Lectures

ON CERTAIN VIEWS ON THE NATURE AND TREATMENT OF PHTHISIS PULMONALIS.

DELIVERED AT THE

BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, IN THE SUMMER OF 1856.

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LECTURE II (*concluded*).

DIMINISHED VITAL CAPACITY AND LESSENER ACTION OF AIR VESICLES LEADING TO DEFECTIVE CHEMICAL CHANGES, TO COLLAPSE, AND TO MORBID PRODUCTS. ALL GENERAL CAUSES ACT BY LOWERING NERVOUS POWER AND LESSENER VESICULAR ACTION. SEX. AGE. TUBERCLE—WHAT IT IS, AND WHY IT SELECTS THE LUNGS AND THEIR APICES.

As, then, it may be affirmed that, at the moment of the occurrence of phthisis, or rather of the deposition of the tubercle, there is no change in the appetite or the functions of the alimentary canal; but that there is a marked change in the quantity of air which the lungs are capable of containing, and consequently a diminution in the process of aeration, it is important to ask if the last is an effect of some anterior condition, and only cotemporary with the deposit of tubercle, or if it is directly or indirectly causative of this deposit. It is quite capable of proof that the diminished vigour and depth of breathing may not only exist long before tubercle is probably deposited, but it occurs in cases in which no tubercle is subsequently deposited, and hence does not appear to be necessarily connected with that deposition. It is, however, highly probable that the deposit is always, or nearly so, preceded and accompanied by the lessened breathing; and hence its coexistence must be regarded as more than an accident. It seems fair to infer that, as the cases of phthisis form so large a proportion of all cases of disease, much more of those in which there is this lessened breathing, the lessened breathing may commonly be regarded as tending greatly to the deposit of tubercle. Whether, in this point of view, phthisis may practically be regarded as one large section of a still larger class of diseases, rather than as an isolated disease, it may be difficult to determine, but there is a high degree of probability that something might be gained by regarding it in the former rather than in the latter light. The essential feature of this larger class would therefore be the lessened respiration, or the still anterior cause which may have produced that condition.

We must hence consider the defective condition of respiration both as the result of anterior causes, and as in its turn becoming the cause of disease. As the result of an anterior condition, it may be owing either to a general cause or some local impediment in the lungs. If we first investigate the latter, we must at once admit that there is no impediment offered by the bronchial tubes: and hence, if it is found at all, it must be in the air-cells of the lungs. From the proposition, there is no impediment existing in the air-cells which is due to the introduction of any solid matter; and, if any impediment exist at all, it must be from a collapsed or a lessened capability of expansion of the air-cells, and that may be either temporary or permanent. That such a state may exist, is highly probable, from the mere consideration of the action of the cells; for if the actions of dilatation and retraction occur at all, surely they may be varied, and thus be lessened until they are lost; but it is rendered quite certain from the fact that we may have an entire absence of the murmur which always accompanies the action of the vesicles. The diminution of vesicular murmur is to be observed in the only cases under consideration in which there is also diminished respiration. Whether, therefore, this local condition is itself due to a general cause or not, it is fair to infer that it does exist as a condition precedent to or attendant upon phthisis. The demonstration of this state of things upon the dead body has always appeared to me to be a matter of great difficulty; but Dr. Graily Hewitt has affirmed its existence in hooping-cough, on the ground that a certain portion of the air-cells cannot after death be distended with air. This appears to me to be a fair test, assuming that there is no deposit, if it be applied with sufficient care and judgment; but it cannot be applied in phthisis, since it is highly probable that the effete cells would become the depositaries for the

new morbid matter; and hence the non-distensibility would be fairly attributable to other and more tangible causes. In hooping-cough the march is more rapid; and hence death may occur whilst the air-cells are both collapsed and empty.

