

~~P. Thompson~~

Dr. Hope

Inaugural Dissertation
on
Pneumonia

by
M. A. Rayon Wilkinson
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The Science of Medicine has numerous obstacles to surmount in almost every step of its progress. These principally consist of certain difficulties inherent in the nature of the investigation itself, & which unfortunately have very frequently not been met by a corresponding assiduity & caution on the part of the cultivators of this Science. Medicine in all its branches is strictly a science of observation & can only be effectually advanced by a patient adherence to the inductive method of Philosophy. As the human body, however, is not like an inanimate object, which the experimenter can arrange at will & insulate from the influence of all other extraneous circumstances likely to affect its actions, but is a highly complicated apparatus, composed of a great variety of different organs all mutually dependent upon, & reacting upon each other; all investigations into the phenomena attending its healthy & diseased states are consequently liable

to numerous sources of fallacy, which do not affect the observations of the mechanical & Chemical Philosopher. The progress of the Science of Medicine must necessarily be slow & gradual even when prosecuted by numerous & zealous cultivators, deeply imbued with just & philosophic views of the nature of the difficulties to be encountered & the best methods of overcoming them & will require the accumulated observations & experience of several generations before we can expect it to be emancipated from many of the numerous uncertainties which still float around the most common & important diseases to which the human race is liable. — Fortunately Medical inquirers now appear to be fully aware that the only proper method of investigating disease is to confine themselves to a rigid observation of facts, to watch carefully the nature & progress of the symptoms during life, & to compare these with the appearances presented after death, & the effects of the remedies employed during the course of the malady. The lamentable failures which even the most subtle minds have exhibited when they have attempted to explain the laws

of the animal economy either in its healthy
or diseased condition by a process of reasoning
carried on in the closet, must have long since
this time, fully convinced every one, that
it is only by a careful & laborious collection
of facts that we can hope to arrive at any use-
ful & practical conclusions on such questions,
& that these are the only true touchstone by
wh: all theories ought to be tested. The time
will, we doubt not, in the course of years
arrive, when all the present inefficiency of
the healing art in the alleviation of human
misery will in a great measure be removed.
On reviewing the progress of Medicine
since the commencement of the present
century, no part of it affords more cheering
hopes of the realization of these anticipations
& brighter prospects of its steady advance-
ment, than a comparison of our present
knowledge of diseases of the organs within
the chest, with the state in wh: it was
found by Boyle, Corvisart & Laennec
when they commenced their labours. Though
much had been done by preceding Pathologists
to elucidate these diseases, yet until these
great men gave the results of their investiga-
tions to the world, they were involved in many

a doubt wh: has now been fully cleared up. Several able Pathologists have followed in their path & have added & still continue to add to our extended knowledge on this interesting class of diseases. However arduous & arduous these investigations into the diseases of the Chest have been, it is impossible that they could have succeeded in throwing such a flood of light upon a subject formerly so obscure; had they not been materially assisted by the discovery of two new methods of exploring these organs in their healthy & diseased states, viz, Percussion & Auscultation. To attempt to give any thing like even a brief & general view of the diseases of the organs enclosed in the chest, within the limited extent of an Inaugural Dissertation, would be perfectly impossible. We shall therefore restrict ourselves to some remarks upon one of these only, & for this purpose we have selected Pneumonia.

Pneumonia or Peripneumonia were the terms employed by the Ancient authors to designate all inflammations of any of the textures of the lungs — Mucous, Parenchymatous, & Serous, wh: were not attended by severe pain. The word

Pneumonia & Peripneumony are now restricted to denote inflammation of the parenchymatous structure of the lungs; Bronchitis being employed to express inflammation of the lining mucous membrane of the bronchial tubes; Pleurisy that of the serous membrane or pleura; & Pleuro-Pneumonia or Pleuro-Peripneumony that of the texture of the lung & pleura occurring at the same time.

Pneumonia is a disease of very frequent occurrence in such variable climates as that of Great Britain. When seen in its early stages & uncomplicated with other affections, it is in general very much under the control of the proper remedies. When permitted, however, to proceed for some time unchecked, the natural spongy structure of the lungs may become extensively altered, & all the serious evils wh. arise from the circulation of an imperfectly arterialised blood through the organs of the body may ensue without it being in our power to arrest their progress. When this disease occurs in an individual previously in good health, or tolerably robust, its attack is generally at the very commencement accompanied by symptoms sufficiently prominent to attract the attention of the medical man to the affected organ.

But there are other numerous cases termed Silent Pneumonia, where it seizes upon persons already debilitated by age, disease, or their own vicious indulgences, without being ushered in by any marked sign, & under these circumstances it frequently proceeds onwards to an irretrievable extent before it manifests itself by any symptom sufficiently obvious to attract the attention of the medical man who is not fully aware of the insidious nature of such cases, & who will not avail himself of percussion & auscultation in examining the condition of the organs within the chest. In such cases we can only hope to produce an efficient check to the disease when it is early recognized, & it is therefore incumbent upon us to familiarize ourselves with its different aspects. In this manner we can alone hope to escape many a bitter pang arising from a consciousness that we have from culpable neglect, failed to put in requisition all the remedial means which the condition of our patient required. Pneumonia attacks all ages & classes of society — the weak as well as the strong.

