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ACUTE LOBAR PNEUMONIA.

with special reference to its Treatment

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ACUTE LOBAR PNEUMONIA.

Acute Lobar Pneumonia is one of the most important diseases with which we have to deal, on account of the appalling mortality with which it is attended. In his "Clinical Studies", Bramwell says "There is perhaps no disease which cuts off so many valuable lives as Acute Croupous Pneumonia, killing as it does so many people at the height of their full vigour, activity, and usefulness". (1).

In Great Britain alone, about 1,000 lives per week are terminated by this malady.

Although most fatal at the extremes of life, no age escapes its ravages, and many of the apparently most robust fall victims to it.

The percentage mortality varies considerably in different epidemics, and under different physicians, but it is usually from 20 - 30%. Out of the huge total of 465,000 cases collected by E. F. Wells from all sources, 94,826 died, giving a mortality of 20.4%. (2)

ETIOLOGY.

Pneumonia is now regarded as an infectious fever, and the severity of an attack often bears no relation to the Pulmonary lesion.

A very small area of affected lung may be accompanied by extreme constitutional symptoms.

From time to time the disease occurs in epidemic form, and at such times, the mortality tends to be even higher than in sporadic cases.

Pneumonia resembles to some extent the other fevers in its clinical course, in having periods of incubation invasion, fever, and defervescence.

Exciting causes. In the great majority of cases in this country, the disease is directly due to the Pneumococcus of Fraenkel, an organism which is present in the mouth and nose of many healthy persons.

This coccus is capable of causing many other diseases besides Pneumonia, the chief of which are Meningitis, Peri- and Endo-carditis, Nephritis, Peritonitis, and Empyema. It also causes a form of Conjunctivitis, and a large number of less common suppurations and inflammations, all of which may complicate any case of Pneumonia, and it need hardly be said, add greatly to its gravity.

It is now recognised that the Pneumococcus is not the only cause of Pneumonia, but that many other organisms may be responsible, and notably the Pneumobacillus, Streptococcus, and Staphylococcus. The Bacillus of Influenza is also an important causal organism, and this may explain the frequency with

which Pneumonia follows epidemics of that disease. (3). The B. Typhosus, B. Pertussis, and the Gonococcus are also possible causes. (4).

The form due to the Bacillus Pestis, and constituting the extremely fatal pneumonic form of Plague, must never be forgotten, especially by those who practise in Eastern countries.

In any given case, more than one kind of organism may be at work; thus the Pneumococcus and the Streptococcus or Staphylococcus are often found together. Such cases are said to be more liable to septic complications, e.g. Abscess or Empyema.

Predisposing Causes. In addition to the organismal or actual cause, there are many conditions which predispose to Pneumonia.

Chief among these is exposure to cold, and this factor occurs in so great a proportion of cases, that formerly it was regarded as the one and only cause of the disease.

Alcoholism is of great importance, not only as a causal factor, but as an extremely serious complication, which places the patient at a great disadvantage during his illness.

The above two causes, cold and alcoholism, are often combined, the patient catching his chill through lying out while intoxicated.

Some cases develop after injury, especially to the chest wall. I have seen a case develop apparently as the result of a kick, one rib being fractured, but in this instance the Pneumonic lesion was in the opposite lung.

Unlike most other fevers, a previous attack of Pneumonia confers no lasting immunity, but rather renders the subject more liable to any subsequent infection, and each succeeding attack seems to increase this susceptibility. Consequently, it is not uncommon to find that a patient has had one or more previous attacks of the disease. The occurrence of twenty eight authentic attacks in one patient has been recorded.(5).

Certain families also, seem particularly prone to the disease.

Many other diseases predispose to Pneumonia. It may complicate other fevers (e.g. Typhoid.), and is especially apt to occur in cases of wide-spread Exfoliative Dermatitis. Diabetes, also most of the slower Nervous Diseases, such as Disseminated Sclerosis and Progressive Muscular Atrophy, are often terminated by it.

Ether Pneumonia and that due to the inhalation of Nitrogen Peroxide, or other irritating vapours, belong rather to the Broncho-Pneumonic group, and do not need further discussion here.

SYMPTOMS AND COURSE.

The incubation period of Lobar Pneumonia is not definitely known, but it is probably very short. The disease sets in with great suddenness, and is usually ushered in by a rigor, of varying severity and duration (10 to 30 minutes), or in children by a convulsive seizure. The temperature then rises very rapidly until it reaches its fastigium which is most frequently about 103 - 104 F. Its height varies with the severity of the attack, and with the resisting power of the patient. It tends to be higher in the young and strong. In those of feeble resistance, particularly in alcoholics, and the aged, the temperature tends to remain lower, and this is usually an unfavourable sign, being an indication of a diminished power of reaction. Just occasionally, the disease is afebrile throughout. The fever reaches its height within an hour or two, and remains at that level with very little diurnal variation until the termination of the disease. Its onset is frequently accompanied by headache, and vomiting, and by aches and pains throughout the body generally.

At the same time the pulse and respiration rate is much increased, and the pulse-respiration ratio is altered, the respirations being quickened much more in proportion than the pulse. Instead of being 4 to 1, as in health, the ratio now becomes 3 or even 2 to 1.

The respirations are quickened partly by the local lesion in the lungs, diminishing the amount of lung tissue available for oxygenation, and consequently throwing more work upon what is left, and partly by the fever. They may also be quickened by associated Pleurisy, the patient voluntarily breathing shallowly to avoid pain. It is to be noted that although the patient's respirations are greatly increased in number, he does not usually feel short of breath.

In children the respiration frequently has a very characteristic expiratory rhythm, and a short grunt accompanies each expiration. (6).

The pulse also is quickened by the fever, and by the condition of the lung in so far as it throws an extra strain upon the circulation: for, it will be noted that there being a diminished amount of lung available, and the same amount of blood requiring oxygenation, an increased rate of work is necessary. The pulse rate however is influenced mainly by the condition of the heart itself, and the heart in its turn, is greatly affected by the degree of toxaemia which happens to be present.

The fever terminates by crisis in about two thirds of the cases, and the fall takes place usually upon the eighth day. In mild cases, it may occur earlier and is not uncommon upon the fifth day: on the other hand, it may not occur until the tenth or twelfth day, or even later. The older authors thought that it was commoner upon the "odd" days, 5, 7, or 9.

The fall of temperature is accompanied by a corresponding fall in the rate of the pulse and respirations, and an obvious betterment in the patient's general condition. It is also accompanied by profuse sweating. Profuse sweating early in Pneumonia is a bad symptom, and often accompanies an extreme degree of toxæmia, or occurs in alcoholics.

The crisis of Pneumonia is supposed to be brought about by the formation of an antitoxin in the patient's body. (7).

A few days before the crisis itself, a "false crisis" may occur: the temperature falls, but the corresponding fall in the rate of the pulse and respirations, which accompanies the true crisis, does not take place, nor is there any improvement in the patient's general condition. After a short period, the temperature rises again.

A falling temperature associated with a rising pulse and respiration rate is most ominous, and is usually an indication of exhaustion with heart failure.

In about one third of the cases, the temperature falls in lysis, and this is the most favourable mode of termination, as it is attended with least risk to the patient.

After the temperature has fallen, it usually tends to be subnormal for some days: a swinging temperature should be regarded with suspicion, as it often indicates some complication, for example Empyema.

The fever of Pneumonia is attended with marked loss of weight.

The facies of a patient suffering from Pneumonia is most characteristic. The face is flushed and fevered looking; the skin hot and dry; the eyes are bright and there is an anxious expression. The alae nasi may move with respiration. Often there is an eruption of Herpes Simplex round the mouth and nose.

In some cases the patient has a look of intense toxæmia, and he may be deeply cyanosed. Marked distension of the veins of the neck is a frequent accompaniment of cyanosis. In toxic cases occasionally there is jaundice, and this is said to be commoner in some epidemics than in others. (8). In rare cases there may be a purpuric rash. (9).

The symptoms directly referable to the condition of the lung are cough and pain, and both of these are very variable.

The cough tends to be short and hacking, and is suppressed as much as possible by the patient. This is owing to the pain which it produces by causing movement of the inflamed pleura. The cough is often troublesome at night, and is therefore one of the causes of sleeplessness. In some cases cough may be entirely absent.

The sputum is at first scanty in amount. It is gelatinous in appearance and very tenacious, so that even if the vessel containing it is inverted, it will not fall out. It tends to stick in the patient's teeth, and is often a source of annoyance to him. In a few days the amount is increased, and about the

fourth day the sputum becomes tinged with blood, which given it the characteristic "rusty" appearance. In a few cases, the amount of blood may be so considerable as to resemble the haemoptysis of Phthisis. When associated with Oedema of the Lung or Gangrene, the sputum may be dark and fluid like prune juice, and this form is of grave significance.

If there is much associated Bronchitis, the expectoration may be white and frothy as in this disease. The sputum of Pneumonia is rich in Chlorides, and abundance of the causal organisms can usually be found in it without difficulty: occasionally also small fibrinous casts of the bronchi may be seen. In children, throughout the disease, no sputum is usually obtainable, as they almost invariably swallow it.

The pain of Pneumonia is dependent upon associated Pleurisy. The substance of the lung itself is insensitive, and in a deep seated Pneumonia, where the Pleura is unaffected, there is no pain. Such cases are not common, and pain is present in the great majority of instances, though the degree varies much. It may be extremely severe and be the patient's chief complaint, or it may be so slight as to be hardly noticed by him. Being due to Pleurisy, it is pleuritic in character, that is, sharp and stabbing and much aggravated by coughing or on movement. From time to time, the patient may cry out with a sudden attack of pain brought on by some movement he has inadvertently made.

If severe, pain may be a cause of sleeplessness,

and as such is of great importance, calling for special treatment. (q.v.)

The pain of Pneumonia may be referred to the abdomen, and this referred pain may lead to great difficulty in diagnosis. It tends especially to be referred to the Appendix region, simulating Appendicitis: this resemblance is most commonly seen in children. It is therefore well to remember the rule "In every case of abdominal pain occurring in a child, first examine the chest". In adults, in addition to Appendicitis, Perforated Gastric Ulcer or any other acute abdominal condition may be closely simulated. It need hardly be said that immediate diagnosis is of the utmost importance. This is sometimes a matter of very great difficulty, particularly as it is generally in the early stages before any of the physical signs of Pneumonia have developed, that the question arises. In these cases, chief reliance must be placed on the alteration in the Pulse - Respiration Ratio, which is present from the commencement in nearly every case of Pneumonia. The appearance of the patient, and the history of the mode of onset of his illness, particularly the presence or absence of a rigor at its commencement, and whether he has had any previous illnesses or not, must all be carefully noted. Thus a history of previous attacks of Appendicitis would lead one to think more particularly of that trouble, while a history of recent gastric trouble would suggest a careful consideration of the possibility of Perforation. As we shall see later, examination of the urine, and of the blood, is of great value in

The toxins of Pneumonia have a specially depressing influence upon the heart, and a large proportion of those cases which prove fatal, terminate from heart failure. Symptoms referable to the Circulatory System are therefore very common.

