powder ; constant hot poultices, to the belly, and blisters ; and in the last stages camphorated mixture, wine, brandy, and nourishing glysters were administered. But whatever treatment was pursued, I scarcely saw any recover except one ; and I am confident that a great many cases reported as recoveries have not been puerperal fever in its pure form, but common acute inflammatory cases. Some practitioners declare that they never lost a patient under puerperal fever, from their peculiar mode of treatment. It may be quite true that their patients recovered ; but it is questionable if the disease was pure puerperal fever. It is not easy to steer a course in the treatment of this disease, when we notice that emetics, purgatives, turpentine, bark, stimulants, and Dover's powder have all had their advocates ; and that mercury, in its various forms, especially calomel, even to the enormous extent of upwards of 500 grains in the course of two, three, or four days, has been highly commended as a remedy in some of the worst forms of the distemper.

ART. VI.—*Experiments and Observations on the Cause of the Sounds of Respiration.* By ROBERT SPITTAL, F. R. C. P., Physician Extraordinary to her Majesty in Scotland, Lecturer on Pathology and Practice of Medicine, &c.*

Two theories have been proposed in explanation of the sounds perceived during respiration on applying the ear to the human chest. The first, and until recently the only one, is that which may be inferred from the writings of Laennec rather than from anything decided he has stated on the subject. According to this theory, the different respiratory sounds comprehended under the terms tracheal, bronchial, and vesicular respiratory murmurs, result from the friction of the air on the inner surfaces of the trachea, bronchial ramifications, and air-cells during the passage of the air to and from the lungs, in the acts of inspiration and expiration ; and that this view of the subject was considered sufficiently satisfactory is evident from the fact, that every writer who has recorded his opinion on this topic, at least so far as my research has gone, has, with one exception, adhered to the explanation just stated. Of those who have recorded their opinions, very few have advanced anything like experimental evidence in favour of this particular theory. M. Piorry, in his work on Percussion, details the following experiment, "Take," says he, "the lungs of a sheep bled to death, or of a person who has died of hemorrhage, non-crepitant and free from any frothy matter ; inflate them ; imitating as nearly as possible, either with your own breath, or by means of

* Read at the Meeting of the British Association at Newcastle, 1838.

a pair of bellows, the respiratory movements, and the observer who shall apply the stethoscope upon the vesicular structure will hear distinctly the movements of expansion of the air-cells. He will hear the puerile respiratory murmur, if the inflation be strong, and a feeble murmur, on the contrary, if the inflation be gentle.”*

Now although this experiment is not advanced by M. Piorry in support of what may be termed Laennec’s theory of the respiratory sounds, but to combat certain views of that author in regard to the connection between the intensity of the vesicular respiratory murmur and a supposed active dilatation of the air-cells of the lungs, still it must be regarded as one apparently calculated to give authority to such a view; and we find some years afterwards the same experiment advanced directly in support of this theory by Magendie. According to this author the respiratory sounds are caused in the following manner. “At each inspiration the air is drawn into the chest, and strikes against a multitude of small tubes, giving rise to the developement of a peculiar sound, or bruit, connected with the entry and exit of the air from the organic apparatus. This appears to me,” continues M. Magendie, “the most simple and correct manner of explaining the production of the respiratory murmur; it is, in fact, nothing but the noise arising from the frottement (friction) of the air against the elastic membrane which composes the pulmonary air-cells;”† and in support of this doctrine the following experiment on the human thorax is detailed. “When the lungs,” says M. Magendie, “are inflated through the upper part of the trachea, and the stethoscope is placed on any portion of the surface of the chest, I can hear the bruit of the respiratory murmur most distinctly. The sound produced by the entrance of air into the vesicles is here in fact very intense; the integuments have been removed from the anterior portion of the thorax, and the muscular layer by which it is covered is extremely thin; hence any sound developed in the interior of the cavity is conveyed through the elastic parietes to the ear, without losing any of its force or distinctness.”‡

Having repeatedly performed similar experiments as well on the human lungs, as on those of the lower animals, such as the ass, sheep, and dog,—whose lungs, from possessing an analogous structure to those of man, answer sufficiently well for such observations,—I am enabled to corroborate the statements of the foregoing physiologists, that the sounds observed on the inflation of dead lungs, whose bronchial tubes and air cells are free from liquid matters, resemble very accurately those perceived during life; the tracheal, bronchial, and vesicular modifications of the respiratory murmur possessing their ordinary and distinctive peculiarities, with this

* Piorry, *Procede Operatoire*, &c. Paris, 1831, p. 88.