Since the physiological actions of the lungs are to bring the blood in contact with the atmospheric air drawn into the minute air-cells

at each inspiration, we are able to predict many of the symptoms ~~to~~: attending any alteration of the physical structure of the lungs, wh: interferes with the proper exposure of the blood to the air. The usual effects wh: result from imperfect arterialization of the blood at the lungs are in the first place, increased frequency of the respiratory movements, attended by uneasiness & a sense of anxiety in the chest. As the mass of blood becomes less arterialized, wh: is more likely to happen when a considerable portion of the lung is suddenly rendered useless, & when the individual is robust & full of blood, we find languor increasing to stupor & coma, lividity of the face, particularly observed in the lips, arising from the circulation of dark blood in the arteries. The respiration instead of being rapid & frequent as at first when the functions ^{of the} central organs of the nervous system were unimpaired, are now slow, heaving, & performed at considerable intervals & become at last arrested. The heart from the increased difficulty of propelling the blood through the lungs when the function of respiration is thus deranged, frequently becomes somewhat labouring in its action for a short time before the function of respiration is suspended, & its movements now become arrested

from the right side of the heart being no longer
 able to propel the blood through the lungs when
 the inspiratory movements have ceased. The de-
 gree of the increased frequency of respiration &
 the sense of anxiety in the chest is principally
 regulated by the extent of the lung diseased,
 the rapidity with wh: this is effected, & the
 quantity of circulating fluids in the blood-
 vessels at the time. There are however, indi-
 vidual peculiarities or idiosyncrasies in this
 respect for wh: we cannot account. That inflam-
 mation of the substance of the lungs should
 be attended with pain, cough & expectora-
 tion we are à priori also prepared to expect.
 As a greater or less degree of pain generally
 accompanies inflammation of every organ
 in the body, there is nothing in the anatomical
 structure or physiological properties of the
 lungs wh: would lead us to believe that they
 would form an exception. From the nature
 of the intimate anatomical structure of the
 air-cells of the lungs, inflammation of the
 walls of the air-cells could scarcely occur without
 extending itself to the lining membrane of the
 air-cells & terminating bronchial tubes, pro-
 ducing some degree of effusion & consequently
 occasioning cough & expectoration.

The debility of the heart's action wh: has occasionally been observed to attend the disease even from its commencement might also have been anticipated, for from the facility with wh: the contractility of the heart is enfeebled in some individuals by sympathetic causes, we would expect to find this occasionally attending inflammation of the lungs. The febrile symptoms observed during pneumonia are exactly similar to those wh: accompany other inflammatory diseases. We are also from our knowledge of the physical conditions of the parts within the thorax prepared to expect that pneumonia should be accompanied by certain physical signs, & since these are of such a nature as to be liable to be modified by those numerous circumstances wh: influence the vital action of the body, we can easily understand the great & efficient aid derived from this source in assisting our diagnosis. — Since the resonance of the chest depends upon the presence of air in the minute cells of the lungs it would necessarily follow, that when this air is expelled from a portion of lung & its place occupied by fluid & solid effusions that this resonance should disappear. We have also no difficulty in understanding

+ Clinique Médicale Tom 1. P496. 1829

how the natural murmur occasioned by the air rushing in & out of the air-cells should be altered by the presence of morbid effusions in the air-cells & minute bronchial tubes.

Instead of beginning with a detailed account of the symptoms of Pneumonia, the order of their occurrence & the important variations to wh: they are liable we prefer commencing with a description of the morbid changes in the lungs found accompanying this disease, as we believe that an account of the symptoms & physical signs will more appropriately follow the consideration of the morbid conditions wh: give rise to these.

Morbid appearance. Pneumonia was justly considered by Larnec as dividing itself in an anatomical point of view into three stages, wh: he termed Engorgement, Hepatization Rouge & Hepatization Grise. These are undoubtedly the most common appearances observed after death from Pneumonia, but in rarer cases we may find that the inflammation has proceeded to the formation of Abscesses & in others to Gangrene. Andral suggests[†] after making an apology for the necessity of introducing new terms, that as in the conditions of the lungs most usually denominated hepatization rouge & grise, the

texture of the lung is much softened & friable, while in rare cases such as generally happen in chronic inflammation, it is harder, firmer & denser than in the natural state, that we might designate these friable conditions of the lung attending acute inflammation ramollissement rouge & ramollissement gris, & these firmer conditions attending chronic inflammation induration rouge & induration grise.

First Stage or Stage of Engorgement. (Engourment.) The lung in this first stage of inflammation is of a dark red colour arising from the great quantity of blood contained within it. This red colour varies in depth according to the proportion of blood in it. When this is great the colour is almost black. The colour is frequently modified by the dark pulmonary patches wh^{ch} are generally ⁱⁿ greatest abundance in old people. It scarcely crepitates when handled from the small quantity of air in its interior. It is easily lacerated & the air-cells & smaller bronchial tubes are filled with a reddish serum mixed with a sufficient quantity of air to give it a frothy appearance. This fluid flows out freely when the air cells are cut across by the knife. This reddish appearance of the serum depends on the presence of blood & consequently varies in depth of colour in different cases. In some cases

it is almost colourless. It appears that very little change has been effected upon the texture of the lung in this the first stage of inflammation, for by gently squeezing out the serum & by washing the lung repeatedly with water, the natural spongy structure of the organ may be restored. As the inflammation, however, proceeds to the 2^d stage effusion of lymph begins to take place & it is rendered more dense. We find it often extremely difficult to distinguish this stage of engorgement dependant upon inflammation from the congestion of blood wh: takes place during the agony of the dying, or soon after death when the blood ceasing to be acted upon by the propelling powers, begins to follow the laws of gravitation & gradually settles in the most depending parts of the body. In such cases we may have all the appearances of the engorgement arising from inflammation exactly simulated even to the softness of the texture. For we can easily understand that when the delicate cells of the lungs are filled with any fluid, that these are kept distended when pressed upon by the finger, & are fully exposed to the effects of any force applied upon them; while on the other hand when they are filled with air, the air yields before the finger

+ Dict: de Medic: Tom: XVII. Art: Pneumonia.

& so prevent the prepure from acting upon them with
 effect. Though C. homel has stated* that the
 lung in the engorgement from inflammation is
 easier lacerated than in that arising from grasi-
 tation, yet we believe that we express the opinion
 of those who have lately investigated this point
 with greatest care when we state; that we cannot
 distinguish these two conditions of the lung de-
 pending upon courses so different from any
 dissimilarity in their appearance or physical
 quantities, & we must therefore look to collateral
 circumstances to guide us in distinguishing be-
 tween them. If this engorgement depends upon
 mere congestion of the blood after death, & it
 must of necessity be found in the lowest parts,
 & must be of equal extent on both sides of the
 body be so placed after death as to favour it
 equally upon both sides; while if it arise from
 inflammation we may expect it to be sometimes
 present in situations, for wh. we cannot assign
 such reasons, & indeed may be quite opposed
 to the laws of gravitation. The Physical expla-
 nation wh. we have given above of the diminished
 cohesion of the congested pulmonary tissue
 when any external force is applied to it is that
 advanced by Andral & Lannee. It is men-
 tioned however by S. J. A. Williams that inflam-
 matory

Cyclopædia of Practical Medicine Vol. III. P. 409.

a mechanical engorgement tend to diminish the cohesion of the parenchyma more than the mere mechanical increase of liquid in it can explain & for the following reasons. 1st If a portion of the healthy tissue adjoining an engorged portion be pulled gently a laceration takes place in the latter before the healthy portion is stretched to the utmost, & with a much smaller degree of force, than is required to tear this healthy portion. 2^d The fragility of the tissue is not always in proportion to the quantity of liquid in it. 3^d An engorged portion of lung does not lose its greater friability when the blood has been gently pressed & washed out of it.

