Thesis on Pneumonia
with particular reference to Treatment.

John Burnett.
Pneumonia

Its Pathology, Symptomatology & Treatment.

The subject of Pneumonia is deserving of attention, not only by reason of its own intrinsic interest, but also in virtue of the prominence that has been given to this disease in the great controversy which has agitated the medical world in modern times, as to the true pathology and correct treatment of inflammatory diseases in general. The signs and symptoms of pneumonia are generally so well marked and characteristic, and, since the art of physical examination has reached such a degree of perfection, the diagnosis and progressive stages of the disease are so easily made out, that it forms an admirable standard by which the truth of the various theories on the nature of inflammation may be tested, and the efficacy of the various modes of
treatment may be contrasted and compared. The statistics in regard to the treatment of pneumonia are very abundant and trustworthy, and have been put on record by physicians of such eminence and ability, that much information may be drawn from this source—those copious and reliable statistics affording admirable data from which the general results of treatment may be inferred with all confidence and fairness. Before proceeding, however, to take up the important subject of the treatment of the disease, and that which we intend mainly to consider, we may, for the sake of giving more complete help to the subject, make some brief preliminary remarks upon the pathology, physical signs, and general symptoms of pneumonia.

Pathology and Physical Signs

We shall first consider the pathology of pneumonia, and it will also be more convenient to consider under this head
the physical signs, the varying phenomena of which are due to the different morbid conditions that the lungs present in the progress of the disease.

Pneumonia is an acute inflammation of the substance of the lungs, and may be either single or double—that is, it may affect one or both lungs. According to Andréau, the right lung suffers from inflammation twice as often as the left, in this respect differing from Pneumonia pulmonalis in which the left lung is much more frequently the seat of the disease. Double pneumonia again only occurs about once in eight cases. There is another point of contrast between these two diseases, inasmuch as while in Pneumonia pulmonalis the upper lobes of the lung are generally found to be affected, Lenné has pointed out that in Pneumonia the disease most commonly begins in the lower lobes.
The progress of a case of pneumonia presents three different stages or periods, in each of which the lungs present very different conditions and appearances. These three periods are: (1) the stage of engorgement; (2) the stage of red hepathization; and (3) the stage of grey hepathization or of purulent infiltration.

1st. The stage of engorgement.

In this condition of the pulmonary tissue, its substance is gorged or loaded with blood or bloody serum, which may be seen to flow out from it when a section is made of the lung. On applying your stethoscope to the chest of a patient in this stage of pneumonia, you hear the sound described as very fine or minute crepitation — this fine crepitation being at first mingled with the ordinary vesicular murmur of the lung; though afterwards when the inflammation has advanced and is threatening to pass on to the
Second Stage, the natural respiratory murmur is completely masked by this morbid crackling sound. This fine crepitation is diagnostic of the presence of fluid in the air vesicles and smaller bronchi. On practising percussion we find the resonance of the lung substance somewhat diminished and duller than natural. If the pneumonia is not arrested at this stage it passes on into the next or

2d Stage, or that of Red Repetition. The stethoscope if now applied to the chest may reveal no sound whatever—neither the rustling sound of the pulmonary vesicular murmur nor the crackling sound of crepitation. But as a general rule these are superseded by an entirely new morbid sound—viz.: that of Bronchial Respiration, a peculiar whistling sound caused by the passage of air through the larger bronchi, which are still patent—a sound also which in the healthy lung is not
Conducted to the ear (except when the
Stethoscope is applied over the large bronchi)
but in the morbid condition under Con-
ideration is conveyed to the ear by the
solidified lung. It tells us that the
lung has now lost its spongy nature
and become solid or hepatized. Generally
also Bronchophony is increased resonance
of the voice exists and is due obviously
to the same cause as the Bronchial
Respiration - namely, the solidification
of the lung. There is necessarily also
increased percussion. Presumably Res-
piration is generally heard in the sound
lung on account of the increased respiratory
work it is called upon to perform.
If the disease should fortunately stop
short at this stage, then all these signs
disappear and there is a return in an
inverse order to the Conditions noticed
in the first stage - three of crackling
fine crepitation and vesicular murmur.
But should the disease go on unchecked,
then we reach the
3rd Stage - that of green suppuration, and of purulent infiltration. We have now a condition of diffused suppuration of the pulmonary texture - the structure of the lung breaks down, and pus is expectorated. There are no physical signs at first by which the presence of this condition can be determined. But when a part of the lung structure breaks down and is expectorated, we find large gurgling crepitation from the entrance of air into the cavity that has been formed. When the disease has reached this stage then a fatal termination may be looked for.

