Thesis
on
Pneumonia

by
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The term Pneumonia denotes inflammation of the parenchyma of the lungs. Williams regards the capillary ramifications of the pulmonary artery and vein as the proper seat of Pneumonia, and thinks, that "there may involve more or less of the tissue, through and around which they pass." Probably, there are few examples of the disease in which the inflammatory process does not involve all the textures composing the pul-
monary substance in the part inflamed.
Bronchitis almost invariably accompanies pneumonia, and generally to a corresponding extent; pleurisy may coexist, or it may not, commonly it does.
This disease has been divided into stages, according to the anatomical character which it presents at different periods of its course; these are three conditions of the lung, produced by it, which are very constant, well marked, and easily recognized. The first state is that of Engorgement. 2. Fibratization. 3. Purulent infiltration.
Engorgement. A portion of lung in this state is of a dark red, or violet colour, externally, of various shades; its firmness is increased; it is increased in weight, and puts on pressure, but is still somewhat crepitant, and, though heavier than natural, usually floats in water. When a section is made, it still presents its spongy structure, the cut surface is of a bright red colour, and a large quantity of sanguineous, and frothy serum flows from the incision. Its integral cohesion is diminished.
and it is therefore more easily torn than the healthy lung. The mucous membrane of the small bronchi is of a deep red colour.

In examining the dead body, care must be taken to distinguish, between the condition of the lung now described as a result of inflammation, and that mechanical engorgement which so frequently presents itself; the situation of the latter is determined by the position of the body at, or after death, and has not been preceded by any of the ordinary symptoms of the inflammatory form.

Stokes describes a stage previous to that of engorgement, in which the pulmonary tissue is drier than usual, not at all engorged, as in Laennec’s first stage, and of a bright vermilion colour from intense arterial injection.

Necratization. The lung is still red externally; internally it presents a mottled aspect, produced by the intermixture of irregularly situated black spots of pulmonary matter, along with patches of a whitish colour marking the vessels and interlobular areolar tissue, less...
affected with the inflammation. It no longer crepulates under pressure, and it sinks in water, the spongy character of the organ is lost, its weight and firmness are like those of the liver. There is little or no exudation from the secretion of a hepatized lung; if it be squeezed, a thick, opaque, yellowish, puriform matter may be scraped from the cut surface. If a thin slice of a lung in this stage be examined with a simple lens, its texture appears granular, the grains are small, red, solid, and flattened, apparently the air vesicles, rendered solid by the exudation, and reddened; although the opinion has been held, that solidification depends rather on effusion into the walls of the cells, and congestion of the vessels, than into the cavities of the cells. An entire organ in the state of hepatization will seem to have been increased in bulk; this increase of volume is partly real, from the congestion of its vessels, and the exudation into its substance; but mainly only apparent, on account of its being incapable of collapsing when the thorax is opened; the marks of the ribs are occasionally
visible in the distended lung. Reparation is sometimes limited, especially in children, to certain lobules here and there in the lung, the surrounding parts remaining unchanged. The consistence of the lung is sometimes such, that a slight amount of pressure will suffice to reduce it to a pulp; there are varieties, termed amyloidization, and caseification, according as the texture most resembles that of the spleen, or of a piece of muscle. This stage is not necessarily preceded by the former, it may occur primarily as the first step in the morbid change. Purulent infiltration. In a degree still further advanced, the pulmonary tissue, preserving still the same density, firmness, and granular structure, becomes of a yellow, drab, or straw colour, sometimes mottled with red, or with the black pulmonary matter. The granulations change from red, to grey, or dirty white, and the texture of the lung has its friability increased. At first, small yellowish spots of pus are scattered here and there over the sephatized surface, these enlarge, and finally unroof, giving the whole a straw colour.
The lung is loaded with puriform matter, which oozes out from incisions made into it, spontaneously, or with gentle pressure, and shows itself upon the cut surface in the form of minute drops. The least pressure is capable of reducing the pulmonary tissue to a pulp. In old subjects, the black matter being in greater quantity, and混着 with the yellow produced in the state of purulent infiltration, gives the lung a darker tint than what is found in young persons.

There are two other conditions of the lung consequent upon inflammation, both of which are very rare; the first of these is, Circumscribed abscess. Suppurative inflammation in this locality, is seldom preceded by the formation of an abscess, such as we find in other parts of the body; purulent infiltration as described above, being the ordinary result of that action. One only has Andral seen a real abscess of the lung form as a consequence of pneumonia.

Various explanations have been advanced to account for the rarity of this phenomenon,
Ox. That death occurs before an abscess has had time to form. That the excretory powers of the pulmonary apparatus are so great, that the pus, as soon as formed, is expectorated, instead of being allowed to accumulate in the inflamed part. That the free admission of atmospheric air into the surrounding sounder tissue, and for a time even to the inflamed portion itself, causes the suppurrative process to supersede the adhesive; and no no walls of circummallation is formed by the coagulable lymph, as is the case in areolar tissue which is not accessible by the air." Finally, Lecenee's view of it is this. In all the cases where abscess was found, the inflammation occupied only a part of one lung. This circumstance may help to account for the infrequency of collections of pus in the lungs, as cases of partial pneumonury usually yield either to nature or art, while an affection of great extent produces death before the purulent infiltration is so far advanced as to form, by the destruction of the tissue containing it, distinct collec-
tions of this. When an abscess does form, it may be encapsulated just as in other parenchymatous parts; or, its walls may be formed by dehydrated lung, or, the pus may be found lying between the lung and the pleura. Collections of pus in the lungs are common enough in the bodies of persons who have died of phlebitis, and, according to some, are the product of inflammation occurring in the part where they are found. If this theory be the correct one, then these abscesses must be looked upon as exceptions to the general rule, and as arising moreso from a peculiar and specific form of pneumonia.