Second Stage or Stage of Red Hepatization (Hepatization Rouge.) In this stage the lung is of a red colour, though this is generally less deep than what is observed in the 1st Stage. All crepitation on handling has disappeared & from its resemblance to the texture of the liver it has derived its name of Hepatization. It has become sufficiently dense to sink in water, & for the present has become totally unfit for respiration. When cut into, instead of the copious frothy effusion observed in the first stage, we can press out a small quantity of bloody serum only & not a single globule of air.

* *Precis D'Anatomie Pathologique* Tom: II. P. 507. 1829
Clinique Medicale Tom I.^{re} P. 503. 1829.

Forbes Translation P. 201

o. *Oper: cit: P. 410*

It has become even more friable than in the first stage, & readily breaks down under the finger. It is on this account that Andral has proposed to designate it red softening (*ramolissement rouge*). This is the same kind of softening wh. occurs in acute inflammation of the other tissues of the body. When a hepaticized lung is cut or torn the surfaces present, when narrowly examined a granular appearance consisting of a number of small grains thickly set together. Andral has maintained that this granular appearance arises from the effusion of a solid matter from the inner surface of the air cells & filling them up. * According to Larroque "These are evidently the air-cells converted into solid grains by the thickening of their parietes & the obliteration of their cavities by a concrete fluid" # Dr. Williams maintains that these cells do not contain any concrete effusion, but that they are obliterated entirely by the swelling & thickening of their parietes, occasioned by the blood in the vessels & by the deposition of "soft albuminous matter" in their texture. There appears little doubt that this granular appearance arises from the effusion of coagulable lymph, but the exact seat of that effusion we cannot as

Précis de Tom. II. P. 507.

Oper. Cit. P. 201

yet venture to determine. It sometimes happens as Andral has pointed out, that this granular appearance is wanting. * The explanation of this peculiarity by different authors may be considered to be merely conjectural. When a section of a portion of hepatized lung is made, it frequently presents a mottled appearance like some kinds of granite. This depends upon the presence of small patches of black pulmonary matter, & from points of a lighter colour arising from the interlobular septa, cut blood vessels & bronchial tubes. A hepatized at first sight appears larger than a healthy lung; but Larnec has informed us that this appearance is deceptive, & is occasioned by the inability of the lung to contract, on the chest being laid open, as occurs in the sound state of the viscus. # When inflammation of the lung has continued for a considerable time, ^{forming} ~~and~~ what is called chronic inflammation, we find as happens in the other textures of the body under such circumstances, that it becomes dryer, firmer, more granular, & to this condition of the lung as we have already mentioned Andral has given the term of red induration (induration rouge). Another variety of the second stage of pneumonia is to be found occasionally in persons affec-
-ted

with fever, & Chronic diseases attended with great debility, & when they have been confined to one position for a long time. This variety of Pneumonia is always found in the most depending portions of the lungs, & is easily distinguished from the Engorgement so often found in the same position, by the denseness of its texture. From the other kinds of the 2^d stage of Pneumonia it is generally readily distinguished by being of a dark red colour approaching to black, by its position, & by the granular appearance of its cut or torn surface being very indistinct. It appears to be produced in this manner. In a person much debilitated from previous disease the blood for some time before death, & from the enfeebled state of the circulating organs, is subjected to the greater or less extent to the laws of gravitation, & begins to stagnate in the most depending parts of the body. It is well known that the result of this congestion when continued for some time is a species of inflammation in the part thus circumstanced, soon leading to some structural changes. This is the Pneumonia des agonizans & the meaning of the term is evident after what has been said of the class

As A. Williams states that the word gris is not to be translated grey (a mixture of white & black), but drab or stone coloured like light brown paper which in France is called papier gris.)

of patients in wh: this variety of Pneumonia occurs.

Third Stage or Stage of Grey Hepatization
(Hépatization grise.) + In this stage the affected
part of the lung is of a grey or ash colour, &
when cut into, globules of pus flow from all
points in greater or less quantity, on pressure.
This pus is almost or entirely inodorous. When
the red hepatization has only recently passed
into the grey, it still partly retains its granular
appearance, & we can sometimes restore the red & granular ^{aspect} appearance of the 2^d
stage by gently pressing out the pus. When
however, this stage is fairly established the
lung breaks down on the slightest pressure
& loses completely its granular aspect. It is
on this account that several terms it has been
called melleoformant gris. The pus instead of being
infiltrated through the texture of the lung
is occasionally collected into distinct abscesses
(the vomicae of the ancients); But this
wh: was formerly supposed to be a very common
result of inflammation of the lungs is now
ascertained to be a very rare appearance. We
often find all these three degrees of inflammation
well marked in different portions
of the same lung. These three stages of the
lungs, therefore, resemble the progress of inflammation

in the cellular texture of the other organs of the body, with this difference, that when it proceeds to the formation of pus, this fluid is rarely collected into encysted abscesses in the lungs, but is generally found infiltrated. Considerable collections of pus are sometimes found in the lungs without much if any previous inflammation. Such cases occasionally follow amputations of limbs from wh: a large & constant secretion of pus has for sometime previously been carried on. These have also been seen in fatal cases of diffuse inflammation of the cellular tissue.

Gangrene of the Lungs. We have already stated that inflammation of the lung occasionally runs on to gangrene. The colour of the gangrenous portion is of a dirty dark brown. When the disease is more advanced it is exceedingly soft, & a dirty greenish serum flows from it. It is readily distinguished by its great weight.

