Lobar Pneumonia

A Thesis
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by

Daniel Rees Davies, M.B., C.M. 1883.

Lobar Pneumonia.

I have chosen this disease as the subject for my Thesis on account of its frequent occurrence in practice, and also because many changes have been made in its ætiology since I was a student. When I attended the class of Practice of Physic under the late Sir T. Grainger Stewart this complaint was included under Diseases of the lungs, but now it is mostly classed under infectious diseases. Osler in his book on Medicine places it under infectious diseases, and so do Muir and Ritchie in their Manual of Bacteriology, but Dr. Pye Smith in his article on pneumonia in Allbutt's Medicine still places it under diseases of the lung.

Definition - Lobar or Croupous pneumonia "is a febrile disease running a short course with a special form of acute inflammation of one or both lungs." (Allbutt's Medicine, Vol V page 92.)

"An infectious disease characterised by inflammation of the lungs, toxaemia of varying intensity, and a fever that terminates absolutely by crisis."
Osler's Medicine page 108.

Acute lobar pneumonia is essentially a disease of the lung alveoli, and the most prominent feature is an exudation of fibrine, from which the name croupous pneumonia is derived. — The fact that the diplococcus is frequently present in the normal sputum, and consequently in the lung, points to the existence of other contributing causes. It is probable that certain conditions of the body, such as exposure to cold, or a preceding attack of influenza, may give rise to the specific microbe, and enable it to overcome the resistance of the tissues. (Cont's Pathology, page 763.)

Pneumonia is to be regarded as one of the acute specific fevers, in which the infective agent has a local seat. — The fever has a distinct periodicity, and consistently with this there is an

antitoxin produced, which has the power of conferring immunity Coats' Path. pg 263.
Immunity has been produced in rabbits in various ways, as by injection of the toxines, and the blood-serum is stated to confer immunity on other animals - The blood-serum of patients who have recovered from pneumonia is also said to confer immunity on rabbits -
An exceedingly interesting fact is that the sputum of healthy persons frequently contains the capsule cocceus - The secretion of the mouth in such persons when inoculated subcutaneously in rabbits produces the regular form of disease Sputum Septicaemia, Coats' Path. pg 347.

Causation. - Acute lobar pneumonia for long, both popularly and medically had been supposed to be an effect of exposure to cold, but some observers were dissatisfied with this view of its etiology. - Cases occurred where no such exposure could be traced, but it

had been observed that the disease sometimes occurred epidemically, and was occasionally contracted by hospital patients lying in beds adjacent to those occupied by pneumonia cases. Further the sudden onset and definite course of the illness conformed to the type of an acute infective fever. It was thus suspected by some that it might in reality be due to a specific infection.

Friedländer was the first contributor in 1882–1883 to the modern view of its etiology. – He found in the bronchial contents and in sections of pneumonic lungs, cocci adherent usually in pairs, and possessed of a definitely contoured capsule which was faintly but distinctly stained.

Coats in his work on Pathology page 346, states that pneumonia is caused by virulent pathogenic bacteria, but the same microbe is not always the infective agent. – In some cases of secondary pneumonia the ordinary pyogenic micrococci have been found

but in proper primary cases one or other of two distinct forms can in the great majority of cases be detected. These are the Diplococcus of Fraenkel and the Pneumococcus of Friedländer. Weichselbaum found in 83 cases the former 54, and the latter 6 times. The Diplococcus when found in the animal body is surrounded by a capsule but in cultures it loses this.

Bacteriology = as I have already mentioned, the first contributor to the modern view of lobar pneumonia was Friedländer. —

In 1881 Sternberg & Pasteur discovered a micrococcus, and in April 1884 A. Fraenkel determined that this same organism (the coccus of sputum septicaemia) was the most frequent in acute pneumonia. —

Another organism described by Friedländer in November 1883 which is now known as the pneumo-bacillus. The subsequent investigations of

Frankel, and Weichselbaum showed that in a very large proportion of cases of croupous pneumonia the diplococcus is present. Established. page 110.
The most extensive investigations on the whole question were those of Weichselbaum published in 1886. He examined 129 cases of the disease and included not only acute croupous pneumonia, but lobular and septic pneumonias - From them he isolated four groups of organisms.
1st Diplococcus pneumoniæ - This he described as an oval or lancet formed coccus
2 Streptococcus pneumoniæ - This was less common than the last, was rounder, and formed longer and more twisted chains, but on the whole presented similar characters.
It was more vigorous in its growth, and could grow below 20°C. though it preferred a temperature of 37°C.
3rd Staphylococcus pyogenes aureus.
4th Bacillus pneumoniæ - this was

a short rod-shaped organism, which must be classed among the bacilli. Weichselbaum, however was of opinion that it was identical with Friedländer's pneumococcus.