Such is a brief abstract of the pathological conditions and principal physical signs which we find in the progress of a characteristic case of pneumonia. We now proceed to an equally short consideration of the general symptoms of pneumonia.
General Symptoms.

Pneumonia is generally ushered in by a rigor or shivering fit, but this is soon succeeded by a condition of fever, marked by an increase of the temperature of the body and a greater frequency of the pulse. Though there is a sense of oppression about the chest, there is no general rule to real pain in pneumonia. In this respect contrasting in a marked manner with pleurisy, in which there is acute lateral pain or stitch in the side. At the same time however it should be observed that pneumonia very frequently or perhaps most generally is accompanied with pleurisy, so that in this case the characteristic lateral pain of this disease would be present.

Another symptom of pneumonia is cough, which at first may be dry, but is soon accompanied by expectoration of a very characteristic kind. This expectoration is observed to be
of a rusty or tawny appearance. It is moreover, very vivid and tenacious. So tenacious indeed, that the spatu form one homogeneous mass that adheres strongly to the sides and bottom of the vessel containing it. So much so that the vessel may be inverted without causing its attachment thereto from. The expectoration is composed of mucus mixed with blood; the union between these two elements being very intimate. This it is that gives to the spatu their uniform rusty colour. The expectoration in pneumonia thus strikingly differs from that of Bronchitis, and this is a valuable aid to the diagnosis between the two diseases; for, while in the latter complaint the mucus is only streaked with blood, in the former the whole spatum is tinged or impregnated with it. In the advanced period of the disease the spatum may be of a purulent character. This is in the 3rd stage, and sometimes it is very liquid and is described as
being of a prune-juice appearance.

Another symptom of pneumonia is an increased frequency of the respirations. There is no true dyspnoea or laborious breathing as a general rule, but only a mere acceleration of the respiratory function. Here again we have a marked difference from what obtains in bronchitis, for in this disease the difficulty of breathing is generally great — indeed, in many cases this dyspnoea is so extreme, that the patient is compelled to abandon the horizontal, and assume the sitting posture.

Delirium is a most unpleasant symptom that may occasionally supervene in the course of pneumonia, depending upon the imperfect degree of oxygenation of the blood that results from the pulmonary disease. It is said to occur most frequently when the upper lobes of the lung are the seat of the malady.
The urine should be attentively noted during the progress of a pneumonia, as valuable indications may be derived from the various conditions that it presents in the course of the disease. It has been pointed out by Dr. Beale of London that there is an absence of chlorides from the urine—these being either totally absent or present in very diminished quantity. This condition of the urine is not peculiar to pneumonia, however, for it occurs in many other acute diseases, as for instance, Rheumatic Fever, Typhus Fever, etc. Dr. Beale has observed that during the state of condensation of the lung, the chlorides are present in the sputum, but that as soon as resolution has occurred, they return again to the urine. If therefore shows that the disease has taken a favourable turn. A dense deposit of amorphous urates in the urine may also be regarded as a favourable
Indication in the progress of pneumonia. Having now briefly enumerated the main points in the pathology, physical signs, and general symptoms of pneumonia, we next proceed to the important subject of its treatment.