† Magendie’s *Lectures*, *Lancet*, 1834, 1835, p. 542.

‡ *Ibid.* p. 797.

difference, that, when the naked lung is the subject of auscultation, the sounds are all louder, because nearer to the ear, and deprived of the usual impediments to their free transmission, which the parietes of the thorax present.

Knowing the ease with which air can be thrown into sonorous vibrations, we admit that these experiments appear, on the first view, to afford very strong evidence in favour of the theory of which we now speak; and we are not inclined to be out of humour with M. Magendie, who complains so much of the hasty and inaccurate conclusions of others, because he has, without further examination, come to the conclusion, that "During the act of respiration, the air is compelled to enter and alternately to evacuate the lungs; hence by a *simple and natural mode of reasoning*," continues he, "we deduce the production of sound from the friction of the particles composing the atmospheric fluid against the sides of the bronchial ramifications," and the pulmonary vesicles.*

In these few simple and apparently conclusive experiments are to be found the only evidence, of an experimental nature, in support of the present theory; but, however much they appear to favour this view of the subject, on close examination it cannot fail to be remarked, that they are quite insufficient to bear out the conclusions which have been deduced from them; and show, in a forcible manner, the fallacy of trusting to any "*mode of reasoning*," however "*simple and natural*," unless based upon careful and repeated experiment. To this loose method of arguing physiologists are in an especial manner indebted for many worm-eaten and musty, but albeit curious, tomes, which now scarcely ever see the light of day, excepting under the protecting gaze of some sorely benighted medical antiquary.

The second and only other theory of the respiratory sounds with which I am acquainted, and which it is my chief object, in this paper, to notice, is that of M. Beau of the Necker Hospital, who, after numerous experiments and examinations, arrives at the following conclusions,—"*1st*, That the different respiratory sounds, not complicated with râles, are not mechanically produced by the passage, and the friction (frottement) of the air against the walls of the bronchial ramifications where they are heard. *2d*, That they are produced by the resounding throughout the whole column of air inspired, and expired, of a sound resulting from the striking (refoulement) of that column of air against the *velum palati* or the neighbouring parts. *3d*, That every sound produced in the upper respiratory passages must be transmitted throughout the bronchial ramifications, with its own proper character and degree of intensity. *4th*, That in practice, we should

* Magendie's Lectures, *Lancet*, 1834-35, p. 795.

never conclude that the air does not enter into the lungs before having examined whether a guttural sound is produced or not. 5th, "That we can, by stopping the guttural sound, stop the respiratory murmur, of which it is the reverberation, and thus obtain, in a state of purity and fulness, certain sounds of the lungs, of the pleura, and the heart, which are often confounded with it, and which it is impossible to appreciate unless they be so isolated." *

It does not seem to me necessary to state here the experiments by which M. Beau has arrived at opinions so opposite to those which appeared so satisfactory and conclusive, and which had so long remained unscathed by the breath of controversy, destined seemingly to enjoy the repose which is alone inseparable from long established and severely tested truths. On the one hand, however, while they do not seem to me to prove, so clearly as might have been done, some of the conclusions which are deduced from them, on the other, they appear far from meriting the objections and animadversions which have been urged against them.

Our first object of inquiry shall be as to the existence of the sound which is said to take place in "the superior respiratory passages," in the manner described by M. Beau. In the first place, then, it is a matter of familiar observation, that a blowing, rushing sound takes place both during inspiration and expiration, synchronous with, and consequent upon, the entrance and exit of the air from the lungs. This sound every one can hear distinctly, and in his own person, without any artificial aid, especially on full, free, and quick respiration; and we perceive at once that it has its site in the upper portion of the respiratory passages. When the mouth is shut, it seems chiefly connected with the external nasal apertures; when open, we would refer it almost entirely to the mouth itself; and when the latter is widely opened, to the back part of it, to which, and the neighbouring parts, M. Beau refers it, and where perhaps it is not inaptly termed the "*guttural*" *respiratory sound*. On close examination by means of the stethoscope, this sound appears to me to be loudest, and to have its origin at the upper part of the larynx; and probably is chiefly produced in the narrowest part of this, or at the *rima glottidis*, where the air, in passing to and from the lungs, and meeting with an impediment to its free passage, is thrown into sonorous reverberation; and this is quite in accordance with all observation in regard to the rapid or forcible movements of aeriform fluids.

