

*Vanderpoel & S. March*

SUGGESTIONS

*Compliments of*

RELATIVE TO THE

*S. O. Vanderpoel*

PATHOLOGY OF PNEUMONIA.

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By S. O. VANDERPOEL, M. D., ALBANY, N. Y.

*Presented by  
Henry March.*

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## SUGGESTIONS RELATIVE TO THE PATHOLOGY OF PNEUMONIA.

BY S. O. VANDERPOEL, M. D., ALBANY, N. Y.

The opinion very prevalent in the profession, and consequently among the community, that pneumonia is induced solely by exposure to cold, or to sudden variations of temperature, has, we think, a pernicious influence upon the treatment, based as it is upon a wrong pathology.

That pneumonia is excited by causes more intimately connected with the healthy workings of the system than mere exposure to cold, we think is plainly evident; else why will the same person at one time undergo prolonged exposure and experience no ill effects, while at another, comparatively slight, he is stricken with the malady; or why are A. and B. apparently equally endowed with the capacity to resist morbid influences, and yet when equally exposed to variations of temperature, the one has pneumonia while the other escapes.

One of the first things which strikes us in looking at the subject from this stand-point, is the relation of pneumonia with certain diatheses, and with traumatic diseases subjected to an infected atmosphere. These diatheses are intimately connected with the circulation of morbid or poisoned materials in the blood which fail to be eliminated by the proper excretory organs, or to the direct inhalation of a vitiated atmosphere. This latter condition has been frequently noticed in large army hospitals, where proper hygienic precautions are not taken. In a limited experience we have observed case after case dying from pneumonia, while the wound was apparently progressing favorably, where the external atmosphere was bland, but where from imperfect ventilation, or the great mass of suppurating wounds, the air in the wards was tainted with decomposing effluvia.

Our opinion therefore is, that pneumonia cannot result *alone* from exposure to cold, no matter how prolonged and intense; but that co-existing with this exposure there must be morbid materials circulating in the system which, acting on the sentient fibres of nerves that supply the air vesicles, partially paralyze them, and permit a change of temperature or any irritant cause to produce the phenomena of inflammation and its attending sequences. Further, that in pneumonia two phases of disease are presented, the one wholly dis-

tinct from the other. In the first stage, lasting from four to seven days, it is the system struggling to eliminate or cast off the poisoned material—a stage always attended by the most acute symptoms and violent arterial reaction, the close of which is marked by a decided abatement in all the constitutional symptoms, and an exudation into the air-vesicles called hepatization. From this point begins the lung disease proper, and whatever of subsequent constitutional symptoms ensue, arise from efforts to relieve the solidified air-vesicles of their foreign material.

Perhaps this will be better appreciated by following the natural history of a case of simple pneumonia. First, the course of the fever as measured by the thermometer and the pulse, dating the onset of the disease from the shivering, we usually find on the third day an active febrile condition, with flushed cheeks, constant cough, viscid bloody expectoration, hurried breathing with crepitation and the commencement of bronchial respiration at the base of the lung. During the third, fourth and fifth days the temperature is uniformly high, rising from  $98^{\circ}$  as a normal standard, to  $104^{\circ}$ – $106^{\circ}$ , and with slight alternations of  $1^{\circ}$  and  $2^{\circ}$ , between morning and evening, maintaining this temperature until some time on the sixth day, when a rapid fall takes place, so that some time during the seventh it marks but  $98^{\circ}$ , the normal standard. The pulse follows closely the increase of temperature, rising to  $100^{\circ}$ , to  $120^{\circ}$ , and about the sixth day falling to  $90^{\circ}$ ,  $80^{\circ}$ – $70^{\circ}$ . Respiration rises to about  $40^{\circ}$ , and does not decrease in proportion to the heat and pulse.

Second. The course of the local lung symptoms—crepitation—becomes less, while the bronchial respiration increases, with the increasing hepatization. This reaches its maximum about the sixth day, when a *crisis* occurs, a sudden and rapid defervescence, usually accompanied by a strong action of some eliminating organ, such as the skin, the kidneys or the bowels. The sputa, which are most bloody on the third and fourth days, become more rusty on the fifth and sixth, after which they are less viscid and become free from blood or hæmatine. After the seventh and eighth days the bronchial respiration begins to lessen and ceases from the twelfth to the sixteenth day. From this casual and rapid description, it is seen that the crisis occurs, with a rapid and marked diminution of the constitutional symptoms, at the very time when the lung trouble—the hepatization—is at its height, and when, if we suppose mere inflammation of this tissue constituted the disease, there would be the most decided evidence of constitutional disturbance. Rather do we suppose, that with the elimination of the blood poison from the economy into the air-vesicles, the active disturbance ceases, when the depurating organs quietly convey it from the economy.

We propose to present our considerations for this belief under the heads of crisis, diathesis—the action of eliminating organs and treatment.

