which they present to the mammiferous type, in the description of the organ of hearing, they should likewise have a position assigned them under this class: in them the sense of hearing is highly endowed. The whole organ is constructed upon a scale relatively to the size of the body, larger than that which prevails among the other orders of mammalia; and this enlarged form of the ear is rendered more striking when viewed in juxta-contrast with the eye: the diminutive proportions of which the ear appears designed to compensate. The external appendage in some species, as in the pteropus, however, does not exceed the ordinary dimensions, and presents the usual inequalities which distinguish the pinna of all mammiferous animals. In the insectivorous genera, the concha, on the contrary, attains a very considerable size; while the ear of the plecotus auritus, the common bat of this country, supplies a well-marked example of the average magnitude which the auricle acquires in these nocturnal animals. In addition to the feature of size, there is a further remarkable peculiarity in the auricle of some of the cheiroptera. The *tragus* is more highly evolved than is ordinarily remarked in the mammalia, and presents at its summit, according to the description of Owen, a bifurcation, which enables it to fit more accurately over the orifice of the meatus. This condition may be seen in the *vespertilio spasma*; and in those species which are called the great bats of Britain, *vespertilio noctulæ*, although less forked than in the former. It cannot be doubted that this augmented proportion is given to the *tragus* of the bat's ear, as a provision for the guarding of the meatus against injury during the flight of the animal through the intricacy of the wood; and probably, also, from the too rapid introduction of cold air during the abrupt vicissitudes of atmospheric currents, in order that the air, on either side of the *membrana tympani*, may be maintained at an uniform temperature. The only remaining peculiarity in the auditory organ of the bat consists in the inordinate size of the cochlea. It appears to me that the hypothesis of Weber, Breschet, and others, which assigns to the cochlea the faculty of appreciating sonorous undulations as conveyed by the surrounding *solid* parts, derives from this fact an interesting confirmation.—T. WILLIAMS.]

THE ORGAN OF THE MIND.—Mental acts have been instantaneously arrested by the pressure of the finger on the brain; and during mental repose and activity such changes have been seen in the workings of this mysterious organ, as have induced the greatest of British surgeons to declare that tranquillity of mind is an indispensable condition for the cure of injuries of the brain.—*Dr. Cowan.*

KING'S COLLEGE HOSPITAL.

CLINICAL OBSERVATIONS ON CASES OF DISEASED HEART,

By DR. R. B. TODD.

THERE having been four interesting cases of diseased heart at the same time under Dr. Todd's care in the hospital, he took a review of the symptoms of each case, for the purpose of contrasting the effects, very different both in kind and in degree, which result from different lesions of the heart.

Dr. Todd expressed his belief that the proximate causes of the heart's sounds were, for all practical purposes, sufficiently distinctively made out by recent experiments, many of which he had himself performed in conjunction with Drs. Williams and Clendinning.

The elements of the first, or systolic, sound, he considered to be threefold. 1. Tension of the auriculo-ventricular valves. 2. Muscular bruit. 3. Impulse against the thoracic parietes. These elements were enumerated in the order of their importance. The first had been much insisted upon, and with great justice, by Dr. Billing. Its importance might be best appreciated in cases of disease, where even a slight lesion of those valves, the mitral in particular, whether affecting their elasticity, or impairing their sufficiency, would modify the systolic sound, in a manner readily recognisable by a practised ear.

The second sound, inaccurately called diastolic, was occasioned by the sudden tension of the semilunar valves, consequent upon the falling back of the column of blood in the arteries upon them. It was evident that this sound could not be perfect, unless these valves possessed their natural pliability and elasticity.

Dr. Todd believed that the strength and clearness of this sound were also dependent, in a great degree, upon the state of the vital tone of the arterial parietes. In an atonic state of the arterial tunic the column of blood would be thrown back upon the valves with feebleness, and thus these membranes would be stretched but slightly. In this way might be explained the feebleness or even absence of the second sound, which had been noticed in typhus and other depressing diseases.

When, on the other hand, the arterial tunic was in a highly tonic state, it reacted powerfully on the column of blood, which was quickly and forcibly regurgitated, and being intercepted by the semilunar valves, caused correspondently rapid and forcible tension of them, and a proportionately clear and distinct sound. Thus it might be stated, that two conditions were necessary to produce a clear and perfect second

sound. First, perfectly healthy and pliable semilunar valves, with, of course, a normal state of the arterial ostia; and, secondly, a tonic state of the arterial tunica.

