did not still exist in our University. Every unclaimed body which dies in the Infirmary and is unopened, is sent, not to the teachers in turn, or in a ratio corresponding with the number of their students, but to the anatomical rooms of the University, sent there indiscriminately, unwished for, and with the knowledge that they will be wasted. Those rooms are filled with bodies, from many of which no one ever derives any benefit. They cannot all be used. But monopoly is there the maxim, and, like the dog in the manger, others are prevented from getting what is useless to themselves. The next month, however, will, in all probability, if the Town Council do their duty, break up the unfair system of self-election to the management of the Infirmary. The unclaimed bodies which are made the subjects of inspection in the Infirmary are, indeed, distributed to the extra-collegiate lecturers, but those bodies are almost always in such a mangled state as to be nearly useless. The College Professor refuses to admit an opened body. Still, however, the voluntarily-attended extra-collegiate classes are flourishing, and, through the exertions of the private lecturers, Edinburgh bids fair to resume her ancient pre-eminence. I am, Sir, your obedient servant,

EDINENSIS.

Edinburgh, Dec. 24th, 1838.

ON THE AUSCULTATION OF THE HEART.

BY DR. HOPE.

RELATIVE SITUATION OF THE DIFFERENT VISCERA WITHIN THE THORAX.

THE heart is moveable ; its most fixed point is about the situation occupied by the pulmonary artery. When a patient lies on his back, this point corresponds to the interspace between the second and third ribs, a little to the left of the sternum. When he lies over to either side, this point may pass a little over to that side. If he is in the upright position, it gravitates down to the level of the third rib ; a line drawn opposite to the lower margin of the third rib passes, as near as possible, across the pulmonary valves. The aortic valves are behind these, but are from about half an inch to one inch lower down. In the interspace between the second and third ribs, the sound of the pulmonic valves is more distinctly heard than elsewhere, for at this point the vessel is nearest the surface, and the contained column of fluid within it transmits the sound ; the second sound of the heart is also heard most loudly about this point.

The aorta ascends from behind, curves forward anteriorly to form its arch, and ap-

proaches near the surface, a little to the right of the pulmonary artery, and at this point the sound of its valves is best heard. Two thirds of the heart lie to the left of the sternum ; its apex beats between the fifth and sixth ribs. This, as a general rule, may be correct, to which, however, occasional exceptions arise, as from one inch to one inch and a half to the inside of the mammary nipple.

The relative position which the lungs occupy to the heart is important. At the superior portion of the thorax, there is an interspace of about two inches between the inner border of each lung ; but as they descend they recede farther outwardly from each other, and leave an interspace occupied by the apex and a portion of the right ventricle of the heart. In listening for the sounds of the heart, the ear should be applied over that portion of the parietes of the chest with which the heart is nearest in contact, and where it is not covered by the lungs, as their contents are bad conductors of sounds. The right auricle is at the summit of the base of the heart, but situated anteriorly. The greater portion of the left auricle lies posteriorly, its appendix being almost the only part seen ; the mitral valve is somewhat lower than the auricular appendix. The tricuspid valve occupies a similar situation on the right side. The sounds produced in these valves are more distinctly heard below this point, where the heart is less overlapped by the lungs, for the reasons given above. When the heart is enlarged it changes its position, and becomes rounder in shape ; its axis is considerably more oblique, and, as the diaphragm is less yielding, it presses upon the lungs, and there is larger extent of its surface in contact with the parietes of the chest. Percussion will detect its extent. Notwithstanding the opposing power of the diaphragm, the heart, when in this state, descends somewhat, and its apex may be not uncommonly felt beating between the sixth and seventh ribs. If hydropericardium exists to a considerable extent, you may also expect that there will be a considerable surface of dullness on percussion. The sac of the pericardium in these cases is generally cylindrical in its shape, and the effused fluid is generally contained in its anterior portion.

Action of the Heart.—Two sounds accompany the action of the heart.

The first is dull, and somewhat prolonged in permanence ; it accompanies the contraction of the ventricle, and is synchronous with the pulse.

The second is short and clicking.

