DEFECTS OF THE PRESENT SYSTEM OF RESPIRATORY TRAINING FOR THE SOLDIER, WITH HINTS TOWARDS ITS IMPROVEMENT.

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For some time past the physical training of the soldier has interested me, and the conclusion that has forced itself on my mind after the examination of a great number of men is that, in spite of his muscles and, in many cases, big chest as well, the so-called "trained soldier" is a "respiratory degenerate." The term "trained soldier" is used advisedly, for, strange as it may appear, from a respiratory point of view the youngster is, I often find, the better man. It is no uncommon experience to come across a recruit with a chest expansion of two to three, or even three and a-half inches, but I have yet to find more than a very small percentage of "trained soldiers" who can show a difference of even two inches between their minimum and maximum chest expansion. (I here allude to honest mobility of the chest, and not to that sham expansion and contraction brought about by the tension and relaxation of muscles covering the thoracic cage.) Now pulmonary suction depends largely, if not wholly, upon the adequate movements of the chest-wall; if this be inefficient air cannot be drawn into the lungs with sufficient force to make it pass fast enough to supply the needs of the organism through the comparatively small openings of the nostrils, so it is not surprising to find that numbers of these men breathe through the mouth more or less continually. It is true that the majority can on occasion use the nose when their attention is specially directed to it; if, however, the mind is taken off the respiratory act, the nasal passages are ignored more often than not, and this is all the more noticeable during some slight extra exertion, such as walking upstairs, &c. It is not necessary, nowadays, to dilate upon the importance of nasal respiration on all and every occasion, for it is well-known that more or less persistent oral breathing leads sooner or later to varying degrees of nasal, aural, pharyngeal or laryngeal trouble. To satisfy myself that there was no nasal obstruction amongst the men examined, I made many rhinological observations with practically negative results in the majority of cases. It cannot, of course, be argued that this respiratory inefficiency constitutes as yet a pathological condition; but there can be no doubt that sooner or later, unless steps are taken to re-educate the respiratory mechanism, ill-health of one sort or another must supervene. Be that as it may, there
can be no question whatever that staying power—one of the qualities to be most prized in a soldier—is seriously jeopardised, for endurance is directly related, yes, and directly regulated, too, by the respiratory organs. The cause of the defect pointed out is not difficult to trace, for it is nothing more or less than the strained position in which the soldier is made to carry himself, coupled with the erroneous assumption that all physical exercises tend sufficiently to develop the breathing powers. The study of the chest poise and respiratory mechanism of a runner going strong with his "second wind" will give us an idea as to what constitutes perfect respiration, for the so-called "second wind" is nothing more or less than Nature asserting herself; in other words, she has corrected man's mistakes, so that the intense breathlessness which was before a prominent feature is now absent. The mouth is closed, and the air passes silently in and out through the nostrils, which dilate more or less with each inspiration. The head, with chin slightly drawn in, is carried erect, but not stiffly. The chest is prominent, but not unduly so, and the shoulders are held steadily down and comfortably back, whilst the back is flat, with the spine practically straight, i.e., not curved in the lumbar region or elsewhere. The abdomen, as high as the waist, is retracted, the lower ribs at the back and sides move freely out and in, whilst the upper part of the abdomen, viz., the pit of the stomach, is drawn in during each inspiration and flattened again in expiration. (There is a complete absence of that constrained position so beloved by the drill sergeant, in which the chest is rigidly held out by the shoulders being well drawn back and the back hollowed.) It should be observed that the antero-posterior diameter of the upper chest remains a constant factor; this is also a noticeable feature in the respiration of horses, dogs, and other animals. It is interesting to note that this poise of the chest is also to be seen in vocalists of both sexes who follow the traditions of the old Italian school of voice production, and is sometimes known to them as the High Fixed Chest Method of Breathing; and the good physique of the majority of singers, coupled with their excellent general health and immunity from tubercle of the lungs, speaks volumes for this method of respiration.

