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# CASES

## DISEASES OF THE HEART,

ACCOMPANIED WITH  
PATHOLOGICAL OBSERVATIONS.

BY

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IN the following pages it is not my intention to enter into any detailed account of the different diseases of the heart which I shall have occasion to allude to, but to report briefly some remarkable examples of derangement of that organ which have occurred to me in practice. I mean to accompany them with such observations only as have naturally arisen in my mind during a painful attendance on these melancholy cases.

I shall first consider some morbid affections of the membranous coverings of the heart ; secondly,

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those changes which I have observed its muscular structure to undergo ; and lastly, I intend to describe and exemplify, by cases, those organic alterations of the auricular and arterial openings of the ventricles which I have remarked more than all the others to derange the function of the circulation.

I.—OF MORBID AFFECTIONS OF THE MEMBRANOUS COVERINGS OF THE HEART.

The pericardium, according to the modern arrangement of membranes, belongs to the fibrous class, and consists of two layers, differing from each other widely in their structure and uses, and very differently affected by disease. The internal serous layer is a transparent membrane, forming a shut sac, immediately investing the heart itself, and reflected from it and its vessels to line the whole concavity of the external fibrous portion ; it serves to isolate the heart, and to contain a fluid which facilitates its motions ; the external fibrous layer thus lined is partially covered by the pleura, is attached below to the diaphragm, and lost above by surrounding the large arteries arising from the heart. To the assigned use of this fibrous layer to form limits to a cavity in which the heart is to move, it may be added, that interposed between two more delicately organized membranes, it may perhaps occasionally though not always, serve as a barrier interrupting the ex-



tension of inflammation of one serous membrane to the other, and thus prevent a fatal combination of pericarditis and pleuritis. Examples, however, of such a combination are by no means uncommon; in these cases it is not always easy to determine in which of the serous sacs the inflammation originated, but it is reasonable to suppose, independently of what the symptoms might lead us to suspect, that the pleura, as being the more exposed membrane, and presenting the more extended surface, is generally the first attacked, and that the pericardium becomes secondarily affected. Inflammation sometimes in its extension disregards all difference of structure, and passes from the surface to the heart. This is, I believe, by no means common; but I have lately known a well marked example of it, in the case of a man who received an external injury of the chest: to the ordinary consequences of the primary injury succeeded the acute symptoms of pericarditis, which terminated in death. On dissection were exhibited the effects of inflammation of the different textures from the skin to the serous membrane of the heart, which was extensively coated with lymph; the pleura and neighbouring portion of the left lung had been also implicated, the inflammation having passed the barrier, which in ordinary circumstances the fibrous portion of the pericardium would seem to set to it.



## OF MORBID AFFECTIONS OF THE FIBROUS MEMBRANE.

Like the dura mater, the fibrous membrane of the heart, to which it is analagous in structure and function, is liable to ossification, although this change is very uncommon. Senac, Burns, Baillie, each have seen an instance of this alteration of structure; but Laennec, in his *Essay on the Heart*, gives the only minute and full account of a case of ossification of the fibrous layer of the pericardium I have met with in authors; I may briefly mention that his patient had the common symptoms of diseased heart, and that he died dropsical. On dissection the heart was found enlarged, and at first sight seemed as it were enclosed in a bony case; around the base of the ventricles there was a band about two inches broad, partly cartilaginous, partly bony, unequally thick, flattened, and a little rough on its surface, which sent from its interior a process, separating the ventricles from the auricles, and along each side of the septum of the ventricles, it produced a triangular prolongation, almost entirely cartilaginous, about two inches broad above, which terminated in an angle at a short distance from the apex of the heart; this plate of bone was evidently developed between the fibrous and serous layer of the pericardium; the auricles were larger than the ventricles; the right cavities were full of very fluid blood, of a deep

reddish brown colour; the left cavities appeared in the same state, although they were empty when examined, the blood having most probably flowed out when the lungs were separated from the heart.