Gangrene is sometimes, but very seldom, the result of acute inflammation of the lung; sometimes it occurs as an independent and primitive affection of the lung, and this is perhaps not quite so rare. Pneumonias complicated with other diseases, as the several exanthemata, and typhoid fever, are those which are most apt to terminate in gangrene. It may be mor-
-circumscribed, occupying the greater portion of a lobe, or even a whole lung; or it may be limited to a small part. The gangrenous part is moist and wet, of a greenish brown, or dark brown colour, and tears easily, of the same density as when engorged; the odour is very offensive, while the puriform infiltration of the third stage of pneumonia is attended with no foetor.

The collection of pus in abscess, or the slough in gangrene, having been expectorated early remains in the lung.

Situation of Pneumonia. The morbid process almost always commences in the lower lobes of the lungs, and has a strong tendency to invade the different portions from below upwards. Sometimes, when a whole lung has been affected, and a perpendicular section is made of it from its apex to its base, the lower part is found in a state of purulent infiltration, the middle in that of liquefication, and the superior engorged with bloody serum. Andral found that of eighty-eight cases of
pneumonia, the inflammation affected the inferior lobe forty-seven times, the superi-er lobe thirty, and the whole lung at once eleven. Pneumonia is greatly more common on the right side of the body than on the left, of 1131 cases collected by Dr. Forbes, in 562 the right lung alone was inflamed, in 333 the left alone, and both together in 236. The asthenic form is said to be more common on the left side. Double pneumonia is of more frequent occurrence, and consequently the disease is more fatal, in females than in males.

Duration of the different stages. This disease is highly acute in its nature, and rapid in its course; it may run its course in four days, or it may last for six weeks. Watson reckons the average duration of it to be ten days. Laennec has seen the state of engagement last for seven or eight days, and involving the whole of one lung, and part of another, before any portion was he-patized; in some instances, on the other hand, the third stage is reached in, from twenty-four
to thirty-six hours, in persons who are weak from age, some serious complication, or any other cause. Usually, the disease runs the following course; the first stage lasts from twelve hours to three days, before the repARATION is complete; repARATION continues for three days before points of purulent inflammation begin to show themselves; and from that time until the purulent stage has been developed, varies from two to six days (Lecanu). The duration of the different stages must be very much influenced by the treatment employed, as well as by other concomitant circumstances.

Termination. Pneumonia may prove fatal in any of its stages, though seldom in the first; or, at any period, resolution may be the result.

Resolution generally proceeds inversely, occurring first in those parts which were last affected. The changes which take place are as follows; the first stage not having been transgressed, the sanguineous fluid is replaced by a serous, it frequently in no at least, and then
gradually the infiltrated fluid is absorbed, and in no great length of time, the lung regains its normal character. After hæmatization, the matted parts become first pale, and then pass from red, grey, or violet, to their natural colour; the texture becomes softer and more humid, and appears to contain more serum than blood; the granular aspect of the lung disappears, and ultimately it assumes its ordinary vesicular structure. These changes proceed unequally, more rapidly in some points than in others. Stokes avers, that all the signs of solidification may subsist within twenty-four hours, and, that this is a strong argument in favour of the idea, that this condition is due, not to any deposition of lymph, but to excessive congestion of blood. Resolution is usually complete within the month. Although, during life, there are no certain signs indicative of the inflammation having reached its third stage, yet most authors seem to be of opinion, that resolution is still possible without any disorganization of the pulmonary substance. Lærme especially,
The describes its progress thus; the yellow colour of the part becomes paler and whiter; the pus contained in it is intermixed with serum, both are in a short time filled with bubbles of air; the air-cells become again apparent; the part loses its hepatic firmness, is slightly crepítous, and does not always sink in water. The surface of a section is still of a dirty yellow, or green colour; this change of colour remains for a time, with perhaps some serous infiltration, but by and by the both disappear.

Recoveries have been made from small excised or circumscribed abscess, and even from gangrene when limited in extent. The cavity left by either of these contracts, dries up, and cicatrizes by adhesion of its walls. The signs of abscess have been known to disappear in fourteen days.

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Physical signs. 1st. Of Engagement.
If the ear be applied to the surface of the
chest at this period, over the affected part, the sound denominated Crepitation is heard, a sound pathognomonic of the condition in question. It exists from the very commencement, and is exceedingly distinct when the engorgement occupies a superficial portion, becomes less so the farther it is from the surface, and sometimes its source is so centrally situated, that it does not reach the ear at all in the first instance, but it does so as the disease advances and approaches the surface.