From the earliest period of medicine the word *crisis* has been associated with the idea of elimination; as if the system had been striving to free itself from some foreign material acting banefully upon the whole organism. Of course among the ancients the idea underwent many fanciful changes, but this was the inherent principle. We now understand by the word, a change for the most part favorable, which arises in the course of a disease, announced by some particular phenomenon, as an abundant excretion, either by hemorrhage, sweating, or deposite in the urine; and at the same time a marked subsidence in all the constitutional symptoms. The term is rarely applied to local inflammation of organs or tissues, but rather to those conditions of the general system where the fluids seem poisoned, or impressed by some deleterious material which nature is struggling to cast off. Such is the case in the different forms of malarial and typhus fevers, and in those peculiar conditions of the system, represented by the diatheses, and which we term the strumous, gouty, rheumatic, &c. The expression “favorable crisis” in any of these affections, is synonymous with some decisive eliminative act. Whatever of subsequent sickness occurs in the disease, arises from incidental causes, or injury to some organ affected by the eliminative process. Applying this to pneumonia, we contend that the sickness up to the fifth or seventh is this struggle for elimination; which when completed a decided crisis occurs, marked by an abatement, indeed in most cases, by a decided subsidence of all general symptoms. Not those however of a local character, as the respirations remain near forty, and hepatization is then complete. It does not invalidate this position to ask, why the peculiar poison in pneumonia should seek the lungs. We know them to be one of the three great eliminative organs in the economy, and we recognize daily, how seriously the other two, the skin and kidneys are affected when by the presence of some foreign element their excretory functions are impaired. Dr. Parkes the able clinical lecturer at Edinburgh in relation to this point, says: “The only blood disease which has yet been indicated by the supporters of this view, as anterior to pneumonia is hyperinosis (excess of fibrin), and as hyperinosis occurs in rheumatism without pneumonia, it is evident that there must be some other cause, either in the blood, or in the local structure of the lung, which locates the disease in that part. Now hyperinosis is really anterior in pneumonia as in rheumatism; that it is not however the only condition will be generally admitted. But what other blood affection is there ?

None has yet been indicated to my knowledge in the acute sthenic pneumonia of young persons without gouty or renal disease. But there is one point on which I have been trying to collect evidence for some years, but at present without sufficient success. It is well known how frequently the liver is affected in pneumonia, so that some amount of jaundice is not at all uncommon, and sometimes bile pigment appears in the pneumonic sputa. I have also found in some cases evidence of liver affection for some time before the lung disease especially the so called torpor with deficient biliary flow. Is there then any condition of the liver which adds something to the blood which ought not to be there? Taurin has been found in the healthy tissue of the lung; but in the hepatized lung, it seems from Verdeil's observations to be in excess. Is it some compound of this sort which in combination with the hyperinosis, determines the localization of the blood disease, or produces by its irritation the inflammation of the lung?

*Diathesis.*—In giving the natural history of diseases, writers too often fail to recognize the influence of *diathesis*; while in practice it is one of the most important elements to consider. It is this idea, to which laymen unconsciously attach so much importance when they say of the physician "he understands my constitution." These "personal peculiarities" the careful physician must recognize in practice, oftentimes assuming prominence, far greater to the vital relations than the peculiar malady under which the patient suffers. The system thus stamped with a "peculiarity" or diathesis, tends to the repeated expression of some form of ill health, always in the same way. They are by no means limited to the individual, but are transmitted from parent to offspring, and thus become hereditary. Not traceable to the extrinsic action of a virus, and with none of the properties attached to infection, they are apparently generated, developed, and sustained under the influence of an intrinsic blood-poison; the result of perversion of the nutritive or assimilative functions of the individual. Dr. Walsh thinks "each member of the group has its specific morbid principle in the blood, uninterchangeable with the rest, just as any one virus is uninterchangeable with others." It is only necessary to name the rheumatic, gouty, strumous, and syphilitic as the conditions indicated in their respective diatheses. True other divisions of a more general character are at times made by the surgeon, and which are really of vital importance from his standpoint; as the plastic and aplastic diatheses; but our present argument has only to do with the former, which are inherent and constitutional, and not with the latter, which are more or less acquired and accidental.

Now, it is we believe an admitted clinical fact, that pneumonia in the great majority of cases, appears in persons laboring under one or

the other of these diatheses. We recognize also in such constitutions, the importance of a free action of the eliminative organs, and how soon the respective diatheses become apparent, if the functions of either of these organs are impaired. When the poison seeks the kidneys for an outlet, suffer though they may in their function, yet their tissue less delicate, and less essential to the vital organization than the pulmonary does not manifest itself by as active local symptoms, or when defervescence occurs entail secondary lesions, which call for new efforts of the economy to restore. The same is also true when the functions of the skin are temporarily impaired.

It does not invalidate the theory of a blood-poison as a latent cause of pneumonia, to state that its immediate determination to the lungs may be owing, either to the depressing influence from exposure to cold, or as in an infected hospital to a poisoned atmosphere acting on sentient fibres, weakened in vitality from its influence; in the latter case, an acquired diathesis, the aplastic, supervening.