There is, however, one very striking fact which has been seen by all of us, viz., the puckering of the lung at the apex, which is not by any means uncommonly found in phthisis, and in deaths from other diseases. It has been the fashion to explain this by stating that it represents a closed and healed vomica; and when it has been found apart from phthisis, it has been seized upon as evidence of the curability of that disease; but I submit that there is little evidence to support that assumption. On making perpendicular and transverse sections of the puckered part, it is seen that there is a mass of thickened structure having its long diameter directed in a line parallel to the distribution of the bronchi, and having a transverse thickening to the extent of about a line. There is retraction of the pleura along its edges, but more particularly at the apex, with some little morbid change in the character of the membrane itself. On microscopic examination of the thickened mass, it is found to consist almost entirely of a close mass of white and yellow elastic fibres; and to my mind that and the aspect of the adjoining cells rather implies a condensation of the lung tissue, with obliteration of the cells, than the remains of tubercular infiltration and deposition, with the inflammatory exudation such as would necessarily attend the formation and closure of a vomica. Moreover, as the supposition implies that the vomica had been lined by a membrane of the serous type, and consequently that, on the closure of the vomica, the two surfaces must be brought into contact, there ought to be some remains of these surfaces, and of the line of their apposition, in the line of closure; but I have sought for this in vain. I could not affirm, however, that there had not been a cavity at that point; but the anatomical evidence, conjoined with the comparative infrequency both of these puckered parts and of the permanent arrest of the disease, lead me to think that the explanation just offered is at least as probable.

Then, to what circumstances may we attribute the collapse or lessened capability of extension of the air-cells? Can it be local—that is, within the air-cells themselves? Since the air-cells are the essential parts of the lung, and their functions are most important, it may be reasonably inferred that they are endowed with properties either more perfect than or different in kind from those which are distributed to the other parts of the lungs. It is admitted universally that the structures entering into the composition of the air-cells are entirely different from those constituting the bronchi; and with difference in structure there is usually difference in disease. Moreover, the peculiar mode by which the vesicles act, viz., that of extension and retraction in a spiral manner, as may be imperfectly imitated by a spiral spring, must surely be a circumstance depending very especially upon peculiar and local nervous power; and its constant repetition eight thousand times during every hour of life must certainly lead to its diminution. That there should, therefore, be states of disease peculiar and restricted to the air-cells of the lung, would be highly probable. Whether this special liability to disease ever induces the collapse to which reference has been made, is not known at present; but the occurrence of the rapid form of phthisis, and the supervention of phthisis upon inflammatory conditions of the lungs, and also as a result of the inhalation of hard particles in grinding, would seem to render this probable.

The spiral action of the air-cells, above referred to in the text, is imperfectly represented in the drawings on next page.

It is not unusual to see cases in which, with more or less dyspnoea and hindrance to the circulation in the lungs, the only change which can be ascertained is lessened or lost vesicular murmur, with some shortening of the inspiratory effort; and they forcibly impress the mind that there is a state of disease of the air-cells in which their function is simply lessened or lost, and that more or less extensively. This has not been sufficiently investigated, but I feel assured that the next improvement in chest pathology will be to give less attention to the mere conduits of the air, and more to the essential air-vesicles.

Without, therefore, being able to affirm positively that there is collapse of the air-cells, due to local causes as an antecedent to tubercular deposit in the lungs, I submit that there are grave reasons to induce us to believe that such must be the case. That such a state of things should result from a general cause, as that of the nervous system, is highly probable. The air-cells, however much they may be independent of the other and non-essential parts of the lungs, must for that very reason

be dependent upon the nervous system; and as, with a due supply of nervous power, the air-cells may perform their duties perfectly, a deficient supply would be followed by deficient respiration. Any state, therefore, in which there is deficient nervous power in the body (and hence more particularly in the sympathetic system, as influencing the vital action), may or will be accompanied by lessened respiratory action. We all

Fig. 1 exhibits a collapsed intercellular passage, with its surrounding air-cells; the opening marked 3 being the distal end, which has been cut away in making the section. The projecting lines 1 are the free projecting edges of the valve or spire, which winds in a spiral manner; whilst the spaces 2 are the air-cells situate between each of the valves or spiral edges. In a good section of a lung, one or two, and sometimes more, of the free edges may be seen, and also traced to a certain point, by continuously lowering the focus. I have a section exhibiting five free edges. In ordinary expiration, it is almost certain that the collapse cannot have proceeded to the degree exhibited in the drawing.

Fig. 2 represents a section of the termination of a bronchial tube 1 into the intercellular passage 2, and the air-cells arranged on each side and also at the distal end of the intercellular passage 4. The constricted parts 3 are the seats of the valve or spire, which projects internally, as shown in 1, Fig. 1; whilst the intervening bulgings represent the air-cells more or less, but equally distended. At the constricted parts, there are circular bands of elastic fibre, which could not be shown in the drawing; and there are also four or five large bands of the same tissue passing from the bronchus on the sides of the air-cells, and ending in the terminal air-cells, 4. These, by retraction, retract the air-cells: and, in a state of retraction, the fibres in the bands are variously folded, so as to give a figured and not uniformly smooth appearance to the inner surfaces of the air-cells. The spiral arrangement is shown by the position of the air-cells on either side of the intercellular passage, and also by a white line traversing the intercellular passage from 3 to 3, indicating the free valve 1, Fig. 1. The delineation is a matter of some difficulty, and is not perfect in the drawing.