We have already noted the increase in the pulse rate, and the various factors upon which this is dependent. The pulse is the great index to the condition of the heart, and its rate is a most valuable indication of the severity of any given case. In a mild case, the pulse rate does not usually exceed 110 beats per minute. In a case of moderate severity, it will be about 120, while any case where the rate is more than 130 - with the exception of children - must be regarded as a severe and dangerous one. 115 may be taken as the "danger line". Any increase in the pulse rate, however slight, is to be regarded with anxiety: it is often the first sign of some unfavourable change, and immediate treatment is usually called for. If the pulse reaches 140, the patient's condition may be regarded as extremely serious, though a large proportion of such cases should recover under proper management. I have seen an adult patient recover whose pulse rate reached 170 per minute.

Especially serious is an increase in the pulse rate, if it be associated with a falling blood pressure.

A dicrotic pulse is not of much significance, provided the pulse rate remain low.

Irregularity of the pulse is a sign of rapid failure of the circulation, and tends to occur towards the termination of any case. It is to be regarded as a sign of very great gravity, and particularly so, if it occurs relatively early in the disease, as on the 4th. or 5th. day.

Throughout an attack of Pneumonia, the blood pressure should remain at or about the normal, i.e. 120 mm. A fall in the blood pressure is an indication of failure of the circulation, and an urgent call for stimulation. The fall usually takes place gradually, and it is essential for the safety of the patient that it be detected at its commencement, and any further fall checked at once. Sometimes the fall takes place with great suddenness and rapidity, and then we are faced with one of the desperate emergencies that can possibly arise in the course of the disease. The patient's life depends on our knowledge of how to treat him, and treatment must be immediately instituted with great energy. Half hearted measures are no use.

During any case of Pneumonia that is progressing satisfactorily, the heart sounds should remain clear and strong throughout. There is almost invariably a smart accentuation of the second sound in the Pulmonary area, this being due to the condition of the circulation in the lungs.

Weakening of the first sound is an indication that stimulation is required. Weakening of the accentuated second sound in the Pulmonary area is another call for stimulation, and is generally associated with

over-distension of the right side of the heart.

Cyanosis and distension of the veins of the neck are frequent concomitant symptoms.

In extreme cardiac asthenia, the intervals between the heart sounds tend to become equalised, so that the heart assumes the foetal rythm.

In many cases of Pneumonia, head symptoms are prominent, and may present themselves in any form from mild delirium to acute mania. Delirium Ferox or Acute Mania, and Delirium Tremens will be considered under the heading of complications; but it is well to remark here, that any patient presenting symptoms of either of these conditions should be most carefully examined for signs of Pneumonia.

Apart from the above, the delirium may be produced by one or more of several factors. In its mildest form, it may be due to the fever alone, and may first show itself as a mild talkativeness particularly towards nightfall. A very high temperature is generally accompanied by marked delirium.

In other cases, the delirium may be dependent mainly, or entirely, upon the toxaemia present, and will vary according to its severity.

Some cases are due to heart failure, and others again are due to sleeplessness, and it must be recognised that this is the most important cause of delirium. Delirium, whether it be primarily dependent on any other cause, is almost invariably preceded by want of sleep, and in any propely managed case, measures should be taken to ensure that this does not occur. Besides Delirium, sleeplessness is an important cause

of heart failure, and of Hyperpyrexia.

To sum up, it may be said that delirium is an indication either of cerebral poisoning, or of cerebral exhaustion. It is a danger signal which requires prompt attention; but, prevention is better than cure.

We have just noted that sleeplessness is productive of delirium, heart failure, and excessive fever, three of the most important dangers of Pneumonia. In almost every case, there is throughout the disease a great tendency to restlessness mainly on account of toxæmia and fever. It is of importance to recognise that this restlessness is a cause of sleeplessness, and as such, an indirect cause of the same three dangerous complications. It also therefore calls for most careful management.

During an attack of Acute Lobar Pneumonia, the kneejerks are in most cases absent, and do not return until after the crisis.

The mouth tends to be dry, and the lips cracked. The tongue is furred, and in neglected cases becomes covered with sordes, when it may be a source of great discomfort to the patient.

The breath is often offensive, and this depends to a large extent on the condition of the mouth.

Thirst is a prominent symptom.

Constipation is the rule, but occasionally diarrhoea is present. If the degree of toxæmia is severe, the patient may have loss of control of bladder and rectum. As we have noted, vomiting may accompany the onset of the fever.

The appearance of the Urine is noteworthy, as it is often helpful in diagnosis. In the early stages of the disease, it is scanty in amount and more acid than normal, and has a very characteristic milky look. Frequently urates are present in excess. The chlorides are much diminished and are retained in the body until the crisis: they appear to be used up in the exudate in the lungs, and to enter into its composition. (10). (11).

At the crisis, the flow of urine becomes reestablished and the chlorides are again liberated, and become excreted in greatly increased amount. This increase of chlorides in the urine precedes the fall of temperature by a brief interval, and hence has been regarded as the first sign of the crisis. (11).

After the excess has been got rid of the proportion again becomes normal.

During the febrile stage, the urine frequently contains a small amount of albumen, but this is rarely of any serious significance.

THE BLOOD IN PNEUMONIA.

Examination of the blood is of great importance in Pneumonia. It is of value in the diagnosis of doubtful cases: it helps one to gauge the severity of an attack, and hence is an aid to prognosis: above all, it may give important indications as to treatment.

The changes in the blood are mainly protective, and illustrate the efforts by which the body tries to defend itself.

The most important change is an increase in the number of the white corpuscles, and this varies in degree with the severity of the attack, and the resisting power of the patient.

In mild cases the leucocytes will number from 12,000 to 20,000 per c.mm.; in more severe cases they will number from 20,000 to 30,000; while in cases of great severity, they may be increased to as much as 60,000 or more, provided the patient's resisting power is good. Where the patient's power of resistance is very low, or his attack of Pneumonia extremely severe, the blood may show no reaction; indeed there may be a diminution in the number of the white corpuscles. In these cases where the body makes no attempt to fight the disease, but gives in as it were without a struggle, the prognosis obviously is of the gravest.

Examination of a stained film will show that not only is there an increase in the number of leucocytes, but there is also an alteration in the relative

proportion of the various kinds. In health, about 70% should be Polymorphs; in Pneumonia, the proportion rises to 80, 90, or 95% - perhaps even higher - depending on the severity of the case. (12).

One further point is of importance; the Polymorph leucocytes can be shown to contain glycogen, and exhibit what is called the glycogen reaction. (13). The intensity of this varies with the severity of the case, and is an indication of the degree of toxæmia. (14).

During the febrile period, the Eosinophils disappear from the blood: they become present again, in increased numbers after the crisis, when the exudate in the lungs is being broken up. (15).

In Pneumonia, the proportion of fibrin in the blood, and the number of thrombocytes are both greatly increased: it is therefore not surprising to find that the blood coagulates much more rapidly than normal. It has been said that great increase in this rate of coagulability is a bad prognostic sign. (16).

To illustrate the value of blood examination in Diagnosis, we need only refer to the case of Typhoid. In Pneumonia, as we have noted, there is in the vast majority of cases, a leucocytosis with an increased proportion of Polymorphs and a Glycogen Reaction of varying intensity. In Typhoid, on the other hand, there is generally a diminution in the number of white corpuscles (or at least no increase) with a relative lymphocytosis. The Glycogen Reaction is never intense, and does not appear until the end of the second week. (17). In those extremely serious cases

of Pneumonia in which there is no leucocytosis, the Glycogen Reaction is always very marked.

The prognostic value of the blood changes, we have just considered in detail, but we may here summarise them for comparison.

<u>Pneumonia</u>	<u>Leucocytes.</u>	<u>Polymorphs.</u>	<u>Glycogen React.</u>
Mild.	10 to 15,000.	75 to 82%	Very slight.
Moderate.	15 to 20,000.	80 to 87%	Slight.
Severe	20 to 35,000.	87 to 92%	Marked.
Extremely severe.	(1) 35 to 60,000 or more.	over 92%	Very intense.
	(2) 4 to 10,000.	60 to 80%	Very intense.

The value of the blood changes in this last group as an indication for treatment, will be considered later.

As in other acute diseases, Pneumonia is usually followed by some degree of Anaemia.

It will be readily understood that cases of Pneumonia vary according to the symptoms which most predominate, and for this reason several types of the disease present themselves. These are important from the point of view of Diagnosis, and will be considered under that heading, but we may here tabulate the leading types and the main symptoms which characterise each. Of course overlapping and combinations are common, and all symptoms may be present to some degree in any case.

<u>Type.</u>	<u>Predominant Symptoms.</u>
1. Septicaemic.	Appearance of intense poisoning. Cyanosis. Engorgement of veins of neck. Great prostration. Restlessness. Mouth foul. May develop later head symptoms, heart failure, and hyperpyrexia. Perhaps jaundice.
2. Pulmonary.	Cough. Sputum. Pain of Pleuritic type. Sleeplessness due to pain.
3. Circulatory.	Cyanosis and venous engorgement. Bad pulse with low blood pressure. Weakness of heart sounds.
4. Cerebral.	Headache. Vomiting. Delirium. Head retraction (sometimes). Convulsions in children.
5. Abdominal.	Pain in abdomen. Vomiting, (often associated with headache). Abdominal tenderness. Diarrhoea or constipation.

PATHOLOGY.

To intelligently understand the Physical Signs of Pneumonia, a brief reference to the Pathology is necessary.

Pneumonia is commonest in the lower lobes of the lungs. The upper lobes are often affected in children and in alcoholics. The middle lobe of the right lung is only rarely affected.

The first change that takes place in the affected lung is that of Acute Congestion. The capillaries of the alveoli become dilated and engorged with blood, and lymph transudes through their walls, filling up the air spaces, and rendering the lung more or less solid. (18). Small haemorrhages into the alveoli are common.

In the next stage - that of Red Hepatisation - these changes continue, and in addition leucocytes emigrate into the alveolar spaces and fibrin is formed. The air spaces thus become filled with fibrin and leucocytes and the air is driven out of them, so that the affected lung (or part) now becomes quite solid and is increased in size. It presents a red granite-like appearance.

What next occurs is a matter of some dispute, but it has been the teaching of the Edinburgh School that one of two changes may take place.

(1) The stage of Grey Hepatisation may supervene. The congestion begins to pass off, and the exudate undergoes degenerative changes. The lung, on section, presents an appearance like grey marble. Microscopic

examination shows the exudate retracted from the walls of the alveoli. Leucocytes are present in still greater numbers in the alveolar contents. This stage is said to be rarely, if ever recovered from. (19).

or (2). The lung may pass into the Stage of Resolution. The contents of the air spaces become softened, and are removed by phagocytic cells, and air again enters the alveoli. The damage to the lung tissue is then repaired by proliferation of the lining cells.

This change is followed by recovery, granting that no complications, - such as Abscess or Gangrene - have arisen. Imperfect or delayed resolution may occur.

Some teach that Grey Hepatisation is a stage in every case of Pneumonia, - provided the patient does not die before it is reached, - and that it normally precedes the stage of Resolution. (20).

We are now in a position to appreciate the Physical Signs of Pneumonia, and shall consider these in relation to the pathological stages to which they correspond. The method of examination of the patient, which is of great importance, will be considered under treatment.

(1) Stage of Congestion. Inspection, Palpation, and Percussion reveal as yet no abnormality, and we have to depend upon Auscultation alone.