It does not appear necessary, however, that any such contraction should exist for the production of this sound; for if air be blown through any tube, the same species of sound is easily produced and

* Beau, Recherches sur la Cause des Bruits Respiratoires, &c. Archives General. Vol. v. p. 570. Paris, 1834.

distinctly perceived at the extremity whence the air issues, and where it is most likely produced by the vibration of the air in passing out, against the edge of the extremity of the tube, which acts here, seemingly, the part of a constriction in reference to the surrounding air; and the same thing happens if the air from the tube be made to issue into one of larger dimensions, or, which is the same thing, at any contracted point in a large tube. Again, if air be inhaled by means of any tube, a sound of a similar character is produced, and which we refer at once to the aperture by which the air first enters, and where the same species of vibration seems to take place, and probably in the same manner as that we have described as occurring on the exit of the air from the tube.

The shape of the extremity of the tube, or the aperture by which the air enters or issues, exerts a considerable influence over the degree of sound. If, for example, that used be a tube with a conical extremity, such as the ordinary stethoscope of Piorry, the sound will be perceived much louder than when a tube of equal diameter throughout be used—difference of materials likewise modifies the results.

These simple experiments appear to me to render of no avail the observations of M. Raciborski, founded upon an experiment on a rabbit, in which the trachea was cut through, and the animal allowed to respire by the artificial opening, and in which state the respiratory sounds were heard as before; for although the superior parts of the respiratory passages were cut off from the possibility of having any share in the production of the sound of which we speak, still the open extremity of the trachea may have been quite sufficient for its production, and in the manner just noticed. At all events, such an experiment is far from possessing the importance which its author would attribute to it, and not calculated to disprove, or even to affect much, if at all, the theory of M. Beau.* The existence of sounds in the superior respiratory passages was well known to Laennec; but he tells us, that “all the sounds which take place in the back part of the mouth (*arrière-bouche*) and the nasal fossæ have no influence on the murmur of respiration.”† In support of this opinion, however, he offers no manner of proof, and how far such a view of the subject is correct, will perhaps become apparent in a more advanced portion of this communication. Magendie has likewise noticed these sounds, and does not seem to think it unlikely,—notwithstanding the opinion he has formed in regard to the cause of the respiratory sounds,—that they may exert some influence on those perceived in the human chest.‡

Having proved, then, the existence of a sound in the superior re-

* Raciborski, p. 101. Paris, 1835.

† Laennec.

‡ Magendie, op. cit. p. 793.

spiratory passages during respiration, the next point for determination is, Does this sound resemble at all the respiratory murmurs which are perceived in the lungs and trachea during respiration? To this question we find a ready answer in the words of Laennec, who, in describing the vesicular respiratory murmur, says, "This sound may be compared to that produced by a pair of bellows, whose valve makes no noise; or still better to that emitted by a person in a deep and placid sleep, who makes now and then a profound inspiration."* In these remarks we recognize the most correct observation, showing, in the first place, the similarity which exists between the vesicular respiratory murmur, as heard by means of the ear applied to the chest, and that sound which takes place in the superior respiratory passages, and which can be easily heard at a considerable distance, and without any artificial aid, and which, doubtless, is that to which Laennec alludes, "as emitted by a person in a deep and placid sleep." *Secondly*, these observations prove, what may be considered as the next step of the inquiry, the similarity which exists between the sounds of respiration and those produced artificially by blowing air through a tube, as in the case of the bellows to which he refers, and in which instance the sound seems to take place at the nose of the bellows, consequent upon the exit and entrance of the air during the action of the instrument; much louder, of course, during the former, as the air can only find its exit by one small aperture, whereas in the latter the air enters chiefly by the large opening of the valve, where, finding easier ingress, it is not thrown into such intense sonorous vibration; and in the experiments of Piorry and Magendie, this sound may have been conveyed throughout the lungs, and modified in the same manner as the guttural sound described by M. Beau.