know that, in states of health, the breathing is less deep under circumstances which call forth but little of the nervous energy, as, for example, the lying posture, quietude, absence of food, darkness, and sleep, in all of which states there is less respiration than in their opposites. So also, in regard to the mind, when the system is oppressed with quiet grief, or when the mind is absorbed in deep thought, we have each noticed the greater shallowness of the respiratory act, and the occurrence of yawning or sighing, both of which acts enable the respiration to be deeper and the exchange of air to be greater. If, therefore, we are conscious of this in health, what difficulty can there be in inferring the like results from states of disease which lessen the nervous power and the depth of inspiration: hence we infer that, in enfeebled states of system, and more particularly of the vital nervous system, the action of the air-vesicles is lessened, and it may be even abolished in whole or in part.

Now, if the air-vesicles, or any of them, cease to act, or have a lessened action, from whatever cause, for a period more or less long, the natural result would be, that they would lose their power of action, and, in obedience to a recognised law of nature, would change in structure, and fall into decay. A collapsed air-cell, if it have existed from some distant period, will have lost its vital power, and be incapable of regaining it; and will, therefore, have degenerated in structure. Such a change may, consequently, be due either to the prior diminution of the

general nervous power alone, or to that conjoined with changes which may have proceeded within it; and the state of the nervous system may either be due entirely to something apart from the deficiency in the respiratory act, or to both conditions conjoined and acting co-ordinately. The lessened respiration will thus be both a result and a cause of an enfeebled condition of system, and also of phthisis.

It has long been admitted that the various causes which are commonly believed to favour the occurrence of phthisis have all the direct tendency to lower the tone of the system. Such are some of the following—deficient food, etc., especially of animal food; deficient clothing; exposure; impure air; anxiety of mind; too great bodily or mental exertion, or a deficiency of both; late hours; night watching; tight lacing; intemperance; abuse in sexual indulgences; and long continued disease. Some of these seem to be necessary evils in the life of a large part of every community, as the poor, in reference to food, clothing, exposure, and anxiety; and many others, whether necessary or not, are widely disseminated through every class of the community. If, therefore, these circumstances have a tendency to induce phthisis, it cannot be a matter of surprise that phthisis should be the most prevalent of all diseases, when we remember that the causes are irremovable from the lives of the bulk of mankind, and are engrafted into the habits and vices of both the high and the low classes of the community. From the nature of things, those circumstances which the most tend to disease will be of a depressing character, and the more so in large communities, part of whom are afflicted with poverty, and another part with vicious customs and habits. Then, if we add to this the fundamental evil, and consequently the one which is more powerful than any other, viz., the defective states of system which the parent communicates to the child from the action of these adverse influences through many generations, and by which we are prone to succumb to the influence of adverse agencies, we must admit that there is abundant reason for the prevalence of this fearful disease. It is highly probable that even the defective systems which now prevail amongst mankind vary in the readiness with which they bend to any of the above or other depressing agencies, and also that one may be more under the control of one agency, whilst another may be more influenced by a second cause; and hence one cause absolutely, or acting with any given degree of force or duration, would produce equally evil results on a large number of persons. Hence the induction of phthisis may occur in some systems which may actually appear to be in an average state of health, whilst in others the system must be more broken down before this result can follow. The states of organisation which seem to be the most exposed to this disease are directly opposed to each other in the one particular of activity, but both agree in the want of true tonic. Thus the poorest and the most sensitive constitute the one, and the most phlegmatic or lymphatic the other. Those of a medium state of organisation seem to be more resisting. It is also not uncommon to find, in a large class of these cases, a certain tendency to roundness or embonpoint—a circumstance which is rather due to the deficient respiration than to excess of carbonaceous elements in the food, or to very great deficiency of exercise. But, as the disease affects all classes, and arises from so many varied circumstances, it is hazardous, in a discussion as to the nature of the disease, to rely upon the personal peculiarities of a section only.

