

if its ill effects be guarded against, the mineral will, I think, regain its former high position as a cure for syphilis. It is to be hoped it will never again be recommended so indiscriminately, or employed in such large doses, as formerly. What can prove more highly the estimation in which it is now held by its former opponents, than the avowal that they are unable to cure their patients without employing mercurial preparations, and this after abortive attempts, during many years, to find substitutes for a mineral they formerly refused to employ in any case, or in any quantity? No remedy, I may safely say, has gone through such an ordeal, or passed an examination more victoriously. Let me hope that its *abuse* has passed, and that all will turn their attention to its *use* in the cure of a disease which is becoming better understood.

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## DISEASE OF THE MITRAL VALVE OF THE HEART, WITH REMARKS ON DIAGNOSIS, PATHOLOGY, ETC.

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A GENTLEMAN, aged about sixty, suffered, some eleven years ago, from severe rheumatic fever, and was treated by colchicum in such a way as to have brought on an almost fatal prostration. He cannot now recollect whether any shortness of breath, or other symptoms of thoracic disease followed. In 1837 he was again attacked with rheumatism, in a severe form; the pyrexia was high, and one side was so swollen and painful, and all power of motion so completely taken away from it, that his friends thought he was labouring under paralysis; from which disease his father had died. The disease had been going on for some days before I saw him, and I found the chest participating in the disease, though not in the form of endocarditis or pericarditis. There was a great tendency to syncope, with hypertrophic impulse of the left ventricle of the heart at other times; but no tumultuous action, such as we have in endocarditis, nor any of the diagnostic symptoms of pericarditis. Unfortunately, his stomach was peculiarly irritable, and he could not bear alkalies in the doses I wished to prescribe them; indeed, hardly at all. He recovered, however,—better than the medical gentleman, with whom I was in consultation, and I, could have expected,—and went and rode about as usual, only that he would sometimes feel giddy, and once he suddenly fell down, after a little giddiness. Again, in 1844, he had another attack of rheumatism, with tightness at the præcordia, and undue action of the heart. Again he recovered, without any other evidence of heart-derangement being left, than that it was easily excited into undue action. At times he could even walk up hills without difficulty, and seemed to be in pretty good health. During the autumn of 1844 he suffered from repeated colds, mixed up with rheumatic pains, and early in 1845—viz., by the end of January—he again put himself under my care. His state was as follows:—Face livid and puffy in parts; no remarkable fulness of jugular veins; sleeplessness, he says, for many weeks; on going to bed, up two flights of stairs, he always suffered more or less dyspnoea; no pain, but tightness in the præcordia; the heart full of blood, and labouring under its load; instead of the first sound, a puff or blowing sound is heard below, and to the right of the nipple, midway between it and the sternum, very distinct; yet not heard at the base of the heart,—that is, at mid-sternum, and on a line with the lower margin of the third left cartilage and rib. This murmur was also heard subsequently in the back, near the lower angle of the left scapula; the sounds at the base were normal, and not at all changed. The pulse small, quick, feeble, unequal, but not intermitting, synchronous in both wrists, and with the heart; the right ventricle acting feebly, and seemingly rather dilated; right auricle also dilated; no pulmonic râles, but I thought respiratory murmur in lower pulmonic lobes less free than usual; distressing dry cough; orthopnoea, and waking in a fright, as if after nightmare. This last feeling shortens sleep, so that he never obtains more than an hour and a half's sleep before he is thus distressingly awakened; great languor and death-like syncope occasionally, at which times the cutaneous surface becomes of a dark, cadaverous yellow; the feet, hands, and skin always cold; urine scanty, and loaded with the lithates; ankles œdematous, but no ascites could be traced; bowels confined, and much flatulence at stomach, which invariably exacerbates; paroxysms like those of hysteria; every exertion exacerbates the symptoms.

In cases of regurgitation through the mitral valve, we generally meet with hypertrophic action of the right ventricle, as an effort of nature; but here there was a want of propelling power in it. The indications here were to increase the propelling power of this ventricle and auricle; to prevent as much as possible the right cavities from being over-distended; and to overcome the delay which must take place in the pulmonary circulation from the mechanical obstacle in the left ventricle; to lighten the labour of the left ventricle, by gradually lessening the mass of blood which must pass through the cardiac cavities; and, at the same time, to prevent the bad consequences from the congestion, by exciting the action of the hepatic, urinary, and cutaneous organs.

To have detracted blood by the arm to any considerable amount—to have exhibited digitalis or sharp hydragogues—would have caused a fatal syncope. In most cases of patulous or obstructed mitral valve, I find digitalis a most potent remedy; but then, such cases are generally accompanied by hypertrophy of the right ventricle, with much action in the heart. Here, the heart's action seemed as if about to stop many times in the day; and the coldness of the surface, the pulse, the extreme languor, all proclaimed debility, local and general. Still the congestion of the right cavities was so urgent, that I was obliged to order one cupping on the sternum; and although this loss of blood caused a temporary increase of the weakness, yet the dyspnoea was a little relieved by it. A combination of blue pill, and compound squill, and soap-and-opium pills, was ordered night and morning; gentle diuretics and tonics, with occasional purgatives; which last brought away motions, at first clayey and light-coloured, indicating that the liver had suffered from the heart-affection: dark motions followed. The pills removed the cough considerably, and enabled him to enjoy a little more sleep than before. Gin-and-water, or brandy-and-water, were allowed, to prevent or shorten the paroxysmal attacks of syncope; also foot-baths of mustard and hot water were ordered. His bed was brought down to the basement floor, so that he had no stairs to ascend; and, to maintain his body in a semi-erect position, he slept on a raised pillow.