In order to ascertain how far, or whether the sounds perceived in the superior respiratory passages exerted any effect, either in producing or modifying the respiratory murmurs observed in the lungs, it appeared to me that some experiments were required, in which the "guttural sounds," or sounds similar in character, might be produced, and at the same time the passage of a current of air in the lung prevented. For this purpose some experiments were performed on the lungs of the lower animals previously mentioned, and in the following manner:—The largest bronchial tube of one lung, proceeding directly from the great bifurcation towards the base of the lung, was dissected out by the fingers,—which answer better than a knife for this purpose,—and all the lateral branches and extremity carefully tied. The other lung was, in some cases, left entire, or the same bronchial tube was exposed by an incision near to the base of the lung, for the purpose of comparative ob-

* Laennec, by Forbes.

DR SPITTAL ON THE CAUSE OF THE RESPIRATORY SOUNDS.

ervation. The trachea was then attached to the nosle of a pair of bellows, and air blown into the lungs thus prepared. The effect of course was to distend the remaining lung and bronchial tube, while on listening, by means of the stethoscope, a loud bronchial sound was heard, almost, if not quite, as clearly in any part of the bronchial tube through which the air did *not* pass, as in that portion exposed artificially, or where it is naturally exposed before entering the vesicular tissue, and through which the air passed freely during the experiment. As, however, the stream of air from a small pair of bellows was of too short duration to admit of calm and careful observation, another method of experimenting was had recourse to, which, at the same time that it afforded ample leisure for observation, gave results more to be depended upon, and altogether more free from objections. Instead of the bellows an ordinary air condenser was employed, measuring about eight inches by nine in diameter. The interior of the cylinder of the condensing syringe used measured about an inch and a quarter in diameter, and eight inches in length. A hundred strokes of the piston were generally employed, and these afforded a continuous stream of air, lasting about five minutes, which was found quite sufficient for all the purposes of our experiments.

Exp. I. Two carotid arteries of a horse, prepared with all their lateral branches tied, were attached to the tube of the condenser, as may be seen in the accompanying diagram, Plate III. Fig. 1. The arteries were about a foot and half in length, and nearly half an inch in diameter when fully distended. The metal tube of the condenser was rather less than a quarter of an inch in its bore. One of the arteries (*a.*) was tied at its extremity, at a point immediately anterior to the attachment of the gum-bottle, seen in the diagram, so that no air could pass into it except to distend it. The other (*b.*) was attached to a small gum elastic tube (*c.*) for the purpose of carrying away the air, lest the noise of its exit should have proved a source of annoyance. On the air from the condenser (*d.*) being allowed to issue, both arteries became distended, and a rushing noise was distinctly perceived, which could be heard at a considerable distance with the naked ear. On close examination this sound appeared to have its site immediately at the point where the air issued from the tube of the condenser into the arteries. Its character was much the same as that produced by a small pair of bellows, but sharper, probably owing to the nature of the materials of which the whole apparatus was composed, viz. copper and brass,—varying in intensity and tone according to the quantity of air allowed to issue. This sound was distinctly perceived throughout the whole extent of both arteries on the stethoscope being applied over them ; * loudest, and of considerable in-

* Which was easily accomplished by means of a circular portion of cork, with a

tensity, at the extremities of the arteries nearest to the tube of the condenser; gradually diminishing in intensity from this point except in the artery through which the air passed, in which, when this took place with a certain force, the sound was again perceived to increase somewhat, towards the other extremity of the artery attached to the gum-elastic tube; and this appeared to arise either from the entrance of the air from the artery into the tube, which was much narrower than the former, or to be communicated from the other extremity of the same tube, where a similar sound accompanied the exit of the air. With this exception, there was not much difference in the intensity of the sound in the arteries, although it generally seemed somewhat greater in that along which the air passed, as shown in the diagram by the direction of the arrows. In order that the sound might pass freely, it was found necessary to keep the arteries fully distended with air during these observations, which was easily accomplished by regulating its exit from the condenser. Simple compression of the artery (*a*,) with the finger, anywhere between the point examined and its open extremity next the condenser, at once interrupted the sound, which was immediately to be perceived again on its removal.