There are, however, a few circumstances which call for a little inquiry before we attempt to draw any deductions from these statements. It is clear that the disease affects every class of the community, and therefore persons placed under every condition of the ordinary hygiene. The high born, brought up with every care and luxury, and without a thought which need to give anxiety, as well as the poor labourer, with deficient nutriment, clothing, and housing, and whose whole life is a scene of great care and anxiety, are alike exposed to this disease; but, different as may seem to be the circumstances of each, they are, in fact, in a great measure identical in their operation as a cause of phthisis. The deficient bodily exertion, and too often also of healthful mental exertion; the constant excitement, or alternation of great excitement with equally great apathy; the habit of late retiring to rest, and of late rising, by both of which the sleep is rendered less sound and refreshing; the close and heated air of the drawing-room, the ball-room, and even of the closed carriage; the thin clothing of the person, and especially of the extremities; the habit of selecting food rather to please the palate than to supply nutriment, and hence the ready surfeit of the appetite, and the small quantity of food which constitutes the meal,—these and

many other similar evils really assimilate the condition of such an individual to that of the poor cottager with his want of nutriment, clothing, and pure air. Even as to the matter of anxiety, which I believe to play an important part in these morbid agencies, although the rich need not to have any, and the poor must have it ever present with them, there is, in fact, a great similarity; for the sensitive organisation of the one suffers much from a small cause, whilst the blunted feelings of the other bear much without suffering.

Then, again, so far as we know, the disease is known in every clime, whether of heat, moisture, or elevation; none is free from it, if there be masses of human beings there. It is said and believed to have increased in new countries in an increasing ratio with the increase of civilised communities; and, although no statistical returns exist for a period sufficiently long to prove this, the fact is highly presumptive. That, however, phthisis should be common in such savage tribes as obtain a very precarious subsistence and live in crowded huts constructed to prevent change of air, and more particularly if to all this be added the rigors of a Polar region, or the heat and moisture of many tropical countries, may not excite surprise. Whether, therefore, in savage tribes taken generally, phthisis is so destructive as in civilised communities, is not capable of demonstration; but it is probable that the out of door engagements and the thin population of most of such uncivilised people render them less liable to the disease. We cannot doubt that the present habits of society are extremely inimical to health; and that, instead of the highest civilisation being represented by vicious habits and customs and enfeebled constitutions, it ought rather to be, as it is probable it may ere long be, by habits which really tend both to the comfort and longevity of mankind placed in communities.

The influence of sex is not well marked, since it does not act with uniformity, and, except in a large minority of cases, only to a slight extent. In the investigations into the etiology of phthisis published in 1851, I found that, in the whole of England and Wales, the mortality was the greatest in females, and was, to the population, as 1 to 337 in males, and 1 to 313 in females. This was also found to be the case in nine out of eleven registration districts, but in the sub-districts the contrary was frequently found. This last fact was commonly found in the large manufacturing towns, as Manchester, Wigan, Bolton, Birmingham, Nottingham, Coventry, Leeds, and also in many maritime districts and fishing ports, as Liverpool, Bristol, Cardiff, South Shields, and Plymouth. In the agricultural districts, on the other hand, the mortality was commonly greater amongst females. Perhaps this may be explained by referring to the greater hardships which women have to undergo in the poverty of agricultural districts, and the greater anxiety, long hours, incessant labour, and vicious habits of men in the great towns. I do not think that, upon the whole, we can make any great distinction in the sexes in reference to their liability to phthisis; and, when it occurs, it is less owing to the organisation of either than to the circumstances in which they are placed. It is, however, not improbable that a kind of balance may be struck between the less robust organisation and purer habits of females, and the greater labour, exposure, and vicious habits of males; and hence the mortality amongst females would preponderate in those localities where the men are placed under conditions more than usually favourable to health.

In reference to age, I also ascertained by the same investigations that, over the like area, the greatest number of deaths occurred from the 20th to the 35th year, and that there was a remarkable diminution in the 5th year, and thence to the 10th year; and again at the other extreme end of life. When, however, the number of deaths from phthisis is compared with the number of persons living of each sex at the various ages, which is the only correct mode of determining the influence of age, the liability to phthisis is somewhat different. Thus it was, in quinquennial periods, arranged in the order of intensity, beginning with the most intense:—

Males under 1, 55, 35, 25, 45, 20, 65, 40, 30, 50, 60, 15, 4, 70, 75, 80, 10, 85, 5, 90.

Females under 35, 25, 0, 30, 20, 55, 45, 40, 15, 65, 50, 60, 4, 70, 10, 75, 95, 5, 90, 85.