At first, the sound of the ordinary respiration is heard distinctly combined with this crepitation; as the inflammation advances, the former is more and more obscured, until at length it is entirely supplanted by the morbid sound. When mixed with other sounds, as in Bronchitis, the pneumonic crepitation is best distinguished at the end of each inspiration, which the patient should always be directed to make as full as possible, if he be a child, and the physician cannot get him to understand his directions, the
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[Signature]

[Date]
best way is, to obstruct the breath for a mo-
moment, and then the effort to resume it
will ensure a deep inspiration.
As the case proceeds, this sound gradually van-
nishes, until at length it ceases altogether;
then, it may be, no sound at all is heard
in the part; or, what is more common, its
place is occupied by one of two very different
things, either by the natural respiratory mur-
mur denoting resolution, or by another more
loud sound which indicates advance of the
disease.
There are two theories afloat upon the nature
of this crepitating sound, and the mode of its
production. One is, that it results from the
passage of air through the liquid secretion,
contained in the air-cells, and minute divi-
sions of the bronchial tubes; numerous little
bubbles forming, and bursting, in quick suc-
cession; the same in kind, though differing
in size, as those produced in the larger bron-
chial. The other theory is, that the distended
vessels, and swollen interstitial tissue, press
upon the minute bronchial ramifications,
and partially obstruct the ingress of air into the cells to which these lead, while the altered secretion of the mucous membrane, filling the calibre of the tubes thus encroached upon, only allows the air to pass through in successive bubbles. This bubbling of air through a viscous liquid, contained in an infinity of tubes, of equally diminished calibre, causes that regular and equal and equal exhalation which constitutes the true crepitant phoneme."

The sign is undoubtedly one of very great value, inasmuch as it indicates the presence of a severe and dangerous disease, and that at the earliest period, before much mischief has been done, and when remedies are most likely to avail. Stokes affirms, that mere respiration always precedes crepitation.

When the engorgement occupies but a small portion of a lung, and all the more if that part be deeply situated, percussion will afford no information; but, should the engorgement be extensive, and the disease somewhat advanced, some dulness on percussion may be perceived, without any pleuritic effusion.
2nd Of Hepatization. Neither the natural respiratory murmur, nor expiration can now be heard, and the absence of these phenomena is sometimes the only sign we have of the presence of this condition.

Bronchophony occasionally exists, that is, the voice of the patient, when he speaks, is conveyed to the ear applied to the chest, in an altered form, as if he spoke through small tubes; the words are not heard distinctly, nor are they always synchronous with those uttered by the mouth. This occurs particularly when the inflammation affects the summit, or neighbourhood of the root of the lung, and extends to the surface; when the centre, or surface alone are hepatized, this phenomenon may be altogether absent. Bronchophony is always most distinct at those parts of the chest which correspond to the roots of the lungs; a small layer of fluid interposed between the pleurae also increases its intensity. Bronchial respiration is another sign of hepatization; the sound of the air passing through the larger bronchi during inspiration
and expiration, which during health had been obscured by other sounds, now becomes audible; it has been likened to that produced by blowing through a crow's grill, and is best heard in the same situation with the last. The reasons why bronchial respiration becomes manifest at this stage are, that the natural respiratory murmur is now no longer present to obscure it, and that the dense and solid lung is a much better conductor of sound than the healthy tissue, the latter also accounts for the bronchophony. When a whole lung has been liquefied, it ceases to respire, consequently there can be no bronchial respiration in that case, although bronchophony may still remain. Percussion over a liquefied portion of lung yields a dull sound, except when a healthy, or comparatively sound portion intervenes between it and the wall of the thorax, then the dulness is not so decided. On the right side, the presence of the liver modifies the sound elicited by percussion; naturally, it is duller in the neighbourhood
of that organ, than at the corresponding part on the opposite side.

Laennec describes a sign, which he calls the
'Souffle voile'. "When the hepatisation surrounds
a large bronchial tube near the surface of the
organ, during inspiration the air appears as if
drawn from the auscultator's ear, while
in expiration it seems blown into it, and
of a pretty sound portion of lung be placed
between the parties of the chest and the
resounding bronchial tube, it seems to us as if
every vibration of the voice, cough, or
respiration, agitates a sort of movable veil
interposed between the tube and the ear."

When any considerable amount of one or both
lungs is affected, the necessity for respiration
in the healthy parts is increased, so that in
the latter the respiratory murmur becomes
louder, and more distinct, similar to the
healthy sound in young children, hence the
term 'in Wirte respiratio' has been applied to
that modification. It is distinct, in propor-
tion to the extent and completeness of
the hepatisation.
Of Purulent Infiltration. It has been stated already that there are no certain means of ascertaining the presence of the third stage during life; the same physical signs belong to it as to the condition last considered. Sometimes, however, the bronchial respiration and vocal resonance are found to cease, and are supplanted by a gurgling mucusous rattle indicating the presence of liquid in the bronchi, purulent, or purulent.

Of Abscess. When some of the pus has been evacuated by expectoration, the bronchophony is converted into peculiarity, and the respiration and cough, instead of being bronchial, are cavernous; that is to say, over the seat of the abscess they are so. The limitation of these signs to a small space materially aids the diagnosis, especially when the signs of the previous stages have been similarly limited, for it is in partial inflammation that abscess is most portable. The physical signs of gangrene do not differ from those of abscess; in the one case they are preceded by the extrusion of the whole, or a part of the slough; in the other
of the pus, a cavity being essential for their production. Should the cavity, as sometimes happens, communicate on the one side with the bronchi, and on the other with the pleural cavity, the signs proper to such a condition will be evinced.

Functional signs. Pain is slight, or even absent, except when the pleura is affected; but in most cases there is pleurisy, and consequently pain. It may be diffused or confined to a point; the latter generally in pleuritic cases, though not confined exclusively to there, and commonly felt a little below one or other breast. The pain in pneumonia is usually most severe at the commencement; it is aggravated by cough, a full inspiration, and by pressure, or percussion over the part; the patient does not lie on the affected side. A feeling of tightness, or uneasiness, is felt in the chest, when actual pain is absent.