He had several peculiarities as to certain medicines: thus, compound spirit of ammonia would cause both a spasm in his throat and sickness; alkalies always disagreed; sharp hydragogue cathartics would distress him severely; and a few grains of calomel and blue pill would cause salivation. On the 30th Jan., I found he had slept comfortably for seven hours; and, what he deemed a great improvement, he did not awake *en sursaut*; the languor and coldness of surface diminished; the systolic bruit de soufflet does not now completely take the place of the whole normal sound, but only of the first half; pulse rather fuller; a little more cough than on my last visit; bowels confined; altogether improving, though he often cries out for more breath. Ordered extract of colocynth five grains, in a pill, to be taken every three hours, until purging is produced. To continue his draughts of calumba and acetate of potash. Diet nutritious, but little liquid allowed, and never much at one time. Stimuli pro re natâ.

Feb. 1st.—Yesterday, much better; to-day, worse; a bad night. This day the gentleman in attendance with me distinctly heard the abnormal sound, and observed the normal sounds at the base, and was satisfied as to the diagnosis. This recurrence of the abnormal murmur, in its full force, must be owing to the bad night's rest having weakened him; for the bowels had acted freely. Urine scanty; no improvement in the urine, nor œdema of the feet, nor in the shortness of breath. Ordered some blue pill for a few nights, and some jalap in compound infusion of orange-peel.

5th.—Yesterday, much better; but after one hour and a half's sleep he awoke suddenly, and fell into a state approaching syncope, which lasted an hour and a half, in spite of brandy-and-water, and mustard foot-bath. It appears he had been exerting himself too much in talking during the evening, and at supper his sago was prepared unusually thick. Indigestion occurred, and caused the above-stated fearful attack; for he only revived after passing a quantity of flatus from his stomach. Ordered some bicarbonate of soda in his mixture, and at night half a grain of nitrate of silver to be added to his pill. To try bread-and-milk for his supper, as milk has always agreed well with him.

8th.—Better in all respects, though it was thought that the œdema was increasing, and that ascites was coming on.

11th.—Much thoracic uneasiness last night; murmur still very distinct; pulse oppressed; has slept three hours at once. A hot foot-bath relieved the chest; to try a foot-bath with iodine every night. Ordered, tincture of foxglove, half an ounce;

soap liniment, half an ounce. Mix for an embrocation; a tablespoonful to be rubbed into the inside of the thighs night and morning. Aperients, tonics, and the soda, as before.

15th.—No marked improvement. The friends were very anxious. The iodine foot-bath relieved the coldness of feet, but caused an annoying itching; feet still swollen. Ordered, calomel, half a grain; extract of aconite, one-eighth of a grain; extract of henbane, three grains. Mix for a pill, to be taken nightly. Repeat the mixture.

19th.—Worse; legs swelling more. On the night of the 17th,—he was thought to be dying; much flatulence again; nights sleepless; the stools are solid, and seem to be evidently the result of his diet, which is, perhaps, too good, and causes too much blood to pass through the lungs; yet he cannot bear less food. To have his supper early in the evening, so as to avoid the flatulence of digestion whilst in bed. To try some extract of rue and hydrocyanic acid for the flatulency.

22nd.—Becoming daily worse; all the phenomena aggravated; the sleeplessness, the sudden waking in a fright, and gasping for breath; dropsy increasing, *though both the bowels and urine are free*; attacks of dyspnoea severe; the increased secretions are not sufficient to relieve the labour of the lungs. The right ventricle was now again distended as it was when I first saw him on Jan. 7th; the pulmonary artery sound was *not sharper* than usual; there was evidently congestion in the lungs; the cough is increased; but no râles heard in the pulmonary lobes. I talked of a small bleeding, but agreed to wait yet a day or two, and ordered ten minims of tincture of foxglove to each dose of his tonic mixture, although I feared I should witness but little advantage from it; because when I first saw him, in January, I had then ordered the foxglove, which had disagreed increasingly with every dose he took of it. Night-pills of blue pill, squill pill, and extract of aconite, ordered.

26th.—A great amendment in all the symptoms, except the dropsy of the feet; the legs were swelled up to the gastrocnemii; a little nausea from the mixture. The tincture of foxglove was lessened to doses of seven and a half drops. Repeat the other medicines.

March 5th.—All symptoms of distress gone; sleeps, and eats well; wakes tranquilly from sleep; anasarca gone; feet, nose, and lips and skin, warm; natural functions all properly performed.

19th.—All has been going on very well indeed; the anasarca gone; ankles not even puffy; now breathes easily when quiet, and he has been walking about his house gently, up and down stairs, without suffering; no systolic bruit de soufflet to be heard, though the sound is not quite normal; since my last visit he has been attacked with giddiness, for which some leeches were applied to his temples. To be cautious, to ride out in his close carriage, and to leave off medicines gradually.

Thence till the 22nd, no ground was gained, when the digitalis, which once before had disagreed, and the aconite, with the mercurial, seemed to give great and, I may say, sudden relief. I should have ordered the first remedy sooner, had I not been deterred by the great languor and faintness, and by the peculiarities of the patient as to certain medicines. I explained to all around and to the patient himself, that all now depended on himself to keep off any future attacks, for the disease had not been cured, and I took my leave.

I was sent for on July 3rd, when I found he had been neglecting the precautions which had been laid down, and in the last week, in a fit of irritation, had exerted himself to move some shutters or steps, when in a house a little way from his home. He had great difficulty in reaching home. He has been suffering ever since with his old symptoms; great dyspnoea; restless nights, nearly sleepless again; almost afraid to go to sleep; urine scanty; pulse 130, small, unequal, but regular as to number; no œdema of the feet. The right ventricle acting now with some force; on auscultating, the old bruit was there, below and between the left nipple and sternum, and it was as distinct and as circumscribed as before, but not so long nor so loud. I ordered blue pill, with extract of henbane, night and morning; and a mixture of tincture of foxglove, half a drachm; spirit of nitric ether, a drachm and a half; compound infusion of orange-peel to four ounces; sesquicarbonate of soda, a drachm; mix. A fourth part to be taken three times, daily.