For the first day or two perhaps no signs at all may be detectable, particularly if the Pneumonia be situated deeply. A few fine crepitations may then become audible over a localised area, being heard best at the height of inspiration. ("Indux Crepitations".) The breath sounds are faint and are at first vesicular: as consolidation progresses they tend to become bronchial, and pass through all the stages from vesicular to bronchial, which they ultimately become when the consolidation of the lung is complete. In the stage of congestion, the Vocal Resonance is unaltered.

(2) Stage of Consolidation.

Movement of the affected side of the chest is diminished.

The Vocal Fremitus is increased unless there be fluid present as well, when it will be diminished.

There is dulness on Percussion, but this sign is frequently absent before the fourth day, the reason being that the process of consolidation often starts

deep in the lung, and requires several days to reach the surface.

On Auscultation, the breath sounds are bronchial, and high pitched in quality. There are no accompaniments, - except perhaps Friction, - as no air is now entering the alveoli. The Friction too, may disappear at the height of consolidation. (21) The Vocal Resonance is increased and altered in quality, and this alteration constitutes the most characteristic sign of Pneumonia. (Broncophony) These signs may be altered by the blocking of the bronchi by the exudate. (22).

At the edge of the consolidated area, where the lung is still in the stage of Congestion, a few crepitations may still be heard.

We have noted that the consolidated lung is increased in bulk. It therefore fills up a larger part of the chest cavity than normal, and it follows that the unaffected part of the lung will be relaxed. Over this relaxed lung, the percussion note is hyperresonant, and the breath sounds harsh vesicular.

On the side opposite to the consolidation, there may be a compensatory increase in movement.

(3) Stage of Resolution.

The first sign of approaching Resolution is a change in the character of the breath sounds. These lose their high pitched quality and become of a lower pitch.

Loud coarse crepitations ("Redux" crepitations) then become audible, and are due to the liquefaction of the exudate in the air spaces.

The signs then gradually approach the normal. The breath sounds become first broncho-vesicular, and then finally vesicular. Little by little, the increased Vocal Resonance and Fremitus disappear. The last morbid sign to be removed is the dulness on Percussion.

To avoid repetition, it is convenient to consider the Complications and Dangers of Pneumonia together. Both of these are extremely numerous, and they are conveniently considered under six headings. The important ones will be discussed in detail: those which occur but rarely need only be mentioned.

1. Condition of the Lung and Pleura.

(A). EXTENSIVE INVOLVEMENT.

Apical Pneumonia is more serious as a rule than basic, and is particularly liable to be associated with head symptoms. It is much less common than the basic variety, and occurs most frequently in children and in alcoholics.

Double Pneumonia constitutes a particularly serious form of the disease, where both lungs are affected, and the patient may actually die from there being an insufficiency of healthy lung left to carry on respiration. The two lungs may be affected simultaneously or consecutively, in which case the crisis will be delayed until about 8 days after the last infection. In other words, the crisis must be dated from the last infection.

More lobes than one may be affected in the same lung, and as in Double Pneumonia, this may be simultaneous or consecutive. The dangers are also the same, - asphyxia or delayed crisis.

Spreading Pneumonia is the name given to that variety where one lobe tends to become affected after the other. The lesions may be in the same

or opposite lungs. As we have noted, the crisis is delayed with each successive spread.

Massive Pneumonia is a rare form in which not only the alveoli become filled with exudate, but also the bronchi. As the bronchi are plugged, the breath sounds are absent, and the signs resemble those of Pleurisy with Effusion. The dulness is as great as in that disease. The importance of this variety lies in the diagnosis.

Grey Hepatisation is an unfavourable change in the lung from which few are said to recover. This however is by no means certain, for clinical experience seems to indicate that the very worst cases of Pneumonia, - just those in which one would expect this change, - may recover if properly treated.

Bronchitis may be associated with Pneumonia, and adds to its risk, by throwing an extra strain on the heart.

(B). SEPTIC PNEUMONIA.

This is commonest in subjects of low resistance and, like so many other complications of Pneumonia, is most often seen in alcoholics. The temperature tends to be irregular with no tendency to settle, and the patient is subject to shiverings and sweatings. Septic Pneumonia may occur in one of three forms, according to whether it is localised or general throughout the lung.

Purulent Infiltration is the name given to the generalised form. It is the most serious and seems to be uniformly fatal. Fortunately it is rare.

Abscess of the Lung is commoner. The physical

signs are those of a Phthisical cavity. The breath tends to be very offensive. The sputum also is extremely offensive and copious in amount.

Gangrene of the Lung is similar as regards signs and symptoms. It too is characterised by extremely offensive breath. The sputum is very foul and frequently like prune juice, and portions of disintegrated lung tissue may be coughed up. Pneumothorax may in very rare instances result from Gangrene. (23).

(C). DELAYED RESOLUTION.

In weakly people, the affected portion of lung may not be so rapidly restored to the normal as it should be. In such cases, it may form a nidus for the Tubercle Bacillus, and hence Phthisis may develop. Many cases of basic Phthisis commence in this way.

(D). CHRONIC INTERSTITIAL PNEUMONIA.

After Pneumonia there is frequently left some interstitial change in the lung, due to the excessive formation of fibrous tissue. It is especially apt to be seen in those who have had several attacks of the disease.

If this fibrous tissue contracts, pulling on the bronchi, it may cause their dilatation and give rise to the condition of Bronchiectasis. (24). The symptoms and signs of this latter condition are similar to those of Abscess and Gangrene.

(E). PLEURISY.

Dry Pleurisy is present in some degree in practically every case of Pneumonia, and is responsible for the pain in this disease. As the cause of pain, it is an important cause of sleeplessness.

During an attack of Pneumonia, more or less effusion may be present, and modify the physical signs. It produces increase of dulness with diminution of the breath sounds, vocal fremitus, and vocal resonance. The breath sounds, if they are audible at all, will still be faintly bronchial. There is sometimes great difficulty in diagnosing a Massive Pneumonia from Pleurisy with Effusion.

(F). EMPYEMA.

Empyema is a not uncommon sequela of Pneumonia. It may be suspected if the temperature does not settle after the crisis; or, if after having fallen, it commences to rise again. In either case, shiverings and sweatings are present, and the blood shows a leucocytosis. The physical signs are the same as in Pleurisy with Effusion, but the use of the exploring needle will serve to distinguish the two.

An Empyema may sometimes burst into the lung, and the pus be discharged into a bronchus, whence it will be coughed up. Or, it may burrow through the chest wall, and be discharged externally. Again, it may find its way into the abdomen, and give rise to Subphrenic Abscess.

After Empyema, a large portion of lung may sometimes be left collapsed and incapable of expansion.

2. Heart Failure.

Foremost among the dangers of Pneumonia, comes that of heart failure, and the causes which contribute thereto are very numerous. Most of them

have already been considered in connection with those symptoms referable to the Circulatory System.

The degree of toxaemia, the amount of lung involved, (i.e. the amount of obstruction in the Pulmonary Circulation), the temperature, and the condition of the blood are important factors.

Sleeplessness is the most frequent predisposing cause, and must never be allowed to continue. It also leads on to head symptoms, and these are still more conducive to cardiac failure.

In Delirium Tremens especially is the greatest danger, owing to the natural tendency to cardiac failure in that disease.

Local cardiac complications, - such as Pericarditis or Endocarditis,- are also an important cause, though less common.

Antemortem Clotting may be the cause of the cardiac failure: fortunately the accident is of rare occurrence.

To whatever cause it may be due, the first sign of cardiac failure is an increase in the pulse rate. This tends to be progressive, and is soon followed by a fall in the blood pressure which is also progressive. The patient appears to be not so well in his general condition, and tends to become restless: some degree of head symptoms often follows. The heart sounds may become feeble, and may assume the foetal rythm. Irregularity of the pulse is a very grave sign, though dicrotism is not of much importance.

Needless to say, Pneumonia is more dangerous in those having a heart which has been already damaged

from any other cause.

3. Cerebral Symptoms.

Cerebral Symptoms constitute one of the most serious complications of Pneumonia, and may occur in several different forms.

(A). SIMPLE DELIRIUM such as is commonly met with in fevers. This is usually mild at first, and the subsequent course depends on the management of the case. A large number of factors may contribute to the production of this delirium, and in almost every instance, proper management of the case will prevent its appearance, or at any rate its development to any degree.

Fevers and toxæmia are the two most fundamental causes. The former is the more likely to cause delirium, if the patient is overheated from bed clothes and bottles, and if he is not allowed to get fresh air.

Fever and toxæmia lead to restlessness, and this to sleeplessness. Sleeplessness is an invariable precursor of head symptoms of whatever type, and must never be allowed. The best way to prevent it is to manage the fever properly, and see that the patient is not overheated.

Head symptoms lead on to heart failure and hyperpyrexia.

(B). MUTTERING DELIRIUM is most commonly seen in those who have had a prolonged illness, and is one of the accompaniments of extreme weakness.

(C). DELIRIUM TREMENS is a most common complication of Pneumonia. It is most commonly seen in chronic soaks, and is most fatal owing to the natural

tendency to heart failure in that disease.

In every case of Delirium Tremens, the chest should be carefully examined for Pneumonia.

(D). DELIRIUM FEROX. Sometimes the onset of Pneumonia is accompanied with Acute Mania. It is therefore wise to look for Pneumonia in every case of Acute Mania, setting in suddenly in a previously healthy individual.

Occasionally this form of Mania may develop a day or two after the crisis.

(E). DELUSIONAL INSANITY, in rare cases may follow Pneumonia.

4. Septicaemic.

As already noted, the Pneumonococcus is capable of causing a large number of other conditions in addition to Pneumonia. Any one or more of these conditions may arise in the course of a Pneumonia, and hence may be a complication of that disease: many of them add seriously to the gravity of the case.

Meningitis is relatively speaking the commonest.

(25). It is invariably fatal. The signs and symptoms in no way differ from those of other forms of Meningitis. On Lumbar Puncture, pus may be obtained in the cerebro-spinal fluid, and in it the causal organism may be found.

Nephritis is a complication common to all fevers, and occasionally occurs in Pneumonia.

Pericarditis may be pyaemic in origin, or result from direct spread from lung to Pericardium. It is said to be commonest in cases where there is much associated Pleurisy.

Endocarditis also occasionally results. Following on it Embolism may occur.

Both Pericarditis and Endocarditis are important as possible sole or contributory causes of heart failure.

Thrombosis may occur either in the heart, when it constitutes Antemortem Clotting; or in the veins, especially the femoral. From this latter "white leg" results, and the same danger of Embolism is present. Thrombosis, cardiac and venous, is predisposed to by the excess of fibrin in the blood in Pneumonia.

Embolism of the Pulmonary Artery may result from either; the result depending on the size of the embolus, and may be either sudden death or Infarction of the lung.

Peritonitis, Arthritis, and Suppuration of the Bronchial Glands are uncommon dangers.

Otitis Media A considerable proportion of suppurative ear conditions are Pneumococcal in origin. These cases tend to be infective, and often spread throughout a hospital ward. They seem also to occur in epidemics.

Membranous Inflammations of the Conjunctiva, Mouth, Fauces, Nares, and Stomach may occur. (26). Those of the Conjunctiva, Mouth, and Nose are not uncommon, but usually occur apart from Pneumonia.