Of these organisms, the diplococcus was by far the most frequent - it occurred in all forms of pneumonia. Next in frequency was the streptococcus pneumoniæ, and lastly the bacillus pneumoniæ. - Inoculation experiments were also performed by Weichselbaum with each of the three characteristic cocci he isolated. The diplococcus pneumoniæ, and the streptococcus pneumoniæ both gave pathogenic effects of a similar kind in certain animals. Muir & Ritchie, Bacteriology - page 206.

The general result of these earlier observations was to establish the occurrence in connection with pneumonia of two series of organisms 1st Fraenkel's pneumococcus which is recognised to be identical with the coccus of "sputum septicæmia".

with Weichselbaum's diplococcus pneumonia, and probably also with streptococcus pneumonia.

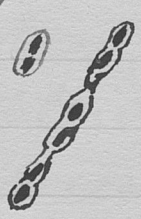
2 Friedländer's pneumococcus, now known as Friedländer's pneumo-bacillus which is almost certainly the same as the bacillus pneumonia of Weichselbaum.

Fraenkel's Pneumococcus - This organism occurs in the form of small oval cocci, about 1 μ. in longest diameter, arranged generally in pairs (diplococci) but also in chains of four to ten. The free ends are often pointed like a lancet, hence the term diplococcus lanceolatus has also been applied to it. - These cocci have round them a capsule which is rather broader than the body of the cocci, and has a sharply defined external margin - It is the organism of by far the most frequent occurrence in true croupous pneumonia.

Friedländer's Pneumobacillus, this organism somewhat resembles Fraenkel's pneumococcus in appearance

and arrangement, and in the presence of a capsule. — Its form, is more of a short rod shape, and it has blunt rounded ends. It is also rather broader than Fraenkel's pneumococcus. It is now usually classed amongst the bacilli. — Its capsule has the same general characters as that of Fraenkel's organism.
Friedländer's organism is much less frequently present in pneumonia than Fraenkel's, sometimes it is associated with the latter — very rarely it occurs alone, Sims + Ritchie's Bacteriology page 208.

I here insert a rough sketch of the Pneumococcus Fraenkel and Friedländer's pneumobacillus



Fraenkel's pneumococcus

Friedländer's pneumobacillus

The Pathology of Lobar Pneumonia.

The disease is an acute inflammation, and as the lung alveoli possess merely a single layer of pavement epithelium which is soon desquamated, the inflammation resembles that of serous, rather than of mucous membranes. We have a fibrinous exudation, and though this occurs primarily and mainly in the alveoli, the fibrine generally extends to the finer bronchi, forming casts of them. Coats' Pathology page 764.

Pneumonia is divisible into several stages.

1st Engorgement - active inflammatory hyperaemia, the lung capillaries are highly injected, and there is an exudation of serous fluid into the air vesicles, the lung is of a dark red colour, inelastic to the touch, called splenization. - The serous fluid contains leucocytes and red-corpuscles. As the alveoli are filled with serous fluid, the air bubbling in and out among the fluid during respiration,

produces the fine crepitation which is the auscultatory sign of this stage.
On section a quantity of reddish serum escapes, and the tissue does not crepitate under the knife so much as in the natural state.
2nd Stage – Red hepatization – in this stage we have fibrine in the alveoli. In consequence a coagulum occupies the lumen of the vessels and infundibula, instead of the mixture of serous fluid and air present in the first stage: The solidified lung is a much better conductor of sounds than a lung filled with air, hence we hear the sounds of the trachea and bronchi much more distinctly than usual.
The lung retains its red colour, and it does not crepitate under the knife or finger, and it sinks in water, no air being any longer contained in the vesicles. – On close examination the cut surface has a coarse granular appearance. – These granulations are undoubtedly the plugs of fibrine with

