorough sponging with warm water: in a restless, wakeful child it may be given some hours earlier than usual, and then often induces a quiet sleep.

COLD BATHS: I seldom order, as the shock is great to one with a high temperature; but the application of cold water to the head and spine, will usually cut short an attack of laryngismus stridulus, if this be present as a complication.

HOT BATHS: Any patient, with signs of impending collapse, is greatly benefited by immersion in water at 100° F., increased slowly to 110°. About ten minutes should be occupied over this proceeding.

A more stimulating, and less transient effect, is gained by the addition of one tablespoonful of mustard to each gallon of water. Keep the patient in this, until the arms of the administrator begin to tingle, usually about five minutes.

The simple hot bath is of use, also, in hyperpyrexia, but will be referred to again. These baths/

baths may be repeated every four hours but should be kept for emergencies, as frequent use causes exhaustion, and not stimulation.

Administer all baths in front of a fire, and permit little delay over drying and returning to a bed, with freshly filled hot water bottles, and dry bed-clothing.

Collapse in a hot bath is rare, except when it is being used as a last resource, but be prepared with stimulants.

HOT PACKS: Entail less handling of the patient, and the application is more prolonged, though less stimulating, and so are used where prostration is extreme. To use this, roll the patient in a blanket wrung out of water at 110° F., cover with a waterproof sheet, and leave for twenty minutes.

COLD PACKS: I have never used as I have found tepid or cold sponging sufficient, in all cases of hyperpyrexia.

Temperatures not exceeding 104° F. are left alone, unless cerebral symptoms are excessive. For those above this point, sponging is resorted to.

Cold sponging is begun with water at 75° F. reducing to 60° F., while tepid begins at 80° F. reducing to 70° F., taking ten to fifteen minutes over the process. This/

This has always been efficacious in reducing the temperature, and in quietening the patient. Careful watch must be kept for any signs of collapse, and stimulants at once administered, if these appear or the temperature drop suddenly to or below normal. A reduction of two or three degrees is all that is aimed at.

The mouth requires much attention from the nurse. The lips become hard, dry, and cracked if neglected, but this is easily prevented by the use of lanoline, boroglyceride or any emollient application. The mucous membranes of the mouth also become dry, as do the gums, the tongue is coated with white fur, and the teeth covered with sordes.

Listerine (Liquor Thymolis Compositus B.P. C.) or Glycothymoline (Glycerinum Thymolis Compositus B.P.C.) in the proportion of one dram to a pint of water, make satisfactory mouth washes: but the best plan is to clean the teeth, if any, gums, and tongue with a swab of cotton wool dipped in a solution of equal parts of glycerine and boroglyceride.

If stomatitis is present wash the mouth out with a solution of ten grains of boric acid to an ounce of water, and give a mixture internally of potassium chlorate as in this form.

R/ Tincturae/

R/ Tincturae Ferri Perchloridi	m ii
Potassii Chloratis	grs ii
Glycerini	m x
Aquae	ad
	3 i

Misce.

Signetur: Every two hours.

N.B. All dosage quoted is that for a child of twelve months old, unless otherwise stated.

If the ulcers of the mouth are persistent lunar caustic (Argenti Nitras Mitigatus) must be applied to them.

The mucous expelled from the lungs does not, usually, require special attention. When it is very tenacious, and causes partial obstruction of the pharynx, it may be removed by a sponge or with one's finger. Eversion of the patient may assist to get rid of mucous collected in the throat, and the expulsion is much aided, if the patient is made to cry vigorously: in fact, Jacobi recommends constant slapping, to keep up crying, as he holds that the dilatation of the superficial vessels, and improved respiratory action, relieve dilatation of the right side of the heart.

This suggests the use of emetics, and they certainly are of great use in the early stages, when the secretion in the larger bronchi is excessive; but/

but they are contra indicated if there are any signs of heart failure, or any tendency to collapse. Their value is greatest in the flabby rachitic patient, with great increase of bronchial secretion, demonstrated by extra auscultatory râles. Of emetics, ipecacuanha root is the best for children. Fresh preparations of the Vinum in thirty minim~~um~~ doses, or five grains of the powdered root are given every ten minutes, until vomiting is caused. Do not persist beyond six or eight such doses, but proceed to wash out the stomach, as some are totally unable to vomit, and the depressant action of the drug must be guarded against.

APOMORPHINE, though perhaps more rapid and certain in its action, is too dangerous to use in young children.

ZINC SULPHATE, given in ten grain doses in warm water is safe and effective.

When drugs fail, washing out of the stomach is a simple procedure, and, in itself, is often sufficient to give great relief. A number twelve (English) soft rubber catheter is easily passed into the stomach, and to it are attached a short tube, and a conical glass funnel. Warm boracic solution, sterilised water, or a solution of bicarbonate of soda, is allowed/

allowed to run in slowly; after about four ounces have passed, the funnel is depressed, and the contents of the stomach syphoned off. The removal of undigested food, and other substances from the stomach, lessens the distension of this organ, thus allowing more scope for diaphragmatic action. The retching, and straining induced by this procedure, are of great assistance in expelling mucous from the trachea and bronchi.

Belladonna is used when drastic measures are not imperative, and yet there is great general increase of secretion in the respiratory organs. To be successful with this drug, as with all others, the cases should not be treated indiscriminately, but suitable ones be carefully chosen. Suitable cases, are those of short duration, acute onset, and with fine râles throughout the lungs, in addition to the small areas of consolidation: in fact they are those often called capillary bronchitis.

Belladonna diminishes the bronchial secretion, slows, and deepens the respirations, and quickens the heart, without diminution of the force.

One or two early cases were treated with ten minim doses of the tincture of belladonna, and were fairly satisfactory: but now, I obtain better results/

results by the use of the *Extractum Belladonnae Viride* in a quarter of a grain dose every two hours. Continue this for twenty four hours; if no improvement is then observable, stop; persistence is useless. When improvement is appreciable continue for another day, with four hourly intervals, then give only three doses during the next day again, and end by giving one sixth of a grain three times in each of the next two days. I have never seen any toxic effects follow the above method, but have been able to reduce the amount given more rapidly in some than in others.

The signs, that have led to early reduction of the amount given, are dryness of the mouth, and a bright scarlet flushing of the face. When these are noted, belladonna is omitted for a few hours and resumed in smaller amounts. These symptoms have only been seen together in cases, which rapidly, and successfully came under the influence, and all such showed rapid clearance of the lung condition. The results at times exceed the highest expectations, though others, apparently similar, fail to respond to the treatment.

In relapses, and cases of several days duration, the results are not so good, but should be tried in all showing great excess of bronchial secretion./

secretion.

STIMULANTS: I now have great faith in the use of alcoholic stimulants, in the broncho-pneumonia of children. I do not think any drug has such an excellent stimulating effect in the acute stage, and although I can give no explanation of this, my clinical experience entirely corroborates.

Whisky is preferable to brandy, in hospitals and with poor people, as a more matured spirit is obtained at a smaller cost. The greatest value to be got from whisky, is during the febrile stage, but during convalescence it is a useful tonic. A general stimulant effect on the heart, a mild stomachic action, and a small food value apparently are the main properties of this spirit. The action is more prolonged in pneumonic patients than in health (Charteris and Cathcart), and there is no doubt, that much more can be used by the patient when acutely ill, than when in normal health.

Twenty minims, well diluted, is the amount given every four hours. This dose is increased in suitable cases, but one ounce in twenty-four hours must not be exceeded.

The administration in warm milk, with a little/

little syrup of a larger single dose, such as one dram, is a safe, and fairly reliable hypnotic.

Brandy should be given in the same amounts as whisky. There is no advantage in the hypodermic use of brandy over that of ether, but two drams in a saline, administered per rectum, is a valuable stimulant.

The contra indications to the use of alcohol are, briefly, delirium and kidney conditions. Strychnine is also given with great frequency, as stimulation is so necessary, and valuable in this disease.

The use is, like that of whisky, based more on clinical, than theoretical grounds. Respiration is quickened and deepened, the peripheral blood vessels are constricted, the heart is slowed, and the blood pressure raised. The drug is also stomachic and bitter, and aids digestion.

Minim doses of the liquor, every four hours, I find best, and seldom increase this amount. Hypodermic medication should be avoided in children; but when there is acute gastro-intestinal disturbance, one two-hundredth of a grain of the sulphate, given in this manner is preferable to the use of the liquor.

Strophanthus: Fraser's tincture (B.P. 1885) is the only/

only form in which I have used this drug. In all with cyanosis, irregularity of the pulse, and signs of dilatation of the heart, the administration is begun at once:but of course earlier use of it is to be preferred. The action is confined to the circulatory system, respiration being unaffected primarily. One minim in one dram of chloroform water, is given three to six times daily:but the amount, and the frequency are greatly increased if necessary.

The addition of half or one minim of the tincture of Capsicum to each dose, is all that is sufficient to stop vomiting, caused by the use of strophanthus, in the majority of instances.

Hypodermically $\frac{1}{500}$ gr. of strophanthin has been given, but is much less satisfactory.

Ether (Sulphuric) is the most valuable of emergency drugs. For collapse, such as follows convulsions, there is nothing better. The action is evanescent, but will tide over a crisis. Administer fifteen minims hypodermically; this is very painful and helps to rouse the patient, but I have once seen localised gangrene follow in a very emaciated marasmus baby.

Adrenalin Chloride is another emergency drug/

drug, best used by dropping one or two minims of the commercial 1=1000 solution directly on to the conjunctiva of the patient. The instantaneous result, judged by the pulse, is sometimes extraordinary, but is also very short lived.

Normal saline is to be recommended in all cases of collapse, and in very emaciated babies. Direct transfusion is not practised, and rectal absorption or infusion, is trusted to.

Rectal administration is done, as usual, by the use of a tube, and funnel, no syringe being permitted. It is simple, and satisfactory when the bowel is not irritable. Three ounces of normal saline, two drams of brandy, and twenty minims of adrenalin, is the best formula for emergencies. The amount given and the frequency of repetition are dependent on the condition of the patient; but are not given more than six times in twenty-four hours.

Infusion is done into the loose cellular tissue of the abdominal wall, the inner side of the thighs, or below the scapulae. A moderate sized needle is used, the saline solution maintained at 105° F, and the necessarily slow rate of flow is obtained, by regulating the height of the vessel containing/

containing the saline. Two feet fall is sufficient, and four ounces is a satisfactory amount to get into the cellular tissues at one sitting, which should extend over about twenty minutes. Repetition can be performed in four hours, but must never be twice successively in the same area.

Baths as stimulants have been mentioned.

Oxygen gas is often disappointing, but I am convinced, that one life, at least, was saved by its use. Always try it, when cyanosis is deep, dyspnoea urgent, and the patient very restless. A long trial must be given, as no effect can be expected from the use for a short time. The restlessness is increased at first, but is soon lessened, and the dyspnoea is also aided.

Never allow the gas to pass directly to a patient, but warm and moisten by the intervention of a bottle of warm water, between the cylinder and the patient.

Leeches applied to the praecordia, when the heart is rapidly dilating will assist the over-loaded right side, and a satisfactory result from their use is increased by poulticing, so as to continue the bleeding from the leech bites.

TEMPERATURE: /

TEMPERATURE: No measures are usually taken to reduce the temperature in ordinary cases. As previously stated, I do not think that any temperature below 104°F. should be interfered with.

This is only a general rule, and there are many exceptions to it. The height, maximum daily variation, and duration of the temperature must all be considered, in addition to observing the effect upon the patient.

When reduction is necessary, and it has not been brought about by nursing for a short time, or by "cradling" the bedclothes, active measures are commenced. Tepid sponging, as before described is best, and I have also mentioned cold packs, and cold baths. An ice cap is advisable, where cerebral symptoms are very evident, as these are minimised and pyrexia is lessened.

Drugs are never given till hydro-therapy has proved a failure in reducing the temperature.

Quinine produces its effect slowly, but this effect remains longer than other antipyretics. The value is most pronounced in temperatures with a large swing. Quinine, also, has a tonic action in all septicaemic conditions, into which category all secondary broncho pneumonias caused wholly, or partly by streptococcal infection, must be put.

Antipyrin/

Antipyrin is the safest of the antipyretic group of drugs, and the sedative action also exerted by it, is helpful in quietening restless patients. A single dose of two and a half grains is given, and may be repeated in two hours: but should not be freely used, as it has a decided depressant action.

The induction of sleep is all that is necessary, in many restless patients, to reduce the temperature, but hypnotics will be referred to later.

Cough is usually infrequent, and a source of little trouble, while it aids materially in the expulsion of mucous from the lungs. The eucalyptus towels, previously described, materially help in minimizing this symptom.

Dryness of the mouth and pharynx creates an irritative cough, simply relieved by the use of boroglyceride, and glycerine, or by the mouth washes mentioned. A constant, short, suppressed cough is often exorcised by a drink of warm milk.

With a more troublesome, hard cough, Syrup of Tolu in half dram doses is satisfactory; or it may be dispensed with an equal quantity of Syrup of Codeine, when exhaustion is being caused and a stop must be put to the cough.

In strong children, with more bronchitis than/

than pneumonia, the following mixture lessens coughing, but is discontinued at once if consolidation increases, as it causes intestinal disturbance very readily.

R/ Vini Ipecacuanhae
 Spiritus Aetheris Nitrosi aa m v
 Liquoris Ammonii Acetatis m xxx
 Aquae Chloroformi ad 3 i

Misce.

Signetur: Quaque quarta hora.

Stimulating and expectorant mixtures are advisable, when troublesome cough appears after resolution has begun. The former acts best with a dry irritative cough, and the latter with a hard frequent one, due to the excess of mucous excretion continuing.

Mistura Pectoralis Stimulans.

R/ Tincturae Camphorae Compositus m iii $\frac{1}{2}$
 Vini Ipecacuanhae m v
 Syrupi Scillae m xx
 Aquae Chloroformi ad 3 i

Fiat haustus.

Signetur: Quaque quarta hora.

Mistura Pectoralis Sedativus

R/ Ammonii/

R/ Ammonii Carbonatis	gr. i
Vini Ipecacuanhae	m v
Syrupi Tolutani	m xxx
Infusi Senegae ad	3 i

Fiat haustus.

Signetur: Quaque quarta hora.

Pertussis is suggested by the cough, and if this is the case, strychnine must never be given as a stimulant, and antispasmodics are necessary. The best cough mixture, in such a case, is a mixture of bromide and belladonna such as.

R/ Potassii Bromidi	grs. iv
Tincturae Belladonnae	m v-x
Glycerini	m x
Aquae Camphorae ad	3 i

Fiat haustus.

Signetur: Quaque quarta hora.

HYPNOTICS: Sleep is all important in the treatment of infantile disorders, but satisfactory methods of inducing it are few, and each of them has definite limitations.