EXP. II.—A small, thin, round, gum-elastic bottle (*e*,) was attached to the extremity of the artery, (*a*). On the air being permitted to issue from the condenser with sufficient force and volume, to distend both of the arteries, and also the gum-elastic bottle, the same sound as that described in the former experiment was heard as well in the arteries, as in the bottle; louder or feebler in the latter, according to the dimensions of that portion of it allowed to become distended. When fully distended, it measured about three inches in diameter, and in this state the sound was feebler in it than in the artery. When its dimensions were reduced to about an inch and a half, which was done by tying a portion of it while in a flaccid state,—to prevent its entire distension—the sound was much louder than in the artery to which the bottle was attached, and by which the sound was conveyed to it.

EXP. III.—In this experiment the lungs of a lamb, bled to death in the usual way, were employed, prepared in the manner seen in the diagram, Plate III. Fig. 2. An ordinary adult œsophagus tube (*f*,) of less than a quarter of an inch in its internal diameter, was attached by its rounded extremity,—on each side of which there was an oblong aperture about half an inch in length, and a quarter of an inch in breadth,—to the laryngeal extremity of the trachea, (*g*,) which measured, when distended with air, a little

groove cut in it sufficiently large for the artery, so as to prevent pressure from the stethoscope.

more than half an inch in diameter. To the first bronchial ramification (*h*,) previous to the great bifurcation, and usually found in the lungs of these animals, and which proved so useful in this experiment, a smaller œsophagus tube (*i*,) was attached by its open metallic extremity for the purpose of carrying off the air. The rounded termination of this tube contained several apertures, all of which were closed, with the exception of a small portion of one, which could be increased or diminished at will by means of a wedge-shaped stopper. To one of the great bronchial bifurcations, a sheep's bladder (*l*,) measuring about ten inches in length, and five in breadth at the broadest part, was attached. To the other was appended one of the lungs (*k*,) which had previously been removed for another experiment; but in which the results to be presently noticed were precisely the same as in a similar experiment, frequently repeated, in which the lung was allowed to retain its natural attachments.

In this state of parts, air was allowed to enter, by means of the œsophagus tube (*f*,) from the condenser, or was blown in by the mouth. On the entrance of the air the bladder became first distended; then the lung; the air finally issuing by the smaller œsophagus tube (*i*,) when the former had become distended to a degree sufficient to counterbalance, by their elasticity, the force of the air issuing from the condenser or the mouth, in which condition the current of air must have passed along the different tubes, as marked in the diagram by the direction of the arrows. On applying the ear, by means of the stethoscope, over that portion of the trachea, where the air issues from the larger œsophagus tube (*g*,) a loud rushing sound was perceived; and the same, somewhat diminished in degree, was heard along the rest of the trachea, and also in the great bifurcation, where it was of a still more subdued but sharper tone, yet of considerable intensity. When the stethoscope was applied over the vesicular structure of the lungs, in a state of distension, a distinct rushing murmur was heard, much deeper in tone than the preceding, and at the same time more subdued; the two sounds having very much the distinctive peculiarities proper to bronchial, or tracheal, and vesicular respiratory murmurs. This sound was perceived all over the vesicular structure, excepting near any large and superficial bronchial tube, which are frequently found in such lungs, and where it was perceived somewhat bronchial. A metallic ring of about three-eighths of an inch in diameter, was now placed on the bladder, so as to divide it into two portions, for the purpose of ascertaining whether the effects of size, in the portion allowed to become distended, made any, and what differences in the character or tone of the sounds perceived in such circumstances, when it was observed, that, in a cavity measuring about one and a half or two

inches in diameter, which was easily formed by pushing the ring towards the extremity of the bladder near to its attachment, there existed a loud rushing dry sound, so to speak, similar to that described as heard in the gum-elastic bottle, in a former experiment, and very analogous to a loud cavernous respiratory murmur. When smaller than this, it became decidedly sharper in tone, proving the correctness of Dr Williams' views in regard to the connection between the tone of the murmur and the size of the cavity; while, on the other hand, when larger, the sound gradually diminished in intensity, as the cavity was enlarged, until the ring was altogether withdrawn, at the same time assuming a feeble, shrill, ringing character, analogous to that form of metallic or amphoric resonance excited by the respiratory vibrations in large tubercular cavities, or in pneumothorax, in which there exists free communication between the bronchial tubes and aeriform effusion, and termed amphoric respiratory murmur, being nothing more than the cavernous respiratory murmur, modified in its character by the dimensions of the cavity in which it occurs.