Dyspnoea. As a general rule the severity of this symptom is in proportion to the extent of the disease. Inflammation in
the upper part of the lung causes greater dyspnoea, than the same amount in the lower. When severe, whether the inflammation be extensive or otherwise, it is a symptom which betokens danger; and sometimes it is most distressing, the respirations are frequent and short; the patient is unable to lie down, and can scarcely speak; his nostrils are expanded; his face pale, or livid; and the expression anxious. On the other hand, it may be so slight as not to be perceived by either patient or physician.

Cough occurs in pneumonia as in most other affections of the respiratory organs, but does not present any peculiar characters; it is commonly frequent, and does not occur in paroxysms. When the pneumonia occurs primarily, not succeeding to catarrh or bronchitis, the cough is dry in the outset, but in the course of a few hours it is usually accompanied by expectoration.

The expectoration is very characteristic of the disease, when it is fully developed. It is, at first, the cough is either dry, or, what
in spot up resembles the expectoration of common cataract; but, as the disease advances, usually on the second or third day, it becomes decidedly pneumatic. The expectorate form a viscid and tenacious jelly-like mass, and adhere so firmly to the recipient vessel, that it may be turned upside down without their being detached; they vary in colour, they may be green, orange, saffron, yellow, rusty, or almost red, according to the quantity of blood which they contain; sometimes two or more of these hues are present in the same specimen; the "rusty" colour is that which is most frequently met with, depending doubtless upon an intermixture of blood with the mucus, as may be seen by examination with the microscope. Bile occasionally tinges the expectorate. Bubbles of air, sometimes numerous and of considerable size are contained in the expectoration, and cannot escape on account of its tenacity.

This peculiar expectoration begins to appear during the first stage of pneumonia, and by the time the second is reached, it has ac-
quired its greatest tenacity, and highest hint of redness, and continues so during the more active period of the disease. Although such expectoration is pathognomonic of the disease, yet there may be pneumonia without any pneumonic expectoration, or almost any expectoration at all. When the extent and intensity of the inflammation are great, the expectoration diminishes in quantity; mucus is still secreted, but on account of its extreme tenacity, and the patient's debility, one or other, or both, the excretion of it does not keep pace with its secretion, so that by accumulating in the air-passage it may even suffocate the patient.

During the third stage, the (mucus) expectorated matter present specks, or striae, of a yellowish colour, from the presence of bile; rarely however are they entirely purulent. In some instances a fluid is expected which has been compared to the juice of prunes.

In cases of gangrene the consistence of the expectoration is more liquid than that of pus, and of a yellow, green, or brownish colour, and the
General signs. In acute idiopathic pneumonia the commencement is marked by rigors, languor, and general uneasiness, and pain, a sense of oppression, in the chest, accompanied by smallness and frequency of the pulse, perhaps vomiting. Next come the symptoms of inflammatory fever; the pulse is frequent, and either full and strong, or small and capable of being developed by bloodletting; great frequency is a sign of danger. The skin is hot; the face is flushed, and red, or bluish; the tongue is covered with a white fur, or it is intensely red; the appetite is gone; and the bowels are constipated; the urine is scanty and high-coloured; thirst and headache are almost incessant. Blood drawn from a vein soon gets both buffed and cupped; and the proportion of fibrin in it has been found to be greater than in any other inflammatory disease. During the state of hepatisation, the pain and inflammatory fever may abate or disappear, while the dyspnoea still continues, or increases. Sometimes, that state is so slowly
From, that, apart from the physical signs, psittasis pulmonalis is closely simulated, there are cough, expectoration, dyspnoea, an habitually rapid pulse, evening exacerbations, night sweats, and emaciation.

On the supervision of the third stage the inflammatory symptoms give way to great prostration, rigors, cold sweats, a quick, weak, and tready pulse, while the breathing is as short as ever, and the countenance becomes pale and corpse-like. The effects of gangrene are pretty similar, probably the odour of the breath in the latter, is the only distinguishing mark.

Signs of resolution. This termination of pneumonia is usually attended by some critical evacuation, not only when the disease has been left to nature, but also in those cases where active treatment has been employed. The most common of these is a copious flow of urine, which, upon cooling, deposits a large quantity of bilious or serous sediment; next in frequency, frequency of occurrence, are critical sweats, and diarrhoea.
There are certain days of the disease on which pneumonia is more apt to resolve than others, according to Lindahl there are the 7th, 11th, 12th, and 20th; of 112 cases collected by him 23 terminated on the 7th day, 13 on the 11th, 11 on the 12th, and 9 on the 20th.

Resolution from the first stage is announced thus: the fever subsides, the dyspnoea diminishes, the sputa lose their characteristic appearance, the slight dulness on percussion disappears, and the crepitation is gradually replaced by the natural respiratory murmur; the same signs which marked its progress occurring in a reversed order. From the second stage it follows a similar course; the dulness on percussion gradually vanishes, along with the other signs of solidity; crepitation reappears (some say uniformly, others not), and is succeeded by the natural murmur; the sputa regain their catarhal character; the fever passes off; and lastly the dyspnoea. It may happen however, that the bronchial respiration is for a time increased, seemingly by the mireased passage
of air attending the reopening of the hepatic tissue, before this has lost its good conducting power; subsequently a mucous rhonchus occurs in the tubes which were before the seat of bronchial respiration. When resolution proceeds irregularly, in patches here and there, the signs will of course do the same.