I always try, with wakeful patients, the effect of a warm bath, followed by a light warm feed, before/

before proceeding to drugs.

Whisky has a little soporific action, and a small advance in the usual dose, given with food, is helpful. The contributory causes of insomnia, cough, pyrexia, and gastro-intestinal disturbances, must be remedied if possible: but if ordinary treatment directed to these fails, one and all may be relieved by opium, and the necessary sleep secured. As a general rule, opium should not be given, but in extreme cases all rules are broken. Sleep thus induced may cure vomiting, reduce temperature, and cause great general improvement. One minim of the tincture by mouth, or $1/40$ th of a grain of morphia, hypodermically, is all that should be given.

Dover's powder (*Pulvis Ipecacuanhae Compositus*) is a safe sedative when diarrhoea is present. A single dose of two grains, or repeated in quarter grain doses every four hours, is very satisfactory. I believe that chloral is the safest pure hypnotic for children, where insomnia alone is present. Two to three grains, repeated if necessary in two hours, is an average amount.

The addition of five grains of potassium bromide to this, is to be recommended when convulsions/

convulsions and meningeal symptoms complicate. To an unconscious or very irritable patient, administer this combination per rectum, in slightly increased amounts.

Once or twice, I have derived much benefit from phenacetin and phenazonum, but on the whole they are best avoided.

CONSTIPATION: is unusual, and the chief danger of this kind, is flatulent distension of the abdomen.

I have found no purgative more satisfactory than Castor oil, and the slight constipating action, which follows its use, is an added recommendation. Because of this latter fact, do not use castor oil frequently, but substitute cascara or calomel when constipation is obstinate: this happens more often during convalescence.

DIARRHOEA: Is another subject too large to be dealt with in a paper such as this.

I can only recommend the most careful attention to dieting, and that the use of drugs to control the diarrhoea should be postponed as long as possible.

Vomiting is rarely seen without diarrhoea, and the treatment of the latter aids the former.

If/

If vomiting without diarrhoea continue in spite of feeding changes, it is always best to wash out the stomach. Of drugs the best in my hands have been bismuth salicylate, and bicarbonate of soda.

The last resource in gastro intestinal irritation is, to sustain entirely with subcutaneous or rectal saline infusions. These will do for a short time, and have tided over a crisis.

DELIRIUM is treated by icebags and sponging: chloral and bromides are only given, when general treatment fails.

DELAYED resolution is met by attempts to improve the general health, and by counter irritation over the affected area.

Open air treatment is very valuable when a change to the country is out of the question, and Ker strongly recommends, that all cases due to pertussis, should be treated by the open air method.

Change of scene has a very salutary effect on long delayed resolution, and one or two, whom I sent back to squalid homes immediately improved, though/

though they were extremely languid and weak, and had been losing weight steadily for a couple of weeks, after the acute stage had passed. Of course it is preferable to send these patients to Convalescent homes, but this is not always possible. Avoid medicinal tonics; but if they are necessary Syrupus Ferri Iodidi. Glycerophosphates e formates (D.F. & Co.), and Vibrona are all satisfactory. The convalescence of Rachitic children is hastened, by adding cream and raw meat juice to their diet, and giving some palatable form of cod liver oil, such as :-

R/
 Olei Morrhuæ
 Syrupi Calcii Lactophosphatis aa mxx
 Sodii Hypophosphitis gr. i
 Mucilagonis Acaciae m vii js
 Olei Cassiae ℥ ½
 Aquae Calcis ad 3 i
 Misce.
 Signetur: Ter in diem.

SUMMARY/

SUMMARY OF TREATMENT.

Place in a tent with eucalyptus towels, apply "flying poultices," lift frequently, and take the greatest trouble to prevent gastro-intestinal irritation.

Stimulate early, and stimulate very freely.
Give emetics if necessary.

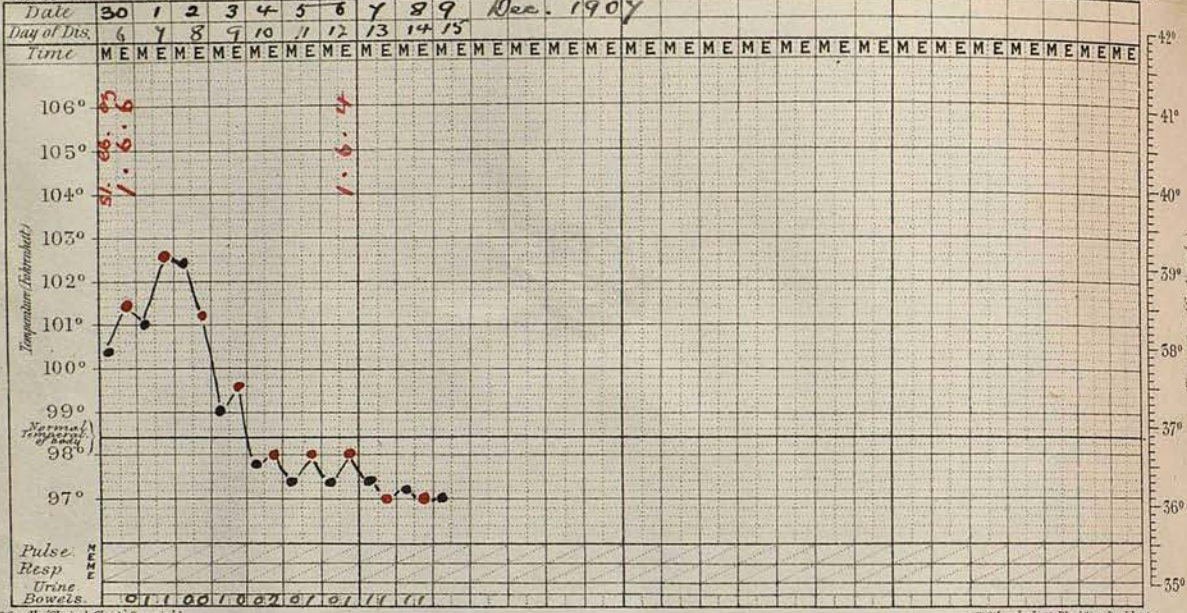
Oxygen, and stimulating baths must be given in the severest cases.

Never despair, the most surprising cases will recover at times.

ILLUSTRATIVE CASES/

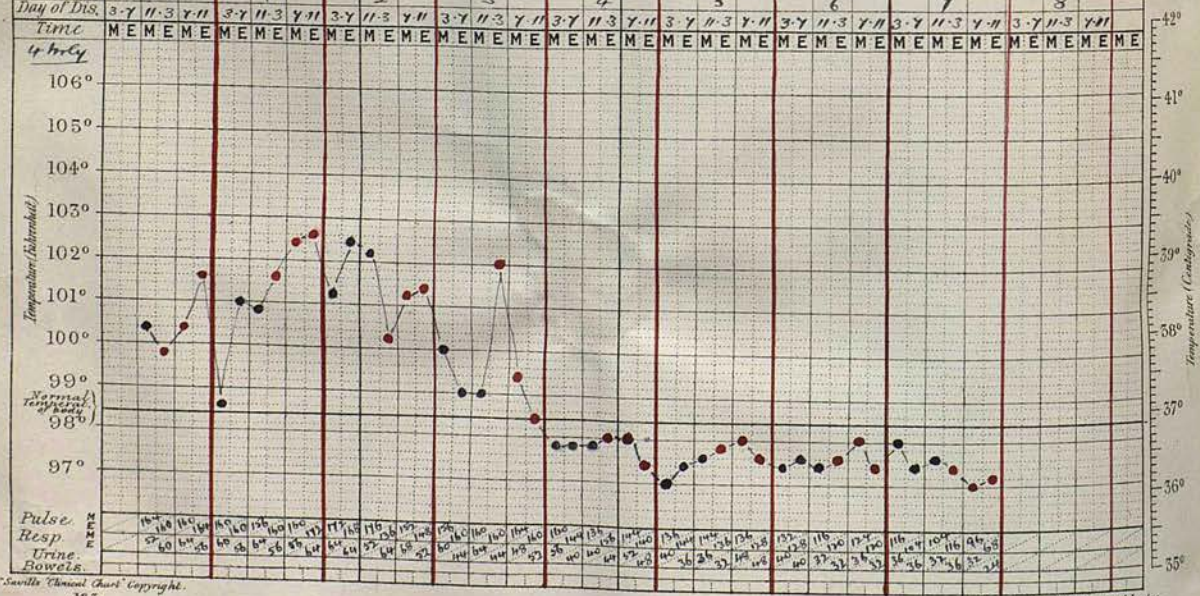
ILLUSTRATIVE CASES.

Name Susan B. Age 2 9/12 Disease Pr. Pneumonia Result Cure



W. Saville Clinical Chart Copyright, No 7. H. Siderlock, 92, Blackfriars Road, London.

Name Susan B. Age 2 9/12 Disease Pr. Pneumonia Result Cure



W. Saville Clinical Chart Copyright, No 7. H. Siderlock, 92, Blackfriars Road, London.

ILLUSTRATIVE CASES.

I.

S.B. aged 2 9/12 was a very rachitic child, who had been subject to slight attacks of bronchitis. Mother became insane during puerperium, and is now in an asylum. Well developed, but rachitic child. A week previous to admission she had vomited, began to cough, and became dyspnoeic. When first seen was flushed, and breathing rapidly (60 per min). Slight cough was present alae nasi acting slightly, and a short expiratory moan. Consolidation at the right base, and bronchitis present in both lower lobes.

Remained much the same for two days, but on the third was sitting up in bed, and playing with toys though signs were unaltered. Next day resolution had commenced, and convalescence was rapid, and uninterrupted.

This case is an instance of primary broncho-pneumonia of a simple, uncomplicated type. Symptoms were never really urgent, and the treatment was the use of a tent with eucalyptus towels, four hourly poultices, and liquor strychnine. during the second, and third days in hospital.

N.B. Figures in red on charts refer to weight of patient: black dots at top to vomiting.

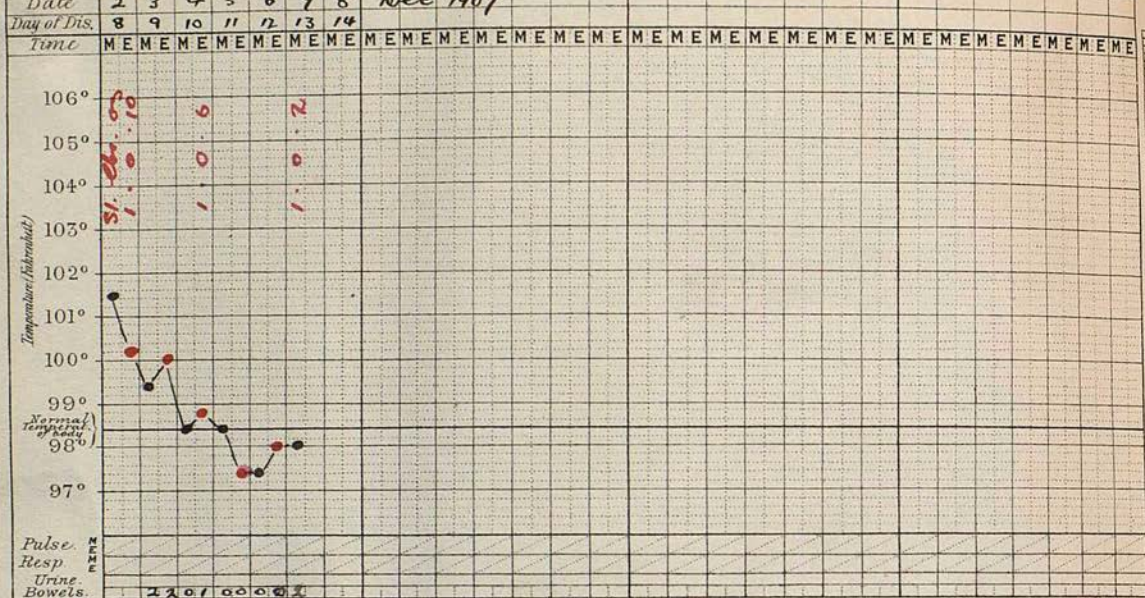
2.

E.C. aged one year: had had one previous attack of bronchitis. Bottle fed baby. Ill for previous week, with cough, dyspnoea, fever, and "rattling in throat."

On admission pale, small, rachitic child, very restless and irritable. Mucous rales in throat very evident; dyspnoea marked by full use of alae nasi, nodding of head, expiratory moan, and deep retraction of rib interspaces, with slight lateral in-drawing of ribs. Broncho vesicular breathing with fine crepitations at base of left scapula. Bronchitis of both bases present. Four days later, pneumonia well marked at base of scapula: but, two days later, this was almost entirely cleared, and bronchitis much less. Troubled with gastro intestinal irritation: but both this, and lungs had cleared on discharge.

This was another primary case, and shows very clearly the sub normal temperature which follows resolution, and how a ^{atrophic} patient may be seriously ill, and yet show few signs on a temperature chart.