If wanted again, I was to be sent for; but I learned he was again relieved by these medicines from all his distresses, and in September I heard of his enjoying life in a summer tour, without any thoracic distress of any kind; and so he may go on for an indefinite time, if he will but take the necessary care, though he has been all along inclined to underrate his danger—indeed, to shut his eyes to it, and to neglect the precautions

recommended, considering himself to labour under asthma, notwithstanding all we could say.

On the 26th of November, I was again sent for, in an urgent message, and saw him early on the 27th, almost in *articulo mortis*; the pulse nearly gone from the wrists, and the air-cells of the lungs loaded with mucus, with the cold clammy sweats betokening approaching dissolution. He died at six p.m. I was told that the medicine I prescribed on the 3rd of July had relieved him very much, so that in a fortnight he discontinued all medicines, and went on his summer tour. He then neglected many of the precautions advised. He returned in September, with dyspnoea, and most of the old symptoms, and sought the advice of an eminent physician in London, who corroborated, in every respect, the diagnosis previously made. He became gradually worse till Monday the 24th of Nov., when he became suddenly worse; was delirious almost all Tuesday and Wednesday, and died on Thursday.

On the 29th November, a post-mortem examination was made: the heart was at least twice as large as it should be, and weighed one pound, six ounces; the right ventricle was a little enlarged, but not so much as might have been expected, from the continuance of the disease; the tricuspid valve was of about the normal size; its opening admitted three fingers, which is the approximative measurement laid down by Sir Charles Bell and some others; the left ventricle was both hypertrophied and dilated, its parietes about three-quarters of an inch thick; the dilatation was proportionally much greater than the hypertrophy. The mitral valve had no deposit upon any part of it, and looked healthy, excepting that the columnæ carneæ were hypertrophied, particularly those in the aortic division of the ventricle; the aperture of the valve would admit rather more than the two first fingers, and under distention the opening would become much larger. The normal size of this opening admits of two fingers only; on careful examination, it became evident that this valve could not duly close the opening, but that at certain times a very considerable portion of it remained unclosed, and that this would happen whenever the ventricle was much dilated or distended, or whenever its walls were in a temporary state of weakness; the left auricle was rather large, but not unhealthy; the right lobe of the liver was congested and morbidly hard, but chiefly in the fore part. Other parts examined were healthy.

*Remarks.*—And, first, as to diagnosis. This is founded on the physical and the general signs. Of the physical, we know that the sounds usually considered distinctive of mitral-valve disease, may not, at times, or in certain cases, be heard at all, and yet disease may exist; though when they are audible, there is, perhaps, hardly any other cardiac lesion which is more easily or more certainly detected by a good practical auscultator than this; or which, on the other hand, would more easily pass undetected by those who rely solely on the general symptoms, and who do not use the stethoscope. Accordingly, no good auscultator is likely, in these days, to deny the possibility of pointing out the diseased valve when signs are in any degree clear. The objection, that as all the valves are so clustered together as to be covered by the open end of the stethoscope, the source of each murmur cannot be made out, however probable it seems, has been removed, by attending to the line of direction in which the murmur is propagated, while our difficulty is further lessened by the fact, that the left or arterial heart is the part mostly affected in valvular disease. To any one who has dissected the muscular fibres of the left ventricle, and has observed how they are connected with the columnæ carneæ, and how they all converge to a point, almost at the apex of the heart, the reason becomes at once apparent, how the murmur from a diseased mitral valve is heard loudest at or near the cardiac apex. The practical man is contented with the fact that it is so, and that fact has been verified by symptoms during life, and by examinations after death.

We must not, however, forget, that although we may have, in the vast majority of cases, no difficulty in diagnosis, yet an exceptional case may occur in which the murmur may be masked by other sounds; or even may not exist; or after having existed, may disappear altogether. As to the masking by other sounds, the auscultator will generally, with care, avoid error; as to the murmur not being present while disease exists in the valve, I have read of such cases, but never met with them; and as to the disappearance of the murmurs, this may arise from the diseased action increasing, and so implicating the valve that too small an opening is left to allow of the formation of a murmur. But here the previous history will have shown what the case has been, and is.

The distinctive physical sign of a patulous mitral valve is an abnormal murmur, generally of a blowing character, heard with the systolic or first sound of the heart, low down, below the line level with the nipple, and between the nipple and the left edge of the sternum. In most cases, this systolic murmur is also heard in the back, to the left of the spine, about the sixth or seventh dorsal vertebra, and near the angle of the left scapula; and this last site of murmur is very diagnostic. The murmur is also sometimes heard in the axilla; yet at the base of the heart the murmur is either very indistinct, or not to be heard at all, the two natural sounds being distinct and clear, as was the case at the head of these observations.

This murmur may mask, or take the place of the whole of the first sound, or of only a portion of it. The systolic murmur, which may most readily be mistaken for this one proceeding from the mitral valve, is caused by some obstruction to the blood issuing from the left ventricle; and the disorder occasioning this last sound is called obstructive disease of the aortic valves. The distinction between the two is founded on the fact, that in the mitral-valve disease there is no propagation of the murmur up the aorta, and into the neck, which is observed in aortic disease; while, on the other hand, in this last disease there will be no abnormal murmur at the heart's apex.

But there are yet other sources of a systolic murmur; it may arise in a fit of hysteria. Here no mistake is probable; for as the murmur arose with the paroxysm, so it will usually cease with it, or very soon afterwards.

It is a not unfrequent accompaniment of chlorosis and anæmia. Here the history makes manifest the cause, and we shall hear, in the same case, various murmurs in many of the superficial arteries of the neck, and even limbs. In the neck, over the carotid artery, we shall not only have the bellows murmur, (and this alone is distinctive,) but also a humming sound, which has been described to be like that sound which reaches the ear from a marine shell. This sound is said to proceed from the jugular vein; it may be intercepted by pressing the finger firmly on the part of the vein above the stethoscope. If we press the instrument too forcibly on the vein, we shall not hear the sound at all.