It was likewise to be borne in mind, that during the production of the first sound the ventricles were in systole, and that indeed the systolic act and its consequences or accompaniments, namely, valvular tension and impulse, were the causes of the first sound; and that simultaneously with the production of the second sound, the ventricles were in diastole, but the passage from the systolic to the diastolic condition was in no way the cause of that sound.

These were points which required to be always kept in view in forming a diagnosis of heart-disease. When a bellows-sound was heard, it was important to determine where it was produced; it might occur in one of three places—first, in either auriculo-ventricular orifice; second, in either arterial orifice; third, in either artery itself, beyond the valves.

When a bellows-sound occurred in the auriculo-ventricular orifice, it was generally, if not always, the result of regurgitation from the ventricle into the auricle during systole; it then accompanied the first sound, and was best heard at the apex of the heart; and sometimes it was very distinctly heard behind, to the left of the vertebral column, at the angle of the scapula, as occurred in two of the cases he was about to detail. When there was disease in the aortic orifice, so as to obstruct the passage of the blood from the ventricle, a bellows-sound would also accompany the heart's systole; but in this case the sound would be best heard over or near to the cartilages of the third rib, and in the course of the artery. The same occurred when the disease was situated not in the aortic valves, but in the aorta itself beyond the valves.

When the disease of the aortic valves was such as to render them insufficient to prevent regurgitation into the ventricle, a bellows-sound would replace the second sound; and if, as was sometimes the case, an obstructive disease of the valves were co-existent with this insufficient condition, the bellows-sound would also accompany the heart's systole; and in such a case there would be a double bellows-sound, to and fro, diastolic and systolic.

It was also necessary to an exact diagnosis, to determine what space the heart occupied in the chest,—for this purpose percussion afforded valuable information; and we should also carefully examine the point at which the heart's apex might be felt pulsating.

The careful physician would not content himself simply with an examination of the physical signs; all important as these were to diagnosis, he knew full well that much

more assistance might be derived from symptoms, in enabling him to form an accurate prognosis, and to adopt a judicious line of treatment.

The pulse, the state of the respiration, the condition of the capillary and venous systems, the existence of pain, of dropsy, the condition of the abdominal viscera, especially the liver, demanded the most careful investigation.

CASE 1.—The first case to which he directed the attention of the students was that of Ellen Grace, aged 29, who was admitted on the 4th of February into St. Clement's ward. She was a married woman, and six months advanced in pregnancy at the time of her admission. She had rheumatic fever three years ago. Her present illness began, as she stated, with swelling of the abdomen and legs four months before. Two months ago she began to be troubled with cough, accompanied by slight expectoration, palpitation of the heart, and dyspnoea. She was first attacked with dyspnoea suddenly, while in bed, at night, and received temporary relief from venesection; since then the dyspnoea had occurred several times. Her present symptoms are orthopnoea, on account of which she is constantly propped up in bed; countenance anxious, leaden, and slightly oedematous; considerable anasarca of the lower extremities; some ascites, which contributes with her pregnancy to the swollen state of the abdomen; troublesome cough, with slight mucous expectoration, which greatly disturbs her at night. The pulse is feeble, small, and as if a small stream of blood were propelled into the artery, it ranges from 90 to 100; appetite bad; thirst; tongue moist; liver slightly enlarged; the heart's impulse is strong, and the apex is felt between the fifth and sixth ribs.

The first sound is obscured by a loud bellows-murmur, most distinct a little above the apex, and likewise very distinctly heard at a corresponding point in the back. This sound gradually diminishes in proceeding upwards from the apex of the heart to the clavicle, and is not at all heard over the aorta or its branches. The second sound is natural and distinct. Percussion over the region of the heart yields a dull sound over a larger surface than is natural: lungs congested.

CASE 2.—Dr. Todd begged the students to compare the above case with the following. Mary Fitzgerald, aged 17, was admitted on the 16th of January. This girl's first symptoms were cough without expectoration, which came on two months before admission: then came dyspnoea and palpitation, both being much increased by exertion of any kind. She lost her appetite, emaciated, and became feeble. The dyspnoea and palpitation increased up to the time of her admission, and she then complained of a

troublesome dry cough; her breathing was laboured and quick, but she could lie down; respirations 36 in number; very slight oedema of the feet and ankles; appetite bad; some thirst; countenance very pallid. She had a very exsanguineous appearance, and had been very much exposed to cold, wet, and other privations; her pulse was small and feeble, and ranged from 100 to 110.