If the lungs were the only organ implicated in an attack of pneumonia, there would be strong ground for regarding it a simple, idiopathic inflammation, but we shall see that in addition to the predisposing influence of diathesis, both the kidneys and skin are seriously impaired in function, and that the signal for their return to a normal condition, is the completion of the eliminative process, corresponding to hepatization of the lung. The amount of water secreted by the kidneys, is lessened from one-third to one-half; while that of urea is greatly increased during the height of the disease. These changes are easily accountable from the general febrile condition; the former being always retained in fever, and the latter marking the metamorphosis of tissue resulting from it. The feature peculiar to pneumonia, is the great diminution, or even entire absence of chlorate of sodium from the urine, during the existence of the fever and the process of hepatization. Even when administered by the mouth it does not appear; nor does it re-appear until the process of resolution is established. Albumen is present in the urine, in a large proportion of the cases, most common at the height of the disease. It cannot be ascribed to absorbed exudation, appearing as it does chiefly before resolution; but rather to the implication of the kidneys in the general congestion and exudation; the most marked local seat of which is the lungs. "One conclusion may certainly be inferred, namely, that the disease of which we are speaking involves profound changes in the chemistry of life."

Finally—the relations of treatment—of no disease has there been such extreme and radical views of treatment, as a single decade has witnessed with reference to pneumonia. From the heroic "coup,

sur coup" bleeding of Bouilland, or the large doses of antimony by other practitioners, to the earnest advocates of a purely expectant treatment we have presented every shade of doctrine and theory. This great contrariety of opinion shows at least, widely different views of pathology, since upon our notions of this latter must all treatment be based. It points also significantly to the fact, that these views are far from being fixed. Experience tells us wherever the pathology of a disease is definitely settled, the treatment is at once simple and uniform.

Bouilland regarding pneumonia strictly as a local inflammation would jugulate it, suppressing every effort of arterial re-action by depletion. Those who pursue an expectant course but follow out the self-limiting theory in the duration of disease. Statistics, imperfect as they are, decidedly favor the latter as preferable of the two extremes. Pneumonia cannot be jugulated by depletion, any more than can a case of acute rheumatism. As in rheumatism the severity of the symptoms may be mitigated, still the mortification is experienced of seeing it prolonged into a chronic stage; so in pneumonia, depletion is far more apt to retard than aid the evolution of the subsequent stages of the malady. On the other hand, the advocates of a purely expectant treatment abandon themselves to a blind fatalism, in which all diatheses, and all conditions of vitality have but the one recuperative agency—nature. We are not of those who favor either party in their extreme views. While on the one hand there are cases in which the hyperæmia is so intense as to cause great pain and dyspnoea; to relieve which a moderate bleeding is beneficial; there are others, where no treatment save proper hygienic measures and diet are necessary for the cure. Unfortunately the latter class of cases, typical in their character, are comparatively rare. Pneumonia is a disease, where in a peculiar manner, the diathesis and vital powers are to be studied; for while in *all* we strive to aid nature in the eliminative process, we quite as frequently find it necessary, even in the early stage, to sustain by stimulants and tonics, as in the stronger vitality, temporarily to depress. The crisis once developed, hepatization completed, no one will question the propriety of sustaining the economy, for the more perfect elimination of the morbid material.

It would be an interesting study to show how unsatisfactory the generally received notions of the pathology of pneumonia are to the most intelligent writers of the day. Struggling as it were for some stand-point by which it could be classed among diseases of a specific character, Todd in his clinical lectures points to this idea of a morbid material seeking elimination—"if you watch the changes which a patient in pneumonia undergoes in his progress towards convales-

cence, you will find more or less sweating always takes place. Sometimes the sweating occurs freely, and it is then considered *critical*. Sometimes too a *critical* discharge of purulent matter from the lung takes place by expectoration ; now and then the kidneys about this time secrete much more urine than previously ; and occasionally, though certainly very rarely a *critical* diarrhoea occurs. Always chloride of sodium begins to escape from the system through the urine, from which during the height of the disease it had been excluded. All this looks as if *something*, which caused the morbid change in the lung were eliminated from the system in one or more of the secretions ; and therefore to promote these should be the aim of our treatment."

We close with the more direct propositions of Dr. Parkes, summing up as they do fully, the views we have ventured to elaborate in this paper. "Pneumonia is a blood disease of some sort, of a nature not thoroughly known, but which consists, in part, in an augmentation of the fibrin, as in acute rheumatism. Increasing up to a certain point, and giving rise to the slight malaise which precedes all cases of pneumonia it is at last brought to a head by some exposure, by a dietetic error, or by reaching a point at which the functions of the blood are seriously interfered with. Then ensues high general fever, from implication of the nervous system, and at the same time some organ or other is, on account of special affinity for the morbid blood, or from previous damage to its structure specially irritated. In pneumonia, the lung is the seat of election, and there is rapid hyperæmia, and transudation of fluid into the air-cells. By this transudation the morbid blood is purified. The process is analogous to that of gout, in which a diseased blood gives rise to a local disease by the deposition of urate of soda in and about joints. When the localization and consequent purification is finished then the fever ends. There remains the lung exudation, which gradually softens down, is partly expectorated, partly absorbed ; and in the process of absorption, it may produce again secondary contamination of the blood, and certain affections of other organs, which constitute those secondary affections which sometimes complicate the after course of pneumonia."