We may have a systolic murmur from deformity of the chest so displacing and pushing about the heart, as to cause this first sound to become almost abnormal in character—quite a whiz, as a late writer expresses it. This whiz is produced by mechanical impediment, but the impediment is without the heart, and not within it. Here the deformity, which is visible to the eye, reveals the mode of formation of the murmur.

It has been said that the natural murmur of respiration may closely resemble this murmur, which is, as I have said, of a blowing character, not unlike that of the breathing; but this source of fallacy will never perplex the auscultator who causes his patient to hold his breath for a few seconds; and this precaution is invariably taken by every well-informed auscultator.

Finally, it has been lately said by Dr. Latham, and before him by Dr. Zehetmayer, that tuberculosis may cause a systolic murmur, and the corroboration of an interesting fact thus afforded by two practical men of professional eminence, living in different countries, must be calculated to fix the attention of our medical brethren on this hitherto unnoticed symptom.

Dr. Zehetmayer published in 1844, and Dr. Latham in 1845. The former says,—“Der erste ton in der lungenarterie ist bisweilen von einem geräusche begleitet, wenn eine insuffizienz der bicuspidalis besteht, (Skoda,) und dürfte von einer auflockerung der inneren gefäßshant herrühren. Zu wiederholten malen hörte ich bei phthisikern, im zweiten intercostalraume, ein deutliches blasen statt des ersten tones der lungenarterie, an einer stelle, wo die gegenwart einer tuberculösen infiltration nicht zu bezweifeln stand. Die section zeugte keine anomalie in dem bezeichneten gefässe.”

“The first sound in the pulmonary artery is at times accompanied by a murmur, if there is an insufficiency of the mitral valve, (Skoda,) and it must take its origin from a loosening or softening of the internal coat of the vessel. I have repeatedly heard in phthisical persons, in the second intercostal space, a decided bellows murmur, instead of the first sound of the pulmonary artery, and in a place where one could not doubt that tuberculous infiltration was present. No anomaly in the vessel could be detected by post-mortem examination.”

Dr. Latham writes thus, at page 66 of his late excellent volume on Clinical Medicine: “Fancy a line drawn from the

left side of the sternum along the upper edge of the second costal cartilage, and continued an inch along the second rib; and another line drawn from the sternum along the lower edge of the third costal cartilage, and continued an inch along the third rib. Between these two lines a space is included, in the whole or part of which a murmur is often audible, coincident with the systole of the heart, when no such murmur can be perceived either in the præcordial region, or in the course of the aorta, or in the carotids, or in any part of the arterial system; but here, and here only. It is a gentle bellows murmur, quite obvious to the ear, and unmistakeable in its character.

“Of such a murmur, often audible in this situation exclusively, I am certain as a matter of fact, and certain, too, of its very remarkable accompaniment: I have witnessed it either in those who were undeniably consumptive, or in those who were too justly suspected of being so. I cannot say in what proportion of the phthisical it occurs; but I am continually meeting with it.

“Yet my knowledge goes no further than the living symptom. I have gained no explanation of it by dissection; I have only a clinical experience of the matter. But there is a practical usefulness in the mere experience of coincident facts, though their pathological relation be not understood. Thus, where, from my direct examination of the lungs I cannot get beyond a suspicion of tubercular disease, the murmur in the space indicated must always contribute to confirm it. Supposing the pulmonary artery, in its first division, to be the seat of the murmur, does it become such in consequence of its own disease, or by reason of pressure or impediment reaching it from diseased lung?”

The observations of these two gentlemen cannot but prove highly interesting, if not, also, very valuable to the practitioner, on many occasions of doubt and difficulty.

Some German auscultators have attempted to lay down a diagnosis, founded on the sharpness or alteration of the second pulmonary artery sound. Dr. Skoda, of Vienna, was the first, I believe, to tell us, that when we meet with a systolic murmur in the left ventricle, and also an augmentation of the second sound in the pulmonary artery, we may safely and certainly conclude that there is an insufficiency of the mitral valve; and he attempts to explain the asserted fact, by referring it to distention of the right ventricle and of the pulmonary artery, produced by the impeded circulation, first through the mitral valve, and then through the lungs; for the distended artery reacts with unusual force on the pulmonary semi-lunar valves. In the words of Dr. Ignatius Sauer, who published in Latin a compendious view of Skoda's work on Auscultation, this source of the increased sound in the pulmonary artery is thus stated:—“In hoc morbo statu circuitus sanguinis multum confunditur, æquidem sub quavis contractione cordis pars sanguinis ex ventriculo in atrium sinistrum refluit, et in hoc atrio, venis pulmonalibus, pulmonibus et arteriâ pulmonali accumulatur, quâ, propter requiritur intensior cordis activitas ut sanguis è dextro ventriculo in arteriam pulmonalem ceteroquin sanguine turgentem prematur columna sanguinis majori pressione in valvulas semilunares arteriæ pulmonalis allidens, sonum sub diastole intensiorem efficit.”

Skoda seems to place such reliance in diagnosis on this augmented sound of the pulmonary semilunar valves, that he goes on to say, we must look to it, when the abnormal murmur is sometimes absent, under certain circumstances:—“Si igitur è defectu strepitus et soni valvularum bicuspidalium statum explorare non possumus, oportet attentionem figere in sonum secundum arteriæ pulmonalis, et ad sonos ventriculi sinistri sub diastole cordis. Dum igitur in hoc rerum statu sonus secundus arteriæ pulmonalis, intensior non percipitur, et simul in ventriculo sinistro sub diastole sonus debite auditur, valvulæ bicuspidales connivent; è contrario vero sono secundo arteriæ pulmonalis intensiori, et in ventriculo sinistro sub diastole strepitu percepto verosimilimum est valvulas bicuspidales esse insufficientes. Si deficiente sono et strepitu in ventriculo sinistro sub systole cordis sonus secundus arteriæ pulmonalis quidem intensior est, sed in ventriculo sinistro sub diastole sonus adest sine strepitu, aut hic quoque abest, ad insufficientiam valvularum conclusio tunc solum valet, si nulla alia ratio detegitur hypertrophie ventriculi dextri favens; uti; scoliosis, exudata pleuræ, &c.” In another place, he says, if no increased sound in the pulmonary artery be heard with a systolic murmur, this latter depends then on some roughness of the aortic valves, impeding the exit of the blood from the left ventricle.