Mediastinitis is an exceedingly rare complication.

Abscesses in Brain, Bone, and Muscle occasionally occur.

The degree of toxaemia varies much in different cases of Pneumonia. The cyanosed, engorged look of the intensely poisoned case has been already remarked upon.

In some cases Jaundice may occur. In some instances, it is haemic in origin; in others, it results from direct spread of the inflammation through the diaphragm to the bile ducts: this variety therefore is commonest in Pneumonia affecting the lower lobe of the right lung.

As in other fevers, haemorrhages under the skin are a manifestation of intense toxaemia.

Coma may develop as a terminal feature in extreme cases.

Meteorism, and Acute Dilatation of the Stomach, are serious dangers.

A few cases in which Peripheral Neuritis has resulted have been described.

6. Hyperpyrexia.

Hyperpyrexia is a danger which does not conform exactly to any of the above headings, and yet it is dependent on almost all of those complications which have been considered. It may be defined as an increase of temperature to 106 deg. F. or over. The condition may be a manifestation of an intensely severe form of the disease, and be simply due to reaction on the part of the body as a mode of defence. In many cases it is however the result of exhaustion, and is most commonly seen in

badly treated cases of the disease. It is the final result of sleeplessness, and heart failure. In these the temperature often tends to rise before death. The degree of toxaemia is also an important factor in causation.

Hyperpyrexia, if not the result of head symptoms or heart failure, may be their cause. Hence the conditions are commonly found together, and are dangers one of another.

The Diagnosis of Pneumonia is frequently easy, occasionally difficult. In discussing the symptoms, types, and complications of the disease, we have referred incidentally to many of the problems which may present themselves, and these do not need repetition.

Difficulty is most liable to arise in three classes of cases.

(1). Where the Pneumonia starts deeply in the lungs, and the signs do not develop till late.

(2). Where the chest symptoms are less pronounced than those referable to some other part of the body, - e.g. the head, (delirium), or the abdomen, (referred pain).

(3). When there are complications, or more than one condition in the same patient. For example, Pneumonia and Meningitis may occur together: or, the patient's illness may commence with Influenza, and Pneumonia develop later as a complication.

The onset of Pneumonia may have to be distinguished from that of other fevers, particularly those which may be ushered in by a rigor, - e.g. Scarlet Fever, Erysipelas, Influenza, Smallpox.

In those cases where the patient's symptoms have special reference to the chest, and there are physical signs on examination, other conditions of the lung and pleura require consideration.

Broncho-Pneumonia is always bilateral, and differs in its physical signs, and in its course.

Acute Tuberculosis can sometimes be distinguished only by its relatively long course, the temperature not falling on the eighth day. The sputum also is not rusty, and may contain the Tubercule Bacillus. Acute Pleurisy with Effusion is simulated by those cases of Massive Pneumonia where the bronchi are blocked, and consequently the physical signs altered. The diagnosis can sometimes only be made by the use of the exploring needle.

Where the symptoms are mainly abdominal, the question of Typhoid often presents the greatest difficulty, - and especially so if diarrhoea be present. Of 529 consecutive cases wrongly sent as Enteric Fever to the Edinburgh City Hospital, during 12 years, 106 turned out to be Pneumonia. (27). It will be obvious then that every case which, at first sight, looks like Typhoid, must be carefully examined for Pneumonia. Examination of the blood will aid in many a doubtful case. The Widal Reaction is not of much use, as a negative result cannot be relied upon until late in the patient's illness. (28).

Acute Appendicitis is often simulated in children, and occasionally in adults: Perforated Gastric Ulcer may also call for consideration. In both instances chief reliance must be placed on the pulse - respiration ratio, the history of onset and previous health, and the absence of the signs of Pneumonia in the lungs.

When the clinical picture is mainly cerebral, Meningitis, Influenza, Delirium Tremens, and Delirium Ferox may give rise to difficulty. In the former,

lumbar puncture may yield valuable information.

It must never be forgotten, that any one of these conditions may commonly be accompanied or complicated by Pneumonia, and that more than one disease may be present at the same time.

Other conditions that more rarely require to be considered are Acute Miliary Tuberculosis, Malaria, and Acute Endocarditis.

Finally, it must never be forgotten that the Pneumonia may be a complication of many other diseases, such as Typhoid, Influenza, or Scarlet Fever. It also occurs as a terminal feature in many chronic diseases, notable examples being Diabetes, Pernicious Anaemia, and most of the slower Nervous affections.

PROGNOSIS.

The great mortality with which Pneumonia is attended has been already noted.

In estimating the chances of recovery in any given case, the following points require consideration.

The Age of the Patient. Pneumonia is most fatal at the extremes of life. It is in general true to say that, with the exception of infancy, the younger the patient, the better the prognosis. The most favourable age is between 12 and 15.

The Variety and Extent of the Pulmonary Lesion. "Other things being equal, a Pneumonia which is limited to one lobe is less serious than a Pneumonia which involves the whole lung, and, a fortiore, a double Pneumonia is much more serious than a single Pneumonia". (Bramwell) (29).

An apical Pneumonia is more serious than a basic, because with it head symptoms are more common; also because apical Pneumonia often occurs in a lung already damaged by Tubercle. (30).

The Pneumonia due to some organisms (B. Influenzae, B. Pestis, Mixed Infections) is most serious than that due to others (Pneumococcus)

"Massive" and "Wandering" Pneumonia are dangerous varieties of the disease.

The Severity of the Attack, as judged by the degree of toxaemia, the temperature, the pulse rate, and the blood changes.

The Vitality and Resisting Power of the Patient. Was the patient healthy otherwise, when he contracted

the disease; and what is the condition of his heart and kidneys?

The Pneumonia occurring as a complication of Diabetes, Pernicious Anaemia, or Nervous Diseases, is very fatal, and hardly to be classed along with other cases. It is nearly always a terminal feature. Pneumonia in those with previous heart or kidney disease is extremely serious, as also is that complicating General Exfoliative Dermatitis.

It need hardly be pointed out that the disease in a debilitated patient, - whatever the cause of his debility may be, - will be dangerous in proportion to the degree of his debility.

The resisting power of the patient is to be gauged from his general condition, the temperature and pulse, and the blood changes as already discussed.

The Habits of the Patient as regards Alcohol.

"Of all conditions influencing the prognosis of Eobar Pneumonia, chronic alcoholism is, in my belief the worst". (Savill) (30). The mortality among alcoholics is appalling: they are especially liable to the dangers of heart failure, and delirium.

The Presence or Absence of Complications.

(a). During the Acute Stage.

Meningitis. Endocarditis. Bright's Disease. etc.

(b). After the Crisis.

Delayed Resolution. Empyema.

The Day of the Disease. In simple uncomplicated cases, and other things being equal, the later in the disease, the better the prognosis. For example, in a patient who on the 6th day of his disease, exhibits

certain serious symptoms, the prognosis is relatively much better than had he presented them on the second day of his disease. In the former instance, he should only have two days to go till his crisis, in the latter, six days.

The Physician. It is certainly not usual to find the physician referred to as a factor in prognosis, but undoubtedly the degree of his skill and care are of great importance. In no disease more than Pneumonia, does the patient need the maximum of both.

TREATMENT.

Some cases of Pneumonia are extremely mild and recover without treatment; a few are extremely severe and die in spite of everything, but the great majority of cases belong to an intermediate group, where prompt and efficient treatment determine whether the issue be life or death.

It is true that Pneumonias vary greatly in severity from epidemic to epidemic, and that no two series of cases are very fairly comparable, but from observation I am very strongly of opinion that the degree of mortality depends very much upon the physician in charge, and that his ability to treat, and the degree of trouble that he takes over his cases, form a most important, though unrecognised, factor in Prognosis. At the same time, caution must be observed in expressing an opinion upon any particular line of treatment, as the course of the disease is such that erroneous deductions might easily be made: and improvement "post" any special treatment must not too readily be translated "propter".

(A). DURING THE ACUTE STAGE.1. GENERAL MANAGEMENT.

Pneumonia is a disease that, in the absence of complications, tends towards a natural termination in about 8 days. During all that time the patient is acutely ill, and the severity of his illness is quite apparent to all his relatives, simply from his appearance.

In many cases the patient may go straight through his attack without any indications of danger, or any call for special treatment; and this is especially likely if the general management has been skilfull. On the other hand, great changes may take place within an hour, and indications calling for energetic treatment may make themselves apparent. The general management therefore is most important.

Anyone who would be successful in the treatment of Pneumonia must make up his mind for one thing, -- and that is work. Each case must be seen early and seen often, and it is usually the management in the first few days of the disease that determines the patient's recovery or otherwise. Any alteration in the patient's condition must be carefully noted, and if need be immediately treated. It is comparatively easy to keep most cases from going to the bad, but once head-symptoms or signs of heart-failure have become in any degree established, it may be extremely difficult to remove them. At the beginning therefore, I would emphasise the importance of seeing each case early and often, watching it closely, and detecting the slightest signs of unfavourable progress, and promptly applying the appropriate remedy. Further, it must be borne in mind, that at present there is no "routine" treatment for Pneumonia, and each case must be treated on its own merits: this is essential to success. In many respects the management is similar to that of other fevers.

Examination of the patient. The patient should

be most carefully examined at first, and the diagnosis made sure of. It will probably be most convenient to examine the chest with him lying first on one side and then on the other. Percussion and Auscultation are the methods which give most information. While thorough, the examination should be as brief as possible. Once sure of the diagnosis, the patient should be disturbed as little as possible unless there is some definite indication for so doing. As noted, he should be seen often and the heart examined on each occasion by Auscultation. The pulse, temperature, and respirations should be taken every 4 hours, (excepting when the patient is asleep) and recorded on a four-hourly chart.

The Patient's Surroundings. These are of the greatest importance, though much controversy rages about them, and widely different methods are adopted. Formerly it was thought that in this, as in Phthisis and other chest diseases, the one important point in treatment was to exclude the air, in order to prevent cold. Accordingly screens were put round the bed, the windows kept tightly shut, and the patient enveloped in a thick "Pneumonia Jacket" of gamgee or cotton wool. Further, blankets were heaped upon the bed, and the patient surrounded with hot bottles. Measures such as these would even in health conduce to restlessness from over-heating, and would they not be all the more likely to produce it, in a disease accompanied by severe fever as in Pneumonia? We have previously noted the dangers arising out of

restlessness, and the first principle in their prevention is "Don't overheat the patient".

The patient should be put to bed whenever he takes ill, in accordance with the general principles of fever treatment, and to avoid straining the heart. His night-dress should be of flannel: his bed should be a blanket one: the amount of bed clothing should not be too great, and in this as far as possible, one should be guided by the patient's opinion. While he should be sufficiently clothed, he should not be wrapped up in any way, and above all do not put on a "Pneumonia Jacket".

The room should be kept as airy as possible, and the windows may with advantage be kept open. "Patients treated near an open window have less dyspnoea and cyanosis, and sleep better than those treated in a vitiated atmosphere". (Savill.) (31).

Treatment in the open air has been tried in America, and a considerable reduction in the mortality has been claimed in the cases so treated. (32).

There is no question also that open air has greatly reduced the mortality in the sister disease Broncho-pneumonia. (33). Without going to extremes, fresh air is an exceedingly valuable therapeutic agency, and certainly reduced the tendency to restlessness, sleeplessness, delirium and hyperpyrexia.