Assuming a previous state of repose, the first motion of the heart is the contraction of the auricles, immediately after which a short smart movement takes place, and almost continuous with this follows the con-

traction of the ventricles. This is followed by the diastole; a moment of complete repose ensues, towards the termination of which the contractile action of the auricle recommences. The contraction of the ventricles is synchronous with the pulse along the line of arterial pulsation near the heart; but is (if the expression might be allowed) perhaps a thought later in the remoter regions of the circulation. The ventricular contraction, the pulse, and the impulse, are synchronous with each other. During the diastole it is that the second sound of the heart is produced. Following the theory laid down by Laennec, and supposing a second of time to be occupied in the production of each complete action of the heart, the ventricular contraction would occupy half that second, the ventricular diastole one-fourth, and the period of repose one-fourth; at the termination perhaps of one-half of the period of repose the auricular contraction recommences. Laennec gives to the diastole a shade less of time, and to the period of repose a shade more, but the above divisions will serve all useful purposes. The distended auricles are stimulated by their state of distention to contract, this propels a certain quantity of blood into the ventricles, which were previously in a state of fullness, but not of distention. The muscular action of the auricles is here required to distend them. Being simultaneously stimulated, they contract, and empty themselves.

Respecting the causes of impulse, it may be stated, that if a dog's heart be removed quickly from the thorax, and laid upon a table, it will present a flattened appearance. If it be pinched, it becomes more rounded in shape, and the apex is tilted upwards; this latter symptom occurs from the base becoming heavier, and, therefore, more fixed; and this is similar to what takes place in the natural state; the auricles then form a pretty solid fulcrum, the apex becomes rounder, and is tilted forwards. With regard to the causes of diastole, it may be said, that the ventricles are not filled by muscular contraction. The diastole takes place from relaxation of the muscle, favoured by influx of blood from the auricles, which are now fuller than at other times, and by the width of the auriculo-ventricular openings.

The muscular system in general requires repose, and the heart enjoys a repose of nearly twelve hours out of the twenty-four; the diastole of the heart is to be regarded as relaxation in other muscles is, as a state of repose. Respecting the sounds of the heart, Dr. Hope considered that the true demonstration on which the first sound rested, amounted almost to a certainty; he (Dr. H.) considers that it is caused by the extension of the walls of the heart (not the *bruit musculaire*), added to by the shutting

of the auricular valves, from the stretching of the chordæ tendineæ, and probably continued by the *bruit musculaire*, or motions of the fluids. It is difficult, added Dr. Hope, to insist on these points, owing to the difficulties which exist in separating these causes, but some pathological facts fully bear out these opinions. The second sound Dr. Hope considers as demonstrated to depend on the closure of the sigmoid valves.

PATHOLOGICAL PHENOMENA OF THE HEART.

In *Hypertrophy* of this organ, the walls are thickened, but the cavity is of the natural size. The *impulse* of action is strong and slow, from the density of the parietes, and there is an accompanying heaving motion from the power of the systole, whilst the sounds are diminished in volume. The *first sound* is dull, from the slowness of muscular extension; the *second sound*, also, is dull, from the slowness of diastolic action, and reaction on the sigmoidal valves becomes equally clear.

In *Simple Dilatation*, the cavity of the heart is enlarged, and the walls are not attenuated. The *impulse* is smart and sudden, and there is no heaving. The muscular action is less vigorous, but the action is smarter. In this condition of the heart, the *first sound* is louder, from the muscle being attenuated in structure, but not deficient in power. In cases where the thinness and weakness of the parietes is very great, the sound is diminished. The *second sound* is louder, the diastolic action being very smart, and the reaction on the sigmoidal valves becomes so too.

Hypertrophy with Dilatation.—Here the cavities of the heart are enlarged, whilst the walls are increased in size and strength, this affection being a compound of the two former ones. The *impulse* is strong, heaving, and sudden. The *first sound* is an increased one, from the considerable increase of muscular extension. Dr. Hope believes, that in cases of this kind he has heard the sound louder than in any other affection of the heart. The *second sound* is louder, from the diastole being sudden and forcible, and the reaction on the sigmoidal valves is sudden also. Between these there are, of course, intermediate stages.

Valvular Murmurs.—Laennec discovered that when an obstruction existed in the sigmoid valves, the systole of the ventricle produced a sound; and that when such was present in the auriculo-ventricular valve, a sound was produced during the diastole. In 1825 Dr. Hope discovered that when the auriculo-ventricular valve was patescent, another sound was produced during the systole of the ventricle, and soon afterwards he found, that if the sigmoid valves did not shut close, a similar sound was produced during the diastole. From

these facts it may be stated, that there may be a double murmur connected with each valve. This has been proved correct by instituted experiments.