corpuscles which fill the air-vesicles.
The finer bronchial tubes when laid open are generally found to contain casts of soft fibrine, as if the exudation had overflowed from the alveoli into them. —
The appearance of the lung is like liver, hence the name, hepatization.
3rd Stage. — Grey hepatization. In this stage the white corpuscles preponderate, and swarm into the alveoli, and distend them more and more. — From the presence of the additional material in the vesicles, the capillaries are emptied, and anaemia of the tissue produced.
The colour of the tissues is changed to grey
Coats' Pathology page 750.
It retains the firm character, and the granular appearance of the previous stage, but the colour is grey. — The pigment of the lung intermixed with the white colour of the cells, gives a marbled appearance — The grey colour is most likely a post-mortem appearance, as it is possible to inject the vessels after death.
Resolution — The lung returns to its

normal condition. - The cells and fibrine in the air vesicles undergo fatty degeneration, and the plugs soften. - The fatty degeneration and disintegration of both cells and fibrine result in the conversion of the exudation into an emulsion which fills the alveoli, and having a yellow or greyish-brown turbid appearance resembles pus in its naked-eye appearances, Coats' Pathology, page 759. The lung is still solid, sinks in water, but its firmness is gone - its surface is pale, yellowish, or greyish red, and a greyish dirty fluid oozes out. - The tissue is very soft, and tears under manipulation. - In removing such a lung from the body, unless care is taken, the pressure of the fingers may rupture the tissue, and so the pus or emulsion flows into the cavity, it may give rise to the appearance of abscesses in the midst of the lung. The exudation is disposed of, partly by expectoration, but chiefly by absorption. Coats Pathology, page 759.

It may sometimes be disposed of, in four or five days from the crisis.
Purulent infiltration - This is a termination of pneumonia which is rarely met with as compared with resolution
Coats Pathology page 960.
In some cases instead of inflammation ceasing, it goes on in its acute form, and leucocytes continue to be exuded.
Purulent infiltration, may end in
Abscess
Gangrene
Chronic pneumonia
The Pleura always takes part more or less in the inflammation of the lung.
The pleural surface of the inflamed portion of lung is coated with a white fibrinous exudation, which is sometimes of considerable thickness - There is rarely any considerable serous exudation in the pleura probably because the lung distended with the solid exudation fills the cavity, and by its pressure prevents the accumulation of fluid
Sometimes the pleural exudation becomes

purulent, and we have an empyema
In other cases the inflammation may
extend to the pericardium.
After pleurisy we may get adhesion of
the pleura.
Secondary changes in the organs of the
body are produced by pneumonia,
such as enlargement of spleen, or
enlargement of liver.
Herpes of the lips is probably due to
the action of the toxins on the nerve stems
concerned. Coats' Pathology page 761.
Weichselbaum quoted in Coats' Path. page 761.
says
"In some cases of pneumonia, the
connective tissue of the mediastinum
and subpleural tissue are the seats of
inflammatory edema, which may
extend to the loose tissue between the
oesophagus and trachea, up to the retro-
pharyngeal tissue, the soft palate, the
tonsils, and even to the nares, sometimes
this inflammation assumes a phleg-
monous character. This probably occurs
by the propagation of the specific microbe

in these loose tissues"

Clinical features and symptoms.—

Primary pneumonia generally sets in very suddenly.—The first thing the patient usually complains of is chilliness and shivering.—The rigor may be more or less prolonged.—He feels very weak, and complains of a headache, sometimes accompanied by vomiting.—His skin is hot and dry, his pulse quick, and he complains of thirst.—The temperature rises abruptly and rapidly on the first day, and is generally about 103° to 104°. and rises to 105° or higher.—The maximum is generally reached on the 2nd or 3rd day.—Cases have been known to recover after a temperature of 107°.—The tongue is white and coated.—There is frequently an eruption upon the face, most commonly on the upper lip (herpes labialis).—The patient sometimes at the beginning of the attack feels a sharp pain in his side, usually referred to the front of the axilla, an inch

or so outside the nipple. — The pain on respiration makes the patients' breathing shallow, and hurried, with dyspnoea. The patient is afraid to cough for fear of increasing the pain in his side.

The appearance of the patients' face is anxious, and there is generally a redness on one or both cheeks. — When he breathes his ala nasi are seen to move very quickly, and altogether the patient seems to be in great distress. His cough is usually very troublesome, being short and hacking, and often of a spasmodic character. — It is much worse if he sits up, or breathes deeply, and generally causes him much distress. The sputum is characteristic; it is abundant, not very frothy. — It is very viscid and will adhere to the vessel even when it is turned upside down. It is of a rusty colour — when very abundant it is more like prune juice, sometimes like greengages. These latter two are held to be of grave significance.