These simple experiments seem to me to be less liable to objection than those of M. Beau, advanced in support of his particular view of the subject; and to render it highly probable, if not to prove, that any sound taking place in the upper portion of the respiratory passages, provided no obstacle to its free transmission exist, must, to a certain extent, pass downwards into the lungs, and more or less in every direction, like any other sound, in greater or lesser intensity, according to the nature of the conducting media.

The existence of the "guttural sound," and also the similarity between this and the sounds of respiration, appear to me to have been proved; and in order to render our experiments available, we have endeavoured to show the analogy existing between the respiratory sounds and the sounds produced artificially, as by the bellows, or otherwise. The first experiment proves that a sound of a similar character to the "guttural" can be perceived at a greater distance from its source, and in a narrow tube through which no current of air passes,—as in the artery whose extremity was tied,—than the most distant portion of the human lungs, are from the site of the guttural sound of which we speak.

The second experiment shews, that when the size of the cavity into which the sound enters is increased beyond that of the calibre of the artery, as proved by the attachment of the gum-elastic bottle, the sounds are modified according to the dimensions of this cavity; being increased beyond that in the artery, when the cavity is about an inch and a half or two inches in diameter, and diminished when extending beyond this.

The third experiment, while it corroborates the two former,

presents us with other results of considerable import. In it, all the different varieties of respiratory murmur were artificially produced, or at least sounds very analogous to the vesicular, were perceived over the vesicular structure ; tracheal and bronchial over the trachea and bronchial tubes ; cavernous, in different tones and degrees of intensity in the bladder, contracted as described in the experiment ; lastly, somewhat amphoric in this, when considerably or fully distended. While these different results were perceived, no current of air, or at least none such as in ordinary respiration, could pass through those parts, the subjects of observation ; the sounds, therefore, could be nothing else than the reverberation of that sound mentioned as existing at the extremity of the larger œsophagus tube (*f*,)—and which represented here the sound perceived in the superior respiratory passages—throughout the trachea, bronchial tubes, air cells, and bladder, which latter represented very well the pleural cavity distended with air, as in pneumothorax.

From all these experiments, it seems to me reasonable to conclude, that the sound perceived in the superior respiratory passages, and which M. Beau has termed the “guttural” sound, does, and must exert a certain influence on the sounds of respiration. At the same time, we do not advance them to prove that this is the only source of the respiratory sounds, although we are strongly inclined to think so, in regard to some of them, as they are not of a character calculated to prove that the passage of the air during respiration, to and from the lungs, may not assist in producing some of them, and especially, perhaps, the vesicular ; but to show that the sounds perceived in the superior respiratory passages exert, in all probability, a considerable influence, if not in producing, at least in modifying the different respiratory sounds, known by the terms vesicular, bronchial, tracheal, cavernous, and amphoric respiratory murmurs, all of which have hitherto been explained according to the theory of Laennec. Should it ever be proved, that the motion of the air in the lungs has no influence in a healthy state in the production of the sounds of respiration, we shall then be enabled to associate such an observation with those connected with the motion of liquids on solids, as of the blood on the arteries ; and of solids on solids, as of the lungs on the parietes of the thorax, or the heart on the pericardium. In the former, we know, that the blood flows silently, at least, so far as our instruments can at present enable us to determine, unless some morbid contraction throw it into sonorous vibrations. In the latter, as long as the surfaces remain smooth, and sufficiently lubricated with the healthy serous effusion, the motions of the two solids on each other are performed also silently ; but the slightest unusual dryness or roughness of the surfaces, at once becomes a cause of

sound. So, in the case of the air, it may be found, that, except where it meets with some constriction or interruption to its free progress, analogous to that caused by the glottis, or when its force is very much increased, it passes along its course, during its ingress and egress to and from the lungs, throughout the bronchial tubes and air-cells, without producing any sound appreciable to our senses.