Cause of Murmurs.—If you throw a large stone into a small stream, a noise and ripple are produced; if fluid is transmitted through a rough tube a sound is produced; the stream is broken, and the particles of fluid are thrown into vibrations which become sonorous. The same results obtain in the heart. A rugged obstruction produces a rougher and a louder sound; increased velocity of the fluid increases the intensity of the murmur. A murmur of regurgitation may be produced in the auriculo-ventricular valve when no murmur is produced as blood flows naturally through; when there is a chink with only an aperture of the size of a crow-quill, powerful ventricular contraction will produce it. Frequently no disease exist but a shortening of the chordæ tendineæ which causes a murmur when, during the systole of the ventricle the valve is held open, from the chords being too short to admit of its closure; occasionally you will find a sound produced from the auriculo-ventricular opening being dilated, and the valve being, from this cause, unable to close it.

Situations in which these Sounds are to be studied, so as to distinguish them from one another.—If, on applying the stethoscope to the interspace between the second and third ribs, close to the sternum, a loud superficial hissing murmur is heard, it is almost certainly produced in the pulmonic valves, as in that situation the artery is near the surface, and this hissing or hissing sound is produced by a superficial obstruction; and if this sound be heard more feebly over the aorta, this opinion is strengthened and corroborated. If you listen over the aorta, and hear distinctly a murmur, whilst there is none over the pulmonary artery, you may conclude that this murmur arises from the aortic valves. If the stethoscope be applied opposite to the valves, the sounds cannot be so readily distinguished as above them, where the vessels approach nearer to the surface. In situations so high as these you can barely hear a sound produced in the auriculo-ventricular valve. In order to hear the murmurs in the mitral valves, you must listen below the situation they occupy. At the point where the ventricles come in contact with the walls of the chest, the murmurs produced in the sigmoid valves can hardly be heard, and from this circumstance, the stethoscopist must listen above one set of valves and below the other. If there is existent disease in both valves, it may be distinguished by a murmur being heard in both situations; the nature of the murmur may also be different in the two valves from each other.

Qualities of Murmurs.—The various sounds

detected in these murmurs have received different appellatives, such as bellows sounds, rasping sounds, filing sounds, and sawing sounds. Laennec and others have imagined that these sounds depended on the differences in the nature of the obstruction. Dr. Hope has found that these distinctive sounds are partly imaginary, but are mainly dependent on the distance of the ear from the surface on which they are produced. If valvular disease exists in the pulmonary artery, the ear applied over that vessel would detect a hissing sound; over the middle of the ventricle a sawing sound would be heard; whilst at the apex of the heart the murmur would partake more of the character of a bellows sound. The sounds in the aortic valves are not so hissing as are those in the pulmonic valves; their murmurs give a scouring sound, from their being situated more deeply beneath the surface. In the mitral valve, which is lower still, there is more of the bellows sound; the murmur produced by regurgitation into the ventricle, is generally a soft and prolonged sighing sound. The stethoscopic sounds are also, to a certain extent, modified by the nature of the obstruction; a very rough cause, for instance, producing a rasping sound. If the obstruction be considerable, you will not only meet with murmuring sounds, but you will also have an accompanying thrill or tremor; this is also sometimes perceptible in the arteries, where there is valvular aortic disease; or where the inner coat of the artery is roughened, and the blood is propelled violently through it from powerful contraction of the heart.

In some cases of hypertrophy with dilatation, a murmur is produced during the contraction of the ventricle; the heart becomes rounded, and the currents of blood in the ventricles are conveyed at more obtuse angles, so as to run together at the aperture, and thus a murmur is caused. Under these circumstances the pulse will be weak, whilst the action of the ventricle is very strong, its power being exerted on itself.