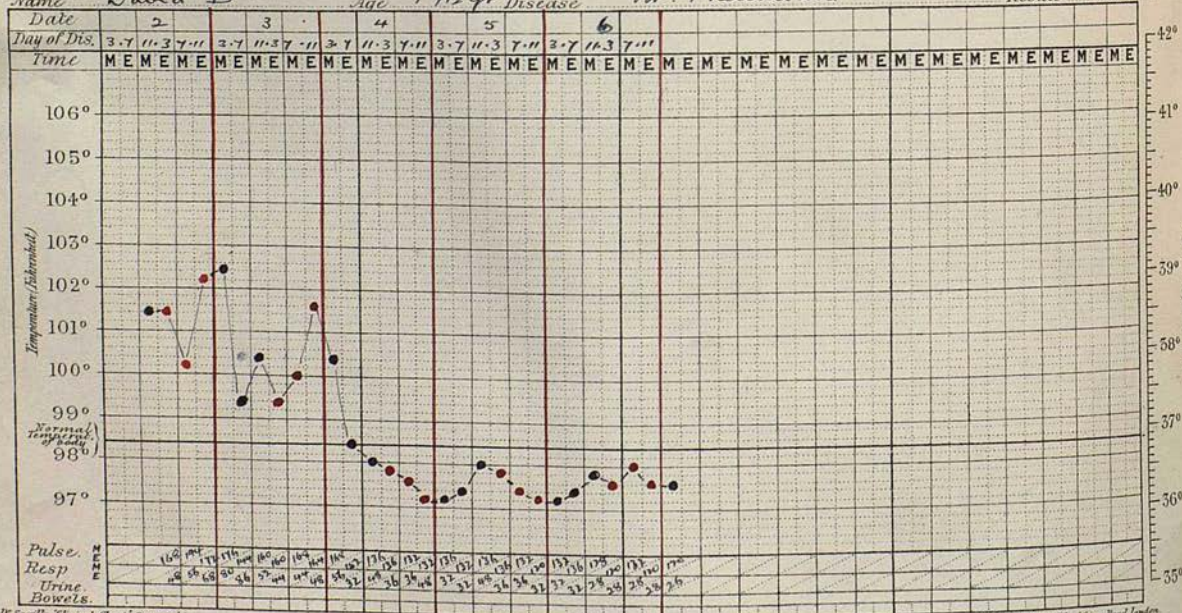
Name David B. Age 1 3/12 yr Disease Br. Pneumonia Result Cure



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Name David B. Age 1 3/12 yr Disease Br. Pneumonia Result Cure



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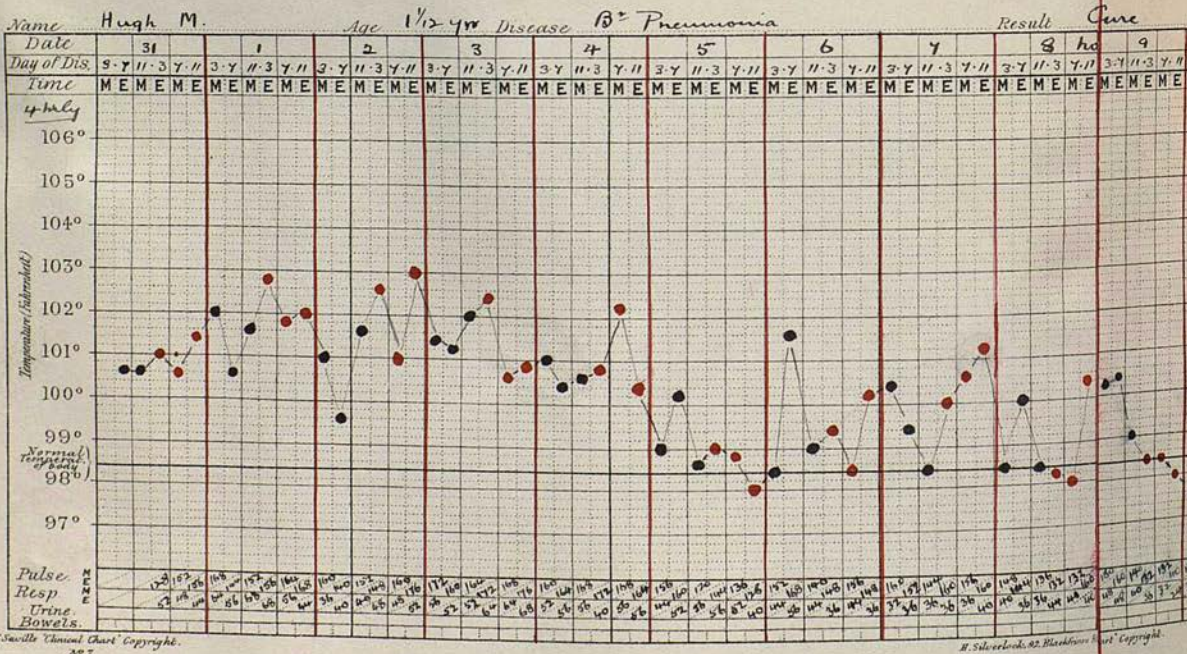
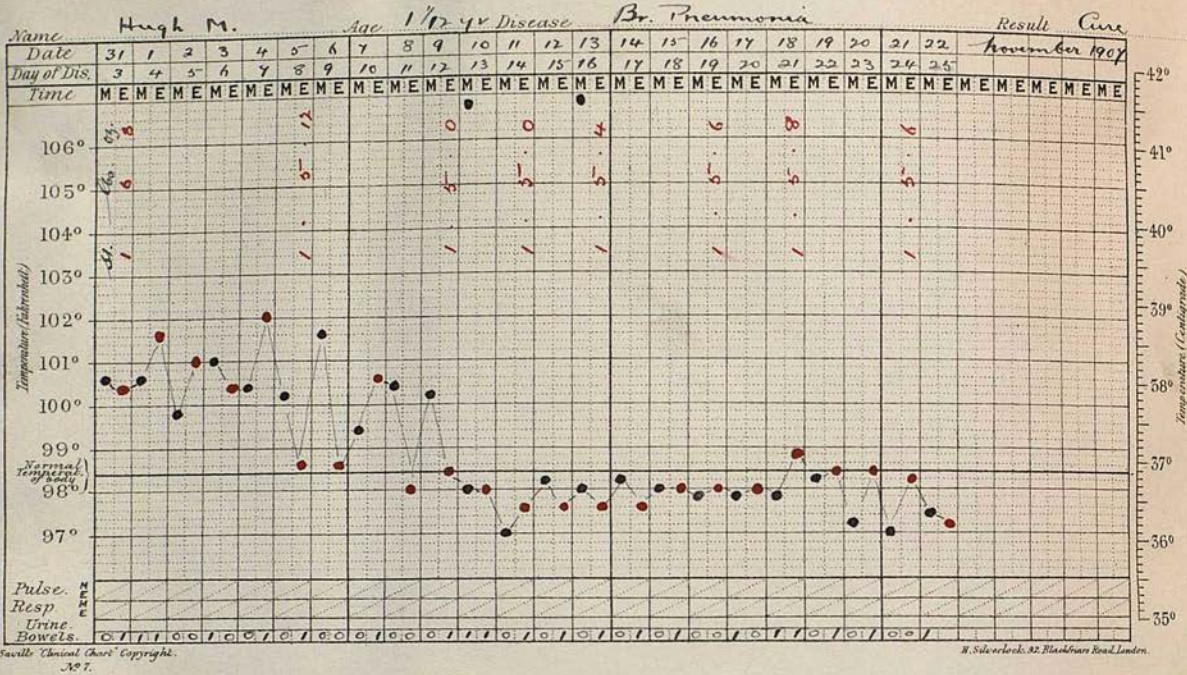
3.

D.B. healthy baby on breast.

Bronchitis(?) began five days before admission, and for three days was dyspnoeic, and feverish. Healthy child, with deep flush on cheeks, when admitted. Dyspnoea marked, alae nasi working, expiratory moan, and large amount of indrawing of rib interspaces. Pneumonia present at Right base; a small area of consolidation being found, with bronchitis of rest of lobe.

Cleared up from time of admission, and was all away, when discharged.

Another simple primary case, which required the use of a tent, towels, and whisky for three days only, and yet looked very ill when admitted. The fall of the temperature by lysis is well seen.



4.

H.M. aged 1 1/12 yr. Breast fed baby. Always healthy. Two days history of fever, slight cough, and dyspnoea. Healthy, well developed child. dyspnoea slight, with little indrawing. Rhonchial Premitus posteriorly over bases.

2nd. Consolidation in right lower lobe.

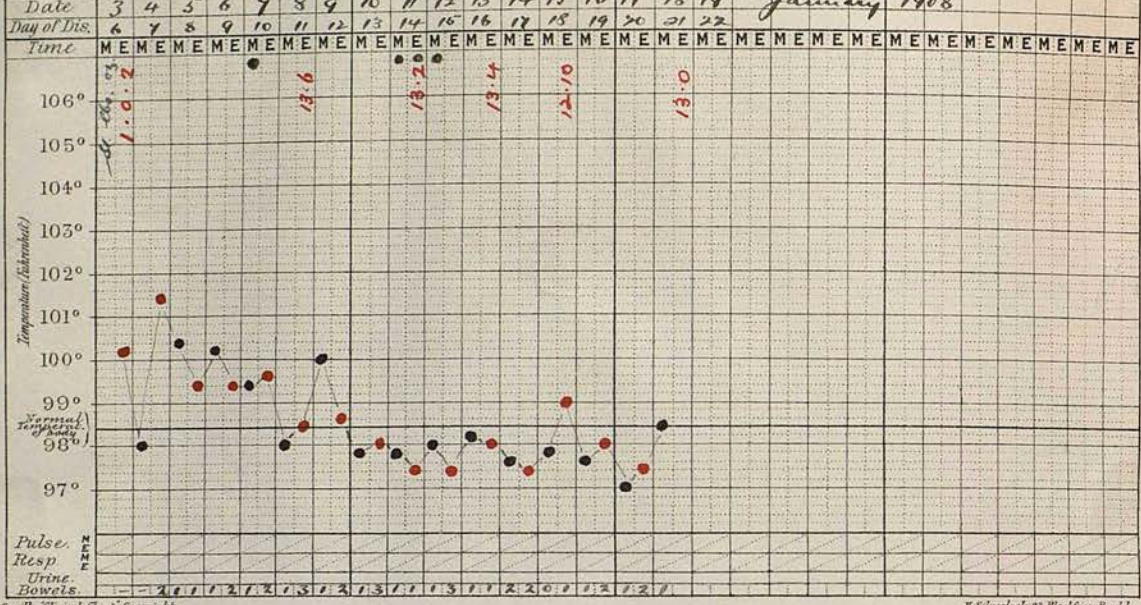
3rd. Dyspnoea worse; pulse and respirations quicker.

5th. Small area of consolidation in left lower lobe.

From this onward until the 20th case was uneventful, and then bronchitis returned with a small area of consolidation in left lower lobe.

This is a good example of the somewhat more prolonged case, the acute symptoms lasting about twelve days. The patient, however, only looked very ill on the sixth day. The subnormal temperature, after resolution has begun, is again well seen.

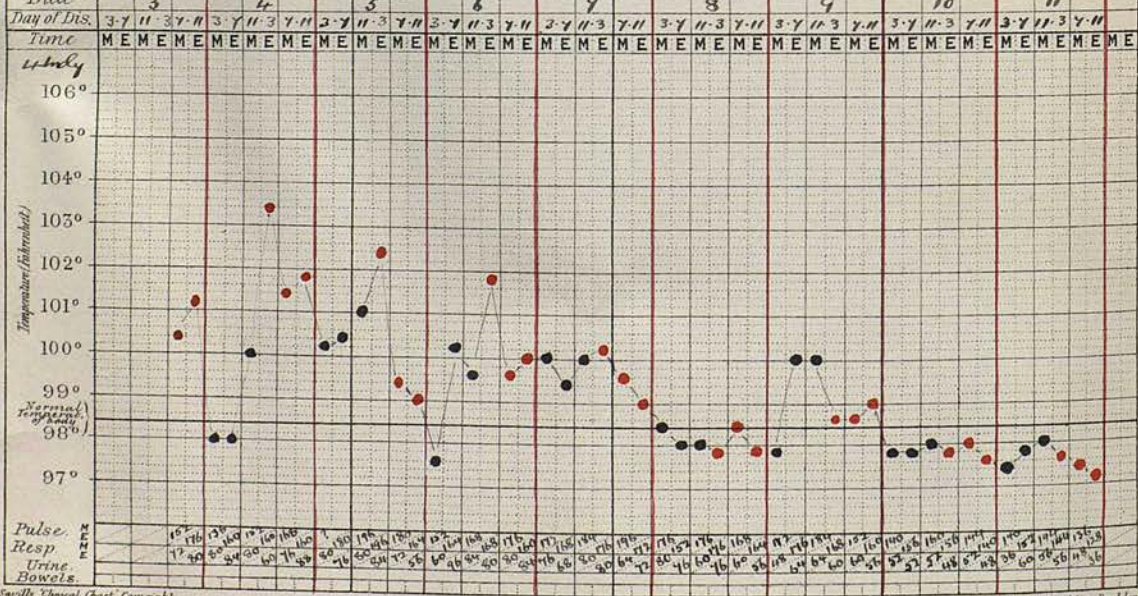
Name Helen F. Age 9/12 Disease Br. Pneumonia Result Cure



D. Swallow 'Clinical Chart' Copyright. No. 7.

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Name Helen F. Age 9/12 Disease Br. Pneumonia Result Cure



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5.

H.T. Aged 9/12 yr. Bottle fed baby.

Catarrh of stomach at 2 months old, always constipated, acute attack of bronchitis at seven months, always has some laryngeal stridor. On admission very exhausted and pale with slight cyanosis of lips. Dyspnoea very marked; frequent, short, suppressed cough, alae nasi working fully, and retraction of interspaces and epigastrium very evident. Consolidation at Right base posteriorly. Had to be stimulated at once with baths, whisky, and strychnine.

4th. Heart showed signs of failure twice during early morning, and extra stimulants were given.

5th. Oxygen given continuously for last twenty four hours.

6th. Again collapsed during early morning, and a mustard bath was necessary. General bronchitis as well as pneumonic areas in both lower lobes present.

8th. More dissemination of pneumonia throughout right lower lobe. Bronchitis better.