Under the microscope, the sputum shows

abundant blood-discs, a few leucocytes, and minute casts of the smallest bronchioles, also transparent structureless mucus with a few small air-bubbles. When treated with appropriate staining the pneumococcus or diplococcus of Frankel is revealed.

The rusty sputum is distinctively pneumonic.

The Pulse rate is generally from 90 to 120 per minute, but may be above this. At first it is strong, full, and incompressible, but afterwards weak, small, and yielding. - It is sometimes intermittent and irregular.

"The smallness of the pulse is probably due partly to diminished cardiac power, and partly to the diminished amount of blood which is propelled from the left ventricle owing to the overloading of the right cardiac cavities which results from the obstructed circulation in the lungs" Quain's Dict. of Med. Article Inflam: lungs page 877.

The pulse-respiration ratio is perverted,

for while the respiration may be 30 to 50 per minute, the pulse may be only 90 to 120. – This is important in diagnosis

The urine is scanty, high coloured, and acid with a deposit of lithates on cooling. – There is generally some albumin present in pneumonia in varying amount in different cases

Physical signs. – The earliest physical signs of acute lobar pneumonia are generally discoverable within 48 hours of the invasion of the disease – They often appear within 12 to 24 hours. Occasionally when the local lesion is deeply seated, nothing abnormal can be detected until the 3rd or 4th day. One of the first sounds we hear is crepitation. – Of this Dr C. J. B. Williams says it is like hair being rubbed between the fingers close to the ear.

Crepitation is caused by air passing through fluid, and making a series of crackles, which are transmitted to the ear through a hepatized lung.

Afterwards as the disease advances, we have tubular breathing, and dulness. Complete solidification of the lung, is shown by bronchial breathing, broncho-phony, and increased vocal fremitus. "Pneumonia is always accompanied by pleurisy, so a pleuritic rub will almost always be heard early in the attack, most often to the outer side of the nipple or near the angle of the scapula." Allbutt's Med. Vol 5. page 103. When the crisis arrives, the dulness gives place to resonance; the redux crepitation is often heard, and râles take the place of tubular breathing. "When resolution is very rapid, redux crepitation may be absent." (Wilson Fox, quoted in Quain's Dict. Med. page 879.)

Diagnosis. — Pneumonia is easily recognised in the majority of cases. The right lung is more commonly affected than the left, and generally in its lower lobe. In double pneumonia one lung is generally involved before the other.

In children, pleurisy with effusion may be mistaken for it, (Osler's Med. page 133.) Error may occur in the intercurrent pneumonias, in those complicating chronic affections, and in the disease as met with in children, the aged, and drunkards.

In diabetes, Bright's disease, chronic heart disease, pulmonary phthisis, and cancer, an acute pneumonia ends the same, and is frequently overlooked. The temperature in these cases should guide us, especially if there is cough. The absence of expectoration and of pulmonary symptoms may make the diagnosis difficult.

In children there are two special sources of error.

1st It may be masked by cerebral symptoms, and mistaken for meningitis.

2nd Pleurisy with effusion - The breathing may be intensely tubular, and ~~tactile~~ fremitus may be present. - The exploratory needle is sometime required to

decide the question. (Osler's Med. p. 133.)
In the old, and debilitated the onset may be insidious - We should make careful examination in doubtful cases.
In chronic alcoholism, cerebral symptoms may predominate, and mask the local process.
It may occur in the form of violent mania.
When we find a patient with a rapid pulse, rapid respiration, and fever, it should always excite our suspicion of inflammation of the lungs, (Osler's Med. - page 133).
Cerebro-Spinal Meningitis is also apt to be mistaken for pneumonia.
From Typhoid fever, it can be diagnosed by means of Widal's reaction.
We must also diagnose it from

pulmonary congestion
severe bronchitis
broncho-pneumonia
acute phthisis

These may be variously combined, and we should remember that

the disease is not always basic.

Prognosis.- Pneumonia is the most fatal of all acute diseases. The old are more likely to die, but the young to recover. (Sturges, quoted in Osler's Med. page 131.) It is more fatal to the negro than to the white race.

