REMARKS ON THE MOVEMENTS AND SOUNDS OF THE HEART, AS ILLUSTRATED BY THE CASE OF M. GROUX.

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[Abstract of a Paper read before the Liverpool Medical Society.]

The members of the profession have been much interested of late in the case of M. Groux, in whom there exists a congenital fissure of the sternum, which renders visible through the integuments and fasciæ, some of the movements of the heart. Many opinions have been expressed with reference to the parts brought into view by the peculiar malformation. A recent and somewhat careful examination has enabled me to form an opinion of some of the more important points of the case, and that opinion I venture to bring forward.

Admitting the following to be the order in which the movements of the heart take place, viz., contraction of auricles, contraction of ventricles (first sound)—pause (during which no muscular action takes place, but which is accompanied by the second sound), followed by contraction of auricles, etc., we proceed to inquire how far the case under consideration, in which there seems to be no abnormal condition of the heart itself, corroborates this view.

The most important points of the case I believe to be the following:—

In the fissure about the middle there exists a tumour which moves in two directions: first, from above downwards; secondly, from below upwards. The first movement diminishes the size of the tumour, and the second increases it.

At the upper part of the fissure, on pressing firmly backwards, two shocks are felt, in the position in which the aorta is normally placed.

In the lower part of the fissure a movement can be seen and felt in the situation of the right ventricle.

In connexion with the tumour, two pulsations can be felt; one accompanying its contraction, the other its dilatation.

The impulse of the heart is felt in its normal position.

The two sounds of the heart are normal; they do not differ in character from those usually heard, but in some situations they differ in degree.

In connexion with the tumour, under certain circumstances, a *bruit* is heard.

It is generally agreed that the tumour in the middle of the fissure is the right auricle, and in this opinion I entirely concur, for the following reasons.

Its position is that of the right auricle. Its downward movement or contraction takes place just before the contraction of the ventricles, and is attended with a *drawing* or *sucking in*, to be felt when the skin over it is pinched between the finger and thumb. When respiration is arrested, it becomes distended. Its dilatation is attended with an impulse communicated to it chiefly, I believe, by the pulsation of the aorta and pulmonary artery, with which it is synchronous. When the sounds of the heart are listened to, and at the same time a finger is placed on the tumour, its contraction is felt to take place in the interval between the two sounds; it precedes the first and follows the second sound.

With reference to the two shocks felt at the upper part of the fissure, I believe the first to be produced by the pulsation of the aorta; the second, by the vibration resulting from the closure of the semilunar valves. The first shock is synchronous with the impulse of the heart; the second immediately follows it.

The ordinary sounds are heard as usual over the præcordial region. When the stethoscope was applied over the base of the great vessels, the sounds seemed to me louder than usual, from the fact that the instrument was placed nearer the source of the sounds. In the upper part of the fissure the sounds are clear, but not very loud: possibly the sounds produced on the left side of the heart are more or less isolated when the instrument is applied to this spot.

With regard to the auricular sound, I have as yet heard no satisfactory explanation of it. The most important question with reference to it is—Is it produced by the contraction of the auricle; and if not, what is its cause? Observation has hitherto taught us that no sound accompanies the contraction of the auricles; and evidence has been afforded that contraction of the ventricles *per se*, produces no sound. In M. Groux, this peculiar auricular sound is only heard under certain circumstances, which are, that the stethoscope shall be applied

over the tumour, and slight pressure be made. It is not heard when no pressure is made, nor yet when firm pressure is made. It differs altogether in character from the sounds of the heart; and resembles somewhat the sound produced by the rush of fluid through a constricted tube. Taking these facts in consideration, I believe the sound to be the result of the pressure exerted, and not of the contraction of the auricle. We know that pressure on a vessel, in which blood is circulating, by altering its shape and calibre, will produce a sound; and pressure on the auricle, from which blood is being propelled at each contraction, may also be expected to produce a sound. We hear the ordinary sounds of the heart without making use of pressure; and it appears to me that we ought to hear the sound produced by the auricular contraction, supposing it to be constantly produced, under similar circumstances; but this is not the case, even in M. Groux. The sound is only heard when an amount of pressure is made, sufficient to alter the shape of the auricle, but not to bring its walls in contact.

The foregoing observations on this interesting case seem to me to confirm the opinions now generally held of the movements of the heart. Of the two sounds, the case proves nothing more than can be ascertained where no malformation exists. I cannot agree with one observation that has been made; viz., that the contraction of the tumour (auricle) takes place slowly; it appeared to me to be more rapid than the subsequent dilatation; and this was especially noticed when the skin over the tumour was grasped by the finger and thumb. This rapidity of action accords with what is seen in the exposed heart of the lower mammalia.

CASES OF CEREBRAL SOFTENING, ETC.: WITH REMARKS.

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In a previous number of the BRITISH MEDICAL JOURNAL, I endeavoured to call the attention of the profession to the fact that the so called threatening or premonitory signs of apoplexy were very commonly due to unusual mental distress, prolonged anxiety of mind, the extension of tubercular degeneration, or to some other cause of general debility; that they were, in fact, evidences of defective power in the heart, or of impaired nutrition in the brain; that they were generally coincident with other unimpeachable proofs of constitutional feebleness; and that *post mortem* examinations proved them to be connected with a degenerate condition of the cerebral arteries and capillaries. I assumed that, if the symptoms were associated with degeneration of blood-vessels, anything which promoted that process would inevitably tend to aggravate them; and that, if a cure was to be effected, it could only be done by improving the vital powers of those parts which were threatened with decay and death. I have also called attention to the extreme frequency with which atheroma in the larger arteries, degeneration of the capillaries, and a fatty condition of the heart, are associated with phthisis; the great probability there is that atheroma is the analogue of tubercle, and, consequently, the strong reason to believe that softening of the brain is, in the majority of instances at least, a process analogous to the softening and breaking up of the lung in cases of tubercular infiltration; that cerebral hæmorrhage is, *mutatis mutandis*, the analogue of hæmoptysis; and that cerebral softening and hæmorrhage require for their treatment a plan similar to what we should employ in incipient phthisis. These views receive strong confirmation from a careful examination of recorded cases of cerebral softening, and its most aggravated form, that of cerebral abscesses. Thus Lebert, quoted by Dr. J. H. Bennett, remarks, "that whatever debilitates the individual, predisposes to these affections." Dr. Bennett confirms his statements; and they base their opinions on upwards of eighty cases. I have myself met with thirty cases of cerebral softening, and have in all found evidence of phthisis, degeneration of arteries, or other proof of malassimilation. The twenty-seven cases recorded by Andral conspicuously point to the same conclusion.

The following cases, which have recently come under my notice, amply confirm the preceding remarks.

CASE I. J. B., aged 40, a burly Swedish sailor, was admitted into the Northern Hospital on March 14th, with complete paralysis of the right hand and arm, slight weakness and numbness of the right leg, some confusion in the head, and difficulty of speech. He had had a similar attack at sea about