An additional argument in favour of M. Beau's theory, is to be found in those cases, by no means rare, in which, in consequence of a catarrhal affection in the larynx, a wheezing sound takes place in or about the glottis, and generally possessing the varying characteristics of the sibilous and sonorous râles; sometimes occurring only during inspiration or expiration, often during both. In such cases, the sounds are often heard at some distance from the patient, and are easily localized by means of examination with the stethoscope, and found to have their site exclusively in the larynx, yet having all their characteristic peculiarities conveyed throughout the whole extent of the lungs in a subdued degree.

A patient lately applied at the Royal Public Dispensary, in whose chest the following observations, bearing on this subject, were made. By means of the stethoscope applied over the lower part of the larynx and trachea, a loud tracheal respiratory murmur was heard during inspiration, and also nearly as loud during expiration; but, in the latter, accompanied with a considerable degree of wheezing of a sibilous character. At other times, a loud sonorous râle accompanied both acts of respiration. These morbid sounds were distinctly perceived throughout both lungs, of diminished intensity, but of exactly the same character as those existing at the time in the larynx, and these varied very much, occasionally possessing the sibilous, at other times assuming more of the sonorous character. When the morbid sounds in the larynx accompanied the expiration alone, similar sounds in a subdued degree were perceived throughout the lungs only during this act of respiration. When, again, they accompanied inspiration also, the sounds perceived in the lungs were easily referred to the larynx, as their source, from the fact of those of inspiration almost always differing from those resulting from expiration, and having their distinctive peculiarities conveyed throughout the lungs. The sounds were also found to increase in intensity as the stethoscope was made to approach the larynx. The vesicular respiratory murmur was generally feeble; and this seemed to be the result of emphysema of the lungs, together with a slight degree of catarrh, indicated by occasional râles, somewhat different from those of the larynx, the existence of which diseases may have exerted some influence in diminishing, in a greater degree than otherwise might have been the case, the intensity of the morbid sounds of the la-

rynæ, as perceived in the lungs, by presenting numerous obstacles to their transmission by means of the bronchial tubes and air-cells, as the feebleness of the respiratory murmur is also to be explained, according to the theory of M. Beau ; the non-existence of the friction of the air to the same extent as in health, explaining the same thing, according to the views of Laennec.

ART. VII.—*Remarks by Mr John Grant Malcolmson on the Notice of his Letter on the Effects of Solitary Confinement on the Health of Soldiers in Warm Climates. In a Letter to the Editor.*

SIR,—IN your Number for April last, which I had the pleasure of seeing at Florence, a passage occurs, on which I take the earliest opportunity after my return to this country, to offer a few remarks ; as it cannot fail to give rise to erroneous and very unpleasant impressions. It forms part of the very flattering notice of my pamphlet on the Effects of Solitary Confinement on the Health of Soldiers : as follows. “ Part of the evils attaching to these prisons, arises, in the author’s opinion, from the attendance of those establishments now falling solely on young men, owing to the late reduction of pay,” &c. &c. P. 597. In this, my meaning has been mistaken, it having been my intention to express my conviction, that by reducing the allowances of the medical officers of prisons, below that of their brother officers in charge of native troops, these institutions would “ *henceforth*” be placed under the care of the junior members of the service.* An old and wise regulation of the Madras government requires that no medical officer of less than three years service shall be appointed to a civil station ; but it cannot be supposed that the authorities will continue to enforce an order, imposing the painful duties of visiting the sickly inmates of a great prison *with pecuniary loss*, on their more experienced servants.

So far was it from my thoughts to ascribe any blame to the medical officers of the jails of the Madras Presidency, that I believe that no institutions of the kind in any country have had abler professional attendance ; and some of the prisons in which the mortality has been at different times the greatest, more under the care of personal friends, of whose qualifications for the charge it would be presumption in me to express an opinion. But I did think it

* “ It is deeply to be regretted that, by the construction put on a recent order of the Honourable Court of Directors, by the supreme government, the pay of the medical officers of civil stations has been reduced to a mere pittance ; and that *henceforth* the duties of these institutions must fall on young men,” &c. Note, page 5.