Previous habits and conditions of life have a good deal to do with the prognosis. Individuals who are debilitated from sickness, hard drinkers, and robust-looking labourers between 45 and 60 years of age, whose organs show signs of wear and tear, and who have weakened their reserve power by excesses in alcohol, are more likely to have an unfavourable result. (Osler's Med. page 132) There are very few fatal cases in robust healthy adults. -

Certain complications and terminations are particularly serious.

Meningitis is probably always fatal

Endocarditis is extremely grave, more so than pericarditis.

The fatal result may be due to gradual toxaemia, or to mechanical interference with respiration and circulation,
Osler's Med. page 132.
The toxaemia is not at all proportional to the degree of lung involved.
A severe and fatal toxaemia may develop with the consolidation of only a small part of one lobe.
The question of individual resistance seems to be the most important one.
A very slight or complete absence of leucocytes is regarded as unfavourable.
Death from direct interference with the function of respiration is rare.
It may happen in extensive double pneumonia, but even with the involvement of a very large section of both lungs, recovery may take place.
The condition of the heart is very important, for quite as many die from this, as from the intoxication.
The Heart weakness may be due to
1st Specific action of the poison
2nd To the prolonged fever, 3rd Over-

dislocation of the right chambers.
The pulse is not always a safe guide, since it may be full, soft, and not very rapid within a few hours of a fatal termination, even in cases without pronounced toxæmia, (Osler p. 132)
"A pulse which in the adult is persistently over 120, and in the child 140, is of grave significance". (Quain's Dict. Medicine page 881.)
After 30 the mortality increases considerably, and the disease is exceedingly fatal in old people.
Pneumonia is more fatal in females than males, the mortality being in the proportion of 3 to 2.
Pregnancy renders the disease more dangerous.
The prognosis is very grave in those who have been injured by the long-continued abuse of alcohol, the mortality being according to Huss from 20 to 25 per cent. Quain's Dict. Med. page 881.
When delirium is marked, and occurs late in the disease, it is very grave.

Tremors and clutching at the bed-clothes are also very serious signs.
A dry brown tongue is very unfavorable especially when associated with only a moderate degree of pyrexia.

Complications.

We may have Empyema,
Pericarditis, when this is complicated with double pneumonia it is most often fatal.
Ulcerative endocarditis
Meningitis, pneumonic diplococci were found in the lymph at the base of the brain. Allbutt's Med Vol V. page 106.
Ulcerative Colitis, is described by Dr Bristowe, and other writers
Epistaxis
Jaundice, more often observed when right lung affected.
Bronchitis, is also a complication especially in the aged and young children.
Relapse after pneumonia very rarely occurs. - Dr Pye-Smith says he has

never met with a case. Allbutt's Med. Vol V. p. 106

Treatment.

In an ordinary case of pneumonia the patient should be kept in bed in a large and well-ventilated room, the temperature of which should be about 60° to 62° Fahr. – A plentiful supply of fresh air is most important, and he should not have too much clothing on the bed. – If the patient is in a position to afford it, two nurses should be obtained, one for the night, and the other for the day. – His body should be sponged about twice a day with cold or tepid water. – Great care should be taken in doing this – a part of the body should only be done at a time, so as not to weary, or expose the patient too much. – If he complains of feeling exhausted, or is suffering much pain, he may be turned on one side, and then afterwards on the other. He should be kept as quiet as possible, and not be unnecessarily disturbed.

His thirst may be quenched by sipping toast water, barley water, & if he prefers it, he may have cold water, - This latter is much recommended by some physicians. - In an ordinary case there is no need for much medicinal treatment. - At the onset, it is a good plan to give a purge - I generally give a dose of calomel at the beginning, afterwards I give a mixture containing Liquor, Ammon: Acetatis, Ammon Carb: & Sp. Ammon: Aromat: and Sp: Æther: Nit: . - This produces perspiration, relieves the hot skin, and makes the patient less restless. - If the cough is very troublesome, Spermaceti Wine, and Tincture of Hyoscyamus may be added. - In a strong and plethoric country patient, Antim: Tart: is very useful, as it reduces the fulness of the pulse - It is recommended by Dr. H. Roberts in his book on medicine - he gives 1/4 to 1/2 Grain every four hours.

