PROVINCIAL MEDICAL & SURGICAL JOURNAL.

PRACTICAL OBSERVATIONS ON SOME OF THE MORE IMPORTANT POINTS CON- NECTED WITH PHYSICAL DIAGNOSIS.

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AUSCULTATION OF THE HEART.

Notwithstanding that many of the phenomena deducible from the physical examination of the circulatory apparatus are less definite and precise than those pertaining to the organs of respiration, chiefly, perhaps, because the former are less numerous, and recognised with greater difficulty than the latter; still, it must be admitted, that the relative value of each is the same, and consequently, that the physical diagnosis of diseases of the heart, equally with those of the lungs, claims a similarly careful and searching investigation.

The precautions necessary to be observed in conducting an examination of the cardiac region, do not materially differ from those previously laid down, when referring to the organs of respiration.

To insure a satisfactory result, attention to the following circumstances becomes more or less imperative:—1st. Perfect quietude, both in regard to the patient and surrounding noises, save, when it becomes occasionally desirable, with a view of rendering the characters more distinct, that the patient, if able, be directed to walk briskly for a few minutes up and down the room, by which means, the pulsation of the heart becoming quicker, the previously indistinct phenomena will be more fully pronounced. 2nd. That the chest, if possible, be bare, or, if covered, that the material be of the thinnest texture, and not flannel. 3rd. That the patient be submitted to examination, both in the recumbent and sitting posture; this will be especially indicated in the case of pericardial effusion. 4th. That the individual be directed from time to time to suspend his breathing for a few moments, in order clearly to distinguish the sounds of the heart from certain abnormal phenomena, perchance pertaining to the respiration. 5th. That the observer take time in the exploration, refraining with decision, in the event of the slightest doubt, from hazarding an opinion upon a single examination.

SOUNDS OF THE HEART.

As in reference to the normal sounds of respiration, it behoves the student to make himself thoroughly acquainted before he attempt to master the abnormal phenomena of disease; so, likewise, in examining the

heart, is it equally imperative, that he, in the first place, familiarize his ear with its natural sounds, by auscultating repeatedly the cardiac region of an individual in health.

The first sound of the heart immediately precedes the pulse at the wrist; it is a duller sound and more prolonged than the second; its maximum intensity is audible a little below, and somewhat exterior to, the nipple. The second sound is sharper and more abrupt than the former, and has its greatest intensity a little above, and to the inner side, of that projection. The period embracing the first and second sounds, with the subsequent pause, constitutes the rhythm of the heart's action. It is now generally admitted, that the first sound is produced by the conjoined influence of the muscular contraction of the ventricles, the shock of the apex against the parietes of the chest, and to a certain degree, by the action of the auriculo-ventricular valves. The second sound is occasioned by the sudden flapping together and closure of the aortic and pulmonary semi-lunar valves, effected by the forcible and sudden succussion of the blood by arterial elasticity, against their concave surface.

In examining the heart, it will be necessary to bear prominently in remembrance the powerful influence exerted by bodily exercise, moral emotions, and nervous impressions, age, sex, temperament, &c., in provoking an accelerated action of that organ. Equally to be borne in mind, are the modifications produced in the intensity and extent of the cardiac sounds, by the amount of thickness of the thoracic parietes: thus, while in thin and nervous individuals, the pulsations of the heart become naturally audible over the entire front of the chest, and even at the back, on the left side; in a corpulent person, with a chest laden with fat, the sounds of the organ, even over the precordial space, will be rendered extremely indistinct, and the impulse often imperceptible.

The above circumstances, in addition to others hereafter to be noticed, require careful attention on the part of the observer, lest, by confounding the conditions arising from natural and independent causes with the more permanent phenomena of organic disease, the most pernicious and often irreparable errors be committed in diagnosis.

SIGNS INDICATIVE OF DISEASE.

Independently of the displacements to which the heart is liable, in consequence of tumours within the chest, diseases of the lungs, pleura, &c., the sounds of this organ are variously affected in disease, both in reference to extent, intensity, rhythm, tone, and the

occurrence of abnormal sounds, co-existing with, or completely masking the natural characters of healthy pulsation.

The increased extent to which the cardiac sounds are occasionally audible, may originate either in certain structural changes in the heart itself, in general constitutional excitability, in nervous palpitation, or in consequence of undue transmission through the medium of an adjoining and more or less consolidated viscous. A decrease in the extent of these sounds may equally depend upon affections of the heart, such as atrophy, softening, &c., or, as already pointed out, upon certain diseases of the lungs, more especially emphysema.

The alterations in intensity to which the sounds of the heart are exposed, are influenced by causes very similar to those affecting their extent. Increased intensity may arise, as we shall hereafter see, from dilatation of the heart, nervous excitability, plethora, or from a generally inflammatory condition of the system; on the contrary, a decrease in the intensity of these sounds will direct attention more particularly to the existence of atrophy of the heart, softening of its tissue, certain forms of hypertrophy, fluid in the pericardium, &c.