Hence, whilst extreme old age is truly the least liable to phthisis, the early age of 5 years, and even of 10 and of 4 years, is nearly equally indisposed to its influence. The most exposed age is under 1 year old, and again from 20 to 55. The medium liability seems to be about and after middle life, viz., from 40 to 60 years of age, except the interval from 10 to 15 years, which also occupies a medium position. Hence there

is a wide range of age in reference to the liability, and the only general facts that can be deduced are, then, that the circumstances attending upon the first months of life, and again when the duties of life are fully entered upon, and until about middle life is attained, are those the most conducive to phthisis. These seem to me to draw away the attention from the organisation of the individual, as reflected by his age, and direct them to the circumstances of his life to which we have already referred. It is clear that the disease occurs at all periods of life, even to those of very advanced age; and hence we must be permitted to infer that it is less owing to age than to its attendant circumstances.

Thus it is manifest that we have to do with a disease which is the scourge of humanity taken as a whole—the poor and the rich, the young and the old, men and women, all climes, occupations, and conditions of men. Now, such being the case, it must be that the cause shall either be one and indivisible, and so spread that it may influence the whole world, or it must be manifold as the requirements of man, and acting ultimately on the nervous system in one common mode. The former is highly improbable, since there is not one influence which in every clime has one and the same degree of power. Even the air which we breathe cannot be regarded as the one cause, for it must vary with almost every habitation. No doubt the common experience of man is correct in regarding a multitude of circumstances as causative of this disease; but, if we admit this as probable, it is quite essential to suppose that, as the causes are many and very diverse, and yet induce one common condition, which is nearly identical under all circumstances, there must be one mode by which all ultimately act upon the system in the production of this one common condition.

Now what can this one common mode be? It must surely be found associated with some of the acts and processes which are essential, and about equally essential, to the life of every man. Of the two which are the greatest of these actions, alimentation and aërication, we have shown that, at and after the beginning of phthisis, alimentation remains perfect, whilst aërication is greatly deficient: hence the mind fixes upon the latter function as the one at fault; and, since the aërication depends essentially upon the air-vesicles of the lung, and they have already been proved to be at fault, it is fair to assume that in them and their functions the common mode of morbid action exists. I would, therefore, affirm that all the circumstances causative of phthisis, as that disease is commonly found, cause it by lessening the respiration, and consequently the actions of the air-vesicles of the lung. I therefore would regard this condition as the essence of phthisis; and other circumstances, as, for example, the deposition of tubercle, as accidents. If, however, the disease be limited to a special class, viz., those in which tubercle is deposited, then the state of the respiratory function of the air-cells would be the essence of the genus, and the tubercle the distinguishing mark of the species.

Hence it would follow that, whatever will arrest the action of any considerable number of air-cells without at the same time closing them or filling their cavities, may induce phthisis. The causes to which reference has been made all act by slow degrees, and the disease resulting is of a chronic kind: but may not the same principle be applied to the production of the acute forms of that disease? At present, it is true, facts are wanting to establish such a law; but it appears to me that there are some reasons which should induce us to pursue investigations in the direction now pointed out. The symptoms attending upon acute phthisis, as contrasted with those accompanying the chronic, are chiefly greater excitement of the vascular system, with more dyspnoea, more nervous exhaustion, and a state of the nervous system greatly resembling that accompanying a low form of fever. Thus there is more rapid nervous exhaustion, and at the same time more vascular action; but these are not commonly the usual marks of inflammation. The more marked dyspnoea may be reasonably accounted for by the more rapid loss of the vital capacity of the lung, and therefore may be so far mechanical. It is, however, also clear that, as there is more rapid deposition of the tubercle, there is also more rapid softening and destruction of the lung.

Now, without attempting to prove that there is or is not an inflammatory basis for this form of the disease, we may content ourselves with the general principle, that the power of the air-vesicles in large portions or the whole of the lungs has become suddenly lessened or lost, and leave it to future investigations to determine the precise mode by which this is brought about. As the air-vesicles are the essential parts of so all important an organ as the lungs, they will no doubt be supplied, not only with the common, but with

special nervous power; and we know that, anatomically, they differ from other parts of the lungs. Hence, with this especial nervous power, there would be especial internal liability to disease; and it may probably be that the cause which, acting on the air-vesicles, induces the rapid form of phthisis, may be rather intrinsic or within the air-vesicles, whilst that inducing the ordinary chronic form may be extrinsic or in the general system. Until, however, we know more of the true nature of tubercle, and can venture with certainty to isolate it from all other growths, we can scarcely venture to affirm that the exceptional disease which is known as acute phthisis is essentially the same with the common form of chronic phthisis.