Nursing. Few diseases require such careful nursing as does Pneumonia, and in no disease does the nurse require to be more on the alert to detect sudden changes in the patient's condition. Good

nursing is therefore indispensable, and a day and a night nurse should be got wherever practicable.

In the nurse, resourcefulness, confidence and action are essential qualities: previous experience is invaluable. She must have a knowledge of what the earliest signs of danger are, and be able to recognise them, and she must be especially proficient in watching the pulse and blood pressure. She should be told that if the pulse increases in rate, shows any signs of irregularity, or becomes weaker, or if she thinks the patient is worse in any way, the medical attendant is to be informed at once. It is far better to be called without reason than not to be called if really necessary. Definite instructions should also be given as to the treatment to be adopted in the event of any emergency. It is a great convenience if the patient's house has a telephone, so that if in doubt the nurse can refer to the doctor, or report on the patient's condition at stated times.

To keep the patient fresh and clean, he requires to be sponged all over at least twice a day, and especially so if there is much sweating. If the clothes become soaked with perspiration, - as is particularly likely to occur about the crisis, - he may require to have them changed frequently: the patient should never be allowed to lie in wet or damp garments.

Care of the mouth is most important, especially from the patient's point of view, as in neglected cases the tongue and lips tend to get dry and covered with

brown sordes, and later become cracked and sore. The mouth therefore should be washed out frequently and swabbed with weak Borax in Glycerine. If necessary, the parts may be lubricated with Vaseline to which a small quantity of Oil of Peppermint has been added.

The sputum should be carefully disinfected with Carbolic or Perchloride of Mercury, a solution of one of which should be kept in the patient's spittoon

Diet. The diet is along similar lines to that in other fevers. It must be entirely fluid, as the patient is too busy breathing to be able to chew anything solid. The three most useful articles of diet are milk, beeftea, and water.

Water should be given in large amount, and the patient encouraged to drink as much as possible. It relieves the intense thirst which is the natural accompaniment of the fever, promotes elimination and hence reduces the degree of toxæmia, acts as a mild and harmless antipuretic, and by so doing tends to prevent restlessness (with all its resultant dangers) and diminishes the tendency to hyperpyrexia. The administration of large amounts of water is obviously then of very considerable therapeutic value.

If the patient likes it, lemon juice may be added to the water, either from a fresh lemon or some pure commercial preparation. The citric acid therein, in either case, acting beneficially as a mild diuretic. Aerated waters are best avoided as it is held by some that they are conducive to abdominal distension and

Meteorism.

A cup of weak tea in the early hours of the morning is often much appreciated by the patient, and in virtue of the Caffein therein acts as a mild stimulant and diuretic. It is therefore my practice to let the patient have the tea if he wakens say about 4 a.m., and I have never seen anything but benefit therefrom. Milk should be given regularly in small amount, say 3 fl. oz. every 2 hours, and should be freshly poured each time. It is bad practice to leave a feeder of milk standing by the side of the patient's bed.

In just a few cases the patient may be one with whom milk habitually disagrees, and in this instance it may perhaps be tolerated if taken with an equal bulk of water. It may be found necessary however to substitute albumen water or beef-tea.

Beef-tea is an exceedingly useful article of diet, possessing great power as a stimulant, and as we shall see is of great value in the treatment of certain complications. It is useful however as part of the ordinary diet, and it may be used alternately with or in place of the milk for variation. It will of course be largely used in those cases where the patient cannot tolerate milk. The beef-tea used must always be prepared from fresh meat, and not from meat extracts, if the best results are to be obtained. About 4 fl. oz. may be given at a time.

The above three articles of diet, milk, beef-tea, and water, with the variations above mentioned, constitute the safest and at the same time an efficient method of

feeding during the acute stage of Pneumonia. Anything else should only be given with great caution, though in special cases custard or other egg preparations, or milk foods may be given. A little stewed apple, if finely beaten, is a pleasant variation.

Attention to the bowels. At the outset a mild purgative is often beneficial. It acts as a mild antipyretic and tends to help elimination and so diminish toxæmia. Loading of the bowel may be a cause of restlessness and sleeplessness in a patient. If preferred, an enema may be used, either alone or along with a purgative. It should be of the soap and water variety or consist of pure saline.

In those cases where the Pneumonia is accompanied by diarrhoea, this should not be checked as its suppression may be followed by an increase in the patient's symptoms. (34). The diarrhoea is an effort of nature to combat toxæmia.

If diarrhoea be present the bowel may be washed out with saline, and this will add to the patient's comfort, and is a help to keeping his clean. The same measure may be of service where there is incontinence of the bowel contents.

The general management of a case of Pneumonia as above outlined, constitutes one of the most important parts of its treatment, and is applicable in every instance. By its careful observance many of the dangers and complications of the disease will be prevented, and in many instances little else will be required.

2. MEASURES DESIGNED TO ABORT THE DISEASE, OR
USED FOR THEIR DIRECT CURATIVE ACTION THEREON.

For many years, the quest of the Medical Profession has been to discover some remedial measure which would exert some action on the course of Pneumonia, whereby it could be cut short. Its "El Dorado" has been something of the nature of an antitoxin, which would have an action analogous to that of the antitoxin of Diphtheria, and perhaps be attended with as satisfactory a reduction in the mortality. That remedy however still remains to be discovered. From time to time remedial measures have been advocated, for which it was claimed that they had a powerful action in shortening the course of the disease, and although the ideal remedy has not yet been attained, certain of these deserve notice as possessing some value in certain cases. Still, it is in this department of treatment that the greatest discrimination between "post" and "propter" must be made.

A. Sera. Vaccines.

These have recently been extensively used, but the results have been disappointing. As regards Sera, the reason for failure is probably that the immunity produced by Pneumonia is so extremely short lived. (35). Perhaps the injection of Sera may be of prophylactic value: certainly in animals a great degree of experimental protection against virulent cultures of the Pneumococcus has

been established. (36).

In the case of vaccines, the cause of failure is fairly obvious. In the first place, the Pneumococcus belongs to the Streptococcus group, from other members of which it is sometimes very hard to distinguish. Anyone acquainted with the recent work in connection with the members of this group, especially that on the fermentation of sugars, (37) will see at once that though to microscopic appearance any two Streptococci seem the same, they may yet be vastly different in their other powers. Therefore it will be apparent that to expect results from polyvalent or stock vaccines will be unreasonable. Again, the Pneumococcus is a very slow growing organism, and before sufficient of the organism would be available for the preparation of an autochthonous vaccine, the disease would be far advanced in its course. In addition to these disadvantages, it has been shown that vaccines in general have not produced the results expected of them in acute diseases, though they may be of value in some chronic conditions.

Just recently a preparation of Pneumonia toxin has been introduced under the trade name of Phylacogen, and much is claimed for the results of treatment thereby obtained. At the same time, these results must be regarded with caution, in the light of the natural course of the disease.

B. External Applications.

The application of hot poultices was for long carried out as a routine in the treatment of Pneumonia, but unless definitely indicated for the

relief of pain, this has been wisely discontinued. The practice is conducive to overheating and restlessness, and the constant changing necessary is disturbing to the patient; further, there is no evidence to show that it exerts any curative influence. For similar reasons, counter-irritation is not now used because the discomfort produced by it is out of proportion to the benefit.

The External application of ice is said to exert a direct inhibitory action on the pneumonic process in the area of lung over which it is applied. (38). It certainly relieves pain in a wonderful way, and the patient often feels much more comfortable generally after its application. It is also antipyretic and often helps the patient to sleep by diminishing pain, fever and restlessness. From observation, I am of opinion that the application of cold is of great value in the treatment of Pneumonia. Its use in the treatment of head symptoms and in other ways will be referred to later.

The Application of Compresses of Salicylic Acid over the affected part of the lung, has recently been advocated by a Russian writer, and very satisfactory results have been claimed. (39). A solution of Salicylic Acid is made in Alcohol to the strength of 10%. To this then is added 10% of Castor Oil. The solution is applied on lint which is kept constantly saturated, and covered with guttapercha tissue. Improvement in the patient's condition is said to take place very rapidly, and is at least partly due to absorption of the Salicylic.



Acid, as in some instances symptoms of Salicylism have been developed.

The method is said to be of special value in Pneumonia following Influenza.

C. Drugs.

Rightly or wrongly certain drugs have been credited with the power of aborting the disease.

Quinine is perhaps the best known of these, and the most widely used. It is usually administered by the mouth in ordinary doses, - say 5 gr., - and good results are claimed by many practitioners. By a large number it is adopted as a routine in all cases. Recent American writers urge that the most potent method of administering Quinine is in the form of the double hydrochloride of Quinine and Urea. This preparation is very soluble, and is to be given by intramuscular injection in the huge doses of 15-25 grains, every three hours until the temperature falls. With it the temperature falls by lysis rather than by crisis. The action seems to be that of an anti-toxin as signs of cinchonism do not develop. "The change in the character of the defervescence from crisis to lysis together with the great symptomatic relief afforded by the Quinine, in the presence of an unchanged pathologic process in the lungs, justifies the belief that the effect of the drug is antitoxic; and this conclusion is further strengthened by the entire absence of cinchonism, notwithstanding the enormous quantity of Quinine administered and absorbed.....There appears to be a mutual neutralization of Quinine and Pneumonia poisons." (Cohen) (40).

Digitalis, apart from its stimulant action on the heart, has also been advocated in colossal doses 1 - 3 dr. of the powdered leaf, and it also is claimed to act as an antitoxin, being itself neutralized at the same time. (41). The procedure would however seem to be a very risky one. I myself have seen symptoms of Digitalis poisoning develop in the course of Pneumonia, from the too long continued use of the drug as a heart stimulant. The urine became diminished in amount, and of a deep reddish-brown colour, and the pulse which had previously been getting slower commenced to run. At the same time, I believe the patient owed her recovery greatly to the Digitalis. The dose given was M.5 of the tincture every four hours, and then every two hours.

Acetyl-Salicylic Acid has been recently used, and most satisfactory results are said to follow its administration. (42). (cf. Salicylic Acid externally). At the same time care must be taken not to overdose the patient. One of my cases which I did not see until the 6th day, and which recovered, was when seen suffering from deafness due to over-administration of this drug. At the same time, he had a great tendency to head symptoms.

Potassium Nitrate in doses of 1 dr. every four hours has been strongly advocated. It is said to have the power of breaking up the exudate in the lungs by liberating the Chlorides contained therein, and so hastening the crisis and cutting short the disease. The salt taste is a disadvantage, and conducive to thirst. The Potassium element also is

probably depressing to the heart. (43).

Diuretin similarly is said to promote elimination of chlorides, and so may have a similar beneficial action on the course of the disease. (44).

Veratrum Viride, Aconite, and Gelseminum all have their advocates, who claim that they cut short the disease.

Tartar Emetic used to be widely used in large doses, but has now almost been given up on account of its depressing action on the heart, and also because its beneficial action is doubtful.

D. Bleeding.

This measure was formerly adopted as a routine in the treatment of Pneumonia, and a large part of the mortality in those times was probably due to unnecessary and too frequent blood-letting. In some cases however, it still has its advocates, and is said to relieve pain, dyspnoea, fever, toxæmia, and cerebral symptoms. (45).