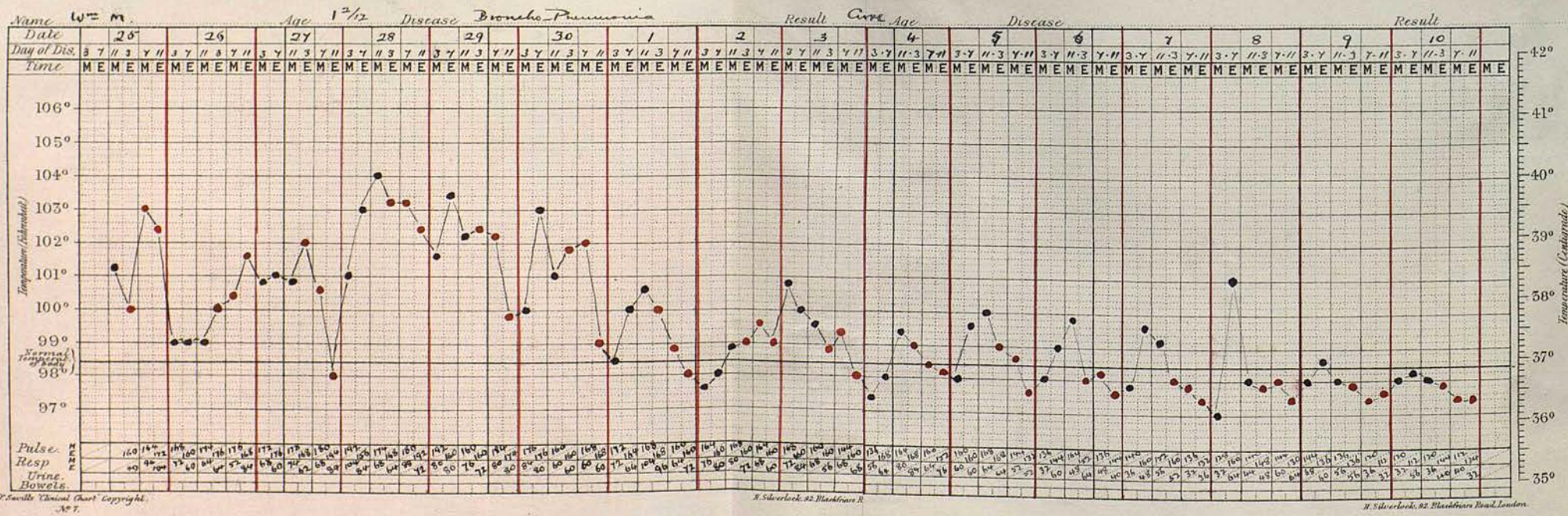
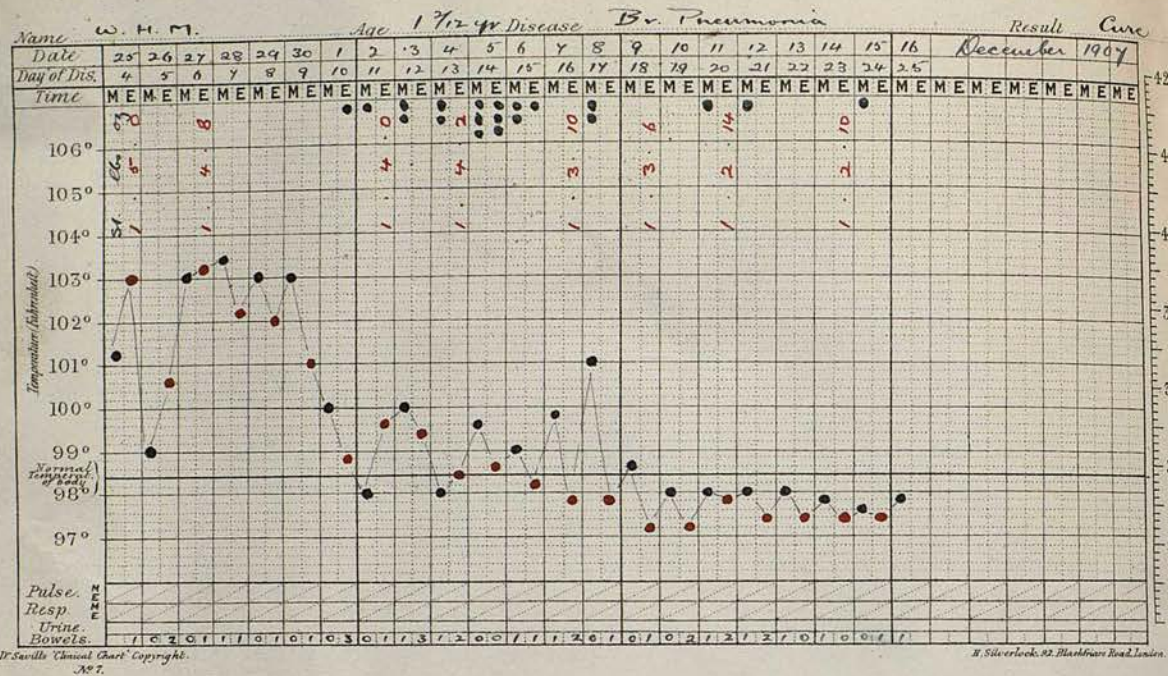
9th. Lungs clearing rapidly. Laryngeal stridor now more evident: probably of congenital origin.

12th/

12th. Gastro intestinal irritation caused a slight set back.

19th. Discharged well: still slight stridor.

A very satisfactory case, which was given up, as hopeless, by two doctors before admission. The quick pulse, respiration, and varying temperature are noteworthy. Stimulants to the fullest extent, baths, and oxygen were all necessary to prevent complete collapse.



6.

W.H.M. aged 1 2/12 yr. Breast fed baby up to admission. Always tendency to diarrhoea. Feverish, drowsy, coughing, and dyspnoeic for three days.

On admission pale, and exhausted, with dyspnoea marked. Indrawing, and retraction evident. Pneumonia at left base, some bronchitis of right base. Leucocytosis 12·200 per c.m.m.

26th. Was much better in every way.

27th. Dyspnoea, cyanosis very bad: consolidation now at right base mainly. Oxygen necessary.

28th. Pulse very bad, respirations over 100 per minute.

29th. Very weak and prostrate. Leucocytes 8000.

30th. Pneumonia again more marked at left base, Leucocytosis 10·000 per c.m.m.

1st. Again very cyanosed, and respirations over 100: but leucocytosis increasing (12·000 per c.m.m.)

2nd. Leucocytosis 21·000. Slight general improvement.

3rd. Sitting up in bed. Right lung almost clear, some patches still in left lower lobe./

lobe.

4th. Again worse: left lower lobe shows much more consolidation. Leucocytosis 20,000.

5th. Vomiting very serious.

7th. Much better: sleeping, and eating well.

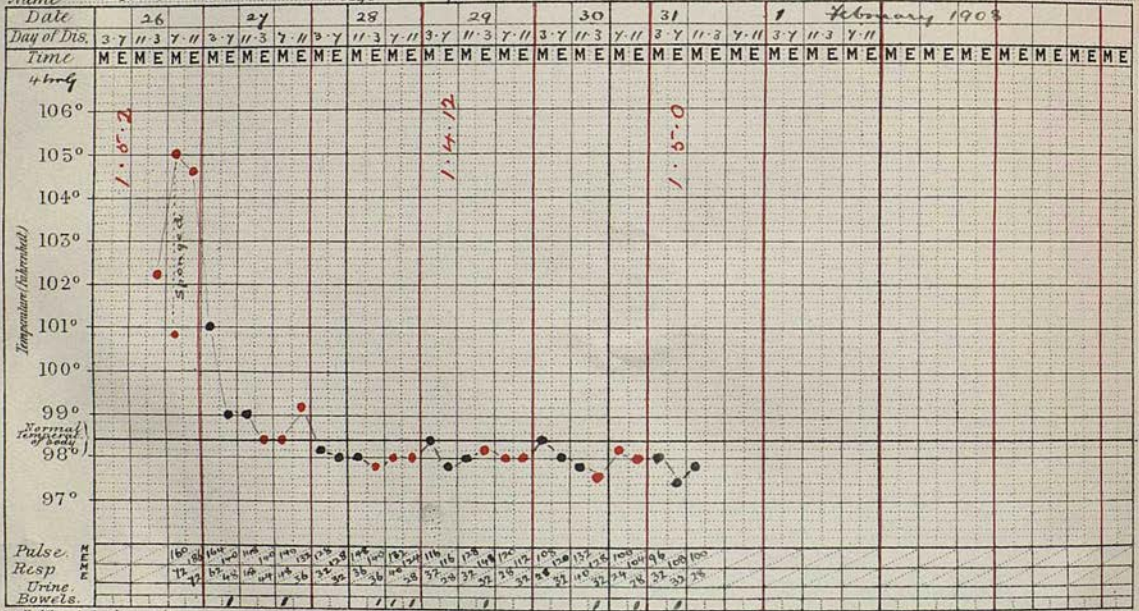
9th. Lungs clearing very fast.

15th. Discharged.

One of the best cases of recovery. The quick respiration rate should be noted, this being the only recovery I have seen in which the rate of 100 per min. was exceeded. The areas of consolidation varied from day to day, and affected both lower lobes. Oxygen was of immense value in this case, and was used continuously for three days, as even a short cessation appeared to increase the distress present. The leucocytosis is also curious, and the reduction to 8,000 per c.m.m. on the eighth day of the illness was very ominous: but, luckily, this condition did not remain.

The child was seen a month later, and was very well, without any signs at all to be found in the lungs.

Name Martha S. Age 1 1/2 yrs Disease Bv. Pneumonia Result Cure



Dr. Sawdl's 'Clinical Chart' Copyright. No 7.

H. Silcock, 92, Blackfriars Road, London.

7.

M.S. 1 4/12 yrs. Breast fed baby. Convulsions at one year, otherwise healthy. Illness commenced suddenly three days before admission with fever, cough, and dyspnoea. Was a pale, but healthy looking child, very irritable, restless, and feverish. Slightly ricketty. Dyspnoea marked, with alae nasi working, and slight indrawing of chest wall. Broncho pneumonia of left base: but both lower lobes extremely congested.

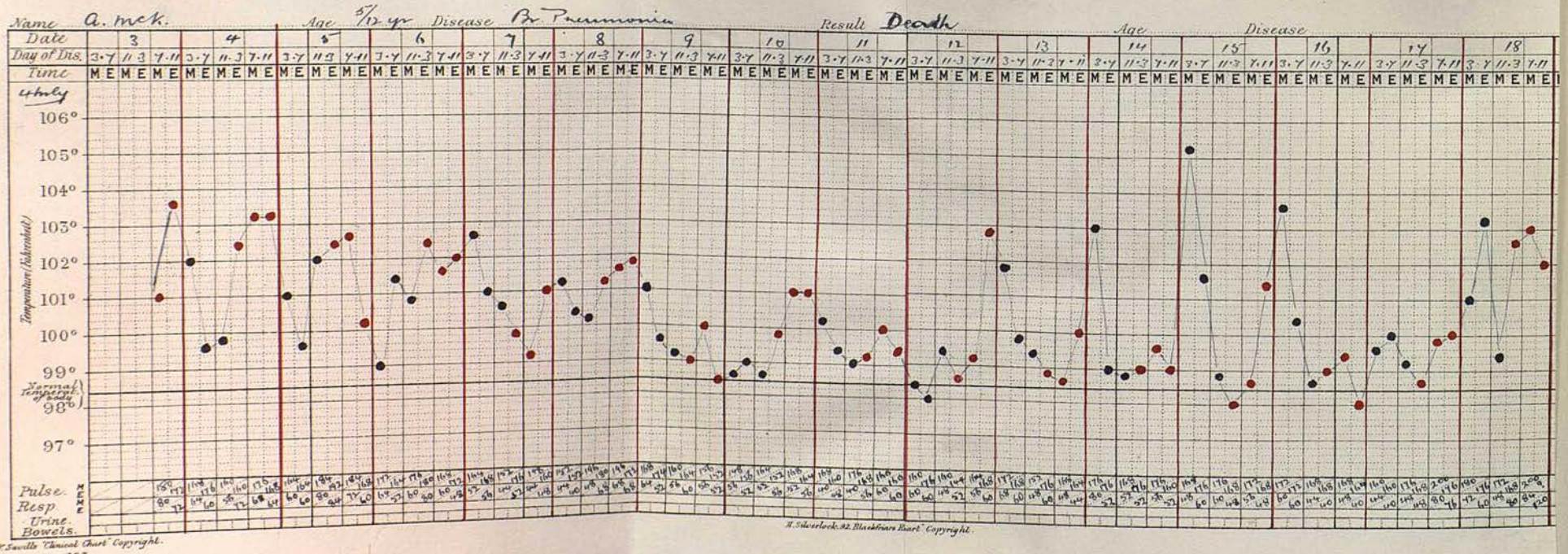
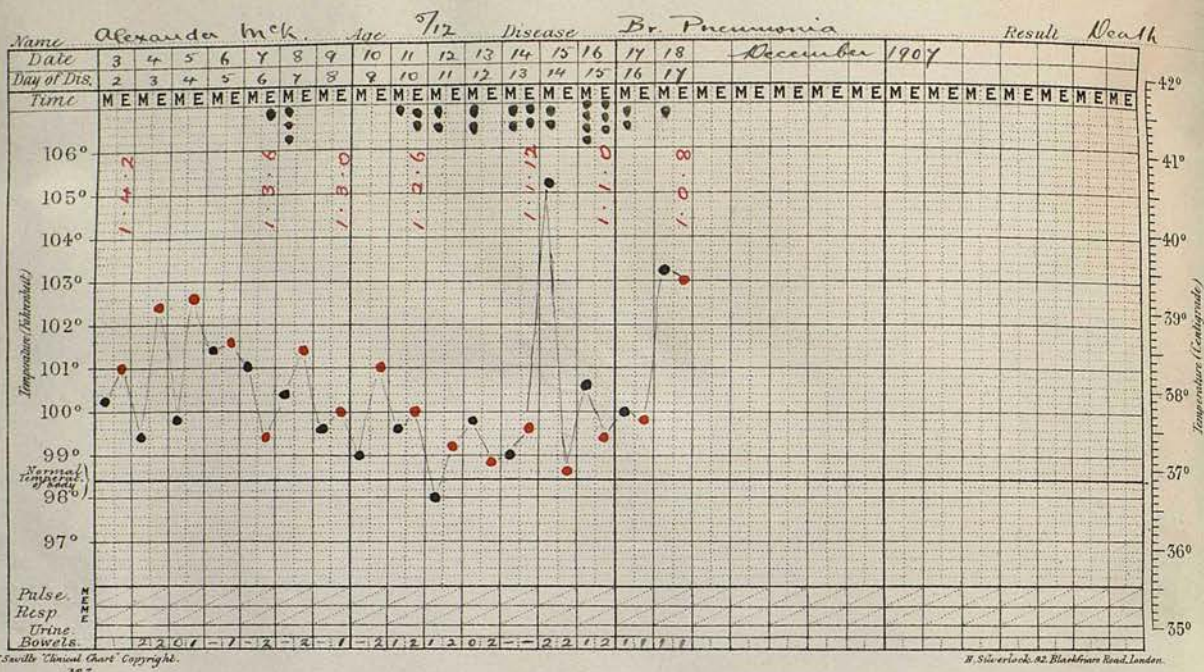
Put in a tent with towels, whisky given four hourly, and belladonna in quarter grain doses of the extract. Was very restless all night, and required sponging to reduce temperature.

27th. Bases very much clearer, and patient sitting up, and trying to climb out of bed.

28th. Only a few medium crepitations found at left base.

This case gave the most satisfactory result of all with belladonna. The patient looked very ill when admitted, and the use of emetics was considered: but the improvement was almost immediately seen after the use of belladonna, and only eight doses, that is two grains, were given in all. I think that the/

the case was one of undoubted primary broncho pneumonia, though the chart is very similar to a lobar condition.



8.

A.MCK. Aged 5/12 yr. Breast fed baby. Always very healthy. Cough, fever, dyspnoea, and great prostration appeared one day before admission. Strong healthy child with a small umbilical hernia. Dyspnoea very marked, alae nasi very full, indrawing of interspaces to great extent. No definite pneumonia: but great congestion of both bases, which remained until the 6th when pneumonia at left base was found: dyspnoea by this time extremely severe. 8th Belladonna caused slight lessening of congestion and by the 10th improvement was very definite.

11th. Consolidation found at right base.

12th. Left base again markedly pneumonic.