The cardiac rhythm becomes altered in regard to the frequency, the regularity, and the increased number of sounds which occasionally obtain during its allotted period.

Increased frequency of the heart's action is the result of so many well known causes, that a simple allusion to its occurrence will suffice. Diminished frequency of the cardiac pulsations will be found to depend more frequently upon deranged function of the cerebro-spinal system than upon special disease of the heart itself.

The first sound of the heart is occasionally prolonged, even to the extent of rendering the second indistinctly audible; this occurs more especially in enlargement or valvular obstruction: an undue interval between the first and second sound of one pulsation, and that succeeding it, together with the various degrees of irregularity in the heart's action, so constantly presenting in practice, as well as the occasional cessation equivalent to an entire pulsation, and constituting an intermission, are all included under the head of alterations of rhythm.

The occurrence of two, three, or four sounds, corresponding to a single pulsation, is very rare. This phenomenon depends upon unequal and irregular contraction of the ventricles, and is indicative of obstructive disease at the seat of the auriculo-ventricular valves.

The degree of pathological importance to be attached to the preceding signs, must depend greatly upon collateral circumstances; for instance, if they obtain singly, if the patient be of a nervous temperament, if transient, and unaccompanied by symptoms referrible to disease of the heart, their semeiological value becomes considerably lessened; on the contrary, their permanency, uniform intensity, conjunction with other physical signs, in addition to the existence of evident symptoms of cardiac disturbance, will render them tolerably sure indices of structural mischief.

The character of the sounds of the heart is liable to undergo considerable variations in different persons,

independently of disease. Beyond a certain limit, however, increased dulness, or increased sharpness, in the tone of the sounds, become morbid phenomena, and which circumstances, as we shall hereafter see, are connected either with disease of the valvular apparatus, or, more generally, with an increase or decrease in the density of the walls of the heart itself.

Dryness and harshness in the cardiac sounds coincide with the commencement of structural changes in the valvular apparatus, and merge sooner or later into the abnormal signs next to be considered.

The metallic sound occasionally heard during the systole, appears to depend upon the increased force with which the apex of the heart, under certain morbid conditions, inducing exaggerated action, strikes the parietes of the chest. This sign, as diagnostic of particular disease, does not, in our present knowledge of cardiac pathology, afford any very precise information.

ABNORMAL SOUNDS OF THE HEART.

For practical purposes, the phenomena included under this head, may be divided into the sounds of friction, and those of blowing; the latter, according to their intensity, merging into sawing, filing, rasping, or, becoming still more shrill, into musical and whistling murmurs.

These adventitious sounds may either accompany or supplant one or both sounds of the heart, and, in reference to the pathological cause on which they depend, vary in their intensity, duration, and permanency.

SOUNDS OF FRICTION.

As in the normal condition, the two surfaces of the pericardium, like those of the pleura, glide noiselessly over each other, during the motions of the heart; so, under the influence of disease does this membrane, equally with the latter, become obnoxious to the presence of adventitious phenomena, to which the names of *friction*, *rubbing*, or *to-and-fro* sounds have been attached. Pericardial friction or rubbing varies in tone and intensity, as well as in character and duration. This sound presents different degrees of harshness, the intensity of which becomes greater in proportion to the force of the heart's action. It may, as is commonly the case, accompany both sounds of the heart, constituting a double friction murmur, or it may pertain singly to either. It is usually confined to the precordial space, more frequently to a limited portion of that region. It varies in permanency, and is often materially modified by the position of the patient.

The phenomena of friction, when not intense, resemble more or less the sounds of blowing, from which they may in general be readily distinguished by attention to the following circumstances:—1st. That the sounds of friction are superficial, occurring immediately under the stethoscope; those of blowing, on the contrary, are more deeply seated. 2nd. That the former are generally most audible towards the apex of the heart; the latter over the base of that organ. 3rd. That the pericardial sounds are usually double, and are not communicated to the arteries; opposed to which, the sound of blowing is more frequently single, and often propagated to these vessels. 4th. The sounds of friction are liable to constant variation, both in reference to seat and duration, while those of blowing, if at all intense, will be found to remain stationary.

Pericardial friction sound will be distinguished from

the analogous morbid phenomenon arising from inflammation of the pleura, in being limited to the precordial region, in being synchronous with the motions of the heart, and lastly, by continuing uninfluenced by the ordinary motions of respiration.

The physical cause on which the sound in question depends, is fully expressed by the sensation communicated to the ear of the observer—viz., that of two roughened uneven surfaces, gliding to and fro upon each other.