The celebrity and professional eminence of Dr. Skoda seem

to have secured the general acceptance of these statements as to this point of diagnosis amongst the medical practitioners of Germany; for very lately, only in 1844, Dr. Zehetmayer has followed Dr. Skoda, and seems to rely on the foregoing rules.

In his work, published in 1844, "*Die Herzkrankheiten*," at page 280, he speaks of several functional sources of a systolic murmur over the left ventricle, and goes on to say—"Der mangel der verstärkung in 2 tone der pulmonal arterie, die bei endocarditis, wohl nie felt, wenn sie am ostium venosum sich fixirte; dies alles zusammengekommen dürfte bei einem nur einigermassen gewandten und aufmerksam arzte wohl kaum eine verwechslung zu stande kommen lassen." "The absence of an increase in the second sound of the pulmonary artery, which is *never absent in endocarditis*, when this latter disease is situated on the ostium venosum: all these considerations taken together would never allow an ordinarily clever and attentive physician to make a mistake." At page 335, again he says—"Niemanden wird es wohl befallen, von einem systolischen blutgeräusche dort zu fasseln, wo der zweite ton der pulmonal arterie accentuirt, und der rechte ventrikel hypertrophisch gefunden wurde." "To no one could it easily happen to be so silly as to make a mistake about a systolic blood-sound, where the second sound of the pulmonary artery is found abnormally increased, and the right ventricle hypertrophied."

Dr. Zehetmayer states, at page 63, that a systolic murmur in the left ventricle may proceed from one of two sources,—from either an insufficiency of the mitral valve, or from the friction of the corpuscles of the blood, as they are propelled over roughnesses of the ostium arteriosum. He then lays down the following rules for our guidance:—"Wenn im linken ventrikel über den herz spitze, statt des ersten tones ein geräusch gehört wird, welches seine grösste intensität nach aussen in der gegend der mitralklappe hat, wenn zugleich der zweite ton der pulmonal arterie verstärkt ist schliessen wir auf eine insuffizienz der zweispitzigen klappe." (In der aorta sind beide töne normal.) "Wenn hingegen das erste geräusch mit grösserer stärke mehr nach rechts und einwärts gehört wird sich in die aorta so fortpflanzt, dass man in derselben statt des ersten tones ebenfalls ein geräusch unterscheidet, der zweite ton der pulmonal arterie nicht verstärkt ist, so sind rauhigkeiten an der arterielle mündung der aorta vorhanden."—Excrescenzen, Atheromatöse Ablagerungen am Endocardium an der Unteren Fläche der Klappe, &c. "If in the left ventricle a murmur is heard over the heart's apex, instead of the first sound, which murmur has its greatest intensity externally in the neighbourhood of the mitral valve, and if, at the same time, the second sound of the pulmonary artery is increased, we conclude that there is an insufficiency of the mitral valve." (Both the sounds in the aorta are normal.) "But if, on the other hand, the first murmur is heard more towards the right and inwards,—if it is continued up the aorta, so that we hear a murmur instead of the first sound in the same,—if the second sound of the pulmonary artery is not increased, then there are rough deposits on the opening or mouth of the aorta."—Excrescences, Atheromatous Deposits on the Endocardium at the Under Surface of the Valve, &c.

These, then, are the rules at this day guiding the diagnosis of our Teutonic fellow-labourers in this branch of practical medicine. Were they correct, how certain and how easy would this part of cardiac diagnosis become. How important it is that we should thoroughly test and examine rules which have been put forth by, and derive importance from, the authority of their eminent propounders, who also are known as having devoted especial attention to auscultation.

I do not recollect reading any author amongst the British who has directed attention to the second sound in the pulmonary artery as a diagnostic sign, except Dr. Hope, and he makes the augmentation of it to depend on hypertrophy of the right ventricle. Drs. Skoda and Zehetmayer both seem to think that this augmented sound is distinctive of, and caused by, three states,—1st, of hypertrophy of the right ventricle; 2nd, of distention of it; and 3rd, of mitral-valve disease.

There is little doubt that this increased sound generally accompanies advanced hypertrophy of the right ventricle, because there is an increased power of propulsion in the ventricle, from increased substance and action of its muscular parietes. As to the second cause, this case may be cited as subversive of the opinion; for distention was repeatedly observed and made manifest by the slow upheaving of the ventricle, and the general signs; yet I never heard this increased sound, although on the watch for it. To the third cause of its existence, this case, as well as several others within my personal experience, gave a decided contradiction.

We must not expect to hear this sound so loud as that of the second sound of the aorta; for, according to the seemingly accurate experiments of Dr. Valentin, published in Henle's "*Zeitschrift*," "the mass of the right ventricle stands to that of the left in the exact proportion of one to two, and it may be concluded that in equal intensity of contractions, the muscular power will exhibit an analogous proportion. The hydrostatic blood pressure of the pulmonary artery must amount to half the hydrostatic pressure of the aorta, and the whole resistance of the bodily circulation must be exactly double that of the pulmonary circulation."

When investigating this sound, the proper place to examine is to the left of the sternum, on a level with the upper part of the third costal cartilage; while the second sound in the aorta is to be heard on the same level, but more on the sternum—i. e., a little more to the right. It may well be supposed that an ear practised in auscultation is necessary, both to distinguish between these two second sounds, and to ascertain the plus or minus of intensity in the sounds themselves. And when I read or hear of gentlemen who deny our power to ascertain these sounds, or to say which valve may be diseased under all circumstances, I cannot but think such gentlemen do not possess an average acuteness in hearing, or that they lack either the necessary practical discernment, or requisite patience; for the practitioner who relies on one, or even more examinations, may miss hearing this sound, as well as other sounds, because we know they vary with circumstances of comparative fulness of the heart or its reverse, or with deficiency or surplus of propelling power.