The respiratory sounds were natural, except in the inferior lobe of the left lung, where a large crepitation indicated an oedematous condition of the pulmonary tissue.

The heart was tumultuous in its action; the first sound was accompanied and obscured by a bellows-murmur, which was most distinct at the apex, and was also heard, but less distinctly, in the left back. The second sound was normal, nor could any abnormal sound be heard over the arteries.

These two cases, Dr. Todd observed, had many points of similarity, and yet they exhibited some important differences. Whilst the diagnosis in both of them would be very much the same, the prognosis and treatment would differ materially.

In both cases the physical signs clearly pointed to the mitral orifice as the seat of disease. The second sound was natural, and nothing abnormal was heard in the course of the arteries; therefore it was inferred that the arterial valves were good, and performed their office effectively; but the systolic sound was in both cases obscured by a bellows-murmur, which was best heard at the apex of the heart, or a little above it, which diminished and disappeared towards the clavicle and over the arteries, and which was also heard distinctly at the left back. Now, a systolic bellows-sound could only occur at two places—the first being at the orifice, or in the course of the artery; the second in the auriculo-ventricular opening.

In these cases it was not in the first-named situation, because it was not heard over, or in the course of the artery; nor did the state of the pulse correspond with that condition of arterial valve, or artery, which would give origin to such a bellows-sound. The cause of the sound must have been, then, at the mitral orifice, because the places at which it was best heard corresponded very nearly to that part of the heart.

It could not be at the tricuspid orifice, for, first, it was highly improbable that a bellows-sound produced at that orifice should be heard at the left back; on the contrary, the situation in which it would be best heard, would be over the sternum. Secondly, such disease of the tricuspid orifice as would cause bellows-sound, was of very rare occurrence; although regurgitative disease of that orifice was common: and,

thirdly, an insufficiency of these valves would give rise to pulsation, or at least to turgescence, of the jugular veins, which symptom did not exist in either of the cases.

Our diagnosis, therefore, in both cases, must be disease of the mitral valves, causing a permanently patulous state of the orifice, and destroying the valvular office; so that at each systole a portion of blood regurgitated into the left auricle. It was probable that in Fitzgerald's case the orifice was less contracted and the valves less diseased than in Grace's, because the bellows-murmur was less distinct, and of a softer kind, and the symptoms were less urgent.

And now with respect to the prognosis and treatment: Grace had long suffered from dropsy, which denoted a considerable obstacle to, and languor of, the circulation; her dyspnoea was intense, her cough violent. The dropsy yielded but slightly to purgatives and diuretics, and the violent action of the heart was scarcely at all affected by digitalis. Sleep was constantly disturbed, and her mind wandered. A very short time more must put a period to her sufferings.* Fitzgerald had, however, the advantage of being much younger; her dyspnoea was less urgent, and her cough was considerably controlled by sedatives. She had a very irritable heart, which, however, could be subdued by rest and sedative medicine. She had little or no dropsy. This girl might be kept alive for a very considerable time, and with attention and proper nourishment might lead a comparatively comfortable life.†

In the first case the object of treatment was obviously to procure rest, alleviate the urgent dyspnoea and cough, and to remove or reduce the dropsy. Opium was found, for some time, fully to answer the first object, but they were compelled to give it up, as it affected the head. With regard to the other indications, they were less successful, although most of the sedative and diuretic drugs were put in requisition.

Fitzgerald benefited by a generous diet and porter: sedatives and steel, opium, hydrocyanic acid, and digitalis, severally afforded her some relief.

CASE 3.—This case had excited great interest during the lifetime of the patient. William Taylor, aged 46, a clerk, was admitted into Sutherland ward, on the 21st of January. He came to London from Scotland in December, and had suffered some privations from being out of employment. He made assurances that he had been always temperate, but he had not quite the

* A fortnight after the lecture was given this patient left the hospital, and died the day after. An autopsy could not be obtained.—*Rep. L.*

† This girl left the hospital very much improved in appearance.—*Rep. L.*

appearance of having been so. He was a large man, of sallow complexion, and rather fat. He had enjoyed good health till a few days before Christmas, when a cough came on, without any assignable cause. Soon after this he had dyspnœa, which was much increased by any exertion; but at this time he had no palpitation, or any other uneasy feeling referrible to the heart. A fortnight before his admission he first perceived his ankles begin to swell, and the swelling soon extended over the whole lower extremities, and in a few days to the abdomen.