It is said to be of the most benefit in robust healthy adults in whom the disease sets in with great intensity and high fever, and is to be used at the beginning of the attack.

Personally, I have never done it at the commencement of an attack. The risk seems to be too great: further if the patient should die, the relatives will say that the doctor killed him. In any case, bleeding would require to be done with very great discrimination at this stage. It is much more likely to be of value in the treatment of cardiac complications under which heading we will further consider it. For

all purposes however, leeching is much preferable to venesection.

3. SYMPTOMATIC TREATMENT.

Many of the contingencies calling for special or symptomatic treatment will not arise if the general management of the case has been skilful. It will therefore be noticed that in this section frequent reference to the general management will be necessary.

1. Treatment of the Fever.

To consider this rationally, we must first ask ourselves the question "What is the nature of the fever?", and we come to the conclusion that there are several factors in its production. In the first place, it seems to be a protective reaction on the part of nature. Its normal height is about 103 - 104 F., and we find that the growth and multiplication of the Pneumonococcus is much more vigorous at body heat than it is at a higher temperature. Hence, it is not surprising to find that, apart from very mild cases, more cases of Pneumonia recover with a temperature of 104 than do with a temperature of 101 F. We therefore observe that a mere reduction of temperature, unless it result from some improvement in the patient's general condition, is decidedly more harmful than beneficial. Consequently drugs whose only action is to produce a fall of temperature will be dileterious.

In addition to this apparently beneficent fever, there are certain harmful agencies which cause increase

of temperature. Examples are toxaemia, heart failure, sleeplessness, delirium, and pain. It is the fever due to these that is particularly apt to get out of hand and go to hyperpyrexia. Long continued fever from any of these causes is apt to be exhausting, and conducive to heart failure. It will be apparent then that a vicious circle may be so produced. This variety of fever therefore will require treatment by if possible removing the cause, but much better than cure is prevention. This is often effected by the proper general management of the case as already studied.

We have noted then, that there are two groups of factors in the production of fever, the one beneficent, the other deleterious. It will therefore be obvious that if the fever is not too intense, it should not be interfered with; but steps should be taken to prevent or remove, as the case may be, the fever arising out of toxaemia, sleeplessness, delirium, pain, or heart failure, by treating the cause in each case.

In every case, elimination should be promoted freely, The patient should be encouraged to drink as much water as possible; and if thought advisable a mild diaphoretic such as Liq. Ammoniae Acetatis, 1 dr. thrice daily or oftener may be given. As we have noted the patient is to be sponged twice daily or oftener. Tepid sponging is an exceedingly useful measure for keeping the fever within bounds. It may be repeated every hour if called for, and requires to be skilfully done. Two nurses are necessary to

do it satisfactorily, and the patient must be kept covered the whole time, the only part exposed being that actually under treatment at the moment. One nurse does the actual sponging, the other dries the part and looks after the covering of the patient. The application of ice in an ice-bag over the affected part of the lung is also a useful antipyretic. The changing of garments soaked with perspiration has been already noted.

No antipyretic drugs of any kind should be given, though Quinine in small doses may be beneficial.

A falling temperature associated with rising pulse and increase in the rate of the respirations is a sign of failing resistance, and must be treated energetically with stimulants. Similarly, too low fever associated with a severe attack of the disease (as shown by the other symptoms) must be treated in the same way.

Hyperpyrexia is a danger arising out of the fever, and may require special treatment. It may be however almost always prevented by proper general management of the case from the start, and more especially by the use of the large amounts of cold water internally as already advocated as a routine. Should however hyperpyrexia be established, the temperature may be kept in check by the application of cold. Sponging with cold water or ice, or the application of several ice-bags constitute the easiest method for its reduction. In more extreme cases the cold pack or cool bath may be called for. (46). With this latter the temperature must not be too far reduced

as collapse may be thereby produced. The patient should be taken out of the bath while the temperature is still about a couple of degrees higher than that to which it is desired to reduce it, as the fall will continue for a short time after the patient has been removed from the bath.

Hyperpyrexia may be the indirect result of heart failure, sleeplessness, delirium, or toxæmia, and if so, the appropriate treatment for the one responsible must be instituted at the same time.

Hyperpyrexia, if untreated may lead on to heart failure, sleeplessness, or delirium. We have therefore another example of the vicious circle in Pneumonia, as shown above in the causes and effects of excessive fever.

Remembering the possible protective nature of the fever, it is not advisable to reduce it unless there are definite indications to do so, as long as it does not go above 105 5 F.

2. The Treatment of Toxaemia.

This resolves itself largely into the promotion of elimination, and the use of any measures which have for their object the dilution of the toxins. Prominent among these latter is the use of fresh air. Its action in preventing cyanosis, - the measure of toxæmia, - we have already noted. It is also of great value in relieving the dyspnoea which may arise in the course of severe toxæmia.

Oxygen is often used with a similar object, but doubt has recently been expressed as to the advisability of this procedure, as Oxygen has been shown experimentally

to be capable of itself producing inflammation in the lungs. (47). It is however the custom of many experienced physicians to order Oxygen early in all cases of toxaemia. As cold Oxygen is depressing, it should be passed through hot water before being inhaled by the patient. A still better way is to pass it rapidly through absolute alcohol, the patient in this case getting also the stimulant effect of the alcohol. If this method be employed, the patient should be given the "alcoholated" Oxygen for five minutes at a time, as often as may be required. Its maximum effect is produced in about that period. (48).

Promotion of elimination resolves itself into the stimulation of skin, bowels, and kidneys. The most valuable agent for so doing is cold water in large amount, and which should be adopted as a routine in all cases. Enemata of saline per rectum (to be retained) are of the greatest value.

The skin may be stimulated by frequent sponging with tepid water, and by a mild diaphoretic.

Mild diuretics are also of much value, such as Potass, Citrate or Acetate in doses of 10 - 20 grains. Diuretin has seemed to me often to be very beneficial, partly for its diuretic action, and partly because it acts as a vascular stimulant. Also, the increase in the elimination of Chlorides after its administration, as already noted, may perhaps have some direct beneficial action on the disease. (49).

In extreme degrees of toxaemia, saline laxatives may be used to aid elimination.

Toxaemia is conducive to heart failure, and hence

cardiac stimulants are often called for in addition to the treatment above outlined.

Meteorism or paralytic distension of the intestines, and an analogous condition of acute distension of the stomach, may result from toxæmia, and both are extremely serious complications.

Prevention by good general management is the desirable course.

Should either of the conditions arise, the patient should be put on drier diet, reducing in particular the amount of milk. Feeding per rectum is also often advisable. Turpentine enemata, Menthol, Aromatic Spirits of Ammonia, and intestinal antiseptics such as Calomel or Salol may all be of value.

3. The Relief of Pain.

This forms a most important element in treatment, as pain if allowed to continue is most exhausting to the patient, and tends to heart-failure, sleeplessness, and delirium.

External Applications. Pain is most safely relieved by some external application. Far the most efficient is the use of ice in an ice-bag: the relief to pain is most striking and the general sense of improvement experienced by the patient is frequently beyond all expectations.

Pain may also be relieved by the application of heat, and this is usually employed in the form of a hot poultice of linseed meal. Heat is occasionally preferred by the patient to cold, and in these cases his taste should be respected, the patient preferring

that form of application which gives him most relief. Poultices are very efficient in relieving pain, but not more so than ice, and they are not nearly so easily managed. Their great drawback is that they require to be so frequently renewed. They tend also towards restlessness and fever, (because of their heat), and their prolonged application leads to soreness of the skin.

Hot fomentations, or a turpentine stupe are alternatives in the application of heat, but have the same drawbacks as have poultices.

Applications of mustard, blistering, or the cautery may also be used, but produce soreness of the part from their application, and which may cause the patient much inconvenience.

Leeching may in some instances be of considerable value, and should be kept in mind. It is much to be preferred to the alternative method of blood-letting, wet cupping, which is sometimes used.

Internal Agencies. The administration of drugs in Pneumonia for the relief of pain, has given rise to great controversy, both as regards the principle and in details. One thing however is quite certain, that pain untreated and allowed to continue is very depressing to the patient. In those cases at least, where external applications are not successful in giving relief, internal measures are indicated.

Paraldehyde is the ideal drug for use in such cases. Unlike all other hypnotics, it is - in virtue of its belonging to the alcohol group, - a

stimulant to the heart, and not a depressant.⁽⁵⁰⁾ It relieves pain very satisfactorily and quickly, but should be given in large doses - 2 dr. - as smaller doses are apt to produce excitement. The dose may be repeated with safety if the initial administration has not been sufficient to produce the effect desired. The drug is often conveniently administered per rectum, when it should be given in a few ounces of beef-tea.

Morphia for the relief of pain is very strongly recommended by some, and just as emphatically condemned by others. The relief it affords is certainly very striking, but there are certain risks with which its use is attended. Its depressing action upon the patient generally, and particularly upon the respiratory centre, - whereby it tends to produce asphyxia and lividity, - demand that it should be used with great caution. It hinders also expectoration of the bronchial secretions, and perhaps it may have a paralytic action on the leucocytes under certain circumstances.

Bearing in mind these possible dangers, it will be evident that Morphia should not be used where it can possibly be avoided.

If the pain is very intense, it may be used in the early stages of Pneumonia, and may be given either by hypodermic injection (gr. $\frac{1}{4}$) or in the form of Dover's powder (gr. 5-10). I have seen great good from its administration, and used to use it frequently.

But, in one case, the patient started to go steadily downhill after a hypodermic of Morphia: the temperature and pulse both started to rise, and the patient ultimately

died from the extension of the Pneumonia to another lobe of the lung. This spread coincided exactly with the injection, and it was suggested to me afterwards that the Morphia may have had something to do with the unfortunate issue of the case. As the case was an exceptionally severe one and the patient an alcoholic, I hesitate to blame the Morphia. At the same time, the course was suggestive. I have never used Morphia since, but have used Paraldehyde instead, and always with most excellent results.

Hyoscine is commonly stated to predispose to dilatation of the right side of the heart, and therefore to be avoided. Its action is similar to that of Morphia. I have used it on several occasions with benefit, though it must be used with great care. It seems to me to be safer than Morphia as the medicinal dose is relatively so much smaller than the lethal dose when compared with that drug.

Phenacetin is of considerable value in the relief of pain if given in doses of gr.20. It should not be given if the temperature tends to be too low, as it has the disadvantage (in ordinary cases) of often lowering it still further.

Bromides are also frequently used, but need to be given in very large doses (gr.40) to be of any service. Their value at the best is doubtful.

Chloral is best avoided excepting in special circumstances as it is depressing to the heart. If it is used, it is more safely given along with some cardiac stimulant like Digitalis.

4. The Care of the Circulation.

Failure of the circulation being the greatest danger of Pneumonia, the heart must be watched with the utmost care, and it is essential that any change for the worse in the circulatory conditions should be detected at the very outset. The physician must be guided in every case by the examination of his patient: cardiac stimulants should not be given as a routine, but kept as a reserve, although in alcoholics or old and feeble patients they may be required from the commencement.

In every instance it is important to recognise the cause of the heart failure, for many different causes may be responsible, and the treatment will necessarily vary with the cause. As we will note, many of the causes are obviated by the proper general management of the case as already laid down: therefore in a properly managed case heart failure will be less likely to occur.