The *general* signs of this lesion are very distinctive in the early stages. And first, of dyspnoea. One moment's reflection on the immediate effect of the retropulsion of the waves of blood through the patulous mitral valve into the left auricle, and then into the lungs, will teach us to expect dyspnoea as the very first as well as the most constant sign. And so it is. If we find dyspnoea to exist, and yet no signs of pulmonic disease, or of other manifest cause for it present, we may suspect disease of the heart, almost from this symptom alone. In some cases which I have published, of diseases of the heart and their treatment, this shortness of breath was the only symptom for a long time observable, and it appeared long before the characteristic murmurs of diseased mitral valve could be detected. This dyspnoea causes congestion of the pulmonary vessels, and that is for a time relieved by medicines, without expectoration, or, in some cases, by an effusion of mucus on the mucous membrane; and thus the dyspnoea may continue without expectoration, or there may be, also, cough with mucous sputa.

Another early and very distinctive sign is, the peculiarity of the pulse, which peculiarity is not met with in any other disease so early as in this. It is very quick; not intermittent, but irregular, or rather, unequal, in the volume of each pulsation: first, a full artery is felt, then a seemingly half-filled one, and the coat of the artery cannot be felt distinctly; it is a soft pulse if no inflammation be present. A late reviewer found fault with me for over-rating the importance of this pulse as a diagnostic, and affected to think there was some misprint; yet nevertheless, I wrote from very considerable experience; and the more I see of diseases of the heart, the more I am disposed to rely on the accuracy of what I have written thereupon. But it is best to leave the flippancy of reviewers to be dealt with by the good sense of the members of the medical profession, if they will but examine for themselves. I will repeat, that when we meet with such a pulse as the one described, either with or without other signs of heart disease, excepting dyspnoea, at an *early* period, we shall not do wrong, if we conclude that there is a patulous state of the mitral valve; for when it occurs in other diseases, it will do so only at the very latter stages.

In some persons, headach is early complained of; and headachs, both severe and long-continued, cause much suffering. These are doubtless caused by cerebral venous congestion, in consequence of the jugular and other veins being partly prevented from emptying themselves into the right auricle and ventricle. In some instances, this and other cerebral symptoms have been so prominent, as to mask and draw our attention from the original and originating disorder. Here the reflex function is sometimes called into action, and the brain becomes involved in that way. These symptoms are not so frequently met with in disease of the mitral valve as in pericarditis. In this latter case, is the phrenic nerve the medium to transmit the irritation, or is the cause a congestion of the vessels of the medulla spinalis induced by the blood being hindered flowing freely from it, in consequence of the highly impeded circulation in the large returning veins?



The liver also speedily feels the influence of this impeded state of the circulation. The *venæ hepaticæ* have mouths which are large and valveless; they therefore easily admit of reflux; and the *vena cava abdominalis* itself is over distended, from not being able to pour its contents into the cardiac cavities. Congestion of the liver follows. Hence the colourless motions so often observable in this disease, and various symptoms of gastric derangement, &c., which results have a pernicious reaction on the original disease, the gastric irritation adding to the cardiac irritation, and aggravating the paroxysms of dyspnoea as well as exciting them; while the retention of those matters which should be excreted from and by the agency of the liver, deprives us of one of our principal means of relieving the load of labour which is imposed upon the heart. This congestion of the liver may lead on to structural disease, to hardness, cirrhosis, or enlargement, which would soon be followed by ascites. The enlargement usually occurring in mitral-valve disease, takes place in the anterior parts of it, and as these parts make room for themselves, by pressing on the abdominal parietes, which easily give way, ascites does not most commonly occur. If the lobulus Spigelii, or the parts adjacent to it, were enlarged, direct pressure would probably be exerted on the *vena cava abdominalis*, and ascites must follow.

Œdema of the feet and ankles is likewise an early symptom, for puffiness of the ankles soon occurs; and if the cardiac disease has taken place suddenly, or there has been a sudden increase of disease, the dropsical effusion involves the whole of the legs and thighs, and creeps up to and over the abdominal integuments with most alarming rapidity. In one of the cases which I have recorded, this increase of the dropsy was manifest at every morning and evening visit, till the skin seemed on the point of bursting, and becoming gangrenous from mere distention.

This effusion is not caused by lack of power in the absorbents, which continue to act with normal activity; and the gangrene, when it does occur, proceeds from distention, whereas the gangrene, which is sometimes met with in this country, but often in Germany, from disease of the aortic valves, partly arises from a want of the proper supply of healthy arterial blood, as well as from local congestion. One of our usual means of checking the progress of the effusion is here of little avail; I mean, laying the legs up on a level with the body, and so long as the mechanical difficulty remains in the heart unrelieved, this œdema goes on increasing, and ultimately augments the dyspnoea, &c.

The rationale of this early œdema is found in the fact that the blood in the *vena cava abdominalis* cannot pass freely in its proper course; it presses on the nearest valves in one single column, the apex of which is the heart, for there are no valves in this large abdominal vein or sinus. These valves are situated at the top of each femoral vein, and are raised by the pressure, and then the femoral and crural veins become distended, and relieve themselves by an effusion of serum into those parts which offer the least resistance, and where there is most cellular tissue—viz., about the ankles, from which point the effusion spreads upwards.

Amongst the later and sometimes earlier sequelæ of this disease we have hæmoptysis, arising from the congestion; in some cases emphysema pulmonum occurs.

Effusion may take place into one or both pleuræ, and into the pericardium, whereby the dyspnoea and danger are both much increased. In the head, we may have apoplexy or paralysis from venous congestion, and effusion or extravasation may be found post mortem; and as the venous blood is often not returned from the medulla spinalis, we may see various signs of spinal irritation, or of failure of the spinal functions, which signs may, through the reflex function, cause some mystification.