On admission, his symptoms were dyspnœa, amounting almost to orthopnœa, mucous expectoration, anasarca of the lower extremities, ascites; the respirations were thirty in a minute; pulse 104. It was of a bounding character, and communicated to the finger the sensation as if, after the wave had passed, the walls of the artery collapsed, and it fell empty; it was, in short, what Dr. Hope had called "the pulse of unfilled arteries." This kind of pulse was very peculiar, and Dr. Todd recommended the students to make themselves well acquainted with it. It was very characteristic of that condition of the valves of the aorta which rendered them insufficient to check the returning column of blood, forced back by the elasticity and tonicity of the arterial walls, and to prevent its regurgitation into the ventricle.

On examining the chest, it was found to be resonant everywhere but in the region of the heart, where dulness was not preternaturally extensive. Much large crepitation was heard all over the chest, but especially posteriorly; the impulse of the heart against the ribs could not be felt. On listening between the cartilages of the fifth and seventh ribs the first sound of the heart was quite inaudible, but a faint *diastolic sawing* sound was heard, which became much more distinct above, along the course of the arch of the aorta, and was most distinct at the upper part of the sternum. It was distinctly audible in the carotid and subclavian arteries. When the stethoscope was placed over the ensiform cartilage, the first sound became audible; it was faint and distant, and unaccompanied by any abnormal murmur. This was the only point at which the first sound could be distinguished.

He must not forget to mention another remarkable sign which was very conspicuous in this patient; namely, a locomotion and visible pulsation in all the superficial arteries. This sign was very valuable as an indication of imperfection in the aortic valves.

It was not difficult in this case to determine that the principal cause of the poor man's sufferings was a lesion of the aortic valves, which impaired their action as valves, and allowed a certain portion of the blood expelled from the ventricle by its systole to

regurgitate into it during its diastole. The returning stream creating a vibration in the orifice, either by acting on the margin of the diseased valves, or of the healthy ones (if one only were diseased) which gave rise to the sawing sound audible during diastole, and which took the place of the normal second sound.

The grounds upon which this diagnosis was formed were as follows:—First, the pulse; its jerking nature followed immediately by the collapse of the arterial wall, and the locomotion of the arteries already referred to; second, the sawing murmur taking the place of the second sound, and, therefore, indicating such a condition of the semilunar valves as was capable of affording an obstacle to the regurgitating current sufficient to produce sound; third, the extreme feebleness of the first, or systolic sound, indicated a condition which naturally and necessarily ensued upon regurgitative disease of the aortic orifice; namely, dilatation of the ventricle. This patient lived only a fortnight after his admission. The immediate cause of death was pulmonary congestion. The current regurgitated into the left ventricle, kept that cavity always in a gorged state; this again reacted upon the left or pulmonary auricle, and that upon the pulmonary veins and the whole pulmonary circulation. As a necessary consequence, the capillary system of the lungs became immensely congested, and had it not been for one or two small bleedings by venesection, and cupping him several times over the chest, the outburst of pulmonary hæmorrhage which carried him off must have taken place much earlier.

For some days previous to the 2nd of February his expectoration was discoloured, and resembled not a little that of pneumonia. A small cupping on the chest never failed to relieve his breathing, and diminish the colour of the expectoration for a time. On the evening of the 1st of February, he was seized with a very copious hemoptysis, which continued throughout the night till the next day. Although he was weak and low, the taking away of some blood by cupping was ventured on; this seemed to check the hæmorrhage, and relieve the dyspnœa for a time; the dyspnœa, however, returned some hours afterwards, and he died almost asphyxiated. Previously to death, the anasarca had considerably extended, and now affected not only the lower half of the body, but also the hands and arms, especially of the right side, and likewise, to a slight degree, his face.