Laennec gives the signs of resolution from the stage of suppuration; the crepitous rattle, usually preceded by a mucous or submucous rattle, and, at the end of a few days, succeeded by the subcrepitous, indicating the intervention of edema; in this case, the natural sound of respiration returns much more slowly than in the preceding instances.

The signs of the closing of a cavity are, the slow disappearance of the cavernous phenomena, and a substitution of the natural vesicular murmur, though generally there remains some dulness, and slightly increased vocal resonance, after the cicatrization appears to be complete. A certain amount of hectic fever will probably accompany tedious suppuration and cicatrization, which may be expect
seed to disappear along with its cause.

Some have supposed, that certain constitutions are prone to inflammation in the upper part
of the lung rather than the lower, and that
in such, tubercular deposit, and ultimately pyri-
is, are frequent results of pneumonia.

Varieties and Complications. Of the diseases
which are found combined with pneumonia,
Bronchitis is the most common; indeed some
writers aver that it is a constant concomi-
tant, and all admit the exceeding frequency
of the complication; in young subjects acute
Bronchitis is liable to pass into pneumonia,
and in old persons chronic Bronchitis often
does so, causing fever, and unusual dyspnoea
which may, without due care, be erroneously at-
scribed to a mere aggravation of the habit-
ual complaint; influenza and hooping-cough
have each a strong tendency to terminate in
pneumonia, the latter especially.

Occasionally, the signs of pneumonia, both
physical and others, are so masked by the
other affection that its presence is not de-
tected. Bronchitis aggravates the cough.
Pleurisy ranks next in point of frequency, but it is not so apt to disguise the disorder, although it considerably modifies it; usually it is limited to those points of the pericardia which are in contact with inflamed lung. It increases the painfulness, or rather, is the main cause of the pain when there is any; and by the impendence which it thus offers to the respiration of the patient, it increases the distress and danger of the disease.

Sometimes the pleura and lung are affected nearly to an equal degree, and then the pleuric effusion by its presence modifies the effects of the inflammation in the pulmonary tissue, giving rise to the state termed carniification, beyond which in such cases the inflammation seldom proceeds; it renders the progress of the pneumonia slower too, and adhesion in the pleura more probable. When the liquid effusion has been removed by absorption, and the chest has become again capable of expansion, the obliterated air cells cannot dilate, and their place comes to be occupied by dilated bronchi, such in the explanation...
that has been given, to account for dilatation of the bronchi, as a result of pleuro-pneumonia. Obstetric subjects are liable to attacks of pneumonia, usually of small extent, the general symptoms of which are therefore readily confounded with those of the primary disease; generally they are not severe, probably on account of their arising chiefly from a local cause; and often their cure is spontaneous, although this must not be trusted to in practice, because pneumonia occurring in such patients, not only accelerates the fatal termination of the tubercular disease, but also immediately endangers life. Their occurrence is marked by an unusual febrile attack, together with dyspnoea, and the ordinary physical signs of pneumonia. Several diseases which may be considered of a general nature have a singular tendency to the pneumonic complication; the various kinds of febrile disorders, especially the exanthematous, are the principal ones; in fact, in a considerable proportion of the fatal cases of these diseases, the chest affection seems to be the cause of death. Commonly the pneumonia takes
a latent form, but not invariably; for, when it occurs during the course of measles, or as the eruption disappears, it is frequently manifested by the ordinary symptoms; and in the other exanthemata too, when they happen in the young and robust, its invasion may be suspected from a marked increase of fever taking place. But in the aged and debilitated, it may come on all at once, attended by sudden prostration, and without dyspnoea, cough, expectoration, or any of its usual symptoms; in persons worn out by cancer, and other severe chronic diseases. Latent pneumonia not infrequently accompanies intermittent fevers too, and joint and rheumatism, when it occurs conjointly with the affections of the limbs, but when it alternates with those, or comes on after the pains in the limbs have ceased, it is generally apparent. Pneumonia is likewise a common cause of death after wounds and surgical operations, sometimes so completely latent, says Dr. Forbes, as not only to be unaccompanied by dyspnoea, cough, or expectoration, but even to yield no results from percussion or auscultation.
When there is hypertrophy of the left ventricle of the heart, the pulse is apt to prove fallacious, neither its frequency nor its strength bearing any relation to the extent of the inflammation. The serous sanguineous congestion of the lungs which so often precedes death, is sometimes converted into pneumonia, or may even get the length of hepatisation.

In different constitutions various organs suffer sympathetically; in some, the digestive apparatus, indicated by a reddened tongue, great thirst, irritability of the stomach, tenderness of the epigastrium, and scanty, high-coloured urine; in others, the hepatic system, followed by bilious vomiting, pale, green-coloured urine, and occasionally a gelatinous tinge of the skin; both of these however are only accidental, and occasional.

Great embarrassment of the respiration interferes with the cerebral functions, causing delirium, and coma; and in children, convulsions; at the same time mitigating the cough, the pain, and the dyspnoea. Relapses show the usual symptoms in pneumonia,
but are less ethereal, and more dangerous. Pure acute idiopathic pneumonia is a rare disease, compared with the varieties of it which are constantly witnessed in combination with other diseases, such as have been enumerated.