The disease indicated by pericardial friction is pericarditis, and under the varied modifications of character, assumed by the false membranes, do we detect the different degrees of rubbing, from the gentle rustling, up to the loud sounds, resembling the creaking of new leather, grating, &c., which latter are often accompanied by a distinct and palpable vibratory fremitus. The phenomena of friction obtain at the commencement of the disease, while the amount of fluid is limited, diminish with its increase, are inaudible when the effusion is abundant, reappear on its absorption, or, in the event of close adhesions rapidly uniting the two folds of membrane together, become totally abolished.

SOUNDS OF BLOWING.

The blowing murmur, or true bellows sound, which definition describes most accurately the impression which it imparts to the ear, obtains more frequently than any other morbid phenomenon to which the heart is exposed. It assumes different degrees of intensity; is either limited to, or extends beyond the precordial confines, accompanying the arterial pulsation at a distance from this region. It may obtain singly, or co-exist with both sounds of the heart, although the first, or systolic, is by far more obnoxious to its presence, and which sound, as already stated, it not unfrequently supplants.

The physical cause of the bellows murmur depends upon the increased friction and vibration to which the blood, under certain conditions, is exposed in its passage through the heart and larger vessels.

The pathological circumstances under which the abnormal phenomena of blowing may obtain, are—1st. Various organic affections of the heart, more especially of its valves. 2nd. Diseases depending upon an unhealthy condition of the blood itself, either in reference to its quantity or quality, as anæmia, chlorosis, &c. 3rd. Certain nervous derangements, under the influence of which the regularity of the circulation through the heart and arteries, becomes considerably affected. 4th. Pressure, either upon the heart or large vessels.

From the latter cause, the blowing sound may depend upon compression by fluid contained either in the pericardium, pleura, or peritoneum; from tumours within the chest; compressing the aorta, or as instanced in a case detailed by the much lamented Dr. Hope, from pressure upon that vessel, by a solidified and tuberculous lung, across which, after death, although not adherent, the course of the compressed vessel was found moulded.

The same author mentions the practice of tight lacing in the female, and in the opposite sex, the wearing tight waistcoats, as capable of producing a bellows murmur.

The formation of a correct diagnosis, between a bellows murmur arising from organic disease of the

heart, and a similar sound originating from causes independent of structural change in that organ, is frequently of the highest moment, both as respects the peace of mind of the patient, as well as the reputation of the observer.

The distinction, in addition to the history of the case, and general symptoms, will be facilitated by attending to the following circumstances:—1st. Organic murmurs may accompany either sound of the heart, or both conjointly; inorganic, on the contrary, are confined to the first sound, with the maximum over the base of the organ. 2nd. The murmur arising from structural changes, is generally harsh, approaching more or less to the sounds of rasping, filing, &c.; that depending upon functional and inorganic causes, so long as it continues, remains weak, soft, and gently blowing. Lastly, the former is almost always persistent; the latter is transient, and influenced by treatment.

The sounds of filing, rasping, sawing, &c., are merely modifications of the former murmur in an intense degree. They are usually persistent, may accompany either or both sounds of the heart, which they frequently obscure, and are most commonly attended by a palpable vibratory fremitus. These phenomena owe their origin to a similar physical cause with the bellows sound, viz., increased friction and vibration of the column of blood produced for the most part, as we shall hereafter see, by morbid changes affecting the valvular apparatus either of the heart or great vessels.

The remaining cardiac murmurs, to which, from their peculiar tone, the names of whistling, cooing, musical, &c., have been attached, are merely shriller, and more fully pronounced varieties of the preceding sounds, and indicate only an increased degree of morbid valvular implication.

In order fully to substantiate a correct diagnosis between organic and inorganic murmurs, as well as to determine the particular portion of the heart which is affected, together with the nature of the existing lesion, a precise knowledge of the situation in which the characters of the different murmurs are most pronounced, becomes of the highest importance.

A murmur of the semi-lunar valves is best heard over the sternum, a little below the third rib; if pertaining to the aortic orifice, it will be propagated upwards, beneath, and a little to the right of, the sternum; if arising from the pulmonary artery, it will follow the ascending course of that vessel. Aortic murmurs are frequently audible in the arteries of the neck; pulmonary murmurs, on the contrary, are not communicated to that region. By tracing the sound upwards from the base of the heart, along the respective courses of the two arteries, the diagnosis between lesions of the aortic and pulmonary apertures will be rendered comparatively easy.

A murmur arising from the auriculo-ventricular orifices, is most distinctly audible, if on the left side (mitral), a little below, and somewhat to the right of the nipple; if on the right side (tricuspid), on the same level, but over the left edge of the sternum. As previously stated, and which must be borne in mind, inorganic murmurs accompany only the first sound of the heart, and are confined to the aortic orifice, since on the situation and connexion which the morbid

sign bears to the first and second sounds of the heart, is indicated the particular valvular lesion under which that organ is labouring.