1. Local conditions of the heart.

(A). Previous Disease of course renders the heart less fit to stand any strain put upon it. Valvular disease and Fatty heart are the most important varieties. The treatment in these cases is to try to help the heart with stimulants, so that it may hold out till the crisis.

(B). Recent local conditions of the heart. Examples of these are Pericarditis and Endocarditis. They are treated in the same way with stimulants, and in addition a blister over the heart is of much value.

(C). Antemortem Clotting is a rare cause of the failure. Treatment is of no avail, and can only be symptomatic.

(D). Dilatation of the right side of the heart is the ultimate result of many of the causes of heart failure, and often may be obviated by their proper early management. It most commonly results directly from obstruction in the Pulmonary Circulation produced by extensive involvement of the lungs. The treatment is cardiac stimulants. The heart may be also relieved of part of its work by the administration of Sodium Nitrite, gr.1, every three or four hours. In extreme cases bleeding may be required to relieve the distension; but it must be done in every case with great discretion. Several leeches over the right side of the heart is the best and safest way to relieve the engorgement.

2. Extensive involvement of the lungs, i.e. obstruction in the Pulmonary Circulation. This gives the heart more work to do, and therefore there is a greater strain upon it. It is a potent cause of dilated right heart. The treatment consists in trying to take the work off the heart, and making the channel through the lungs for the blood larger. This is done by the use of Sodium Nitrite as above. Oxygen also is of great benefit, as making aeration of the blood easier.

(51)

3. The degree of Toxaemia has an important influence on the heart, for we have noted the selective depressant action of the toxins upon it. The treatment is that of Toxaemia as already discussed, the most important agencies being Hydrotherapy, salines and

4. Fever and more especially Hyperpyrexia contribute to the production of heart failure. Their prevention and treatment have been already fully discussed.

5. Pain if allowed to continue exhausts the patient, and heart failure may ensue as a part of the general exhaustion. The heart, being the organ on which most strain is incurred by the disease, feels the exhaustion first. The treatment is to control pain at the outset and if necessary stimulate.

6. Sleeplessness produces heart failure from exhaustion in a manner similar to pain. The treatment is to never allow sleeplessness in a case of Pneumonia: its prevention will be discussed later.

7. Head Symptoms also produce heart failure from exhaustion. They are often preceded by sleeplessness of which some varieties are the direct result.

Heart failure is especially liable to occur in Delirium Tremens owing to the natural tendency to heart failure in that disease. The treatment is prevention, and the use of stimulants.

Indications for the use of Stimulants.

From whatsoever cause arising, there are certain more or less common indications for the use of heart stimulants. Of these the earliest is a rise in the pulse rate. A falling temperature at the same time is a still more urgent call: and more serious still is a falling blood pressure. All three indications are frequently present in the same case and at the same time. Irregularity of the pulse shows great urgency: weakening of the heart sounds is an

urgent call for stimulants. The condition is desperate if the heart assume the foetal rhythm.

As in other departments of treatment, there is great difference of opinion as to which are the best heart stimulants to employ.

Digitalis, in my opinion, is far the most satisfactory. It should be begun early whenever indicated: the dosage must be judged according to the needs of each particular case. A usual dose is M.5 of the Tincture, but this may be increased as required in conditions of urgency. (52)

For progressive heart failure, there is no remedy so valuable as Nativelle's Digitalin in doses of $\frac{1}{240}$ th of a grain. This preparation is so powerful that every dose requires to be watched, in case of overdosing the patient. Sometimes the effect of a single dose lasts for days.

In sudden emergency, some good hypodermic preparation of Digitalis may be employed. If Digitalis by the mouth causes sickness, as it sometimes may, the hypodermic form may be substituted, and often is well tolerated.

Strophanthus is widely used by some instead of Digitalis. Personally I have not seen as good results from its use: preparations of the drug are very variable, and many samples cause vomiting. The taste also is very objectionable.

It is said that the vomiting, if it occur, may be controlled by giving Cocain Hydrochloride gr.1/6th in pill form. The usual dose of Strophanthus is M.5 of the 1885 Tincture.

Strophanthin may be used hypodermically in emergency.

Alcohol at the right time and if indicated is of the utmost value, but it should not be given unless called for. It is of most value towards the end of a case. Good whisky or brandy should be the form chosen, and should be given in plain (not aerated) water, as all gaseous fluids tend to Meteorism. For a similar reason champagne is to be avoided. The dose of whisky or brandy should be dr. 1 - 4 as required.

Enemata of Beeftea or Saline are among the most efficient cardiac stimulants. These should be of 8 to 10 oz. in size, and repeated four hourly. They are of course to be retained.

Strychnine is highly lauded by some (Gibson⁵³), Bramwell⁵⁴), and debarred by others (Greenfield⁵⁵). My only experience of it has been in emergency, and it then certainly seemed to be beneficial. The dosage is usually gr. 1/40th, hypodermically. Some use it regularly throughout the disease (56).

Sodium Nitrite is exceedingly efficient in many cases, by taking the work off the heart, and allowing it a relative rest. As it lowers the blood pressure, its action might at first sight appear to be harmful, but in practice this is not so. It may be used in conjunction with some stimulant which acts directly on the heart, such as Digitalis.

Acute Heart Failure may occur at any time in the course of Pneumonia. It is commonest just before the crisis. It may occur suddenly without any warning, or be the terminal feature of a progressive, slow

heart failure. The condition calls for most urgent and energetic treatment, which must be instituted at once.

Ether hypodermically is a most valuable stimulant in doses of M.40. It stimulates the heart and respirations, and produces a rise in the blood pressure. (57) It may also be given by the mouth as Sp. Aetheris Co. (dr. $\frac{1}{2}$ -1) or along with Sp. Ammon. Aromat. and Sp. Chloroformi, of each equal parts, dr. $\frac{1}{2}$ -1 of the mixture.

Strychnine, Strophanthin, Digitalin, Alcohol, have already been noted.

Belladonna or Atropin may also be of great service in collapse, especially that attending the crisis, and accompanied by profuse sweating. It improves the vascular tone, and may be of service when other measures fail. (58).

Adrenalin Chloride hypodermically is useful in cardio-vascular collapse, especially if the pulse is of low tension or dicrotic. Its action is, according to an American writer, maintained for about four hours after each dose. (59). It is to be given intramuscularly in doses of M.10 - 15. If the collapse is very acute, the injection may be repeated every 15 minutes, till the action of the Adrenalin becomes established. Its action is to raise the blood pressure, and steady the heart.

Pituitary Extract is also employed with a similar object. (60).

Camphor, of late years, has been strongly advocated, especially on the continent, as a vascular stimulant. If the emergency is a pressing one, it

should be given by hypodermic injection, Camphorated Oil being used which has been sterilised. The dose is about gr.1 - 3 of the Camphor. Alternatively, Sp. Camphorae (dr. $\frac{1}{2}$ -1) may be given by the mouth.

5. The Treatment of the Cough.

In some cases the cough is troublesome and requires special treatment. It may be contributed to by several agencies. It usually causes the patient inconvenience by the pain it produces through associated Pleurisy, and on this account may lead on indirectly to all those evils resulting from pain, viz. heart-failure, sleeplessness and delirium.

Pleuritic irritation from Pleurisy is a common cause. It is best treated by some preparation of Opium. The hypodermic injection of Morphia is warmly advocated by some, but we have already noted its possible dangers. Some milder preparation by the mouth is safer, such as Tr. Camphorae Co., Dover's Powder, or the Brompton Cough Mixture. The dosage and frequency must be determined by judging each case on its own merits.

Toughness of the Sputum, whereby the patient has difficulty in expectorating it, may be treated by the administration of alkalies. These render it more fluid. Ammonium Chloride gr.5 - 10, or Ammonium Carbonate gr.2, along with Sodium Bicarbonate gr.20, may be used with this object. The carbonate should not be given if there is any tendency to abdominal distension.

Bronchitis is one of those conditions which may of itself be caused by the Pneumococcus, and inasmuch as Bronchitis like Pneumonia is often the result of cold, the two are often associated; and the cough in

certain cases of Pneumonia is frequently mainly Bronchitis. In these, a mild stimulating expectorant cough mixture will be helpful, as, one containing Ammonium Carbonate. Sp. Ammon. Aromat. is a convenient and useful preparation to prescribe in such cases.

6. The Treatment of Sleeplessness.

A patient suffering from Pneumonia must never be allowed to have sleepless nights. Sleep in itself seems to exert a beneficial influence over the disease; and a few patients literally sleep themselves well. On the other hand, a tendency to sleeplessness is more common and arises from many different causes. It may result from pain, fever, (including overheating from bad management), dilatation of the right heart, constipation, or collapse. If unchecked, it may lead on to delirium, heart failure, or hyperpyrexia, - another example of the vicious circle. It should be the doctor's endeavour to prevent sleeplessness by the proper general management of the case. Take care not to overheat the patient, give him plenty of fresh air, and water in large quantities. If pain be severe, it must be relieved. Similarly, if any of the other causes of sleeplessness be present, they must be appropriately treated.

If sleeplessness be already established, recognition of the cause is essential. In mild cases, Trional gr.20 at night is sometimes sufficient. If pain be the cause, it would be futile to give Trional, and by so doing, valuable time would be lost. External applications of ice would then be called for, and if necessary, Paraldehyde in large doses (dr.2.) or

perhaps Morphia. Similarly heart failure, constipation, or collapse, will call for their appropriate treatment. The treatment of sleeplessness may then be summed up as "Treat the cause". In addition, Trional, Paraldehyde, or Morphia may be used if called for. Chloral and Bromides will be referred to in the next section.

7. The Treatment of Head Symptoms.

Head symptoms, in whatever form they may present themselves, are almost invariably preceded by loss of sleep; and in fact may be described as a further stage of sleeplessness. They may therefore be due indirectly to those agencies which cause sleeplessness, e.g. pain, fever, toxaemia, exhaustion, or heart failure.

Preventative treatment consists in the proper general management of the case, and above all, attention to the sleep function.

In alcoholics, Chloral gr.5, and Digitalis M.5, given from the start of the case every four hours, may prevent the onset of Delirium Tremens, and gives such a patient the best chance of recovery.

Curative treatment. Whenever head symptoms show themselves they must be treated with energy, as the longer they are established, the more difficult it becomes to get them under control, - and they tend to get progressively more severe. They also lead on to exhaustion, heart failure, and hyperpyrexia.

A. Mild Delirium accompanying fever is best treated by fresh air, tepid sponging, and an ice bag to the head. No hypnotics usually are needed. Enemata of

beeftea or saline are frequently of value.

B. Muttering Delirium is a sign of extreme weakness and an urgent call for stimulants. Alcohol should be used freely, and also beeftea or saline per rectum. No hypnotics are allowable except Paraldehyde, it too being a stimulant.

C. & D. Delirium Ferox and Delirium Tremens resemble each other in their treatment. Both call urgently for stimulation. Here again, enemata of beeftea are invaluable. Digitalin is of great service, owing to the tendency to heart failure, and any of the emergency stimulants may be called for. The use of alcohol is a disputed point.

In addition to stimulants, sedatives are also often needed to restrain the patient as he tends to be violent. Again Paraldehyde is the most useful. If the dose of dr.2. is not sufficient, it can with safety be repeated in three quarters of an hour. It is best given per rectum in beeftea.