The kidneys also suffer; for as the renal veins enter the *vena cava* at an obtuse angle, they are subjected to the pressure of the delayed blood in that vein, and thus they cannot relieve the kidneys by emptying themselves; effusion into the renal pelves takes place, the urine becomes charged with albumen, or with components of the blood itself; it becomes scanty, high coloured, and loaded with deposit, and renal disease is added to the list of evils, soon exciting diseased action in the brain, if it have not occurred before, and causing, more or less speedily, a fatal issue. These are the chief results, and this is the progress, of insufficiency of the mitral valve.

*Pathology.*—First of the pathological anatomy and pathology. The pathological processes are numerous through which the integrity of the valvular functions may become impaired; we may view them and their causes as affecting or

implicating—1. The valves themselves, (the membranous part only;) 2nd. The *columnæ carneæ*; 3rd. The *chordæ tendineæ*; 4th. The ventricular parietes.

1st. The morbid changes in the valves may occur in consequence of a deposit of a bony or calcareous nature, causing a shrivelling or shrinking, or they may consist of concretions in them, curling up their edges; but these changes are most frequent in the aortic valves, (chiefly from gout,) and are seldom observed in the mitral valve. The valves may be lacerated, and assume various forms from inflammatory infiltration into their texture, and this change is met with in this valve; lastly, atrophy may affect them, and cause perforation.

2ndly. In the *chordæ tendineæ*. These may be thickened by an organized inflammatory product; they then lose their transparency and elasticity, become enlarged in their transverse diameter, and diminished in their longitudinal, making them too short for normal action. Several cords may be matted together in one thick inelastic cord. Some of these cords may become attached to, and concreted with, the under surface of the valve, whereby the unfolding of the valve is effectually prevented.

Inflammation may cause the deposit of calcareous products; but this form of disease is not often met with in the mitral valve. Finally, the cords may be lacerated.

3rdly. In the *columnæ carneæ*. These are, generally, more or less implicated in this disease; they are generally hypertrophied, and from an inflammatory effusion into them, they may be deprived of their power of contraction, and of their elasticity. A deposit of callus may take place in them, which would destroy the muscular fibre, and cause a shortening of the entire mass. There may be a suppurative softening of them, or a fatty degeneration in them. These masses may be lacerated or torn up by inflammatory softening, by the formation of pus, or of fatty matter.

4thly. In the ventricular parietes. Here, in consequence of dilatation from inflammatory softening, or from other causes, we meet with an abnormal dilatation of the opening, which the enlarged and attenuated valves cannot completely close, leaving a constant opening, more or less large. And this seems to have been the chief, if not the only, cause in operation in the case at the head of these remarks. We can thus account for various signs observed during life—viz., whenever, from debility of the system, or from retention of the excretions, or from a free discharge of them having been neglected, or from too much fluid drunk, there was a temporarily increased fulness of the left ventricle, then the distinctive murmur made itself almost loudly heard, and it would continue during the whole of the systolic sound, completely taking its place. Indeed, it has seemed to continue so long, as to encroach on the second sound.

Even one night's want of rest caused weakness enough to make this murmur more evident the following day than it was before; and, again, the same effect would result whenever some days had been suffered to elapse without having secured a free discharge (almost a vicarious discharge, one might say) from the kidneys, skin, and bowels. The reason of which is given above—viz., that the more the ventricular walls were distended, the larger became the abnormal opening, the less able was the valve to close it, and the greater was the regurgitated wave of blood. On the other hand, if proper means were resorted to, and continued sufficiently long, the murmur disappeared, and the normal first sound would again be heard. For this reason, I was induced to think favourably of the case, and to believe that there was no binding up of, or change of structure in, the valve, from inflammatory deposition; for when there is much disease of structure, the murmur will hardly ever be absent, though it may be louder at one time than another, from various causes.

Thus far, we have been considering only insufficiency of the valves; but the cardiac openings may be contracted, and the mitral valve may be prevented from admitting the blood into the left ventricle, and this is called obstructive disease. The Germans call this form of disease, stenosis. The most common cause of this contraction is a rigidity of the valves from inflammation; they lose their elasticity, and remain fixed in such manner as to cause obstruction to the ingress of blood into the left ventricle.

This state is not, according to my individual experience, a common one, and it is certainly far from being so often met with as that of insufficiency.

The way in which this form of disease causes obstruction, and the way in which the valve projects towards the auricle, in a kind of infundibuliform shape, cannot be well shown by description in words only.

As to the proximate cause, we must first say, that gout generally attacks or involves the aortic valves, while rheumatism generally affects the mitral valve. From the foregoing sketch of the pathological anatomy, the fibrous structure appears often very little involved, and sometimes not at all. In above stated case, the muscular fibre was alone implicated. Can one, then, justly concur with those pathologists who, in reasoning on the connexion between rheumatism and heart disease, try to solve the difficulty by referring to fibrous structure as being the chosen seat and sole originator of rheumatic action and metastasis; and is it not very probable,—I would almost say, can any one doubt,—that during the rheumatic seizures already described, the blood must have undergone some morbid change, whereby it was rendered a cause of irritation to the serous membrane and the muscular fibres of the left ventricle? There were no deposits of coagulated lymph anywhere, neither were there implicated any parts endowed with what is called fibrous structure. May not hyperæmia have been set up in the first instance, and then a slow sub-inflammatory action, causing an increase of growth, or a softening, and then a disability to act as muscles? Then results a tendency to yield to the centrifugal pressure, exerted by the contained mass of blood, and this tendency is increased in proportion to the force of the propelling power, and to the quantity of the mass.

It must be borne in mind, that the boundaries between morbid excitement and inflammation have never yet been clearly laid down.

This appears to me the best mode of accounting for the origin of this heart disease, and for the mode of operation of the *juvantia* and *lædèntia* in the case above described. The failure of colchicum in the largest doses to prevent heart disease was very manifest, as it has been in many other cases.