Treatment of pneumonia. This is a subject which has agitated the medical world very much of late years, in connexion with the recently debated question as to the nature and treatment of inflammation. For centuries the antiphlogistic mode of treatment so implicitly relied upon for the cure of all inflammatory disorders, was blindly adopted and followed in combating inflammation of the lungs. Bloodletting—and that of the most heroic nature—with large doses of Mercury and Antimony, was the great remedies by the employment of which physicians based their hopes of successful practice—hopes which
were doomed to be blasted by a resulting great of mortality which it is now painful to contemplate. But of late years the theoretical speculations in which these principles of treatment were based, have been called in question, and the inauguration of sounder views in pathology has resulted in a more judicious and successful practice. This revolution in our ideas as to the true nature and treatment of inflammations has already become a matter of history. It is not my intention therefore in the brief limits of the present thesis to dwell on the much vexed question of Inflammation, which has already been such a fruitful source of controversy and discussion in the Edin. School of Medicine. My only aim indeed, will be to show from carefully collected and extensive statistical data which of the various modes of treating pneumonia has proved the most successful in its results. As previously observed the statistics of pneumonia are
both abundant and trustworthy. No doubt statistics and the conclusions drawn from them are not always to be implicitly depended upon; but when they are extensive and have been put on record by men of European reputation for medical ability and skill, then they must be considered as most valuable, and affording most reliable data from which general principles may be safely deduced. Now this is eminently the case with the statistics of pneumonia, for the names of the eminent physicians in the following tables speak for themselves, and require no testimony in support of the candour and care with which these have been registered. I have here collected a large mass of statistics in which are embodied the experiences of numerous physicians in the various modes of practice that have been employed for the cure of pneumonia, and have arranged these in tabular form so as to exhibit clearly and intelligibly the results of
the various kinds of treatment.

1. Large Bloodlettings.

Let us in the first place then notice what have been the results of that antiphlogistic practice which trusted for the cure of pneumonia from the employment of Large Bloodlettings. This heroic plan of treatment is so well known as to its modus operandi to require repetition here. It is associated with the name of the eminent Parisian physician, M. Bouillaud, and has been extensively practiced and strongly advocated by him and other French medical men of eminence in the profession. Subjoined is a Table that exhibits the results of the practice of some of those who have followed this plan of treatment.

Table of Treatment of Pneumonia by repeated or large bleedings.
<table>
<thead>
<tr>
<th>Physicians</th>
<th>Number of Cases treated</th>
<th>Number of Deaths</th>
<th>One death in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bouillaud (reported by Pelletan)</td>
<td>71</td>
<td>9</td>
<td>7.9</td>
</tr>
<tr>
<td>Bouillaud (own report)</td>
<td>102</td>
<td>12</td>
<td>8.5</td>
</tr>
<tr>
<td>Briquet</td>
<td>19</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Chomel (reported by Louis)</td>
<td>78</td>
<td>28</td>
<td>2.8</td>
</tr>
<tr>
<td>Chomel (reported by Grisolle)</td>
<td>50</td>
<td>14</td>
<td>3.6</td>
</tr>
<tr>
<td>Andal</td>
<td>65</td>
<td>36</td>
<td>1.7</td>
</tr>
<tr>
<td>Grisolle</td>
<td>332</td>
<td>37</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Average of Deaths about 1 in 4.

This table speaks for itself so plainly and unmistakably that it requires no comment. The numbers given above exhibit a mortality of 1 in every 4 persons treated for pneumonitis by large bleedings. Such a mortality must strike every one as being enormous, and it appears indeed extraordinary that anyone should persist in such a plan of treatment (as
I believe Mr. Bonilla and still does) with such an appalling death-rate resulting from its employment.

2. Antimony with Large Bleedings. Antimony has been long recommended in the treatment of puerperal fever. Indeed of late years Tartar Emetic has been in far more general employment than bleeding itself for this purpose. The virtues of this drug have been much lauded by the two eminent Italian physicians Rasori and Acerbi, who have employed it extensively in conjunction with bleeding. That the results of this mode of treatment anything but justify the commendations that have been bestowed upon it, I think, sufficiently obvious in the results of the practice of these physicians themselves.