Pneumonia may be confined to a small portion of a lobe, or a whole lobe; it may extend itself to a whole lung, or it may attack both lungs. It sometimes commences in detached lobules, leaving intervals of healthy lung between

them, forming what has been called Lobular Pneumonia. This variety of Pneumonia has been most frequently observed in children labouring under Peritonitis. The more frequent occurrence of this lobular pneumonia in children may probably arise from the circumstance that in children the organ appears to be less concentrated than in the adult, consisting of a great number of minute lobules separated from each other by pretty strong septa, in the same manner as the kidneys at an earlier age consist of a number of distinct lobules.

Andral has pointed out that in certain cases the inflammation appears to be confined to individual air-cells or vesicles. This he terms Vesicular Pneumonia.

According to Larunec the lower lobe of the lung is much more frequently attacked with inflammation than the upper, & the right lung is more frequently affected than the left. The observations of Andral seem to differ somewhat from those of Larunec on these points, & would lead us to believe that inflammation of the superior lobes, & of the left lung, though less frequent than the inferior lobes of the right lung are not so ^{rare} common as he imagined. "From 59 cases of Pneumonia

#Clinique Médicale Tom: 1^{re} P 508.

says Andral "collected from the works of Morgagni, Stoll, de Haen & Pinel, of wh: the observations are well detailed, & can leave no doubt upon the nature & seat of disease, 3 were on the right side, 20 on the left & 8 were in both lungs at the same time. These when added to 151 cases of this disease observed by Andral himself at La Charite form a collection of 210 cases, — a number sufficiently large to ^{enable us to} draw satisfactory conclusions. Of these 120 were in the right lung 58 in the left lung, 25 were double, & in 6 the seat of the disease could not be determined. With regard to the relative frequency of the inflammation of the superior & inferior lobes, Andral states "we affirm that the superior lobes are sufficiently often inflamed but this occurs less frequently than in the inferior lobes." In 89 cases of Pneumonia he found the inferior lobe inflamed in 47, the superior lobe in 30, & in 11 the lung was inflamed throughout its whole extent. It has been suggested that the statement made by Morgagni & some of the older pathologists, that inflammation more frequently attacks the upper lobe, may be satisfactorily reconciled with the results obtained by more modern observers. For the only

method wh: could be adopted by the older pathologists to ascertain the seat of the disease was the Post mortem examination when it proved fatal, & since it appears that inflammation of the upper lobe is more frequently fatal than when it attacks the lower, it is evident that a greater proportion of those cases in wh: the inflammation occupied the upper lobe would die & the exact seat of the disease be ascertained, than of those in wh: the inflammation attacked the inferior lobe. Chomel in 59 dissections of fatal cases of Pneumonia found the apex of the lung inflamed in 13, the lower lobe in 11, & the middle part in the remainder. In all probability the greater fatality of pneumonia when it seizes upon the upper lobe depends upon the circumstance, that the condensed portion from its weight & incompressibility prevents the free expansion of the lower lobe, & thus almost reduces the disease to that more dangerous form where it extends to the whole lung. When the progress of Pneumonia is arrested, the structure of the lung gradually recovers its natural appearance, even though it may have run on to the 3^d stage. Laennec has given a particular description of these retrograde changes

#Williams Oper. Cit. P. 415.

Pneumonia is always accompanied by inflammation of the bronchial tubes, & this is generally confined to those distributed in the inflamed portion of lung. Inflammation of the lining membrane of the bronchial tubes may on the other hand continue for a long time without even extending to the parenchymatous structure of the lung. The inflammation of the pleura may or may not accompany Pneumonia. This Pleurisy is much more frequently present than absent, in most cases results from the extension of the inflammation to the pleura covering the portion of lung affected. At other times the pleura is co-existent with the pneumonia & independent of it. The effusion of serous fluid & lymph consequent upon the pleurisy may compress the lung against the spine & considerably modify the usual characters of Pneumonia. The lung is then of a red or livid red colour contains no air & presents no granulations. From its resemblance to the muscular fibre it has received from Larunee the term of carnification.†

Symptoms & Physical Signs

We shall now consider the Symptoms & Physical signs of pneumonia. There are generally rigors followed by increased frequency of pulse

a heat of skin, dyspnoea, cough, pain increased on full inspiration & coughing, viscid sanguinolent expectoration, alteration of the natural vesicular murmur & dulness of percussion over the affected part. We shall shortly consider each of these in the order in which we have enumerated them.

Febrile symptoms. Idiopathic pneumonia is generally preceded by a distinct febrile accession. The patient is seized with rigors followed by increased frequency of pulse & heat of skin. The extent of the febrile symptoms vary much in intensity, in different cases, & may even sometimes be but imperfectly marked. The febrile symptoms instead of preceding the dyspnoea, cough & pain, do not manifest themselves in some cases until after these have presented themselves. More rarely no distinct rigors have been remarked particularly in those cases where the pneumonia has supervened upon bronchitis & phthisis. & where the person has been confined to bed at the time of its occurrence. Sometimes the febrile symptoms assume a typhoid character, — the pulse becomes weak with rapid failure of the strength, the tongue is

covered with black sordes & there is subsaltus tendi-
 num & delirium. Under these circumstances it
 may present all the appearances of typhoid fever
 complicated with severe thoracic symptoms. This
 form of Pneumonia has been generally observed
 in those who have lived dissipated lives. It has also
 been seen though much more rarely in young
 plethoric subjects. In those predisposed to delirium
 Tremens the accompanying fever may assume the
 form of that disease - masking the pectoral
 symptoms, & rendering the diagnosis more ob-
 scure.