Chronic pneumonia may be merely the acute disease imperfectly resolved, and of such duration as to merit that name; or, it may occur through far more rarely, as an original affection. With regard to the latter, it seems not unlikely that there are two forms of the disease, the one producing the brown-grey and indurated lung; and the other forming or ultimately passing into tubercular solidity; the one seldom forming abscess, the termination being in a dense, tough, semi-cartilaginous condition, of a brownish colour; the other almost sure to suppurate. The signs of chronic pneumonia are; slight fever, especially towards night; cough; and the same physical signs as in the acute, differing principally in the greater slowness of their changes; but it is in the occurrence of atrophy, and the consequent contraction of the chest, as after empyema, that the peculiarity of
the signs of this disease is seen.

Causes of Pneumonia. 1. Predisposing. The previous occurrence of the disease seems more than any other circumstance to predispose to it; Rush gives the case of a man who had the disease twenty-eight times. Cold and temperate climates are favourable; it is rare in the equatorial region; in spring and winter it is more common than during other seasons of the year: males are more obnoxious to it than females, but that may be from their being more exposed to the exciting causes; age appears to have some influence, as it is most frequent under five and above fifty; residence in certain localities would likewise appear to act as a predisposing cause; and lastly, the presence of tubercles in the lungs themselves, can readily be believed to heighten the tendency very much.

2. Exciting causes. Among these exposure to cold stands pre-eminent; Lawrence remarks, that this cause is much less powerful, when the cold immediately succeeds to an excessive heat and is not prolonged for a considerable time,
than when it is applied for a length of time to the body only moderately heated. Excessive exertion of the lungs by violent exercise, or by the voice, the inhalation of irritating vapours, wounds of the lungs, the lodgment of foreign bodies, and blows on the chest, the bite of the rattlesnake, and the action of some other poisons, may be named as exciting causes of pneumonia. It frequently follows upon the suppression of habitual discharges, as haemorrhoids, or from metastasis of gouty and rheumatic inflammations. The exanthematosus and other fevers have been added to the list, and likewise diseases of the heart, as well as of the respiratory organs themselves, chorea, pertussis, etc. Sometimes the disease appears in an epidemic form. In some countries, or parts of them, it is said to be endemic, in the neighbourhood of Mount Vesuvius for example (Clark).

Diagnosis. The general symptoms often sufficiently characterize the disease, but their occurrence, and their degree are very uncertain, and by no means constantly announce its
amount or even its presence. Of all the diagnostic signs of pneumonia, the characteristic form of the expectoration is the most infallible; but it is sometimes entirely absent, generally it does not appear until the disease has gone on for two or three days, and it frequently ceases when the disease is far advanced. The expectoration may be more safely depended on, for its presence is more constant, and its extent and progress indicate the exact state of the disease. Pulmonary apoplexy, and oedema are the only other diseases in which it is heard, and there are sufficient grounds to distinguish it by the other signs peculiar to them, more particularly the absence of fever, and in the former the presence of true haemoptysis.

From bronchitis it is distinguished by the character of the expectoration, and of the spu, and by the signs of deperoration in the second stage. In examples of pure pneumonia the cough is not so urgent as it is in bronchitis. The flush of pneumonia is also said by some to be different from that either of
bronchitis, or of pleurisy.

In pleurisy the pain is sharp and cutting, the cough dry or wanting; there is no crepitation, and the respiratory murmurs is weaker than in health. When the effusion is slight, the dulness occupies the most dependent part of the chest, and changes with a change of posture, unless limited by adhesions; and there is no egophony. Dulness, sudden, and without crepitation, has been thought to be the pathognomonic of pleurisy with effusion; but pneumonia commencing with hepatisation may possess the same character.

When the whole of one side of the chest sounds dull, no respiratory sound is heard, and the previous history of the case cannot be learned, the difficulty of diagnosis is much enhanced. Attention to the following circumstances will almost always prevent mistake— if hepatised lung does not perceptibly distort the cavity, conspicuous pleuritic effusion does, producing some, or all of these phenomena— separation of the ribs, obliteration of the inter-
costal depressions, protrusion of the hypo-
chondrium, extension of the dull sound
beyond the middle of the stethoscope, displace-
ment of the heart, and enlargement of
the side, perceptible by the eye or actual mea-
surement. Bronchophony and bronchial
respiration are absent. The thrill in the pa-
rieties of the chest, caused by the patient's
voice, is augmented by consolidation of the
ding, diminished by liquid in the cavity
of the pleura. The patient cannot lie on
the sound side, when the disease has contains
much fluid.

In tubercular disease of the lung, when the
urticaria results from inflammation a-
round the morbid deposit, and no opportu-
nity is afforded of examining the pneuma-
oma in its first stage, the diagnosis is
likely to be inaccurate.

The diagnosis of pneumonia, like that of ma-
ny other affections, is difficult in children;
most of the signs are obscure, and the ex-
pectoration is often swallowed; tubular pneu-
monia is common, producing the physical
signs in numerous points, of small size; true
hypatization is rare, probably because it proves
so soon fatal.

Prognosis. Pneumonia must at all
times be viewed as a serious disease, and
the prognosis, even in favourable cases, should
be given with caution; because, cases which
are at first slight may take an unfavour-
able turn; and, in progress towards recovery,
as long as the disease lasts, there is a chance
of relapse, which may throw the patient
into new and often greater danger.