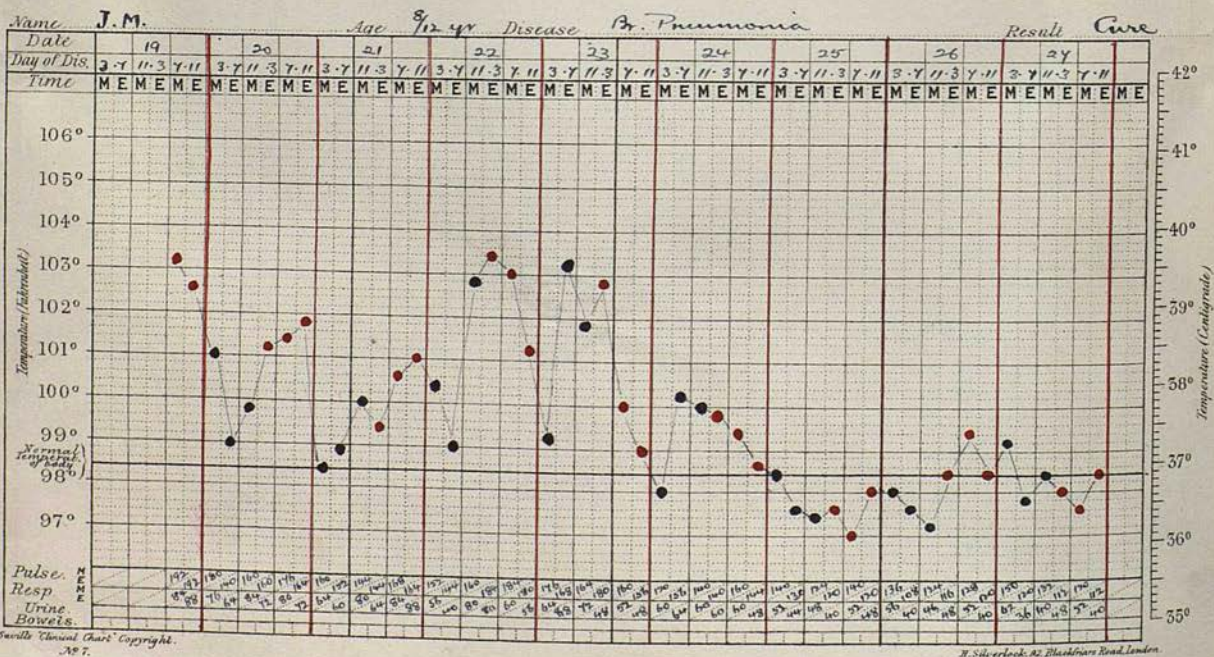
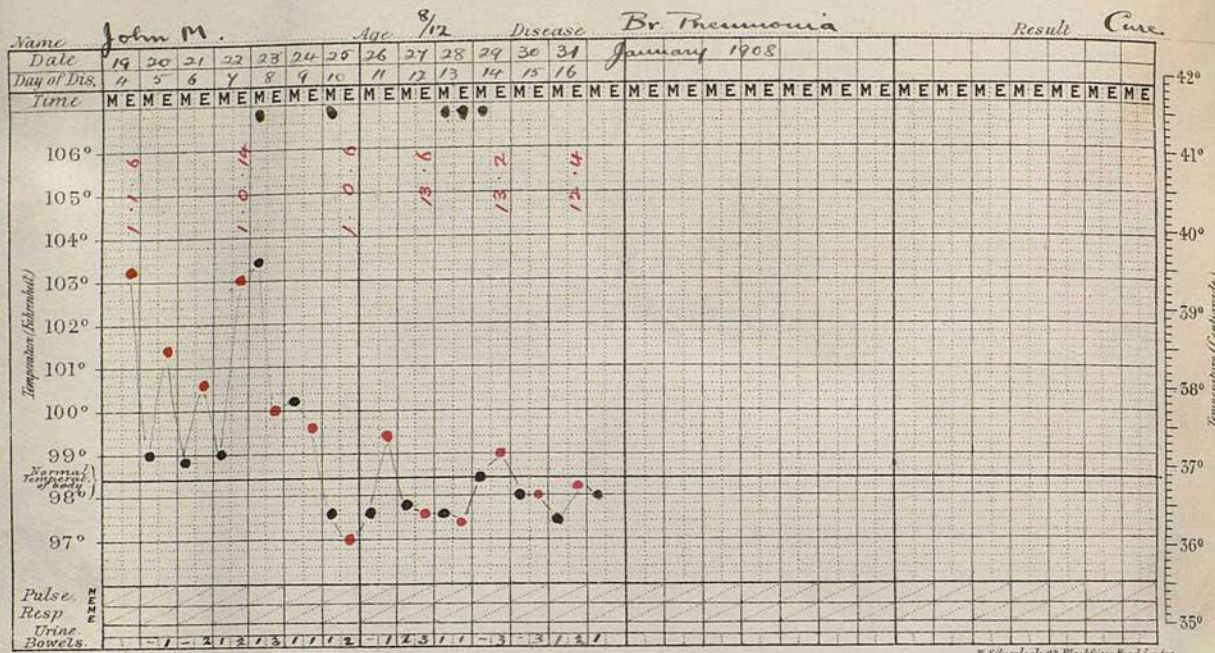
14th. Vomiting everything, and distinctly weaker.

15th. Temperature high, and prostration severe.

16th. Lungs clearer: but head rigidity, Kernig's and other signs pointing to the onset of meningitis confirmed by lumbar puncture.

18th. Died with all symptoms of meningitis.

An unfortunate case, which showed, apparently, the value of belladonna. The lungs were never so much affected after its use, and possibly all the symptoms from this time onwards were due to the meningeal complications.



9.

J.M. Aged 8/12 yr. Broncho-pneumonia at 6 months, and then weaned. Was barely convalescent when he commenced to vomit, became dyspnoeic again, and cough returned three days before admission. On admission was breathing rapidly, but was not cyanosed or greatly distressed. Pneumonia present at right base.

19th. Slight spread to left base.

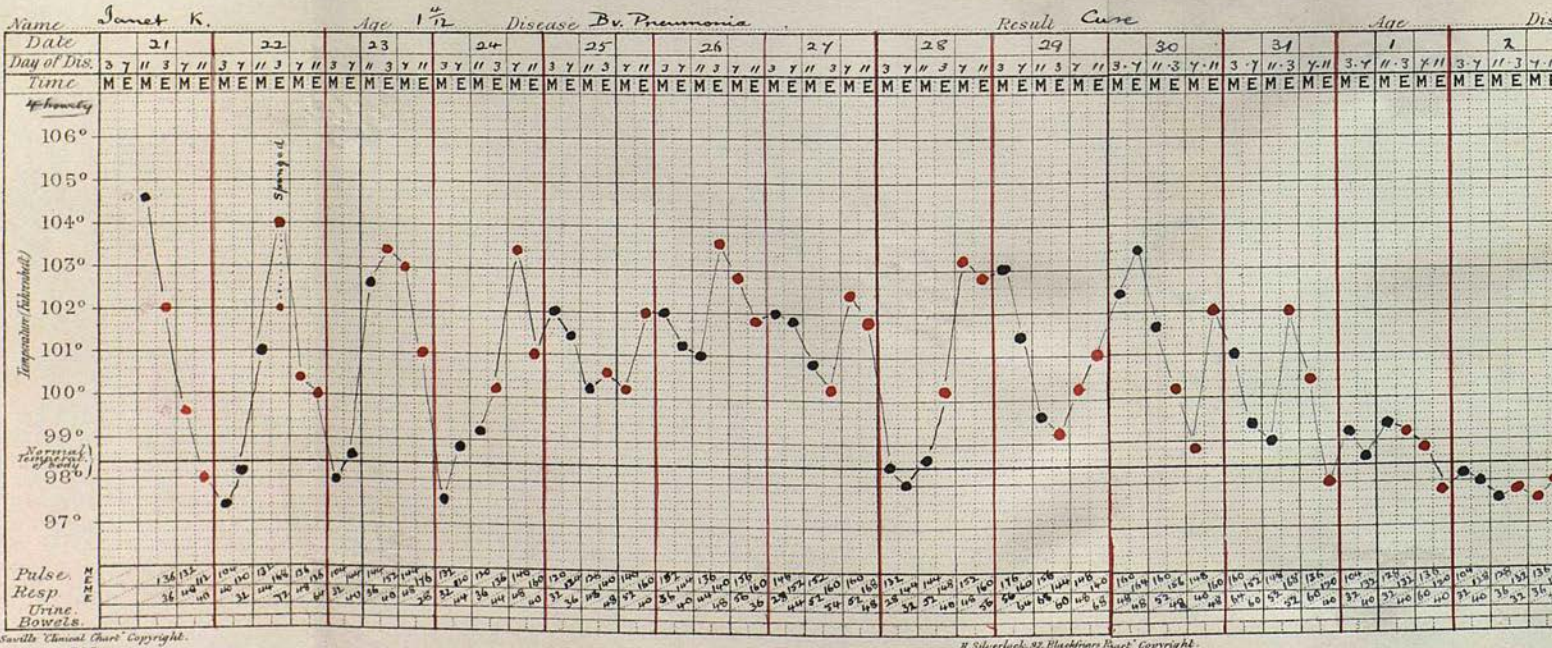
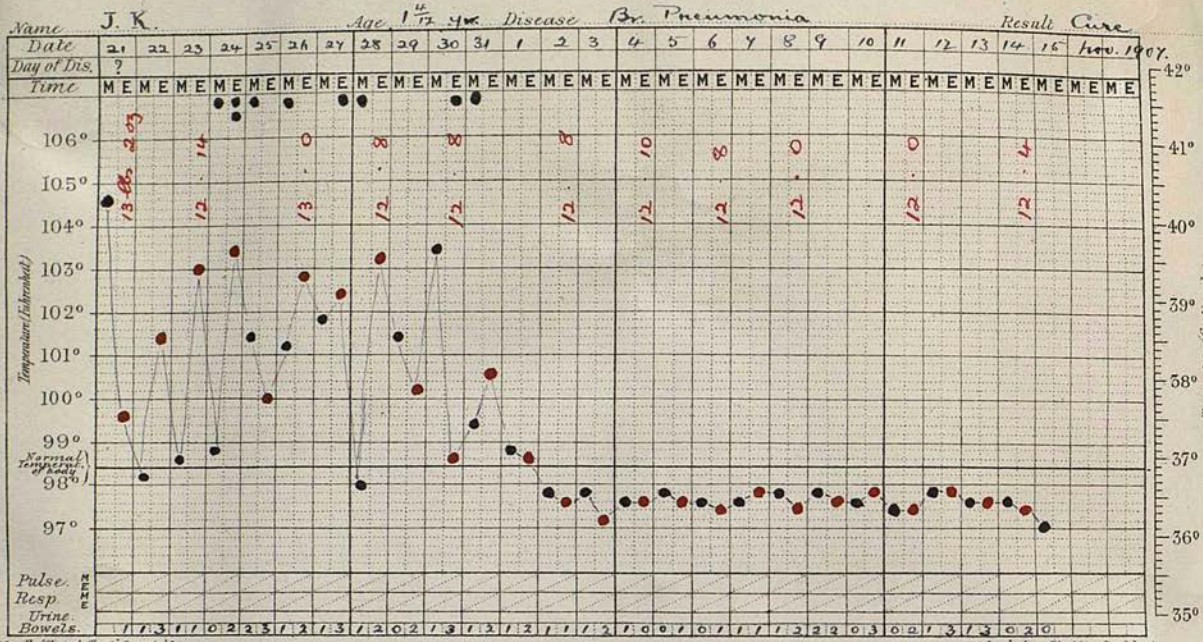
22nd. Both bases definitely affected.

23rd. Right lower lobe showed marked extension upwards.

24th. Bronchitis present generally: less pneumonia.

27th. All consolidation had disappeared: some bronchitis remained until discharge.

The spreading diffuse character was well marked in this case, which also is a fair example of recurrence, and of a swinging temperature. Bronchitis, and gastro intestinal disturbance account for the temperature not remaining subnormal, after resolution had begun.



10.

J.K. Aged 1 4/12 yrs. Bottle fed baby. Suffered from convulsions when six months old, and has been very subject to diarrhoea. Was admitted as a case of diarrhoea with much wasting, and a little vomiting. Had had a slight cough: but no dyspnoea. On admission was very puny, exhausted looking with no dyspnoea. Showed some of the slighter signs of rickets. Was restless, and moaning while asleep. The temperature, and other signs were very puzzling until the 25th when a small area of pneumonia was found very high in the left axilla.

28th. Pneumonic area increased to size of 2/-.

31st. Pneumonia had spread forward a little more.

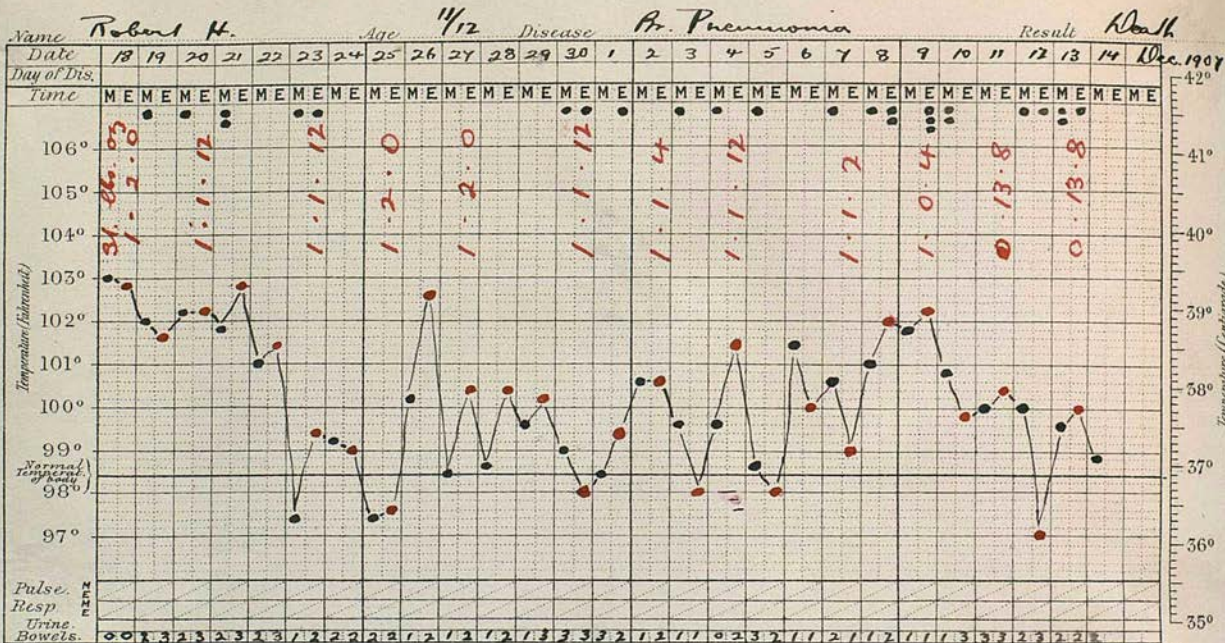
2nd. Began to clear rapidly: pulse very irregular: Diarrhoea the only trouble from this on, as it prevented feeding up.