The pain which accompanies pneumonia

varies in severity, but it may be relieved by warm poultices, or cold applications such as an ice-bag. - Some practitioners prefer cold applications, but I have generally found relief from warm poultices. - Some patients object to cold applications, so we have to consider their prejudices, and also those of their friends. -

A patient whom I attended two years ago was treated by means of cold sponging. - He was over 60 years of age. - His temperature on the second day of his illness rose to 104° to 105°. - His breathing was 40 per minute, and he was unconscious. All covering was removed from him with the exception of a sheet. - His body was sponged over with cold water, a part at a time, two or three times in the 24 hours. - Cold was also applied to his head by means of an ice-bag. - After consciousness returned a mixture containing 3ss: Salicylat was given him, of which he took a

dose every four hours. This reduced his temperature, and as he was still very restless, and sleepless, a mixture containing Potass: Bromid. was given him at night. — His pulse was very quick, feeble, and easily compressible so half an ounce of whisky was given him every four hours.

On the 5th. day from the commencement of his illness, there was a considerable improvement, the temperature having fallen to 100°. the pulse slower and stronger, his breathing slower and much easier, and he was able to sleep at intervals. His diet consisted of milk and soda-water, beef tea, or Valentine's meat juice, and occasionally an egg beaten up in milk.

On the 7th. day, he was much better, his temperature being below 100°. After this he continued to improve, and in a fortnight's time was convalescent.

Carbonate of Ammonia, This drug is most useful in pneumonia. It

acts on the heart, and also on the respiratory centre - It also makes the sputum thinner and less viscid. - It is generally given in four or five drain doses in combination with Syrup of Tolu, a some other sweetening preparation, in order to hide its pungency.
According to Dr Lauder Brunton it stimulates the respiratory centre (Lauder Brunton's Pharmacology page 641.)
When in a case of unilateral or extensive pneumonia bronchitis affects the healthy lung, a the healthy part of one, Carbonate of Ammonia is then perhaps most signally useful. (Allbutt's Medicine, Vol V. page 127.)
Strychnine. - This drug is very useful in some cases. - It is an efficient stimulus of the centres in the bulb, and is most valuable in cases of failure of the hearts' action, when alcohol seems useless or even mischievous to the patient. - Five drops of liquor strychnine may be given and repeated should occasion arise. - It is much more useful

given in one or two full doses, than in smaller ones frequently administered.
Allbutt's Med. Vol V. page 127.
Strychnine is a tremendous stimulant to the respiratory centre (Lauder Brunton's Action of Medicines, page 282.)
He records a case where a patient had ceased breathing involuntarily, who was relieved by the hypodermic injection of strychnine - His breathing was easier.
(Lauder Brunton's Action of Medicines page 281.)
Osler in his book on Medicine page 137 recommends strychnine hypodermically if the heart be feeble in doses of 1/60 to 1/20th grain, or if the heart be very feeble, up to 1/20 to 1/12 grain every three or four hours

Digitalis. - There are various opinions as to the use of this drug - Osler rarely uses it, unless the heart's action becomes very rapid, or unless there is a sudden onset of cardiac weakness, indicated by a very quick and irregular pulse.
It may then be given freely, 15 or 20 m. every 2 hours, until 2 drachms have

been given, or digitalin may be administered hypodermically from 1/20 - 1/20 grain. (Ringer's Medicine, page 137)

Digitalis acts as a cardiac tonic, but should not be pushed, as it then causes the pulse to become quickened. (Lauder Brunton's Action of Med. page 318.)

Strophanthus acts more upon the heart and less on the vessels than digitalis does. (L. Brunton's Act. Med. page 219.) If Bright's Disease should exist as well, digitalis might cause an artery to give way, and cause hemorrhage. (L.B. Act. Med. p. 218.)

Dr. Pye-Smith in Allbutt's Med. Vol V page 127 says, that his own experience of digitalis has been disappointing, and that his disappointment is shared by many physicians who have used it since Traube recommended it 50 years ago. The experiments of Drs. Brunton and Cash, (St. Bartholomew's Hosp. Reports 1871.) indicate that the effect of digitalis on the heart is greatly weakened by pyrexia

Dr. Petresco of Bucharest reports a

remarkable low percentage of deaths in pneumonia treated with large doses of the powdered leaves or of the infusion of digitalis. (Allbutt's med. Vol V page 127).