Table of Treatment by Tartar Emetic and Large Bleedings
<table>
<thead>
<tr>
<th>Physician</th>
<th>Number of cases treated</th>
<th>Deaths</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racori</td>
<td>747</td>
<td>164</td>
<td>4.5</td>
</tr>
<tr>
<td>Acerbi</td>
<td>142</td>
<td>16</td>
<td>8.9</td>
</tr>
<tr>
<td>Louis</td>
<td>78</td>
<td>28</td>
<td>3.5</td>
</tr>
<tr>
<td>Thomel</td>
<td>24</td>
<td>13</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Average mortality—About 1 in 4.

This plan of treatment therefore appears to be as unsuccessful as the former—so unworthy of confidence, seeing there is 1 death in every 4 cases so treated.

3. Few bleedings.

But many physicians, while condemning the indiscriminate employment of the lancet as practiced by Bouillaud and others, extol the advantages that may be derived from a more moderate and cautious use of it. But that this system is attended with much the same result as the previous ones is easily enough shown.
Table of Treatment of Pneumonia by

<table>
<thead>
<tr>
<th>Physicians</th>
<th>Cases treated</th>
<th>Deaths</th>
<th>Owein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietl</td>
<td>85</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>De Bordes</td>
<td>13</td>
<td>2</td>
<td>6:5</td>
</tr>
<tr>
<td>Forget</td>
<td>32</td>
<td>7</td>
<td>4:6</td>
</tr>
<tr>
<td>Schmidt</td>
<td>6</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Dr. Morehead</td>
<td>57</td>
<td>11</td>
<td>5:2</td>
</tr>
</tbody>
</table>

Average of Deaths - About 1 in 5.

4. Antimony with Few bleedings.
A further Table may be given showing the results derived from a combination of Few bleedings with Tartar Emetic. It exhibits much about the same average mortality as the preceding.

Table of Few bleedings with Tartar Emetic

<table>
<thead>
<tr>
<th>Physicians</th>
<th>Cases treated</th>
<th>Deaths</th>
<th>Owein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laennec</td>
<td>62</td>
<td>6</td>
<td>10:3</td>
</tr>
<tr>
<td>Eg (Leoncuk)</td>
<td>32</td>
<td>12</td>
<td>2:7</td>
</tr>
<tr>
<td>Grisolle</td>
<td>10</td>
<td>28</td>
<td>4</td>
</tr>
</tbody>
</table>

Average mortality - about 1 in 4.
Such then are the painful results revealed by the preceding tables in regard to the treatment of pneumonia by Bloodletting whether employed alone or in conjunction with Tartar Emetic. The mortality under each head is something enormous, and may well excite distrust of the efficacy of the remedial measures employed. These startling facts not only show the inefficacy of this medical practice but the positive mischief which it causes, for it is found by actual experiment that the unaided powers of the vis medicatrix naturae will produce a spontaneous cure of the disease in a much greater number of cases than this method of medical treatment will. That much of the fatality of pneumonia is caused by medical interference and not by the severity of the disease itself was demonstrated by the accomplished M. Dietl of Vienna. Of 189 patients under his care for pneumonia who were treated by the regulation of the diet alone, in the year 1848, only 14
died, giving thus a mortality of 1 in 13.6. In 1852, a similar experiment on a larger scale, undertaken by the same physician, was crowned with equally happy results, for of 750 patients treated in this way, only 69 died, or 1 in 10.9. I therefore think that the inference may be honestly and fairly drawn from the preceding facts, that more pneumonia patients die from the imprudent and injudicious use of the lancet as employed by M. Bouilland and others than from the natural progress and consequences of the disease itself.