The unfavourable issue was both unexpected and disappointing; for there was nothing in the symptoms of the living person, nor in the appearances of the dead body, to warrant an apprehension of so early a death. There seems to be little doubt that in this as in many hundreds of instances of cardiac disease, life might have been preserved, in a state of tolerable enjoyment too, for several years even, and he had recovered several times under my care from states of the most imminent danger. Had the patient strictly obeyed directions, and had the heart been kept free from repletion or distention, while mind and body were preserved, the one free from irritation, and the other from all undue exertion, he might still have been alive. From his position in life, not engaged in trade, nor otherwise troubled by business, but enjoying all the comforts which an easy, if not affluent, competency could command, every requisite for a judicious and successful management of the case was united in him. How different was the course pursued, how fatally different the result! Cases like this require a medical man's almost continued watchfulness, rather than an attendance only, when dyspnoea or other symptoms of thoracic distress force the patient to seek him; for professional aid may sometimes come too late; but a system of prevention will, in similar cases, hardly ever fail to preserve life, it may be, for many years.

Weymouth-street, Portland-place, Jan. 1846.

#### AGGRAVATED CASE OF CHOREA.

By J. B. BRYANT, Esq., Surgeon, Lambeth.

I BEG to offer for publication the following case of chorea saltans which lately came under my notice.

William C—, aged ten, a boy of delicate constitution, and sedate and studious habits, had suffered with diarrhoea for about a week. His mother administered astringent medicines, which restrained the action of the bowels. On the 26th of November, 1845, he was seized with violent headach; the pain came on suddenly, while he was reading. He started from his seat, ran to his mother, and clung to her, apparently in great alarm. In a little while the pain abated, and calmness was restored. On the 27th of November, at ten A.M., when he was engaged in looking at a map, he rose up suddenly, and after sweeping all the ornaments from the mantel-piece, he darted into an adjoining room, and began dancing and jumping in the most violent manner, the movements being entirely involuntary. His mother endeavoured to restrain these gestures, and took him into her lap; he was quite overcome by the exertions he had undergone, and fainted. It was at this time, when he was recovering from the fainting fit, that I first saw him. He still complained of very severe headach, especially

over the occiput. I prescribed three grains of calomel and a purgative draught. In the evening the headach was much relieved. Early on the following morning his mother observed that there was a wild expression of countenance, and was apprehensive, from these and other symptoms, that another attack was coming on; she held him tightly for a little while, and these threatenings subsided. I now gave him three grains of bicarbonate of ammonia, with syrup of orange-peel, three times a day, and a pill with equal parts of compound extract of colocynth and blue pill every night. Since that time he has had no attack, although the pain of the head has returned occasionally, which has always been removed by the mixture and pills. The pulse is generally weak, and the tongue coated.

Bridge-road, Lambeth, February, 1846.

#### LIABILITIES OF THE MUSCLE IN DISEASE.

By JAMES A. WILSON, M.D., Physician to St. George's Hospital.

##### CHOREA.

In the York Ward, a young tradesman—self-poisoned, and unable to move. At the next bed in our ward, in the King's Ward, a shoemaker's apprentice, who cannot keep himself still—paraplegia and chorea. This it is to walk the hospital—this is clinical! In both these cases the leading and distinctive symptoms are those afforded by impaired contractility of the voluntary muscle. In both they are associated with evidence of marked constitutional disorder. In the one instance, arsenic, and with it palsy, has been determined by paralysis to the toes and fingers. The exhaustion of bodily fatigue has been followed by incessant restlessness of the fibre in an arm and leg of the patient now before us. On Sunday, October 26th, this young mechanic, (J. G—), aged seventeen, who has scarcely "done growing," by way of relaxation on his day of rest, walked a distance of between thirty and forty miles. Though complaining of stiffness and headach during the greater part of the day, he remained on his legs till bedtime. Early in the following week he felt "ill all over," with pains in his chest, back, and limbs. On Sunday, Nov. 1st, his right leg became painful, and began "to twitch." A few days after this, the right arm was affected in a similar way.

The leg then became comparatively quiet, and the feelings of general illness were somewhat abated. When the lad first came to us, both limbs, especially the arm, were in frequent restive action. Strange perversion of the human will! that in the living body it should be thwarted and defied by the very instruments of its power. Ten days back, this young lad was brandishing his fist in his own face, and, within a limit, would have kicked his best friend. Had his muscles been so many distinct independent animals, they would not have acted in more complete disregard of his comfort and wishes. By the contemplation of this grotesque behaviour of the muscle, we learn little more than wonder. It is not spasm,—it is not convulsion. There is no help in the phrase of the day. "Nervous irritation," in this inquiry, expresses much, but explains nothing. If "irritation," and irritation exclusively of the nerve, then, of which nerve,—and of how many,—how proceeding, and how applied,—from which of the two brains,—from which division of the spinal marrow,—from the double symmetrical nerves,—from the ganglionic system, or from both, and both together? It is reasonable to suppose that a direct local irritation of the nervous centres, capable of inducing such violent and protracted efforts as those of chorea in the muscle, would leave, after death, by congestion or other organic lesion, some traces of its operation in the nervous structure. It is well known, that, upon the most careful dissection, in fatal cases of this disorder, such morbid appearances have not been found; on the other hand, by no extent or degree of vascular congestion,—by no external disturbing cause,—by no known variety of lesion in the nervous structure, can chorea be developed in the voluntary muscles, unless under circumstances implying, by their contest, an impaired condition of the general health. It is as easy to conceive an effect of relief, as one of prejudice, to the central nervous functions, by this large expenditure of contractile force at the distant structural extremity of the muscular nerve, where it is organized in triple union with the blood and fibre. It is impossible to watch the muscles in chorea, and not to think of galvanism. There is further warrant for this open analogy, from the recent experiments of Matteucci, establishing for the voluntary muscles a power of generating the electrical principle in their own composite structure, independently of that which follows