Oxygen gas. — This is useful in cases of pneumonia, if one lung only is nearly consolidated, the patient breathes with the other lung, and when you can at each respiration give him half as much oxygen again as he would ordinarily get. (Lauder Bruntons Actions med. page 283.)
On the other hand, Osler in his book on medicine page 137, says that it is doubtful whether the inhalation of oxygen in pneumonia is really beneficial.
But oxygen is really most serviceable when one lung is clearing up, and the other beginning to solidify.
Dr Lauder Brunton mentions the case of a patient who was librarian at St Bartholomews Hospital, and who was kept alive by means of oxygen. — He was in a condition of stupor for nearly a fortnight: He inhaled oxygen for nearly

a fortnight, for ten minutes at a time whenever his nails got blue. (Lauder Bruntons action of med. page 283.)
In a case I attended last year in London I found the patient derived very great benefit from the inhalation of oxygen. After convalescence she had a slight relapse, and dyspnoea re-appeared. On resuming the inhalation of oxygen her breathing soon became easier and quieter. She believed so much in its efficacy, that she did not feel satisfied unless there was a cylinder of oxygen at hand, so that she might use it, if necessary.
Dr Pye-Smith, says, "that when dyspnoea is urgent, and the patient apparently dying of cyanosis, the inhalation of oxygen is a rational mode of treatment, - it sometimes proves remarkably useful. It seems never to do harm, and it is a matter of surprise that its effects are not more uniformly, and obviously beneficial" (Allbutt's Medicine V. 1. V page 127.).

Saline injections hypodermically have been advocated.

Osler says he has seen it doing good in helping to tide over a critical period of cardiac depression. - As much as a couple of pints may be allowed to run beneath the skin by gravity, a rubber bag and either a large hypodermic, or a middle sized aspirator needle being used. - The injection may be made in the flanks or the thighs. (Osler's Medicine page 137.)

Opium has been forbidden lest its use should increase cyanosis, diminish respiratory efforts, and lead to fatal coma. - When there is extensive consolidation, or much bronchitis, when the patient is becoming livid, and the expectoration scanty, it would be bad practice to give this drug. (Allbutt's Med. Vol V page 128.

In delirium, an opiate may sometimes be given, when all other means fail in quieting the patient, but this should only be done however, as a last resource

and when there is marked asthenia, it is quite unadvisable. — No opiate should be given in one full dose sufficient to procure sleep. (Quain's Diet Medicine, page 884).

Bleeding is an ancient remedy. Dr. Hughes Bennett recognised its value when used in the very first stage of pneumonia before dulness had appeared. When pneumonia occurs as a primary attack in a young and robust subject with severe pleuritic pain, Dr. Lyle Smith advises bleeding not as a cure, but as a means of relief. — If the pulse be full, strong, and hard, and a great sense of precordial oppression be present, the withdrawal of 6 or 8 oz. of blood from the arm, by temporary lowering of the arterial pressure, will sometimes remove distress better than any other remedy, and will have, if not a beneficial, at least no deleterious effect on the subsequent course of the disease. — In cases of cyanoses with a small and feeble pulse

congestion of the surface, and dilatation of the right ventricle, as shown by epigastric pulsation, and pulsation of the great veins, our object is not to lower the arterial blood-pressure, but to relieve the over-pressure in the right side of the heart and the systemic veins. The withdrawal of ten to twelve ounces of blood under such circumstances is a rational procedure, and in practice is often successful in tiding over a dangerous period of the disease. Allbutt's Med. Vol V. page 129.

Osler in his book on Medicine, page 137. says "To bleed at the very onset in robust healthy individuals, in whom the disease sets in with great intensity and high fever is I believe a good practice, - I have seen instances in which it was beneficial in relieving the pain and dyspnoea, reducing the temperature, and allaying cerebral symptoms. I have not had many cases of pneumonia in very strong subjects, so have not had occasion to bleed them, but I quite

agree with Dr. Pye-Smith and Dr. Osler in the above views, and should not hesitate to bleed, in similar circumstances. Emetics, such as antimonial Wine and Specacuan in full doses, etc, in emptying the stomach, also get rid of accumulated bronchial secretion, and produce deep, and efficient respiratory effort. - It is a useful method in children, but often disappointing in adults. - Allbutt's Med. Vol V page 129.