This was a very interesting case, as the lungs were carefully examined every day, and the pneumonic area was so small. Dyspnoea was never urgent, and the lungs might not have been carefully examined.

The irregular pulse of the resolution stage was very clearly shown. Patient returned three weeks/

weeks later, again with diarrhoea, and lungs were found to be perfectly clear, and patient had put on one pound of weight: there was no temperature on the second occasion.

Widal's reaction for typhoid fever was negative.



11.

R.H. 11/12 yr. Breast fed. Had had

otorrhoea on both sides, for a month, before admission. Illness began with great irritability, and dis-inclination for food, one week before admission. Had a severe, frequent cough; much wheezing in chest, and pain in left side. On admission was a small, anaemic looking, very irritable child, very ricketty, cough frequent, loose, respiration quick, tonsils large, and inflamed, indrawing well marked; pneumonia around root of left lung: leucocytes 29000.

21st. Extension of pneumonia into left axilla.

22nd. Extension to right base: empyema suspected from great pallor and signs: but needle failed to get any fluid.

23rd. Diarrhoea causing much trouble.

24th. Pneumonia around root of right lung: left much clearer: laryngismus stridulus troublesome.

29th. No real change until 28th when left lower lobe showed fresh consolidation: but right was clearer.

30th. Both signs, and symptoms pointed to resolution.

1st. Right lower lobe again very congested.

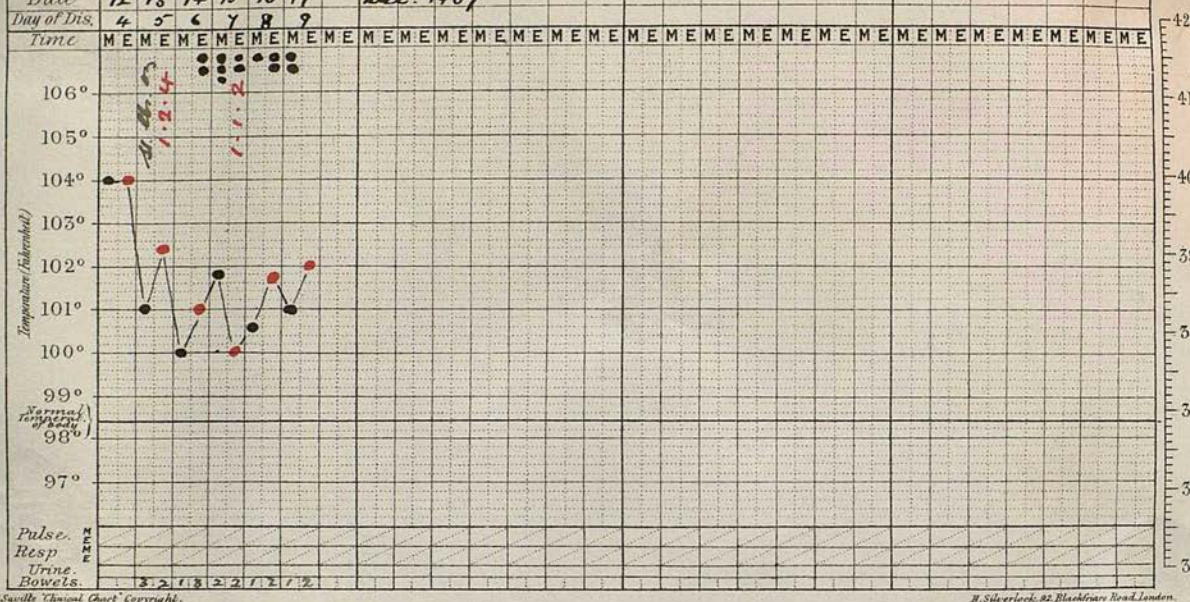
2nd./

- 2nd. Pneumonia again around root of left lung:
leucocytosis 52,000.
- 3rd. Both bases very much choked.
- 4th. Diarrhoea again causing trouble: very exhausted, and anaemic, pneumonia most at left base. Nasal discharge had gradually increased, and was offensive: only staphylococci were cultivated from it, though several cultures were made.
- 5th. Right base again bad: very exhausted, and could not retain food.
- 7th. Left axilla shows most consolidation; lungs much clearer elsewhere.
- 8th. Left apex, and axilla now showed pneumonia.
- 10th. Cough severe, exhaustion extreme.
- 11th. Left base again explored for fluid: but none obtained: nasal discharge still offensive, and large in amount.
- 12th. Lungs very choked: pulse remaining good.
- 14th. Convulsions followed by collapse about mid-day, recovered a little: but died after more convulsions in evening.

This is the best example I can show of a protracted case, and the variations from day to day in the physical signs were amazing. Every portion of/

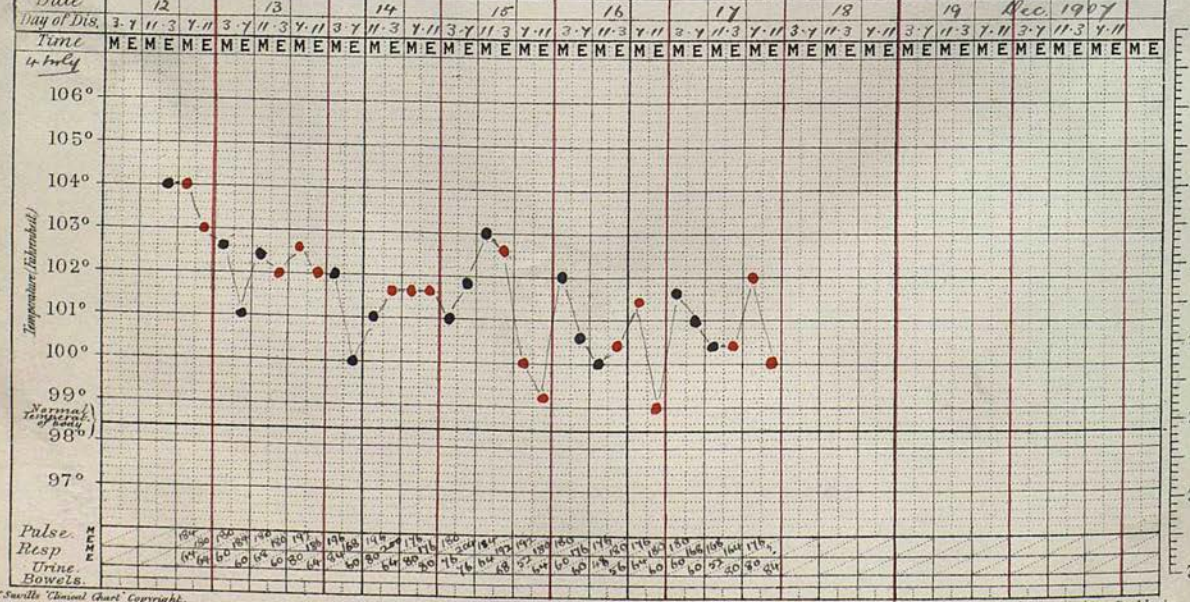
of lung, except the right apex, showed consolidation at some period. The vitality was extraordinary, considering this wide area, the weakly state of the patient, and the great drain of the diarrhoea. The death with convulsions is, I believe, often seen, in these exhausted patients.

Name *William S.* Age *1 1/2 y^o* Disease *Br. Pneumonia* Result *Death*



Dr. Sawille 'Clinical Chart' Copyright. No 7. H. Silverlock, 92, Blackfriars Road, London.

Name *William S.* Age *1 1/2* Disease *Br. Pneumonia* Result *Death*



Dr. Sawille 'Clinical Chart' Copyright. No 7. H. Silverlock, 92, Blackfriars Road, London.

12.W.S. 1 & 4/12 yrs. Breast fed baby. Had

whooping cough and severe bronchitis when seven months old. Illness began with vomiting, and diarrhoea two days before admission accompanied by fever. Dyspnoea noticed following morning, accompanied by cough. On admission ricketty child, very pale, and ill. Skin hot and dry; cough hard, frequent, and suppressed; abdomen distended. Dyspnoea severe, with much indrawing, and expiratory moan. Left apex down to fourth rib, showed a lot of pneumonic consolidation. Just held his own, being very much prostrated, for two days.

15th. Still exhausted, and left base now showed early signs of pneumonia.

16th. Tetany very marked.

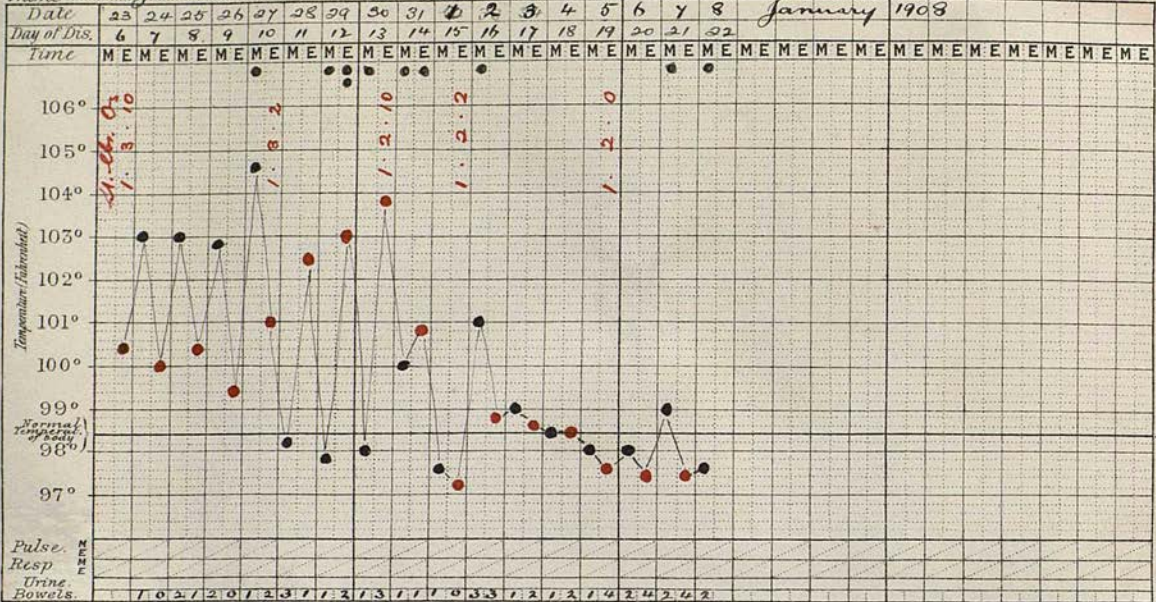
17th. Tetany still present: apex of lung clear almost, but lower lobe much more affected. Patient died quietly in evening.

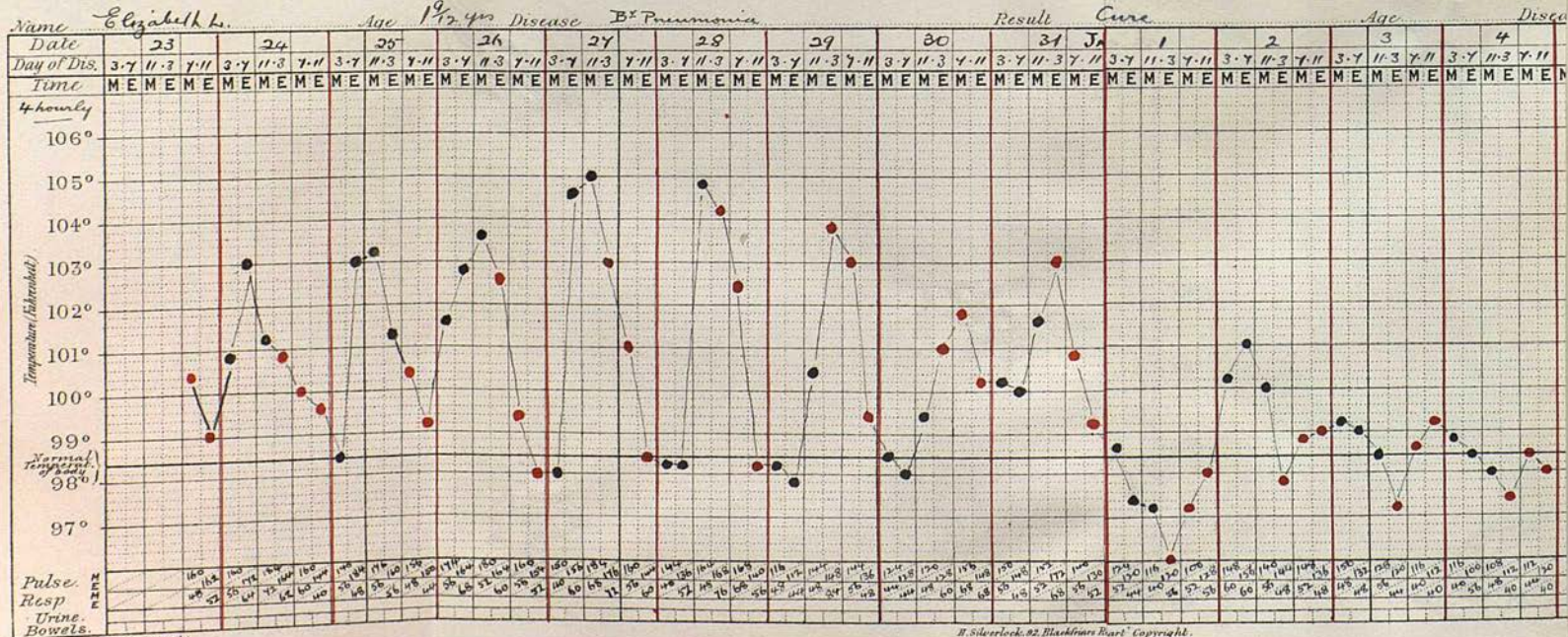
This patient is interesting, as showing the probable spread of infection, by aspiration, from the upper to the lower lobe on the same side. The former had almost entirely resolved clinically, when patient died, and the latter was quite free when first seen. The presence of diarrhoea, and vomiting was, probably, the/

the direct cause of tetany setting in.

The four hourly chart, again shows the variations in temperature more clearly than the morning and evening one.

Name Elizabeth L. Age 1⁹/₁₂ Disease 13^r Pneumonia Result Cure





13.