The circumstances which chiefly affect the
prognosis are the stage of the inflammation,
it's seat, extent, complication with other af-
factions, and the state of the general health
and strength. The second stage is more dan-
gerous than the first, and the third than
the second. In children, and occasionally in ad-
ults, the disease takes some time to pass even
the first stage, sometimes as long as a week;
while in the aged and debilitated, the same
time or less suffices for the suprervention of
the third. Laennec has observed it within
The chances of recovery are very small when those symptoms are present, which have been described as indicating the probable existence of purulent infiltration; even simple absorption requires time, and favourable circumstances to effect the absorption of the effusion, and until there is evidence of the advancement of this process, as well as improvement in the general symptoms, the prognosis must remain doubtful. Recovery has occurred both from circumscribed abscess, and from gangrene, but such fortunate events are rare.

The extent of the inflammation greatly influences the result of the case; double pneumonia being often fatal even in the first stage; when the whole of one lung is involved, an unfavourable issue may be apprehended. But, the gravity does not always bear proportion to the extent, depending in great measure on the natural capacity of the function of respiration in the individual, and its power to bear a judge -

Inflammation attacking the upper lobes, and
roots of the lungs i.e., cæteris paribus, more dangerous than when it is confined to the lower,
apparently because disease of these parts obstructs the passage of blood and of air in the
larger vessels, so that the unaffected peripheral parts do not receive their due supply.
Of complicated pneumonias, those supervening on the different kinds of fever are most feared;
and in these it is very apt to be latent.
Bronchitis augments the risk. Pneumony has the
same result when it occupies the opposite side.
Pneumonia is more than usually fatal during pregnancy, in the puerperal state, at the
extremes of age, or in those exhausted by habitual
excesses, and more so among the lower
classes than among those who are well and
regularly fed and clothed.
In estimating the prognosis in particular cases,
the general health and vigour of the patient,
the severity of the chief symptoms which indicate the state of the vital functions, especially
the dyspnoea, the pulse, the expectoration, and
the mental faculties, and the influence of the
remedial measures which have been employed.
must all be taken into account. The character of the prevailing epidemic may also be considered.

Treatment of Pneumonia. Bleeding. Almost all medical writers ancient and modern concur in their testimony as to the advantages of this measure, although opinion varies as to the extent to which it ought to be carried, the time during which it is beneficial, and the best method of practicing it. There can be no doubt as to the propriety of adopting it in the first stage of acute atypical pneumonia; two objects are gained by it, "in the first place it tends to restrain or extinguish the inflammation as inflammation, but in the next place, it has the effect of relieving the particular function of the lungs." The abstraction of blood will be effectual in proportion as it is early; sometimes, even the free loss of blood at one venous section will arrest the progress of the disease. The patient ought to be bled in an upright posture, and from a large orifice, until some sensible impression is made upon the system.
until the pulse becomes softer; or, if it were contracted, fuller; until the pain and dyspnoea are somewhat relieved; or, until syncope is approached, but not attained, for then reaction would be likely to follow. It is desirable in most cases, not only to make an immediate impression upon the circulation, but also to remove from it some considerable amount of blood; and for this reason, any tendency to fainting at too early a period, ought to be opposed by the ordinary means.

Generally repeated venesection is necessary, as often as the strength of the individual will bear, and the circumstances of the case seem to indicate; copious and frequent bloodletting judiciously employed at the commencement, not only exerts a more beneficial influence over the disease, but also has the effect of lessening the total amount of blood lost, and so of saving the strength of the patient. Stoll bled a man, who was much debilitated, eight times with success. Frank performed the operation as often in a man 80 years old, and with the same result.
Seldom, however, will more than three or four bleedings at the most be either necessary, or advisable. Many of the complications of pneumonia contrabindicate general bleeding; feverous perhaps the complication with measles requires, and bears depletion better than any of the others; the action of the heart, as ascertained by the stethoscope, will sometimes enable the practitioner to decide upon the propriety of this measure, when he feels any doubt about the nature of the pulse; a weak impulsive certainly contrabindicates it, but the opposite may depend upon hyper trophy, and, that circumstance ought to be borne in mind. For such cases the local abstraction of blood by leeches or cupping is most salutary, the latter the preferable mode. In any case local bleeding is useful as an auxiliary to the lancet, especially indicated when there is pain, over the seat of which such abstraction ought to be performed.

Even during the second stage moderate depletion has its advantages, provided the state of the system will permit of it, although it cannot be expected that the disease will be
cut short, or that its good effects will be so decided. It acts beneficially upon the portion of lung surrounding the affected part, which may still be in the first stage; it lessens the quantity of blood circulating in the system, and so exorcises the sound portions of lung; and further, it renders the system more susceptible of the action of other remedies, and puts it into a more favourable condition, for the absorption of the lymph which has been effused into the air tubes and vesicles.

Some maintain that even in the third stage this measure is sometimes expedient; then the portion of lung so changed must be very limited in extent, and the vital powers still tolerably vigorous.

Sparrow emetic. The utility of this medicine in inflammation of the lungs was first pointed out by Dr. Maryat of Bristol, further developed by Rasori, an Italian physician, and fully demonstrated by Laennec, who considered its value to be above that of bloodletting. In this country it is considered only as subsidiary to bloodletting, and it has not been found
useful to give the large doses which science sometimes employs. It seems to be best adapted to the first degree of the inflammation, that of engorgement. The first effects of it are usually sickness and vomiting, followed perhaps by purging, but at length tolerance of the remedy is established, and then it is that its beneficial influence upon the disease is most marked; it is not a little remarkable, that, after the disappearance of the pneumonia, this tolerance of the antimony still remains in the system; so, that patients have been seen to take large quantities of it in their food, without being aware of it; such a tolerance would seem to be the effect of habit, but in the first instance it seems mainly due to the presence of the disease.