The next point in the inquiry will be to seek to account for the deposition of tubercle in the lung; for the presence of that deposit is so constant and abundant that the deposit must proceed from some law.

The first step is that which has already been taken, viz., to find a nidus for the deposit, and to account for the selection of the air-vesicles in preference to other parts of the lungs. By the preceding remarks, it has been affirmed that the air-cell, having nearly or entirely ceased to act in performing vital functions, is ready to put on a state of degeneration, and becomes, in fact, a more or less useless body. Now, being a useless cavity in the organism, it is not only the more fitted to take on disease, but to be a depository of morbid products. Hence we may presume that tubercle may result either from some morbid action proceeding within the air-vesicles, or that it simply becomes the depository of the tubercle derived from other sources. The first obtains a high degree of probability from the fact that there are doubtless, in a state of health, one or more layers of epithelium lining the air-vesicles, and which, in a state of health, are continually undergoing changes of degeneration and of reproduction. It is probable that the epithelium, when degenerated, does not pass into the bronchi in the form of epithelium, but is more or less, perhaps perfectly, homogeneous and fluid. Now, we can readily understand that any change which would prevent the destruction of the epithelium, or its escape by the bronchi, would end in an accumulation of epithelium in the air-cell, and that this would go on so long as the basement membrane retained sufficient vitality to continue the reproduction of the epithelium, and the air-cell was sufficiently large to hold the retained mass. Thus the tubercle might be regarded as a mass of epithelial scales; and, as has already been stated, there is further probability on this point, from the great resemblance which exists in the epithelial cell of the air-vesicles to the tubercle-cell there found in phthisis. Now, if this be admitted, we may readily account for a large amount of change in the mass, on the principle that the mass, being composed of effete material, must necessarily decay, and might then lead to the formation of oily and earthy matter, so frequently known to have resulted from long continued degeneration. It must not be forgotten that we have a similar state of things in another disease, viz., epithelial cancer—a disease which doubtless commences upon the free epithelial surface, and becomes ultimately a mass of epithelial cells, with a more or less malignant tendency to the destruction of parts.

The foregoing theory of the identity of epithelium and tubercle is due to Schroder Van der Kolk and Dr. Addison; and by it, as it appears to me, we account for the deposit of tubercle in the lungs, and for the extreme importance of the disease, on the ground of the vast mass of air-cells in the lung, their peculiar relation to the bronchi, their peculiar mode of action, their incessant action for so long a period, and the all important character of that organ. It, however, leaves it an open question as to the cause which immediately assisted the due disintegration of the epithelial cells; and, as Dr. Addison does not refer to the theory which I have advanced, viz., the disease of the air-vesicle, as an anterior and essential condition, it leaves both that fact, and also the cause which may induce the disease, open to inquiry.

In reference to the alternative above mentioned, viz., that the air-cells may simply be the depository of the diseased secretion, and have nothing to do with the deposition, I am of opinion that it is improbable. It would imply that it proceeded either from the blood directly pouring out tubercle into the cell, or from the changed action of the epithelial cell by which tubercle is formed by the secreting power. Both of these points have already been discussed. The blood does not contain tubercle; and if it did, it would be open to inquiry why it should especially select the lungs for its depositories; and if epithelium has the power to secrete tubercle, why is not that secretion commonly found upon the large secreting surface of the bronchi?

Now, if the foregoing theory of phthisis be admitted, we

shall have no difficulty in accounting for the increase of the tubercular matter with the progress of time. Thus, if the inaction or closure of the air-vesicles be due to some general cause, it may and probably will be itself more or less general; but as we have seen that, by the deposition of tubercle in one cell of a lobule, that cell becomes blocked up and distended, and is thus enabled to press upon adjoining cells, and arrest their action, we have a mechanical reason for the imaginary implication of other cells in the process. This will necessarily be for a time impeded when the air-cells of a lobule are full; for the enclosing membrane of the lobule, being far more resisting than the walls of the air-cells, does not readily give way to pressure, and hence calls for further and further distension in the cells of the lobule before it permits much pressure to be exerted upon adjoining lobules. In this way the disease is often limited, in certain spots, to a single lobule; and, as the enclosing membrane has remained firm and healthy whilst the impacted walls of the cells have in part given way, it is very common to see not only an isolated tuberculosed lobule, but to be able to turn the mass of tubercle, with the degenerated air-cells, almost cleanly out of the lobular membrane. If, therefore, there were but one cell in which the disease first began, it might be a considerable time before the larger part of the lung could be implicated. It is, however, probable that commonly there are many centres of action; and, in proportion as this is the case (or, in fact, as the operation of the cause upon the air-cells is more or less general), and also in proportion as the disease is active or otherwise, so we may presume the disease will progress more or less rapidly. By the pressure thus exerted, it is clear that the relations of the parts will become changed, and the tubercle be no longer restricted to the free surface of the epithelial lining, as is the case in the earliest deposition.