Chloral and Bromides, Hyoscine, or Morphia may be needed in certain cases, but all must be used with great discretion. Morphia must never be given where there is Bronchitis.

4. CONDITIONS OF THE LUNG REQUIRING SPECIAL TREATMENT.

1. Extensive Involvement.

In cases where the aerating surface of the lung is very much reduced from extensive consolidation, Oxygen may be of great service, (61). Also in cases where one lung is beginning to clear

up, and the other is beginning to get consolidated. Because in these, if you can tide the patient over a few hours until the lung which was first affected has cleared up sufficiently to allow it to aerate the blood, he may recover: whereas, if both lungs are affected at the same time to such an extent that the respiratory function cannot be carried on, the patient of course, must die. (62).

2. Pulmonary Oedema.

Pulmonary Oedema occurs in some cases of Pneumonia, and may constitute a serious complication. The best treatment is Atropin hypodermically in doses of gr. 1/100th., or Belladonna may be given by the mouth. (62).

3. Acute Pleural Effusion.

Effusion into the pleural cavity occurs in many cases of Pneumonia, and even though not great in amount may add to both the respiratory and cardiac difficulty. (64). If in doubt put in an exploring needle. In fact, in any case which is not doing well, and in which there is any fluid present, the withdrawal of some of it is often followed by striking relief. Several times I have thought the patient's recovery has been due to this alone.

5. ADDITIONAL POINTS IN TREATMENT.

1. A Leucopaenia instead of a leucocytosis shows that the patient is making no attempt to fight the disease, and unless he can be stimulated to resist he will certainly die. A leucytosis may be induced artificially in some cases by the administration of

Nucleinic Acid,- a 1% solution being used and injected intramuscularly in a dose of M.25.

One case may be cited in illustration,- the only one in which I have had opportunity of watching its use. The patient was a girl of 19. The lower lobe of the right lung was consolidated by Pneumonia: the upper lobe of the left lung was severely affected with Phthisis. When first seen her pulse rate was 132, and the respirations 28. The blood count showed only 8,700 leucocytes per c.mm.

A few hours later the patient was worse in every way. The pulse rate had risen to 140 and the respirations to 34, and all her symptoms were more severe. The blood count had fallen to below 8,000.

In spite of stimulation in every way, she still continued to get worse, and the blood count continued to fall until it reached 6,700. The patient's condition now looked desperate: she was now given an injection of Nucleinic Acid as above.

Two hours later the blood count had increased to 21,000 and there was a great improvement in every way. Next day the count was 16,000, at which figure it was maintained until the crisis several days later. Until the injection, the patient was getting steadily worse: after it she at once improved, and in this instance I think the recovery entirely due to that treatment. It must however be admitted, that the results from its use have not always been so satisfactory.

2. Herpes on the face, if extensive, may be a source of trouble to the patient. If established

it should be dressed with some simple antiseptic ointment such as Boracic. If got just at the commencement, an outbreak can often be aborted by painting the parts with Silver Nitrate, a solution in Spiritus Aetheris Nitrosi, gr.15 to the ounce being used.

3. Other Diseases. It will be obvious that any diseases which may be present in the patient at the outset of his Pneumonia, - such as Diabetes, Exfoliative Dermatitis, or any Nervous Disease, - may each call for appropriate treatment.

Similarly, any of these complications of Pneumococcal origin, - like Nephritis, or Meningitis, - will require the usual management for the respective condition.

(B). AFTER THE CRISIS.

(A). In Ordinary Cases.

After the crisis, the time required for the affected part of lung to be restored to the normal varies much in different cases. In children it is restored very rapidly, - 2 or 3 days, - in adults, it is often as many weeks. During this time the patient should still be kept in bed. How long he will have to remain there, depends on the strength he has left after his attack, and also on the presence or absence of sequelae. Every case should be judged on its own merits, 2 to 3 weeks being an average time. At the end of the acute stage, the patient will be found to have lost much weight, and he will therefore require feeding up. For the first few days however, his diet should be still fluid, and then gradually fish and chicken may be added. Too much at a time

should not be given, as the patient usually has a voracious appetite, and tends to overeat.

Later milk and eggs in large amounts, also cod liver oil and malt and a tonic may be administered.

Porter in feeble patients assists resolution and hastens convalescence. (Wyllie). Potassium Iodide is said to assist absorption of the exudate. (65).

(B) Treatment of Sequelae.

Delayed Resolution is especially apt to occur in feeble patients, and the affected part often becomes the seat of Phthisis. Fresh air and feeding, particularly the use of milk and eggs, are the most important means of treatment. Codliver Oil and Porter are also very useful. The Hypophosphites of Lime and Soda are recommended, the Phosphorus therein being said to hasten the degeneration of the exudate, and thus aid its absorption. (66).

The use of Pulmonary exercises, - such as blowing water from one bottle to another - may aid the lung to expand, and the circulation through it, and hence promote restoration to the normal. (67).

Empyema in adults always requires to be treated by free drainage by resecting a portion of rib. In children, tapping may sometimes be sufficient, though often drainage is required in them also.

In closing this brief outline of the treatment of Pneumonia, I would again draw attention to the appalling mortality with which the disease is attended, and which has increased in recent years. To the so called "expectant" method of treatment, so

much in vogue at present, has been attributed this increase. And so often, no doubt, the "expectant" method means "do nothing", and is used as an excuse for what really amounts to neglect.

The treatment of Pneumonia is a most interesting and difficult study, and one in which to be successful requires constant attention to one's patient and constant application to work. The aphorism of Ambroise Parey might have been written of Pneumonia alone:-

"He that would perform any great and notable work, must diligently apply himself to the knowledge of his subject." (68).

"We all know that "there is a tide in the affairs of men: over that tide we have no control, but, what we can do is to see to it that we shall be ready to take it at its flood, when it sets towards us." (69). The more we can master our subject, and the greater the care we can take over our cases, the better able will we be to turn our opportunities to advantage.

The care of a case of Pneumonia implies grave responsibilities, and a great confidence on the part of the patient in the skill and knowledge of his physician. It is to us to see that that confidence is not misplaced.

BIBLIOGRAPHY.

1. BRAMWELL, Clinical Studies, Vol.3. (1905) p.90.
2. WELLS, quoted by Osler, Principles and Practice of Medicine. 7th edition. 1909. p.187.
3. KLEIN, "Further Report on Epidemic Influenza" 1889-92, Local Govt. Board report, 1893, p.85.
4. EYRE, Journal of Pathology and Bacteriology. Vol.14, 1910, p.160.
5. RUSH, quoted by Osler, loc. cit. p.182.
6. THOMSON, Clinical Examination and Treatment of Sick Children. 2nd edition. 1908. p.274.
7. BRAMWELL, Clinical Studies, Vol.3. (1905) p.85 & 86.
8. OSLER, Principles and Practice of Medicine. 7th Ed. 1909. p.181.
9. Osler, Loc. cit. p.179.
10. WEBSTER, Diagnostic Methods, 3rd edit., 1913, p.182-3.
11. HUGHES, "Treatment based on elimination of Chlorides" New York Medical Journal. Sept.9th, 1911.
12. GULLAND & GOODALL, The Blood. 1912. p.282.
13. GULLAND, British Medical Journal. 16th April, 1904.
14. GULLAND & GOODALL, Loc. cit. p.45.
15. SIMON, Clinical Diagnosis, 1904. p.104.
- TURK, Klinische Blutuntersuchungen, Vienna. 1898.
16. EWART, quoted by Gulland & Goodall, loc.cit. p.281.
17. GULLAND & GOODALL, loc. cit. p.252.
18. BEATTIE & DICKSON, Text-book of Special Pathology, 1909. p.182.
19. BEATTIE & DICKSON, loc. cit. p.185.
20. ALBUTT & ROLLESTON, System of Medicine. 1909. vol.5. p.195.
21. BRAMWELL, Clinical Studies, Vol.2. (1904) p.119.
22. BRAMWELL, do. do. p.121.
23. ALBUTT & ROLLESTON, loc. cit. p.224.
24. ALBUTT & ROLLESTON, loc. cit. p.259.

25. NETTER, quoted by Muir & Ritchie, Manual of Bacteriology. 4th edition, 1907. p.205.
26. ALLBUTT & ROLLESTON, loc. cit. p.230.
27. KER, Infectious Diseases, 1909. p.284.
28. WEBSTER, Diagnostic Methods, 3rd edition.1913. p.589 - 590.
29. BRAMWELL, Clinical Studies, Vol.3. (1905) p.86.
30. SAVILL, System of Clinical Medicine, 2nd edition, p.153.
31. SAVILL, loc. cit. p.153.
32. SOLIS-COHEN, Monthly Cyclopedia and Medical Bulletin. Dec. 1913.
33. KER, Infectious Diseases, 1909. p.
34. CAMPBELL, On Treatment. 1907. p.87 - 88.
35. KOLIPINSKI, Monthly Cyclopedia and Medical Bulletin, 1913. p.398.
36. HEWLETT, Manual of Bacteriology, 4th edit., p.434-5.
37. GORDON, Report Medical Officer, Local Govt. Board. 1898- 99. p.482.
38. LEES, The Treatment of some Acute Visceral Inflammations, & Other Papers. 1904.
39. YOURCHEVSKAIA, abstract in La Semaine Medicale, 11th Sept. 1912.
40. SOLIS-COHEN. loc. cit. p.711.
41. SOLIS-COHEN. do.
42. SCOTT, Guy's Hospital Gazette. 7th Dec. 1912.
43. HUGHES, New York Medical Journal. Sept.9th, 1911.
44. MARTINET, La Presse Medicale, 1907, No.100.
45. OSLER, loc. cit. p.190.
46. BRAMWELL, Clinical Studies, Vol.3. (1905) p.94.
47. LORRAIN-SMITH, quoted by Osler, loc. cit. p.192.
48. GULLAND. Lectures on Medicine. (unpublished)
49. See Martinet, as above. Also Hughes, loc. cit.
50. WHITE, Materia Medica, 11th edition. p.305.
51. BRUNTON, The Action of Medicines. 1907. p.571.

52. BRAMWELL, Clinical Studies, Vol.3. (1905) p.95.
53. GIBSON, Glasgow Medical Journal, May 1911.
54. BRAMWELL, loc. cit. p.95.
55. GREENFIELD, Clinical Lecture. (unpublished)
56. BRAMWELL, loc. cit. p.95.
57. WHITE, loc. cit. p.288.
58. HARE. Text-book of Practical Therapeutics, 14th ed. 1912. p.122 - 3.
59. BROWN, American Medicine. Nov. 1911.
60. SOLIS-COHEN, loc. cit. p.711.
61. BRUNTON, The Action of Medicines. 1907. p.571.
62. BRUNTON, do. do.
63. HARE, loc. cit. p.123.
64. JAMES, Pleurisy. 1911. p.218.
65. HARE, loc. cit. p.65.
66. BRUNTON, loc. cit. pp. 501 - 2.
67. JAMES, quoted by Thomson and Miles. Manual of Surgery, 2nd edition, 1907. p.309.
68. PAREY, Chirurgerie, 1579, English edition, 1678, book 27, p.679, aphorism 5.
69. CAMPBELL, On Treatment. 1907. p.37.