A murmur accompanying the first sound, with its maximum over either of the auriculo-ventricular valves, not extending up the arteries, indicates patency of, and consequently regurgitation through, the affected orifice.

A murmur accompanying the second sound, its maximum in the same situation as the former, and not propagated to the arterial trunks, is a sign of auriculo-ventricular stricture.

A murmur with the first sound, of greatest intensity over the semilunar valves, and transmitted to the large arteries, indicates stricture of the arterial orifices.

A murmur similarly situated, accompanying the second sound of the heart, and also communicated to the arteries, is significant of insufficiency of, and regurgitation through, the pulmonic, or aortic sigmoid valves.

A double murmur, indicates, most frequently, a two-fold lesion of a single orifice.

Independently of the relative situation at which the abnormal phenomena just described present their greatest intensity, as distinguishing between diseases of the right and left sides of the heart, the diagnosis will be further facilitated, by recollecting the much greater frequency of morbid changes taking place in the left than in the right cavities. The diagnosis will be still further assisted by the character of the pulse, if the left side be affected, or, if the disease occupy the right side, by the condition of the veins of the neck.

Purring tremor or thrill, which is felt under certain circumstances, both over the heart and arteries, owes its origin to a similar physical cause, but in a greater degree, as the murmurs above described. This phenomenon is most distinct in regurgitation through the mitral valve, although other lesions of the cardiac orifices are capable of producing it.

Purring tremor, when confined to the heart, is indicative of organic disease. Structural changes affecting the calibre of the arteries by influencing the current of the blood, and consequently increasing the vibrations, also give rise to this sign. The empty condition of the arteries, and watery state of the blood in anæmia, occasionally become the source of vibratory tremor. The friction thrill of pericarditis, previously mentioned, completes the conditions under which the phenomenon in question obtains.

The morbid sounds arising specifically from the arteries, whether depending upon organic or functional causes, do not differ from those just described, connected more particularly with the heart, the consideration of the diagnostic import of which, therefore, may be advantageously deferred until we investigate the physical diagnosis of those diseases, to which these signs more especially owe their origin.

Distinct murmurs, which until lately, were constantly, and even now, by many, are erroneously described as of arterial origin, arise in many cases immediately from the veins. These are the humming, continuous, and musical venous murmurs, which under certain circumstances, are so frequently met with in the region of the neck. By far the most frequent cause of venous murmur, is an anæmic state of the system, similar to that from whence obtains the inor-

ganic arterial bellows sound, indeed the coexistence of these phenomena would strongly militate against the existence of organic disease.

The compression of veins by tumours, and in some cases even by the stethoscope, suffices to give rise to venous murmur.

PERCUSSION OF THE CARDIAC REGION.

As the value of the information derived from this mode of examination will be considered fully under the different diseases to which the heart is liable, it will suffice at present to mention simply the following circumstances:—

1st. That the natural area of dulness over the precordial space, is limited in a healthy chest to a diameter of about two inches. 2nd. That the finger offers the best pleximeter. 3rd. That in performing percussion, a more direct result is obtained, by commencing upon the resonant lung, tracing it towards its edge, and from thence, continuing the stroke both vertically and transversely, across the heart. 4th. That it is desirable to percuss the cardiac region in all obscure cases, both in the erect and horizontal posture. 5th. That the data furnished by cardiac percussion, are occasionally rendered equivocal by malformation of the chest; the existence of emphysema of the lung, or a pneumothorax; the presence of a circumscribed pleuritic effusion; intra-thoracic tumour; or even, occasionally, by the overlapping of a portion of lung consolidated by pneumonia or tuberculous deposit.

The foregoing summary embraces the chief practical points necessary to be remembered in conducting a physical examination of the condition of the heart, a correct estimate of which, however, can only be obtained by ensuring in the first instance, by repeated examination, an intimate acquaintance with its phenomena in health.

(To be continued.)

DISLOCATION OF THE HUMERUS FROM MUSCULAR EFFORT.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND SURGICAL JOURNAL.

SIR,

Having read, with much pleasure and profit, the Lectures of Mr. Hancock, recently published in your excellent Journal, it has occurred to me that the following case, just submitted to my observation, possesses much interest when viewed in connexion with his reasoning, upon the subject of muscular agency, in reference to dislocations. If you entertain the same opinion, perhaps you will assign it a corner in some early number of your periodical. M. Bichat contended that, in the case of a notary, who dislocated his shoulder by raising a heavy register above his head, the head of the humerus was forced down by the violent action of the deltoid; but the case under consideration would seem rather to countenance the notion, if not actually prove, that the real cause is due to the adductors, namely the *latissimus dorsi*, *teres major*, and *pectoralis major*, for under the particular circumstances of the present case, it is difficult to conceive how the deltoid could possibly have been acting with violence.

Richard M., aged 31, gamekeeper, has had the