5. Treatment of Pneumonia by Antimony. If we now turn from the Consideration of
the treatment of pneumonia by bloodletting and examine the iron-bleeding plan
by the employment of Tartar Emetic in
unstained doses, we shall find the
subject almost as uninviting, and the
result almost as discouraging. No drug
in the Materia Medica has been more
lacked in the treatment of any disease
than has antimony in that of pneumonia. And yet the recorded experiences of those who have extolled it most highly give the most emphatic testimony against the accuracy of these statements. That the death-rate is very slightly diminished is no doubt true; but whether this is due to the employment of the Tartar emetic, or to the non-employment of Bloodletting, is a question which I think it would be difficult to answer in favour of the former of these two suppositions. That the results of treatment at any rate by the employment of this drug in repeated doses is anything but calculated to inspire us with confidence in its use may be inferred from the following statement.

**Non-Bleeding Plan of Treatment. Tartar Emetic**

<table>
<thead>
<tr>
<th>Physicians</th>
<th>Cases treated</th>
<th>Deaths</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troussseau</td>
<td>52</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Griselle</td>
<td>44</td>
<td>6</td>
<td>7:3</td>
</tr>
<tr>
<td>Shielmann</td>
<td>110</td>
<td>12</td>
<td>9:2</td>
</tr>
<tr>
<td>Schmidt</td>
<td>37</td>
<td>4</td>
<td>9:1</td>
</tr>
</tbody>
</table>
Average Mortality - about 1 in 8.

The assertions then of Rasori and others as to the value of antimony in the treatment of pneumonia seem when viewed in the light of the preceding Table to be somewhat exaggerated. Indeed the practice of Rasori himself bears the strongest testimony against the justness of his own encomiums, for his large experience of the use of Larican Emetic, as mentioned in a previous Table, records a mortality of 1 in 4.5. It must now be his fairness be observed that with this he conjoined the employment of moderate blood letting, so that it might be quite legitimately argued that this may have initiated the result.

6. Treatment by Mercury.

Mercury, as might be expected from the celebrity it has enjoyed in the treatment of all inflammatory disorders, has been
much used in combating inflammation of
the lungs. But just as its employment
has been found to be quite unnecessary in
many of those diseases in which it had
formerly enjoyed the reputation of being
almost a specific, (as for instance in
the case ofritis and pericarditis, in
which mercury was considered an indispen-
sable remedy,) so also in the case of
pneumonia we find that not only may
this drug be safely dispensed with, but
its use seems to be really injurious. The
recorded experience of one of the most
arduous supporters of the powers of
mercury in the treatment of pneumonia —
I mean Dr. Bell at Glasgow — seems
to establish the correctness of this state-
ment: for, of 35 cases treated by that
physician by the administration of this
drug four died, thus giving a mortality
of 1 in 8.7. Mercury thus seems to
be of no more value in the treatment of
pneumonia than antimony — the death rate resulting from the employment of these
two drugs being almost exactly the same.

Treatment by Opium

Lastly, we may observe that Opium is a drug which has also been relied upon by some in the treatment of pneumonia. There are some who believe that the employment of it alone offers as a good weapon with which to oppose the progress of the disease. That this confidence and trust is based upon a somewhat insufficient foundation is abundantly and strikingly evident from the following cases, where the employment of Opium seems to have been followed by the most disastrous consequences.

Iron Bleeding Treatment. Opium.

Physicians Cases treated Deaths
Schmidt 13 6 2:1
De Bordes 77 17 45

Average mortality - About 1 in 4.
Such then are the results we arrive at from an analysis of the recorded experiences of those physicians who have attempted the cure of pneumonia by an antiphlogistic plan of treatment. Believing the theoretical grounds on which their principles of treatment were based to be false and untenable, we are not surprised that the results of their practice should prove unsatisfactory and unsuccessful to a corresponding degree. No matter what antiphlogistic remedy has been employed—whether Bloodletting, or Mercury, or Antimony, or any combination of them—all seem equally inert and useless in checking the progress of the disease. These means seem all to fail in diminishing the mortality of the disease, and indeed appear to be rather injurious than beneficial. This will be all the more apparent when we proceed, as we shall now do, to consider the effects of an opposite plan of treatment, based on
entirely contrary theoretical views; a plan of treatment which has been crowned with the happiest results.