Dyspnoea. The dyspnoea may be said to be
 generally in proportion to the extent of lung af-
 fected, though as we shall see this is liable
 to several exceptions. The same extent of lung
 rendered unfit for respiration wh: would
 produce great dyspnoea in a young plethoric
 patient where circulating fluids are in great
 quantity, would probably produce very little
 increase of the respiration in an old debilitated
 patient who has little blood circulating through
 the lungs. It is no unusual thing to find
 comparatively a small portion of the lung
 affected in a stout plethoric patient whose
 respiration was extremely hurried during
 life even early in the disease; while on the

other hand a whole lung may be found quite condensed in a weak emaciated patient in whom the dyspnoea was far from being urgent until shortly before death. In fact they may deny that they feel any difficulty of breathing throughout the greater part of the disease. In some persons, from idiosyncrasy & other unknown causes, the respiration is much more easily accelerated than in others. The respiration, however, will be found to be more or less increased in frequency, upon careful examination, in almost all those attacked with pneumonia, who deny that they feel any dyspnoea. The number of respirations is sometimes very much increased above the average standard when in health & at rest. The average number of respirations may be considered as ranging from 10 to 20 in a minute. During pneumonia they may be increased to 30. 40 & even 60 in a minute. Andral states that in general the respiration is more hurried when the superior lobe is attacked, than when the disease is in the lower lobe. The probable cause of this has already been explained. When the disease proceeds to a fatal termination, the dyspnoea generally becomes extreme before death approaches. The

head is thrown back, the shoulders are fixed, & all the respiratory muscles are in violent action. If the lips & face become livid when the dyspnea is urgent, it shews that the usual chemical changes at the lungs between the blood & atmospheric air are imperfectly performed.

Cough. This symptom varies much in intensity, ^{is} & at from being always proportionate in severity to the extent of the disease. The cough is at first generally not severe, does not occur in paroxysms, & is either dry or accompanied with slight catarrhal expectoration. From twenty four to forty eight hours after the commencement of the disease the cough generally becomes more frequent & is attended by a change in the expectoration wh: is quite characteristic of this disease.

Expectoration. The character of the expectoration is often of itself decisive of the existence of Pneumonia. As we have already stated the expectoration in this disease presents at first nothing peculiar, is in small quantity & resembles the common catarrhal expectoration. After the disease has lasted from one to three days the sputa become tenacious, & form gelatinous looking masses, so adhesive as not to flow out when the vessel containing

them is reversed, & are more or less tinged with
 blood. This blood is not arranged in stripes
 or maps, but is intimately diffused through
 the mucus, so as to give the sputa a rusty colour.
 This colour, however, varies in intensity in
 different cases, so as to present all the shades
 between red & yellow. The sputa sometimes
 are so yellow that we are at first led to believe
 that they are tinged with bile, but it has
 been shown by experiments, that all these
 different shades of colour, depend upon the
 varying quantity of blood diffused through
 the mucus. When the blood is more abundant,
 the sputa have a distinct rusty tinge, when
 in smaller quantity they present the yellow
 appearance. A number of small bubbles
 containing air are sometimes observed on
 the surface of the sputa, & this appears to
 be connected with their adhesive property. When
 the sputa present the above characters, we
 may be almost certain, though none of the
 other symptoms of Pneumonia are very
 distinctly marked, that this disease exists.
 If the inflammation of the lung proceed to
 resolution, the expectoration generally soon
 loses its viscidit^y & colour & again becomes
 transparent. If it should again assume its

former characters of tenacity, & rusty colour, this invariably marks a relapse, or at least a very strong tendency to relapse. Unfortunately these appearances in the expectoration so characteristic of this disease, when present, are sometimes wanting during the whole course of the disease, & the sputa remain colourless, & little adherent. When the inflammation proceeds to the 3^d stage, the sputa present very various appearances: Sometimes they are transparent; at other times they present a dirty tinge; sometimes they contain yellowish white specks of purulent matter; more rarely, they are purulent with specks of blood. - Andral has occasionally seen the sputa so black as to resemble the juice of prunes. This kind of expectoration has more rarely been observed to accompany the hepatization stage. When the inflammation of the lung passes on to Gangrene, the expectoration is generally copious, becomes first greenish, then of a dirty grey, sometimes with brownish or greenish sanies, occasionally tinged red in some places & exhaling a gangrenous odour. As the last stage of a fatal Pneumonia approaches, the sputa are under

ordinary circumstances generally scanty, & often entirely suppressed for a few hours before death.

Pain. In Pneumonia the pain is very variable. It is generally obtuse, dull & deep-seated, giving more perhaps the sensation of weight & increasing than of actual pain. The sharp pain so often felt in Pneumonia generally shows that the inflammation has extended to the pleura. Larnec, however, maintained that a catarrh may be present without any accompanying pleurisy, & this statement also accords with the observations of Dr. Williams. This pain may be confined to a single point, most commonly placed at the level of the mamma; at other times it extends over ^{the} greater part of one side of the thorax. It is increased by coughing, full inspiration & often by lying on the affected side. The pain is, on the other hand, sometimes alleviated by the decubitus on the affected side. There is also another circumstance, why the patient may prefer this posture, viz. when a considerable portion of the lung of that side is inflamed it admits of the more free expansion of the sound side. The pain may be entirely absent, during the whole course of a fatal attack of Pneumonia.

The pain however is generally present & may either precede or follow the febrile symptoms.

Physical Signs-

On reviewing the symptoms detailed above, & wh: were until lately the only guides to direct us in judging of the existence of Pneumonia, we have found, that they may all vary in intensity & degree, that they may be all present, & all absent, or at least so slightly marked as readily to escape detection. For the truth of this remark we need only refer to the numerous cases of what are called latent Pneumonia, where the existence of the disease is frequently not suspected during life, & is only discovered in the post-mortem examination. Besides, all these symptoms with the exception of the characteristic sputa, are often even when present, insufficient to enable us to discriminate this disease from other affections within the chest, particularly pleurisy & bronchitis. The importance of the two new methods of investigating these diseases, founded on their physical signs, viz: Auscultation & Percussion, can then easily be appreciated, for since they are derived entirely from the physical changes produced upon the substance of the lung by the inflammation, they are much

less apt to vary, & can in general be confidently depended upon. No doubt the value of these methods has frequently been exaggerated by their advocates, but we believe that every unbiassed mind must admit, that their application to practical medicine has conferred a valuable boon upon this science.