E.L. 1 & 9/12. Breast fed baby. Glands in neck have been operated upon three times, and have not healed yet. Vomiting, cough, and fever had been present for five days; dyspnoea, moaning and extreme restlessness for three days before admission. Was a small, pale, thin, ricketty child, with marked dyspnoea, alae nasi working fully, and expiratory moan. Left base showed a lot of consolidation.

25th. Spread up, and forward of consolidation.

26th. Prostration severe, and right lower lobe rather choky.

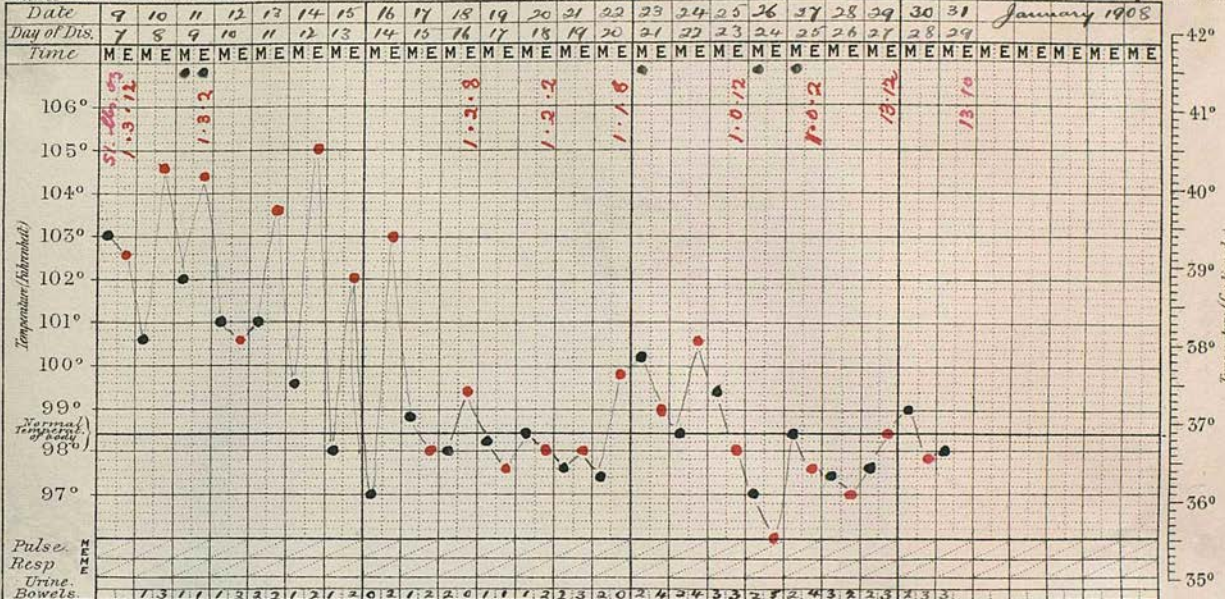
27th. Dyspnoea less: and taking food better.

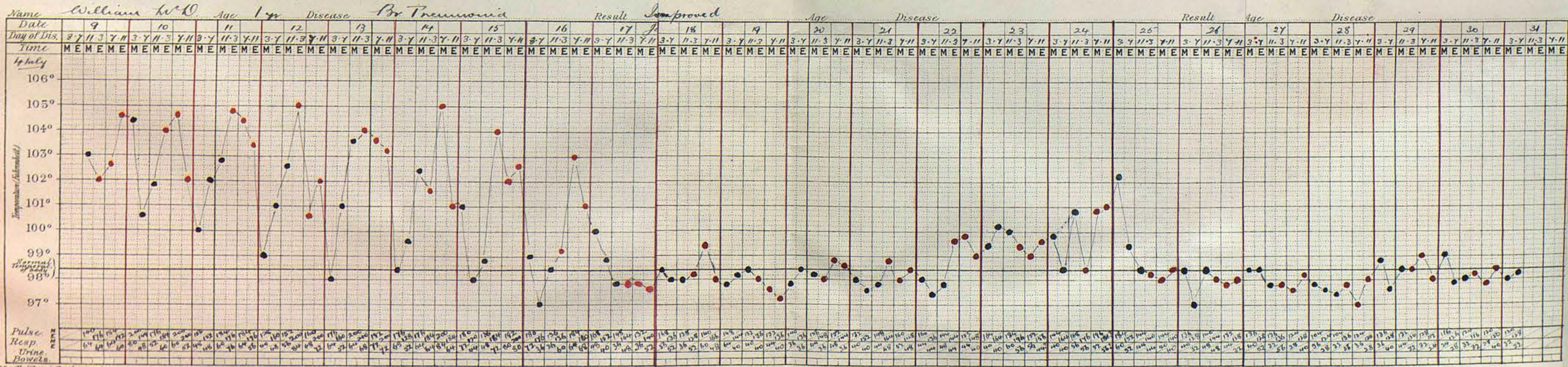
28th. Left base again worse.

30th. Small areas in left axilla of consolidation: vomiting, and diarrhoea troublesome. Diarrhoea remained troublesome, but generally patient improved, and lungs cleared entirely.

The swinging temperature, character of the breath sounds and accompaniments, and glands in neck, all led to a suggestion of tuberculosis: but this was negatived by the rapid clearance of the lungs; Patient improved rapidly on going home.

Name William M.O. Age 1yr. Disease Br. Pneumonia Result Improved





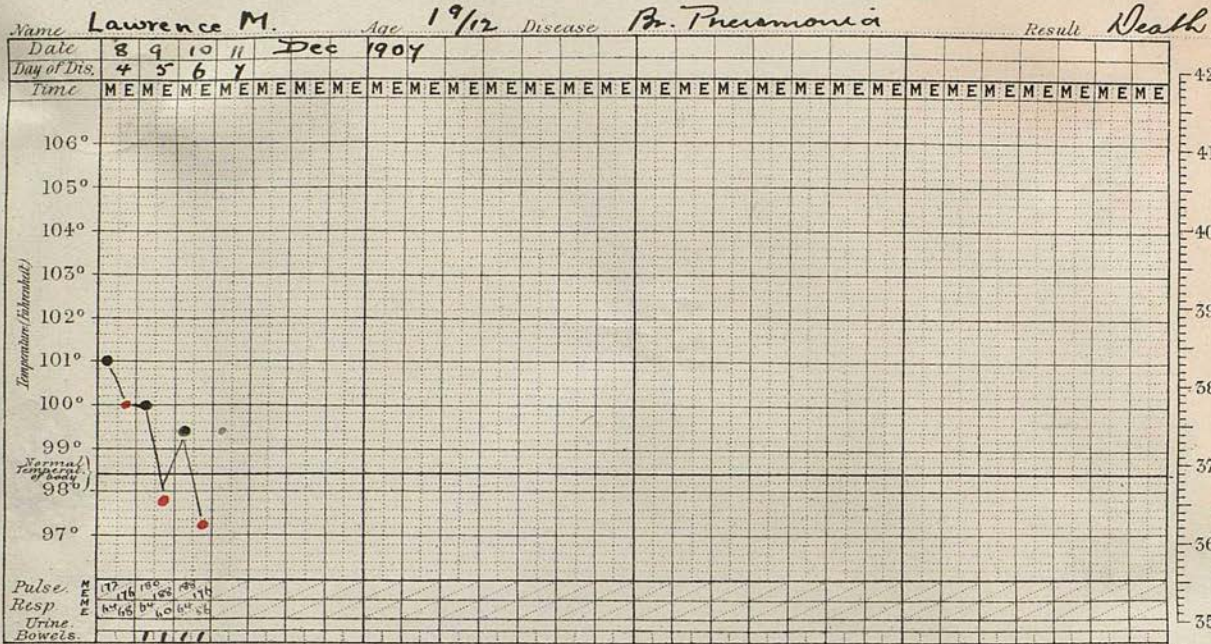
W.M. Aged 1 yr. Breast fed for 3 months; since on bottle. Previous health good. Began with vomiting, and diarrhoea, seven days before admission: cough, fever, and dyspnoea appeared gradually. On admission was heavy, pale, cyanosed with a dry paroxysmal cough. Very ricketty. No definite signs in chest: but some symptoms of meningitis, so was lumbar punctured without result on the 11th, and it was not till the 13th that pneumonia was localised, at the upper part of the left lower lobe.

14th. Right lower lobe congested no definite pneumonia.

16th. Left lower lobe much affected: improved from then until the 22nd: but nothing was found again until the 25th, when patches of pneumonia were formed at the left axilla, and right base.

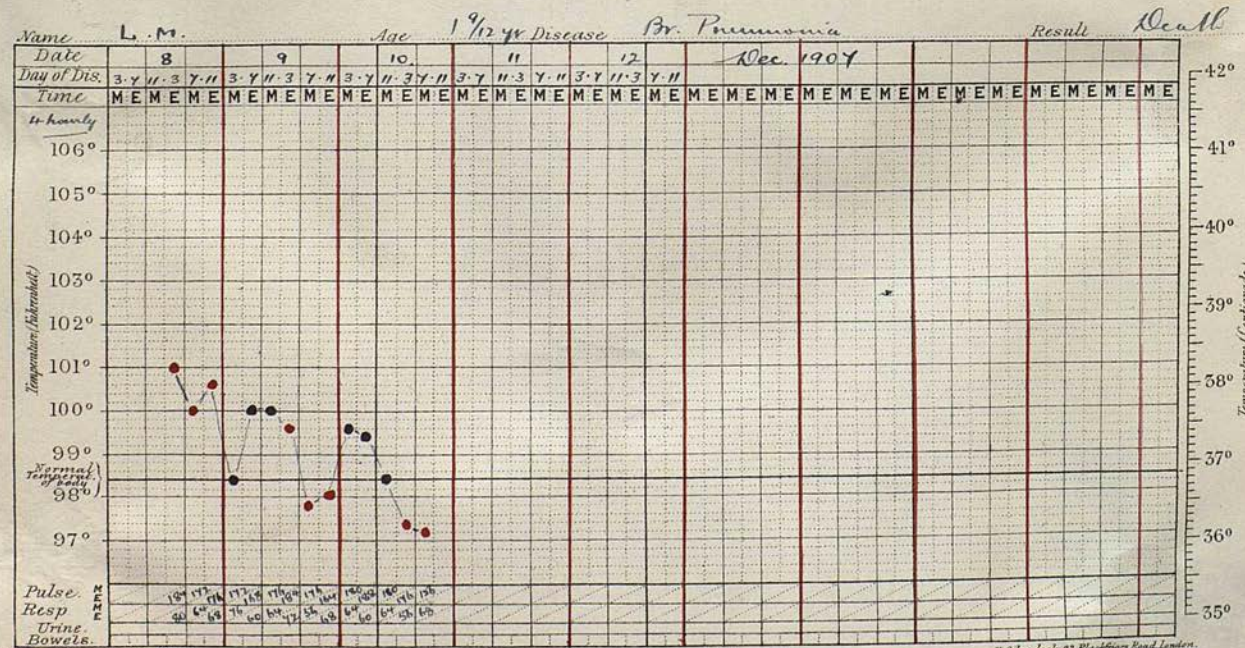
Went home with chest clear, but diarrhoea very bad.

This is another good chart of a swinging temperature and delay of appearance of signs. The relapse on the 22nd, is also nicely shown by the chart. Diarrhoea was a severe hindrance throughout, and it was thought that the only chance of recovery was a complete change. The child was sent home, and was distinctly better one week later, but has not been seen since.



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15.

L.M. aged 1 & 9/12 yrs. Bottle fed baby.

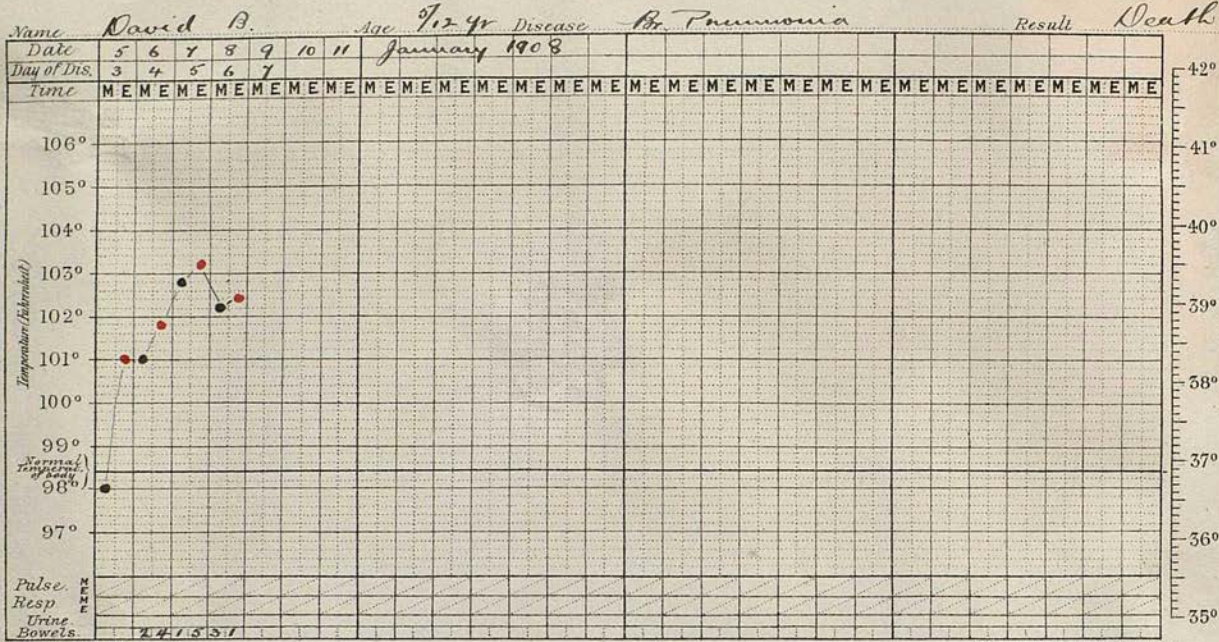
Bronchitis at one year. Four days illness heavy and listless. Fever two days. Cough and Dyspnoea three days. Fat, healthy child: but looking very ill on admission. Cyanosis of lips, hot dry skin, dyspnoea marked with expiratory moan, alae nasi very full. Mucous rales evident, very rachitic thorax, with much indrawing, and some retraction. Marked rhonchial fremitus over bases, which are both very congested, no definite consolidation found. Very restless, cough troublesome, put in tent with towels and strychnine, and whiskey given.

9th. Much worse, more dyspnoea and cyanosis. Both lower lobes choked. Strophanthus given, also mustard baths. Emetics failed and stomach washed out.

10th. No change in lungs: but pulse irregular; baths, slapping to cause crying, and all stimulants given without avail.