S. Treatment directed to favour the natural progress of the disease.

The great exponent of this plan of treatment is Dr. Hughes Bennett of the Edinburgh School of Medicine, who has laboured with great perseverence and ability, with no small measure of success, to establish the truth of the doctrines he has advanced, and to show the profession we therefore much indebted for the more enlightened views that now prevail in regard to the true pathology and proper treatment of pneumonia. Holding entirely different views on the subject of inflammation from those which had reigned supreme in the medical world, he has jealously advocated an exactly opposite mode of treatment from that previously in vogue; and the success of his practice...
Should commend these opinions to the confidence of all enlightened and unprejudiced members of the profession. Shewing aside the time-honoured and stereotyped anti-phlogistic treatment of lowering the system by the use of low diet, active purgation, blepharitis, mercury, and antimony, Dr. Bennett has embraced and practiced a directly opposite method; a method grounded upon the principle "that an inflammation once established cannot be cut short, and that the object of judicious medical treatment is to conduct it to a favourable termination." This object is to be attained not by lowering the vital powers but by supporting them, and by assisting the exclusion of effete products from the system. His efforts are simply confined to attempting to guide the morbid process to a favourable termination, just as in Smallpox, Scarletina, Syphilis, Grypихia, and many other diseases, in which no one now ever dreams of attempting to cut short the
natural and inevitable progress of the diseased process by active and heroic means of treatment. To quote his own words from his work in "Principles and Practice of Medicine" in which these views are fully enunciated. "The treatment I have pursued in pneumonia is founded on the pathological principles formerly given, viz., never to attempt getting the disease short, or to weaken the pulse and vital powers, but on the contrary to further the necessary changes which the tissue must undergo, in order to be fully excreted from the economy. To this end, during the period of febrile excitement, I content myself with giving salines in small doses, with a view of diminishing the viscosity of the blood. As soon as the pulse becomes soft, I order good beef tea and nutrients; and if there be weakness, from 4 to 8 ounces of wine daily. As the period of crisis approaches I give a diuretic, generally consisting..."
"Of half a drachm of nitric ether, sometimes combined with ten minims of Colchicum wine, three times daily, to favour the excretion of urates. But if crisis occurs by sweat or stool, I take care not to check it in any way."

Such is a general summary of the treatment which Dr. Bennett employs with eminent success for the cure of pneumonia. This success is most astonishing and gratifying when contrasted with the results of the antiphlogistic measures formerly employed. He had treated, he says in the last edition of the work already mentioned, no less than 602 cases in the wards of the Royal Infirmary of Edinburgh according to the tales here enunciated, with the wonderful result of not losing a single case. Of course I here exclude from consideration a few exceptional complicated cases of pneumonia where the patient while suffering from a pneumonia succumbed to much greater serious and fatal diseases. There no
doubt whatever that the results of Dr. Bennett's practice in late years is equally favourable; and that the next edition of his work on Clinical Medicine will record an experience equally encouraging and deserving of confidence.

In conclusion I would observe that the results of Dr. Bennett's mode of treatment appears to me not only to demonstrate the superiority of such practice, but also to afford the most convincing testimony to the correctness of his views on the subject of inflammations. These views are the following viz. that when an inflammation is once established it cannot be cut short and that the object of judicious medical treatment is to conduct it to a favourable termination; that neither general nor local bloodletting can possibly diminish the amount of blood in internal parts affected with inflammation; that blood-letting cannot facilitate the elimination of the materia morbi from the blood;
and that a depressing plan of treatment assists the morbid action instead of diminishing it, and so weakens the system as to deprive it of the power of rallying against the effects of the disease.

The wonderful success, which has attended the adoption of the rules of treatment, that the above mentioned views on the nature of inflammations do obviously suggest, affords the strongest evidence to the truth of these principles.

John Turner.

4. W. Claremont St.
March 24, 1862.