Auscultation & Percussion. In applying the ear, either directly to the chest or indirectly through the Stethoscope, over the affected part of the lung in its first stage or engorgement the natural respiratory murmur is found to have given place to a crepitous rattle (the rhonchus crepitans). This resembles the crepitation of salts in a vessel exposed to great heat, or the crepitating sound produced by rubbing the hair close to the ear between the fingers. It appears to be produced by the air forcing its way through the serum effused into the minute air-cells, or breaking in successive bubbles. Such at least is the explanation of Andral & others. Dr. Williams objects to this explanation & offers the following account of its probable origin. "The condensed vapors & the serous effusion in the interstices, press on the minutest bronchial ramifications, & partially obstruct the ingress

"if air into the cells to wh. they lead; while the viscid secretion of the mucous membrane simultaneously inflamed, filling the calibre of the tubes thus narrowed, only yields to the air in respiration forcing its way through it in successive bubbles. The bubbling passage of air through a viscid liquid contained in an infinity of tubes of equally diminished calibre causes that regular & equable crepitation, wh. constitutes the *thoracicus crepitans*". In examining this subject at a subsequent period in his article *Pneumonia* in the *Cyclopaedia of Practical Medicine* he states, "if we modify at all the explanation formerly given, it would be that we have not the ground to confine the crepitation to the minute tubes only, but that it probably occurs in the air cells likewise"

At the commencement of the inflammation the crepitating rale is merely superadded to the natural respiration. As the disease proceeds the crepitating rale becomes stronger & stronger & at last masks the natural vesicular murmur. When the disease approaches the 2^d stage, the rale crepitans becomes fainter & less regular, or is principally heard at the end of each inspiration. When

the diseased portion of lung becomes more dense it is only heard in coughing, or in full inspiration & at last ceases. When the rhonchus crepitans is first heard there is no perceptible dullness on percussion. When the rhonchus crepitans is fairly formed & the effusion of lymph precedes that part of the thorax begins to sound a little duller on percussion than the corresponding part of the opposite side of the chest. The 1.st stage of Pneumonia is not the only condition of the lungs in which the râle crepitans is heard, but it may be present in oedema of the lungs or around the edges of the effused blood in pulmonary apoplexy. When bronchitis extends to the minute bronchial tubes a subcrepitating râle as it is termed, is generally present, which may resemble the crepitating râle so exactly, as to be with great difficulty distinguished from it. Some of those much accustomed to the practice of auscultation have confessed their inability to discriminate these from each other in many cases. This crepitating râle is not invariably present, at least its duration in many cases is so short, that it may escape detection. In inflammation of the root & central

parts of the lungs it frequently cannot be recognized. When the inflammation has proceeded to the 2^d Stage or Hepatization rough the rhonchus crepitans fairly ceases, & upon applying the ear over the affected part of the chest, we hear, instead of the natural vesicular murmur, that modification of the respiratory sound termed the bronchial respiration. The physical cause of the bronchial respiration depends upon the condensation of the texture of the lung around the bronchial tubes. The condensed lung thus becomes a better conductor of sound & conveys the noise of the air rushing along these bronchial tubes towards the surface of the lungs, & is consequently heard when the ear is applied to that part of the chest. On applying the ear to the Stethoscope placed over the seat of the disease, the voice is heard more than usually resonant, producing what is called Bronchophony. The physical cause of bronchophony is the same as that of the bronchial respiration. "This bronchophony" says Dr. Williams "does not as in perfect pectoril. quy, appear to originate in the Stethoscope, & it is not heard in distinct words, but in notes of various continuance, not always synchronous with the words uttered by the mouth, & at intervals is

alternated with what may be called "whiffs of the
 bronchial respiration". On percussing the thorax
 even ~~over~~ the seat of the disease it emits a dull
 sound, though not so very dull as when there
 is considerable pleuritic effusion present. When
 the Pneumonia has passed into the suppurative
 or 3^d stage, the bronchophony & dullness superve-
 nient remain unchanged. The bronchial respira-
 tion also frequently undergoes no alteration so
 that it is generally impossible to decide from
 the symptoms whether the disease has passed
 beyond the 2^d stage or not. A coarse mucous
 rale is sometimes heard at the root of the lung
 at the commencement of the 3^d stage & it
 has been stated "that if this be observed to
 commence in a part where bronchial re-
 spiration & bronchophony were previously
 heard, it may be taken as a pretty certain
 proof of the supervention of this change."
 When a large portion of a lung is diseased, &
 rendered unfit for respiration, the natural
 respiratory murmur ^{in the sound portion of lung} becomes louder or pe-
-rile as it is termed, as the condensation of the
 lung proceeds. When resolution of the Pneumo-
 nia, after proceeding to the 2^d or 3^d stage takes
 place, & the lung begins to return to its natural
 state, the rhonchus crepitans may reappear.

And when such a case is seen for the first time at this period of the disease, it may mislead us into error & to the unnecessary adoption of active treatment. If an abscess for example bursts into the bronchii, we may have the stethoscopic signs of a tubercular excavation, & the difference between them can only be detected by a knowledge of the previous history of the case. Excavations have been known to form by a piece of gangrenous lung being broken down into a kind of detritus & discharged by the bronchii. The true nature of such cases can only be ~~known~~ discovered by an examination of the case. With regard to the crepita ting rale & bronchophony we may remark, that when the bronchitis accompanying the Pneumonia is severe, the mucous rattle may mask these completely.

From this brief review of the physical signs of Pneumonia we have seen enough to convince us that they cannot be implicitly relied upon in all cases, & though they have very materially increased the accuracy of our diagnosis in this disease, particularly when taken along with the symptoms, yet there are cases where the most experienced & dexter in their use may be deceived. They can scarcely

fail to inform us that some of the textures of the lungs are affected, though in some cases they may be insufficient to point out the particular texture diseased.