It may now be asked if any reason can be assigned for the preference which the tubercle evinces for the upper lobe, and especially for the apex of that lobe of the lung. Nothing has been discovered in the anatomical character of the parts which will offer an explanation; and the idea that it may occur from the greater exposure of the upper part of the chest appears to me to be unworthy of notice. There is, however, a reason to be deduced from the action of the lung, conjoined with the above mentioned theory, which may guide us in our inquiries. It is also one which at the same time accounts for the opposite fact of the preference which inflammation evinces for the lower lobes of the lung. It is this. The direction of the trachea and bronchi is downwards; the direction of the expansion of the chest, and of the indrawing of the air, is downwards; and the greatest degree of expansion of the chest is downwards, or at the base: and hence it would follow that the air would more readily pass from the trachea to the lowest parts of the lungs, and those parts would be the most readily distended with air. Hence the apex of the lung would be less readily distended in ordinary inspiration; and before the air-cells in that part could be fully distended on the deepest inspiration, the air-cells of the lower lobes will have been fully filled, and that distension would have become, so to speak, a fulcrum for the forcible direction of the current of air to the apex. If any one will quietly take a full inspiration to the last possible degree, he will find that the lowest lobes are first fully distended, and that the final effort and effect are both felt at the clavicles. Hence I infer that, in ordinary respiration, the air-cells of the upper lobe, and especially of the apex, are not distended to the extent of those at the base of the lung; that, as a consequence, less vital actions proceed in these cells, and they are the first to put on such morbid conditions as follow from the lessened vitality and lessened or lost action of these vesicles. Thus tubercle, in ordinary cases, first finds its home at the apex or in the upper lobe, and in that part flattening of the chest is first perceived; and that the lessened vital capacity of the lung is chiefly found there, before or at the deposition of tubercle, is clear from the flattening, and also from the greater relative loss of mobility at that part, as compared with the lower part of the chest. This is common not only to cases in which tubercle is deposited, but to those persons who are commonly believed to be specially exposed to that condition; and it is seen even in health by the small breath-motion of the upper part, as compared with the abdominal breath-motion.

The same theory will account for the less frequency of primary inflammatory action at the apex than at the base; for it may be affirmed that there is more active circulation and a greater quantity of blood in that part of the lung in which the air-vesicles act freely, and in which the vital processes are the most active. To this also may be added the effect of gravity of

the blood in an organ composed of materials so unresisting, and containing at all times such a large quantity of blood. Hence, where there is the greatest vital action, vitality, and blood, other things being equal, there will be the greatest liability to inflammation; and these circumstances are found most abundantly at the base of the lung. The contrary will be the conditions of tubercular deposit.

Reviews and Notices.

THE JOURNAL OF PSYCHOLOGICAL MEDICINE AND MENTAL PATHOLOGY. Edited by FORBES WINSLOW, M.D., D.C.L. London: John Churchill. January, 1857.

THE last number of this, the most entertaining quarterly appertaining to our profession, is more than usually interesting. The charm of the *Psychological Journal* consists in the wide range of subjects, relative to the science of mind in its healthy as well as morbid conditions, which it embraces. To Dr. Winslow is certainly due the credit of having stimulated the professional mind to cultivate a richer field of psychological inquiry than it had been accustomed to, and not only the professional mind, but the mind of observant educated men of all classes, for we observe articles now and then from the pens of barristers and clergymen, which prove pretty satisfactorily that "subtle souled psychologists" are to be found without the profession as well as within it. The interest imparted to the journal by thus opening its pages to able men wherever they are to be found, is to interest in it a very important class of laymen as well as members of our own profession. The *Psychological Journal* may be seen on the table of the rector and the county magistrate, a class of men to whom it is of the greatest importance to be versed in some degree in the science of mind; for be it remembered, *it is they who have practically the control of all the county lunatic asylums in the country?* From an ignorant board of visiting magistrates, the medical superintendents of these asylums expect and receive nothing certainly but crotchety interference and absurd directions; from an enlightened one, considerate treatment and aid in their efforts to improve the condition of the insane paupers committed to their charge. These gentlemen must therefore see with pleasure the propagation of sound views with respect to insanity, such as we find in this journal, among the class which has such power to aid or to obstruct them in the performance of their duties.