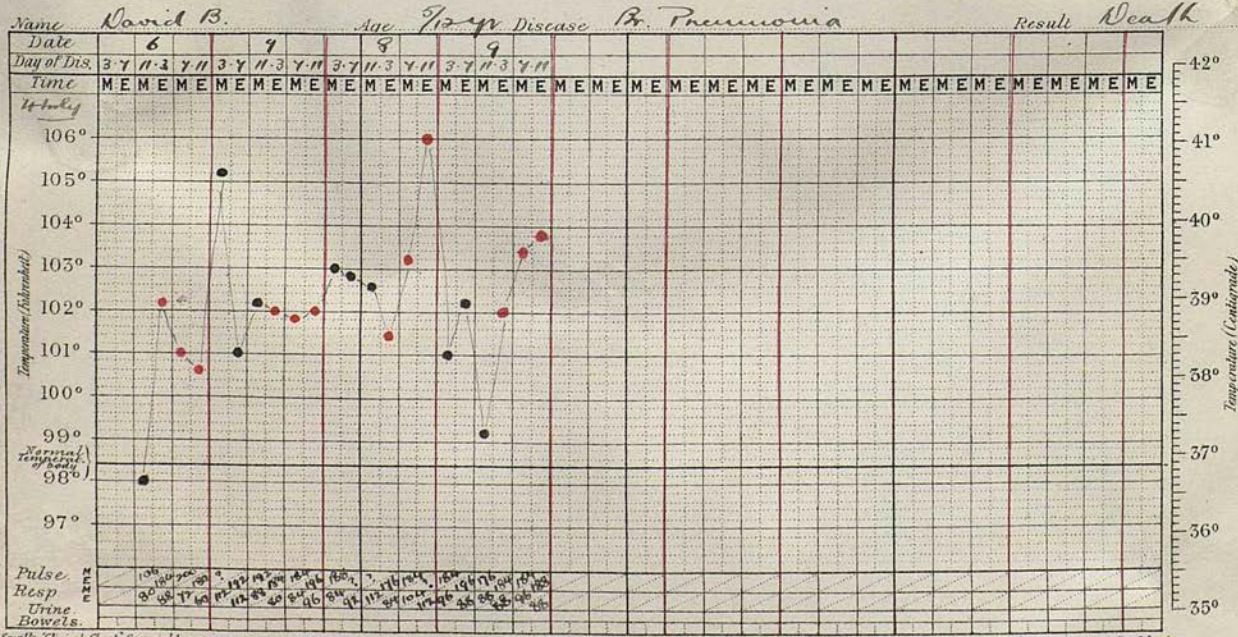
Another acute primary case in a very rachitic child, which was almost hopeless from the beginning, /

beginning, owing to both lower lobes being almost entirely useless for respiratory purposes, and to the dilatation of the heart. The absence of temperature in late stages is noteworthy.



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16.

D.B. 5/12 yr. Bottle fed. No previous illness. Began two days before admission with vomiting, and diarrhoea, has been very sleepy and heavy, coughing a little, but marked wheezing in chest, and dyspnoea..

On admission small, exhausted child, with cyanosis evident, skin cold, and clammy; and baby very listless. Rickets quite well marked. Dyspnoea severe with expiratory moan. Indrawing, and retraction well seen. Broncho pneumonia in right apical region, and axilla.

6th. Pneumonic condition spread to Right lower lobe.

7th. Left lower lobe, and whole of Right lung showed numerous scattered patches.

8th. Failing all day in spite of treatment, and died in evening of gradual heart failure.

Diarrhoea was bad throughout, and greatly added to the prostration.

This case is interesting to compare with the last. It shows how very different the temperature may be, in cases otherwise very similar. The four hourly chart shows the variations more clearly than the other, and also shows the highest temperature

I have seen recorded in this illness. The very high respiratory rate maintained during the second, and third days is noteworthy, the pulse-respiration ratio being well under 2-1.

17.

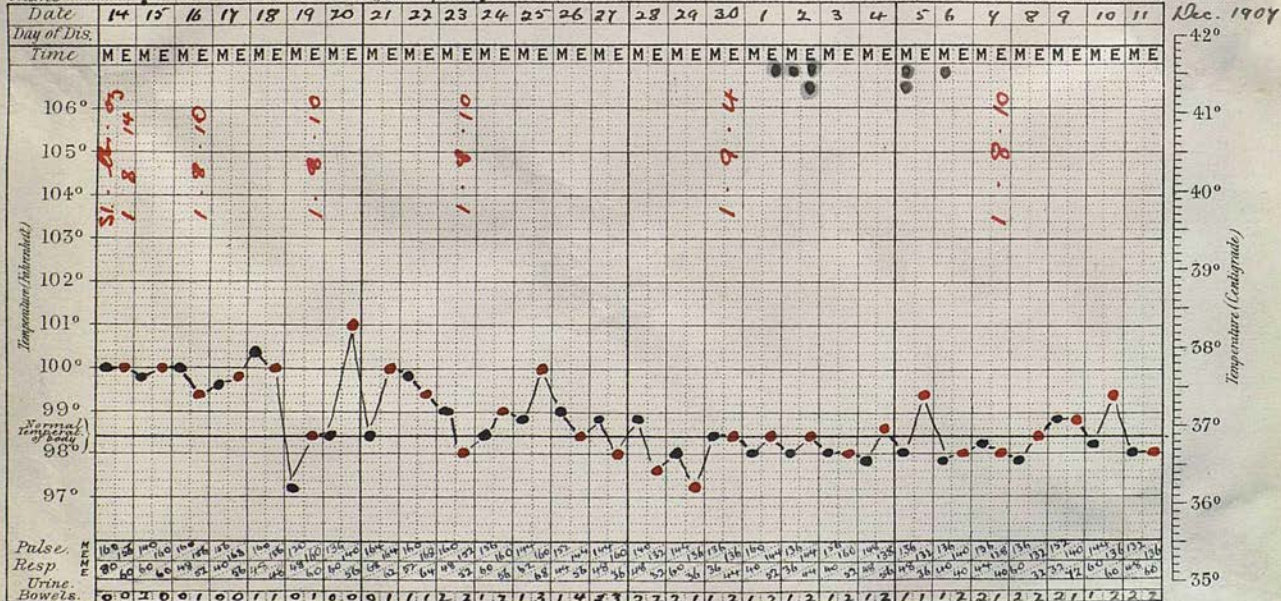
C.C. Aged 2 years. Breast fed baby. Had had chickenpox at five months, and measles at fourteen months accompanied by severe bronchitis. Three weeks before admission had a severe attack of bronchitis, and possible pneumonia: was well for a week, but three days ago became very drowsy, cough became aggravated, and dyspnoea returned. Was a small weakly child: dyspnoea marked by full use of alae nasi, expiratory moan, and indrawing of interspaces. Pneumonia found at left base.

14th. Not sleeping well: left base better, but right base affected.

16th. Right base much more marked: no change except gradual increase in prostration until 20th. when left base showed return of consolidated areas: diarrhoea was causing great exhaustion. Gradually became weaker. Diarrhoea persisted to end in spite of all treatment.

Death may here be put down to the diarrhoea as dyspnoea was never urgent, and there was no dilatation of the heart, but only a gradual failure from general exhaustion.

Name *Margaret S.* Age *2 1/2 yrs* Disease *Br. Pneumonia Tuberculosis* Result *I. S. Q.*



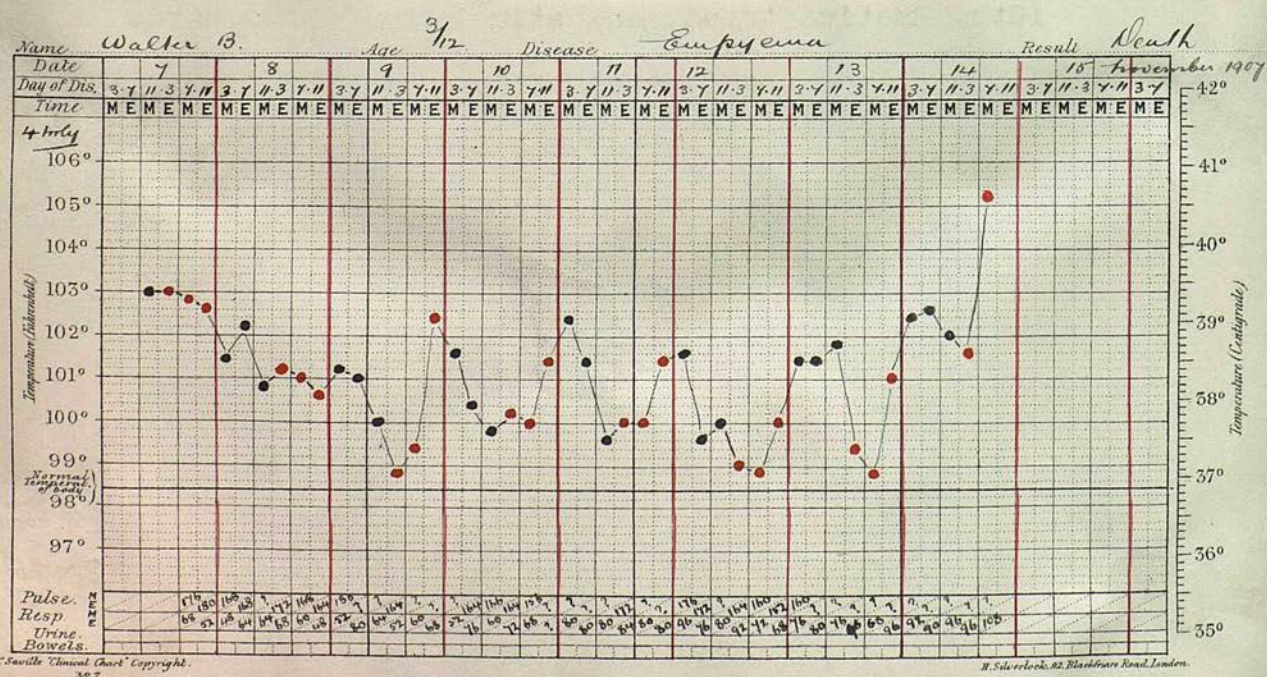
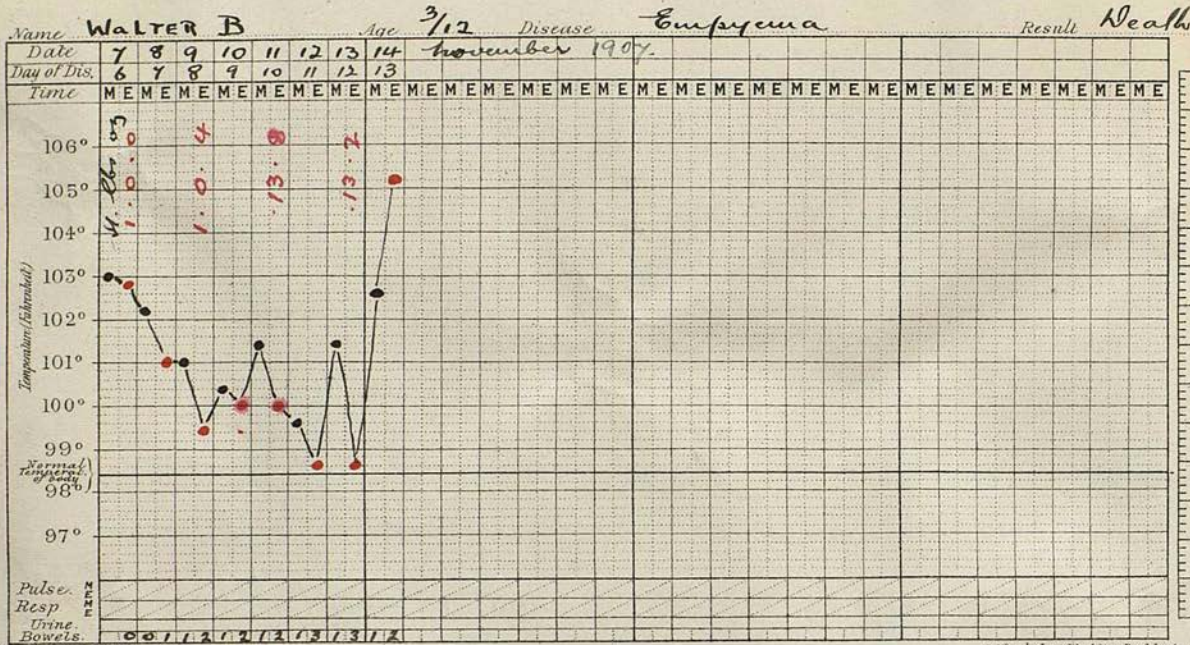
18.

M.S. Aged. 2 11/12 yr. Breast fed. Six months previously patient had pertussis, and measles followed this three months later. A paroxysmal cough had persisted, and was as severe as in the beginning. Had had no fever, but wasted a lot.

On admission was very emaciated, with a very puffy face from coughing. Consolidation around root of left lung posteriorly, and an area of consolidation in left infra clavicular area: bronchitis elsewhere in lungs. In spite of all treatment, including some time in the open air, the cough persisted in a very severe paroxysmal form, and the areas of consolidation began to show signs of breaking down, so patient was sent home. Tuberculosis could not be definitely diagnosed, as swabs from the epiglottis were always negative: but Calmette's ophthalmo tuberculin reaction gave a very positive result.

Patient died four weeks after leaving hospital, the chest condition getting rapidly worse; there being one attack, at least, of haemoptosis, and other signs definitely pointing to tuberculosis of the lungs.

A difficult case, but the position of the affected lung tissue assisted the diagnosis.



19.

W.B. Aged. 3/12 yr. Breast fed baby. Began with wheezing in chest five days before admission, accompanied by a little coughing. Dyspnoea came on gradually; and some cyanosis of lips, with pallor of cheeks noticed just before admission.

When admitted was seen to be a splendidly developed child: but looking very pale, and prostrated. Some cyanosis of lips: great dyspnoea with much indrawing, and retraction of thoracic walls: alae nasi working vigorously.

Left base was dull on percussion: but breathing was bronchial with fine crepitations at end of inspiration. Right base showed some rhonchi only.

9th. Dyspnoea still worse, no change in lungs.

10th. Emetics tried, and stimulants pushed hard.

12th. Dulness had increased to cover whole of left lower lobe, and breathing over this was very intense bronchial with sub-crepitant râles.

13th. Pulse showing signs of failure.

14th. Dulness up to spine of scapula: died quietly, after a very slight convulsive seizure.

At the post mortem examination the left pleural cavity contained quite ten ounces of pneumococcal pus, and the lung was merely a small condensed mass. How the breath sounds were so clearly conducted is difficult to say. All the signs, temperature chart, and other symptoms pointed to bronchopneumonia: but the great pallor, and the absolute character of the dulness should have aroused suspicions: even although primary empyema is so rare.

The case demonstrates some of the difficulties of diagnosis very well.

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