Diagnosis. We have already more than once remarked that our accuracy of diagnosis in this disease has of late years been rendered much more perfect. The older physicians confessed themselves unable to distinguish between Pleurisy & Pneumonia & Bronchitis. It is however a point of great practical importance in many cases to distinguish them from each other, particularly Pneumonia from Bronchitis. If we were to carry depletion to the same extent in many cases of bronchitis, wh: are generally absolutely necessary in pneumonia, we would not unfrequently produce most serious mischief. The only two diseases with wh: there is any danger of confounding Pneumonia are Bronchitis & pleurisy. There is generally as I have already stated a certain degree of bronchitis or pleurisy present in Pneumonia, so that we of course refer here to those cases where they constitute the prominent part of the disease. We in general readily discriminate bronchitis from

Pneumonia, by a sense of rawness amounting to pain under the sternum, absence of pain in either side of thorax, by the free expansion of both sides of thorax in respiration, by the more copious expectoration of frothy mucus, by the presence of catarrhal râles & the absence of all dullness on percussion. Pleurisy is generally distinguished by the acute pain of side increased by pressure between the ribs, the little elevation of the ribs of the affected side in inspiration, by the dry cough, by the presence of that modification of the voice as heard through the stethoscope termed *egophany*, & the absence of the characteristic pneumonia sputa, & crepitant râle.

Prognosis. A favorable result may generally be expected in idiopathic Pneumonia, when the patient is seen sufficiently early in the disease, & where the constitution is sufficiently robust to bear active measures. When it attacks debilitated persons, or those labouring under nervous disease, or has gone on to an advanced stage, it becomes a very dangerous malady. Chomel gives the result of the treatment of 79 cases at different ages wh. illustrates the greater fatality of this disease when it attacks those advanced in years.

In 33 of these at ages between 18 & 30 years; three died; in 9 between 30 & 40 years two died; in 11 between 40 & 50 years five died; in 15 between 50 & 60 years eight died; in 8 between 60 & 70 four died; & in 3 beyond the age of 70 all died. When attended with typhoid symptoms the disease is considerably more dangerous than when the fever is what is called inflammatory. When the respiration continues laborious, the pulse frequent, & the cough urgent, in spite of our remedies, a fatal result is to be dreaded. On the other hand when these symptoms are mitigated we may expect a favorable termination. Considerable dyspnoea, whatever may be the extent of the lung inflamed is always a dangerous symptom. On the other hand if the dyspnoea be not urgent, while the pulse continues of tolerable strength, we may still entertain fair hopes of a favorable termination. Though the extent of the lung inflamed be considerable. A double Pneumonia, for reasons easily understood, is always more dangerous than when the disease is confined to one lung. If the tenacious mucus

Sputa become less red & more fluid, it shows that the inflammation is abating. When the expectoration assumes the dirty or brown colour & is intermixed with pus, — indicating as we formerly remarked, the approach of the 3^d stage; or acquires the factor wh: generally marks the occurrence of gangrene, the danger of a fatal termination is increased, & the more especially if the pulse at the same time become more feeble. If the patient cease to expectorate while the mucous rales are extending themselves in the chest, or are increasing in intensity, it is a most unfavorable symptom, & either indicates that the impressions made on the nerves distributed in the lungs & conveyed to the medulla oblongata no longer excite those movements of the respiratory muscles by wh: the mucus is fused into the air passages & is ejected, or that the strength of the patient is ^{so} enfeebled that he is unable to expectorate. The occurrence of delirium especially if attended by dyspnoea & lividity of the lips, is an extremely dangerous symptom, as it indicates that the blood is so imperfectly exposed to the atmospheric air in the lungs, as to interfere seriously with the sensorial functions. When the Pneumonia

+ Cyclopadia of Pract. Med: wth Pneumonia
I find upon examination that Dr. Williams must
have made some error in the figures given
in this passage. As I have not been able to
procure the vol of the Edin: Med. Journal
in wh. the report from the Edin. Dispensary
is given, I have been obliged to leave the pas-
sage as it stands, but will be prepared to cor-
rect it soon.

supervenes in the course of the exanthemata & other diseases the prognosis must of course be more unfavorable & this in proportion to the severity of the particular disease to which it has been superadded.

Exciting causes. The most frequent exciting cause of Pneumonia is exposure to cold, & this disease is therefore most frequent in cold & variable weather. (In 243 cases treated at the ^{Edinburgh} New Town Dispensary during the course of three years terminating 1st Sep^r 1824, 57 of these occurred from 1st Sep^r to 1st Dec. 184 from 1st Dec. to 1st of March; 94 from the 1st of March to the 1st of June; & 58 from 1st of June to the 1st of Sep^r.) Many cases of Pneumonia present themselves which cannot be accounted for by exposure to cold. Chomel endeavored to ascertain the probable cause of 79 which fell under his observation. He states that 14 of these individuals had been exposed to cold; 5 had indulged too freely in wine; 1 had been over-fatigued; 1 had suffered from mental excitement; 1 had breathed the fumes of charcoal for some time; & the remaining 50 could give no account of the origin of this disease. Pneumonia sometimes prevails epidemically. There are several diseases during

the course of wh: Pneumonia is liable to supervene, such as small pox, measles & fithisis. It is also a frequent occurrence after extensive burns. The Pneumonia in these cases is always a very dangerous complication. It is also liable to occur during the course of many chronic diseases, & under these circumstances it often appears in what is called a latent form, that is to say, where the symptoms do not at all correspond to the extent of the disease in the lungs.

Treatment. The treatment of Pneumonia, like all other inflammatory diseases, must be regulated by the nature of its accompanying symptoms. As a general remedy in Pneumonia, bloodletting is doubtless the most important.