The autopsy verified the diagnosis which had been made. The heart was enlarged; the aorta was somewhat dilated, and its coats thickened and indurated with atheromatous deposits. The semilunar valves were also thickened, and upon pouring water into the aorta above the valves, it was

found to run past them into the ventricle; one of the valves had been torn for about one-third of an inch of its extent from its attachment to the aorta, and thus formed a triangular flap, hanging loosely into the mouth of the artery, and which must have flapped to and fro according as the current of blood passed to or from the ventricle, thus giving rise to the regurgitation which destroyed the balance of the circulation. All the cavities of the heart, both right and left, were hypertrophied and dilated; the right cavities were filled with venous blood. The lungs were greatly congested; some apoplectic spots had formed on the upper lobes; the lungs were not very crepitant, and collapsed imperfectly; there was much mucus in the bronchi.

The abdomen contained a good deal of fluid. The liver was large and much congested.

CASE 4.—He would briefly add one case more to contrast with that just related. Ann Eaton, aged 30, a servant, was admitted into St. Clement's ward on the 14th of January. This woman stated that she had had several attacks of what she calls inflammation in her chest, attended with palpitation of the heart. Her present symptoms set in a fortnight before her admission; they are dyspnoea, brought on by any exertion, palpitation, short cough without expectoration. She has a narrow, rounded, and prominent chest; the region of the heart is preternaturally dull; the heart's impulse is strong, and there is a loud systolic bellows-sound indistinct at the apex of the heart, but very distinct at the base and along the course of the arteries; the second sound is natural; the pulse is thrilling but strong. Rest and digitalis relieved this woman's symptoms, but did not remove the bellows-sound, nor the disposition to dyspnoea and palpitation which exertion always induced. He was led to examine this woman carefully for aneurism, from her having stated that she occasionally lost her voice, and also in consequence of the short cough and shooting pains in her chest, of which she frequently complained. There were no satisfactory signs, however, to indicate the existence of an aneurism. The symptoms seemed sufficiently to denote obstructive disease of the aorta. The second sound was natural, therefore the semilunar valves performed their office. The bellows-sound was heard along the course of the aorta and the vessels arising from it; it diminished in intensity from the situation of the aortic orifice to the apex of the heart. The seat of the sound was, therefore, at the aortic orifice or immediately beyond it, and it probably arose from some slight obstructive alteration of the valves, thickening, for instance, not sufficient to impair their action, although enough to cause sound.

This was one of the most common forms of cardiac disease which came under observation; it had its origin frequently in an attack of acute rheumatism. So long as the obstruction was not sufficient to react materially upon the heart, and derange the balance of the circulation through it, the patient experienced very little inconvenience; and the lecturer knew persons who had distinct systolic bellows-sounds connected with obstructive aortic disease, whose appearance was indicative of perfect health, and who did enjoy excellent health. He prognosticated favourably of such cases as that of Eaton which he had just described. Quiet, the avoidance of mental and bodily excitement, and sedative remedies, were very effectual in these cases in mitigating the symptoms and prolonging life. But when the aortic disease was such as in Taylor's case, of the regurgitative kind, the interference of art would, ere long, be rendered nugatory, by the total derangement of the mechanical protection which the heart experienced from its valves.

FORMIDABLE ANEURISMAL STATE OF THE LEG, CURED BY COMPRESSION.

By SAMUEL YOUNG, Esq., Surgeon.

DEC. 18, 1829. Rebecca Thomas applied for a curious vascular affection of the left leg; from an aneurismal spot, a pendulous body issues at the outer part of the limb, three inches below the knee. The patient is full habited, and of a florid, sanguineous temperament; age, thirty years. First noticed the disease ten years since, in consequence of receiving a slight blow on the part; from the immediate pain produced was then first led to examine the part, and there found a dark, purplish crimson spot, about the size of the top of a woman's thimble. The spot at first was flat on the surface, and its covering like a very thin vellum, but soon rose up to the height of half an inch, hot and pulpy to the feel. On this occasion, after the pain, which continued for some ten minutes or more, went off, the tumour which had so risen returned to the level of the skin. For six years it remained without any apparent growth or pain, except at the latter part of this time, when it remained much longer above the surface than in the first-mentioned instance, after accidentally receiving even the slightest touch.

On the Thursday before Christmas-day (1836), whilst stooping to draw off a person's boot, she felt something very warm trickling down the leg, and on looking, perceived blood on the ground and her clothes drenched. The part was bandaged up with