Every physician has his favourite mode of administering this drug. After few bloodletting, and a purge, say in an acute case, the medicine is entered upon, beginning with small doses, about an third of a grain every hour, and gradually increasing the dose, until two grains are taken every hour; it may be pre-
prescribed in the form of powder, to be dissolved in a little water, shortly before swallowing it. Should vomiting be occasioned by the first few doses, a few drops of laudanum, or syrup of poppy, or two or three drops of hydrocyanic acid may be added to each. Some prefer adding one or other of these from the commencement, so as to prevent the vomiting altogether, and then discontinue them after several doses have been taken. It has also been proposed to allay the irritability of the stomach by the application of leeches or purgatives, and so to favour retention of the medicine. Some preparation of opium is the best corrective of the purgative effect of the medicine. Its use is contraindicated altogether by any serious irritability of the digestive organs.

The administration of from twenty-five to thirty grains will ordinarily suffice to reduce inflammation of the lungs in this country, but larger quantities may and have been given with perfect safety; Stokes gave 170 grains to one patient.

When the remedy has been well borne, it is not advisable to omit its use suddenly; but, to di-
to diminish the dose somewhat gradually; otherwise relapse is probable.

In the typhoid, secondary, and complicated cases; in those where the powers of life have been previously injured, where bleeding cannot be used with boldness, and where stimulants are required, the exhibition of the tincture emetic in full doses is very hazardous. The mercurial treatment is to be preferred from its greater safety, and in this disease more than equal efficiency.

Mercury is more adapted to the second stage, and to the less active forms of the disease. Five or ten grains may first be given as a purgative, and subsequently small doses every two or three hours, the common calomel and opium, well as good a form as any, continued until the system is affected by the mineral, or until the disease is removed. Other forms of the medium are available; the blue pill, hydrargyrum cam cata, or the unguentum hydrargyri, alone, or combined with one of the others.

Mercury, following upon bloodletting, tends to arrest the further effusion of lymph, and
to favour the absorption of that which has been already effused; for the latter reason it may be necessary to keep the system under its influence for some time.

Mercury and antimony may be combined in the treatment of pneumonia, and given simultaneously: as, when there is much pleuritic complication.

Opium: If the attack be very recent, a full dose of opium, not less than two or three grains for an adult, after a large bleeding, will sometimes proceed in cutting short the disease, by mainly sustaining the sedative effect which the loss of blood had induced on the circulation. Its utility in conjunction with both antimony and mercury has been alluded to already. It may also be employed beneficially for the purposes of allaying the cough, and assuaging the pain.

Counterirritation ought not to be employed in the first stage of the disease, especially if there be much febrile irritation; it only tends to increase the distress, and rarely produces any effect in diminishing the inflammation. However, when the fever subsides, the heat of
skin diminishes, and there is a sense of oppression experienced in the chest, with difficult expectoration, a large blister is often productive of very great benefit.

In typhoid cases, blisters may be used from the commencement. In obscure pneumonia, counter-irritation is the means most to be depended on, along with the internal use of Soda, or the Soda of Potassium, and such other remedies as the peculiarities of each case may seem to demand.

A purge ought to be given at the commencement to clear out the bowels, and afterwards gentle aperients may be administered when required.

Expectorants are useful after the inflammatory action has been subdued; and these may be more or less stimulating according to the state of the system; often beneficially combined with alkaline diuretics. In some cases, pure stimulants are required, and that even from an early period; as recommended by Chomel, in the case of drunkards, and others who have been accustomed to their use—directions of some
ga, carbonate of ammonia, beef tea, wine or whatever stimulant the patient has been accustomed to. Recamier recommends mush. Regimen and diet. The patient in the acute stages must be kept perfectly quiet, and permitted to speak as little as possible; the room in which he has ought to be cool; cool drinks may be allowed in moderation, but all stimulants must be avoided, and nourishment of the simplest kind sparingly given. In the third stage and often in the second, we must be guided more by the general symptoms than by the physical signs; when the surface and extremities get cold, when the features are sunken, the face pallid, the pulse weak or irregular, and delirium is present, it is only through the judicious use of stimulants that any benefit can be expected. Marked benefit has sometimes been derived from attention to position, so as to relieve the diseased portion of lung from its dependent situation; the patient being directed to lie on the opposite side, or on his face, according to the site of the disease, for a certain time every day.
Suitable diet, and exercise, with change of air, ought if possible to be adopted during the period of convalescence. Prophylactic change of residence is advisable, at certain seasons, for those who are strongly predisposed by previous attacks.

When the convalescence from acute pneumonitis is decided, and real, it is shorter than might have been supposed. From the period when the pulmonary inflammation is fairly over, the strength returns with unexpected facility, even when large bleedings have been practiced and repeated. But we have to guard, more perhaps in this disease than in most others, against false or merely apparent convalescence. A patient can never be pronounced perfectly secure, so long as any trace of crepitation remains in the affected lung, and this may often continue long; may, it not infrequently ceases only upon the supervision of another more surely fatal though less rapid a disorder—viz. tubercular consumption.