It may not be uninteresting to recall to mind the part played by the diaphragm in lower rib breathing. As is well-known, this muscle is attached to the spine behind, the sternum in front, and to the six lower ribs at the sides. And it has been shown by Duchenne that by its contraction alone this muscle can elevate the ribs to which it is attached, so long as the vault is supported by
the abdominal viscera. In other words, if the abdomen is retracted, the organs in its upper part are fixed in the arch of the diaphragm, the tendon being thus supported cannot be further depressed, therefore the muscular fibres in contracting elevate the ribs. When, however, the abdominal muscles are held in a more or less relaxed state the tendon is unsupported, and descends as the muscular fibres shorten in length, so very little, if any, rib movement takes place. It is this latter action of the muscle which is usually described in physiological works, and is mostly the one employed by the soldier when in the ranks, &c., as it is practically impossible for him to do otherwise even if he wished to, for with a more or less fully expanded chest and the super-erect carriage he assumes, or is made to assume, it is extremely difficult to obtain the proper diaphragmatic rib action.

Not only is it essential for the soldier to be taught the correct poise of chest and body, but it is quite as necessary for him to be given a clear idea of what actually takes place in breathing. To tell a man unacquainted with the facts, as is constantly done, "to take a breath and then let it out again," usually results in the performance of all kinds of unnecessary and incorrect movements, such as sniffing, gasping, lifting of the shoulders, &c. Seeing that no two men have the same build of body, it is hurtful to a degree to try and obtain with all alike that prominence of the chest which is so pleasing to the eye of the drill sergeant. With regard to the proper carriage of the soldier's body, both military and physiological requirements would be satisfied if the words easily and without constraint (which are to be found in the Manual of Infantry Training under the heading "Position of Attention") were borne in mind, and the ideas conveyed by these terms acted upon.

Large, coarse muscles are not required in a soldier, but litheness and lightness, coupled with powers of endurance. Huge muscles are of no use to any one except so-called professional strong men; but even they find to their cost sooner or later that they suffer from emphysema of the lungs, for it is not possible to lift great weights or practise exercises involving constant tension of the muscles without holding the breath, and a state is eventually reached in which it becomes very difficult, if not impossible, to altogether relax the tension of the respiratory muscles, even when not going through movements necessitating gripping or strain, and as the lungs follow the excursions of the chest wall, and are always in contact with it, they consequently remain more or less distended. A lesson to be learnt from the lower animals is that the best strength is that which is produced by natural habits; so if the
soldier were taught to breathe correctly, and this cannot be done unless the carriage of his body is physiologically sound, it can be confidently asserted that (given moderation in food and drink), with plenty of walking and games, such as cricket, football, hockey, &c., his physical condition would be as perfect as Nature intended it to be. Should, however, it be considered essential, for some special reason, that he must possess showy biceps, &c., care should be taken to prevent, as far as possible, the breath from being held during the muscle-moulding process, and for this purpose there is nothing more helpful than counting in a loud whisper.

In conclusion, I would suggest that all chest measurements be taken at or about the level of the seventh rib, as a more accurate record can be obtained here than elsewhere, owing to this being the base of the chest and the seat of the greatest mobility (from a mathematical point of view it is evident that in the expansion of a cone the diameter of the base is by far the most important diameter to be considered), and there are no large muscles that can be thrown into prominence to deceive one.

[Note.—Since forwarding the above article my attention has been called to a very interesting communication by Lieutenant-Colonel F. Arthur Davy, R.A.M.C. (R.P.), entitled, "A Contribution to the Etiology of Heart Disease in the Army," which appeared as an Appendix to the Army Medical Department Report for 1876, and the paper is well worth the perusal of all army surgeons. By closely reasoned arguments the author shows that the usual chest swelling "setting up drill" insisted on in the army necessarily produces a disturbance of the balance which exists in health between the two circulations—the pulmonary and the systemic—which, when it does not eventuate in invaliding, causes great physical discomfort, breathlessness and discontent, and makes hard work very much harder still. As Colonel Davy very rightly says, it is nothing short of pitiful to see him (the soldier) trained to break down when the necessary "physique" might be secured by a little judicious padding instead of at the expense of the heart and lungs. And with regard more particularly to diseases of the nose, ear and throat, I can show that much of the good obtained from operative or other treatment, such as a correct method of breathing, &c., is not unfrequently nullified by the training a man is again subjected to on his leaving hospital, for disorganisation of the respiratory mechanism is followed sooner or later by the return of catarrh of the upper respiratory tract, and the evil consequences resulting therefrom.]