But you may have murmurings and thrillings in the heart and arteries, independent of any existing disease, and this is a very common symptom in patients who are labouring under nervous anemia; these will be found to correspond in pulsation with the systole of the ventricle, and they are referable to the moving power of the blood in the vessels. In some experiments made upon dogs during the period of reaction from loss of blood, when the pulse had risen from 120 to 190, this murmur and thrill in the arteries were perceived. If, after it had disappeared, the dog was held with his head downwards, which made him faint, the murmur returned. In these animals the blood was found to be in a much thin-

ner state than natural, the quantity of fibrine having been very much decreased, and that of the watery portion very much increased, which caused the most murmur. In cases of anemia, with nervous palpitation, this murmur is a very common symptom, being easily produced in a moment by any mental emotion, or slight physical exertion. How are these murmurs to be distinguished from those caused by organic disease? Why, first, by their occurrence in those who are labouring under this species of disease; and, secondly, by their want of permanency, and by their subsiding when the patient becomes calm and tranquil.

Musical sounds are not unfrequently heard, principally opposite to the aortic orifice, and occasionally, but very rarely, in the arteries. They are generally produced by some accidental valvular configuration.

POISONING BY ARSENIC.

EXHUMATION OF THE BODY THREE YEARS AFTER INTERMENT, AND DISCOVERY OF THE ARSENICAL POISON BY MEANS OF CHEMICAL ANALYSIS.

Translated from the Report of M. M. Barruel, Henry, and Ollivier of Angers, as published in the "Annales d'Hygiène Publ. et de Médecine Légale," Nov. 1837.

WITH OBSERVATIONS.

By THOMAS HENRY BURGESS, M.D., &c.

Not many years ago (says the reporter) a generally received opinion gave a deceitful security to the criminal who chose poison for the destruction of his victim. It was then believed that a very short time after interment sufficed, in order that the decomposition of the body might render all evidence of crime abortive. It was believed that the medico-legal researches at that time were inconclusive, on account of the impossibility of again recognising the body upon which the crime was committed.

But the experiments of M. Orfila, with regard to this important question ("Archives Gen. de Med.," tom. xvii., "Traité des exhumations judiciaires," t. ii., p. 265), have demonstrated that the limits of science are not all so circumscribed as was vulgarly believed; they have discovered that an enlightened investigation can, on the contrary, detect the poison, even when many years have rolled by, and when the progress of the decomposition of the body had almost effaced the appearance of those very organs which had received the poisonous substance. In fine, many cases of poisoning in which this substance had been found after the lapse of one month, three months, nine months, and even seven years interment,

have appeared to confirm the correctness of the signal results of M. Orfila. They inculcate the great utility that there is in the publicity of similar examples. They cannot too frequently point out, that a crime so hidden as that of poisoning is, cannot henceforward escape the scrutinising eye of science; and it is with the view of giving a new example of the discovery of arsenic in the human body, after a *long lapse of time*, that I come forward to-day to relate the following fact:—

In the month of November, 1833, the widow Lamothe, residing at Saint Martin sur Oreuse, in the department of the Yonne, confided to some individuals there, that the widow Chevalier had appointed her her general legatee, adding, that she hoped very soon to enjoy her fortune; "because," said she, "the widow Chevalier *cannot live very long*." In a word, a few days had scarcely passed by, when the latter died rather suddenly, after having given evidence of severe and repeated vomitings, and aggravated colicky pains in the region of the stomach. Public rumour immediately accused the widow Lamothe of having poisoned the widow Chevalier; but these serious reports did not come to the ears of justice. However, from that period, all the inhabitants of the village remained convinced of the culpability of the woman Lamothe, and the suspicions of her crime were not at all forgotten, although three years had already elapsed, when a broil broke out in the house of the woman C—, one of the neighbours of the widow Lamothe. This event immediately revived the suspicions of the past; all the circumstances were combined together; besides, in order to accuse the widow Lamothe of this new crime, a complaint was brought against her by the woman C—, who farther declared, that she was acquainted with the poisoning of the widow Chevalier, and that, if she had kept silent up to this time, it was merely from the fear with which the widow Lamothe inspired her, and whose vengeance she dreaded. Judicial investigations were immediately entered upon, and they brought to light the certainty that the widow Lamothe had possessed at the time of the widow Chevalier's death, an ounce of arsenic, the employment of which she could not by any means account for; and the physician who attended the latter in her dying moments, proved some facts which confirmed the whole. The exhumation of the body was then immediately made (Nov. 21, 1836.)

The public cemetery occupies a soil somewhat elevated, gravelly, and naturally very dry. All the proofs as to the identity of the body were perfect; it was found in a state of remarkable preservation, and was immediately conveyed to Paris, where it was submitted to our examination and to our researches, as we shall presently see.