Bloodletting. When Pneumonia attacks a stout healthy patient, bloodletting freely & rapidly repeated is not only the most efficacious, but is in fact the sole remedy in wh: we can place confidence, in the early stages of the disease. When the disease is severe & the pulse of good strength, the quantity of blood drawn, is not to be regulated by the number of ounces, but by its effect upon the pulse. The bleeding should be

carried in general to syncope. The time of blood
 letting ought not to be regulated by the day
 of the disease but by the strength of the patient.
 In those cases attended by typhoid symptoms,
 the time for general bloodletting soon passes
 over, while in other cases where the strength
 remains pretty entire this may be practiced
 even a fortnight after the commencement
 of the disease. As long as the strength of the
 patient will permit it we may lay it down
 as a general rule, that general bloodletting
 should if possible be carried the length of
 making a decided impression upon the
 disease. The efficacy of general bloodletting
 is twofold. It, in the first place, empties the
 inflamed vessels, — the general effect of
 bloodletting in all the organs & textures
 of the body. In the second place, it lowers
 the number of respirations & consequently
 the movements of the lungs. This last effect
 is probably not the least important, as
 nothing tends more to keep up inflamma-
 tion in an organ than motion. The state
 of the pulse though in general it affords a
 very good guide in enabling us to judge
 of the extent to which we may carry our
 depletory remedies is not, however, to be im-
 = plicitly

trusted to, for we sometimes find at an early
 period of the disease, a small & feeble pulse
 accompanied by paleness & considerable
 dyspnoea, wh: becomes firmer & stronger
 after a general bloodletting. If the pulse be
 general our guide in determining the length
 to wh: bloodletting may be carried, it is the state
 of the respiration, wh: determines the time &
 order of its repetition. We must, however re-
 member that when the inflammation has
 proceeded on to condensation of the lung, the
 the respiration may continue embarrassed
 for sometime after the disease has ceased to
 extend itself. A certain degree of dyspnoea
 is also induced in some individuals when de-
 pletion is carried to a great extent, even when
 the lungs are quite healthy. When Pneumonia
 occurs in an old, or debilitated patient, or
 supervenes in an individual exhausted by
 previous disease, we have frequently to con-
 sider well, whether the strength of the patient
 will permit the use of general bloodletting,
 even though the disease may have been seen
 at an early stage of its progress. In such cases
 we are ^{frequently} obliged to restrict ourselves to the em-
 ployment of local bleeding by leeches or
 cupping. In the cases where general bloodletting

has been employed, & where the symptoms still continue urgent after it has been carried as far as the strength will permit, we next have recourse to local bleedings. The amount of blood drawn locally must be regulated by the symptoms & by the strength of the patient. The physician is in this to trust to his judgment & experience & not to any general rules wh. can be laid down for his guidance.

We shall now turn our attention to some of the other remedies employed in this disease. These though valuable adjuvants to general bloodletting, can never be substituted for it with safety in those cases where the disease occurs in a severe form in an individual sufficiently strong to bear general bloodletting.

Tartar. Antimonii. This medicine has of late years been highly vaunted as an efficacious remedy in *Pneumonia*, & there appears to be no doubt, that though its good effects may in many cases have been exaggerated, its use is frequently attended with great advantage. The use of *Tartar. Emetic* in large doses in the treatment of this disease was first introduced by *Rasori* an Italian physician, on the questionable

theoretical doctrines of Stimulants & Contro-
 Stimulants. — The last remains of the once
 famous Brounnonian theory. Larrenee
 adopting the practice, though not the theory
 of the Italian school, gave most flattering
 accounts of its efficacy. He commenced its
 use after a moderate blood-letting (8 to 10 $\frac{3}{4}$
 from the arm, by giving a grain of the
 substance dissolved in some vehicle, & re-
 peated this every second hour for 6 times,
 after wh: he left the patient quiet for 7
 or 8 hours, if the symptoms were not wo-
 gent. But if the Pneumonia remained
 unchecked, the medicine was continued.
 When the disease was violent the dose of
 Tartar Emetic was increased to a grain &
 a half, to two grains or even to two grains
 & a half. A curious & unexpected result
 has been observed in the administration
 of this medicine. During the first day of
 its exhibition it generally vomits & purges,
 but after this it may frequently be taken
 to the extent of 15 grains & even more daily
 without producing any sensible evacuation.
 This wh: was called by Brounnon the tolerance
 of the medicine is considered favorable to
 its action for according to Larrenee & others

"the effect of Tartar Emetic in Pneumonia is
 "never more rapid, or more efficient than when
 "it gives rise to no evacuation." In this country
 the tartar emetic has also been exclusively
 used in Pneumonia, but it has generally
 been regarded more as an adjuvant to the
 lancet, than a substitute for it. Its use may
 be commenced after the first bleeding.
 Many instead of prescribing it in the large
 doses used by the Italian physicians, Larn-
 nec & their followers, order it in doses of
 from $\frac{1}{2}$ grain to 1 gr. dissolved in some ve-
 hicle every three or four hours. When pre-
 scribed in this manner it frequently brings
 up a constant & depressing sickness, wh:
 in all probability expects a salutary in-
 fluence upon the disease. When it acts too
 freely on the bowels landanum may be
 added to the solution.

Rubifacients & Epispastics. When the
 general & local bleedings have been carried as
 far as we believe it prudent, without fairly
 arresting the disease, we may then employ
 some rubifacient or blister applied over
 the affected parts of the chest. These remedies
 are not considered so efficacious in Pneumonia
 as in Pleurisy.

Calomel & Opium. The exhibition of a combination of these two medicines in Pneumonia & other inflammatory diseases, after their force had been broken by bloodletting was strongly recommended by Dr. Robert Hamilton of Lyme Regis & afterwards by Dr. Armstrong & others. The use of the opium is to relieve the pain & prevent the calomel from acting upon the bowels. There can be no doubt that the virtues of this combination of calomel & opium have been greatly overrated by many, but it may be prescribed in those cases where there is some objection to the use of the tartar. Emetic, such as when it produces too much ^{vomiting} ~~excessive~~ & purging. Some have recommended that from six to twelve grains of calomel should be given three or four times a day & that from a grain to a grain & a half of opium should be added to each dose of calomel. Others recommend it in the proportion of two grains of calomel to one grain of opium & to be given three times a day. Whenever the Calomel affects the mouth its use should be suspended.

Prussic Acid. This remedy has also been recommended in the treatment of Pneumonia.

It appears to be useful in some of those cases where the patient remains restless & feverish after depletion has been carried sufficiently far to arrest the further progress of the disease. It also appears to diminish the troublesome cough wh. sometimes accompanies & aggravates the disease. A drop or even two of this acid has been recommended to be added to each dose of the Tartar Emetic in those cases where it produces troublesome vomiting. In those cases where the cough is severe, we ought to attempt to allay it by the mucilaginous & anodyne mixtures generally prescribed on such occasions!

Matth. Alex. Eason Wilkinson

Edinburgh

March 22.nd 1838.