Alcohol is beneficial in the majority of cases of pneumonia. - In moderate doses it diminishes slightly the temperature, increases the appetite, obviates the tendency to heart weakness, is a conservator of energy, being itself consumed in supplying heat in place of the body tissues. - Two or three ounces of good whisky in 24 hours, should be given in ordinary cases. (Osler's Med. page 136.) In cases of secondary pneumonia, and in primary cases occurring in later life with few exceptions, alcohol is indicated, and in all cases when the pulse is

irregular or very rapid, and the first sound of the heart weak. Half an ounce every four hours is suitable for an uncomplicated case of pneumonia in a patient over 50 years of age. From six to eight ounces in the 24 hours are needed in severe cases with feeble circulation, and as much as twelve ounces when the patients' symptoms seem to demand it, and his state to improve under the remedy. When we find that any form of alcohol causes excitement and discomfort, without strengthening the pulse, it is best to omit it for a time, and to rely upon strong beef tea and strychnia. Allbutt's Med. Vol V. page 126.

Pilocarpine. — Soderberg recommends pilocarpin in the treatment of acute pneumonia. — He reports ten cases of acute pneumonia, six of them in children, who all recovered, and the duration of the disease was considerably reduced, from 7 to 11 days, to 24 or 60 hours. He gave the drug internally in a watery

solution, and in some cases administered at the same time Alcohol, Digitalis, or Strophanthus when these appeared to be necessary. - Perspiration and salivation were marked, but no symptoms of collapse were observed, so he considers the treatment free from danger; Caswell's Year Book of Treatment 1899, page 170.

Antitoxin - Antitoxic sera experiments are increasing in number, more in B. Th. Journal Feb. 16th 1898.

Boyyds maintains that unless the injection was used early, it was of little use.

De Renzi considered that a later injection, even to 4th or 5th day, if given in adequate amount and intra-venously might produce good effects

Year Book of Treatment 1899. page 19.

Dr. Osler says there is no specific treatment for pneumonia. - We may reasonably hope that a remedy will soon be forthcoming to neutralize the poison.

Osler's Med. page 135.

Antipneumonic serum, is still in the

trial stage. — The Klemperer brothers, Auld, Washbourn and others have reported favourable results. — The serum was injected into the subcutaneous tissues. Washbourn recommends as a dose 20 cc. and thinks it is well to make an injection twice a day until the patient is convalescent. The serum appears to be harmless. — Osler's Med. p. 135.

Creasote, and Carbolic Acid are used as sprays in the sick room to act as antiseptics — These are useful as preventives for other people, but I do not know that they have much effect on the patient.

Treatment of pyrexia by the cold bath.

This method has been more employed abroad than in this country. The plan followed by Professor Juergensen is as follows. — When the temperature reaches 104° Fahr. the patient should be placed in a bath at a temperature of 60° Fahr. and be kept there from seven to twenty five minutes, according to the effect on the temperature. — The pulse must be

carefully watched, and stimulants be administered both before, during, and after the bath. - If necessary the temperature of the water must be gradually reduced to 42° Fahr. - The cooling process usually continues for about a quarter of an hour after removal from the bath. - This treatment should be employed before symptoms of heart failure, so as to diminish the injury to the heart caused by the pyrexia. When there is marked asthenia, great caution should be used, and the propriety of employing it then, is probably doubtful. Quain's Dict. Medicine, page 883.

Another method, for reducing the pyrexia, is by the cold pack by means of a wet sheet, the application of ice-bags to the spine, and by sponging the surface of the body with cold water. - This treatment is less effectual than the bath, and often causes more distress to the patient.

Quinine, is another antipyretic which is much used by some practitioners. If used, it should be given in doses of from 30 to 60 grains daily. - It is

apt to cause ringing in the ears, and also to upset the stomach.
Antipyrin, Antifebrin, and Phenacetin have been thoroughly tried in pneumonia, and the general opinion at present is against their employment.
Musk has produced good results in some cases, but it is a very expensive drug.
During convalescence, the patient usually requires a stimulant. - This may be given either in the form of wine, whiskey, or beer, according to the preference shown by the individual
Plasmon has been much recommended of late as a food during convalescence. I know some practitioners who have had very good results from it.
The patient's mouth and gums should be kept cleansed, until he has completely recovered. -
In conclusion, I must say that considering that the infectious nature of pneumonia is now an established

fact, we must hope that soon an antitoxic serum, will be discovered which will be as beneficial in the treatment of pneumonia, as antitoxin has proved in the case of diphtheria.

I hereby certify that this Thesis has been composed by myself

D. R. Davies.