Among the papers to be found in this number, we notice a very discriminating review of the new Scottish philosophy of Professor Ferrier of St. Andrew's, and the continuance of Dr. Webster's Notes on Foreign Lunatic Asylums. The indefatigable Doctor, having exhausted in his previous papers the asylums of Great Britain and France, takes a microscopic view of those in Belgium; and we are promised in the next number an account of the very interesting Pauper Lunatic Colony at Gheel, which we shall not fail to notice when it appears. "The Insanity of George the Third" is a paper interesting to the historian as well as to the psychologist; and the article on the use of chloroform in the treatment of puerperal insanity is of great practical interest.

The paper which will attract most attention, however, is by the Editor, on "Prolonged Shower Baths in the Treatment of the Insane". Our readers will recognise this as the title of Mr. Snape's letter addressed to the Visiting Magistrates of the Surrey Lunatic Asylum in reference to the case of Daniel Dolley. When the unfortunate death of that patient took place, and certain adverse influences took advantage of the accident to attempt the destruction of Mr. Snape, we spoke out on his behalf, and supported him as far as lay in our power. We must confess, however, that we never approved of his method of treatment; and we therefore read with considerable

pain his letter, in which he not only excused, but upheld it as a practice of the highest importance. We no more believe in the efficacy of knocking down a violent patient with a twenty minutes' shower-bath, followed by two grains of tartar emetic, than we approve of the method lately fashionable in some of our hospitals, of knocking down the pulse in fever by large doses of quinine. Dr. Winslow justly says:—

"In insanity, the *vis vitæ* is often reduced to the lowest possible condition. In the great mass of acute cases of disordered mind which the physician is called upon to treat, particularly in our public asylums, the nervous system is in a state of positive exhaustion and debility. The furor—the violence—the maniacal excitement—the muscular resistance, so often found associated with insanity, are generally symptomatic of profound nervous and vascular depression. The excitement of the insane is an *excitement without power*; and he is truly the 'ablest physician' who, recognising this important pathological fact, does his utmost to *conserve and husband the flagging and ebbing vitality of his patient* until the mind recovers its healthy equilibrium."

Agreeing as we do most thoroughly with this passage, we cannot second Mr. Snape in his view of the object of the shower-bath in the treatment of the insane, viz., *the overpowering of the patient*. Mr. Snape indeed tells us that, in numerous cases, his system of treatment resulted in the perfect recovery of the patient. He has given us no instance of cure; but all the world knows how unhappily he failed in the case of the unfortunate Dolley. Dr. Winslow has, we think, done good service in boldly attacking and bringing to book this new system of treatment, which is, we think, fraught with so much danger to those subjected to it. We have before said that we entirely acquit Mr. Snape of the charge of having given Dolley the bath and the "white mixture" as a punishment for the blow he received; but we confess we tremble at the introduction of a so called remedial agent which may be so easily used as an instrument of revenge. Dr. Conolly, when he denounced "the laying on of hands" and the infliction of the strait waistcoat as the last remnants of the bad old system, had clearly no idea of the scientific *restraints* which modern philanthropy essays to introduce. A pair of handcuffs or hobbles are indeed mild applications in comparison with the double blow of the twenty minutes' continuous shower-bath, followed by two grains of tartar emetic, which are now set forth as appropriate "quietners", as our Leeds friends would call them, for violently excited patients. By the bye, Dr. Winslow asks the question, Is the plunge-bath (or "bath of surprise") still used at St. Luke's? As we have heard singular reports upon this subject, we should be glad to hear the question answered—in the negative.

Association Intelligence.

ADMISSION OF NEW MEMBERS.

THE LAWS of the BRITISH MEDICAL ASSOCIATION, with regard to the admission of new members, are the following:—

Any qualified medical practitioner, not disqualified by any bye-law, who shall be recommended as eligible by any three members, shall be admitted a member at any time by the Committee of Council, or by the Council of any Branch.

The subscription to the Association shall be One Guinea annually; and each member on paying his subscription shall be entitled to receive the publications of the Association of the current year. The subscription shall date from the 1st January in each year.

The names of new members should be forwarded to the Secretary, Dr. P. H. WILLIAMS, Worcester; or to any of the Secretaries of the Branches.