I shall now relate the only case of ossification of the pericardium I have met with on dissection. Two men, apparently of the same age, about 60, who had been shut up under deck in a vessel lying in one of the docks, and exposed for some time to the fumes of charcoal, were brought into Sir P. Dun's Hospital, both in a similar state of exhaustion: their bodies were warm, but respiration had ceased for a few moments in both; the usual means were resorted to, and both in a little time revived; one completely, but the other, after exhibiting signs of life for two hours, expired. On examination of his body, which was muscular and athletic, the viscera were found all in a natural state, except the heart; this organ was a little enlarged, and was very generally adherent to the pericardium; it was encircled, or nearly so, by a zone of bone, about three lines in thickness, and more than an inch in breadth. That this bone was deposited in the pericardium itself was very evident, although in some points it had sunk into the muscular tissue, and penetrated almost to the lining of the ventricle. In consequence of the adhesion of the pericardium to the heart in some parts, it was not easy to decide where the bone was originally situated; but in others it was quite

evident that it had been deposited between the fibrous and serous layer, as it was lined by the latter in the same manner we occasionally find the internal membrane in the arteries covering those earthy depositions so very constantly found in the tunics of these vessels.

Upon examining the cavities of the heart, which in Laennec's case was filled with fluid blood, white coagula, of an unusually firm consistence, appearing at first sight to adhere to the ventricle, and being, as it were, organised, were found in the left and right sides of the organ. Mr. Wilmot, Professor of Anatomy and Surgery at the College of Surgeons, who gave me an opportunity of seeing this case, has preserved the specimen of these morbid appearances.

When from organic disease or mal-formation, the structure of the heart is at all deranged, so long as the body is in a state of rest, and that respiration goes on in a regular manner, the effects of the imperfection in structure are little felt by the system at large; but the moment that either the mind is agitated by any strong emotion, or that the lungs are disturbed by any rough exercise, the action of the heart becomes laborious and irregular, or its pulsations intermitting, the person falls into syncope. Such an accidental circumstance may be highly dangerous, for the imperfect organ once interrupted, may not be capable of resuming its



functions, a circumstance we should bear in mind in our treatment of such cases.

If the three important organs, the heart, the brain, and the lungs,—the “tripod of life,” as they have been aptly denominated, be not all equally strong at a time when animation has been accidentally suspended, the weak one cannot be roused to resume its functions. Thus under such circumstances what might have been supposed a simple faint, has terminated in death; and I think in the case I have just given of ossification of the pericardium, in such an altered structure, was to be found the cause of death, as a man placed exactly in similar circumstances, but whose organs were sound, survived. It may be worth noticing that the coagula found in the heart in this instance, composed of the fibrin of the blood, evidently bore the appearance of not having been recently formed; we were quite familiar with the appearance of coagula in the heart, but were struck with the consistence of these, and at first sight imagined that they were adherent to the ventricle, and in a commencing state of organization, but subsequent examination undeceived us.

#### OF MORBID AFFECTIONS OF THE SEROUS MEMBRANE.

Perhaps there is no disease the anatomical character of which is better described than pericarditis;

its seat is evidently in that serous membrane which, after having lined the fibrous bag of the pericardium, is reflected over the great vessels and the heart, which it every where covers. The general signs by which the disease may be recognized are exceedingly equivocal, and much requires to be done by the physician to clear the obscurity. I have been frequently called upon to examine the bodies of persons supposed to have died of disease of the lungs or liver, and I have found pericarditis the true and single source of death, although during the previous illness the heart was never suspected to be the seat of a fatal affection. I have myself been witness to the treatment of a case of chronic inflammation of the pericardium in a girl aged 14, which terminated fatally, and during the whole progress of the disease phthisis, or rather what was considered hepatic phthisis, was the disease under which this child was supposed to be gradually declining. Her general appearance bore the character of scrophula; a few days previous to her death I took the following notes of her state, which I copy verbatim. " Sarah Langly is greatly emaciated and very weak, yet does not wish to remain in bed, but prefers to be dressed, and to sit most of the day crouched by the side of the fire; the countenance is pale, and bespeaks great distress in the chest, yet the lips are not livid, but of a good color; the eyes appear large and brilliant; the skin is harsh, dry and rough, and cannot be by any means made clean; there is a general disposition to a growth



of downy hair every where on the surface; the skin is never relaxed by perspiration; the bowels are regular, but occasionally affected by diarrhoea. The tongue is reddish, and but little different from the healthy state; the respiration is 54, the pulse 156 in the minute. There is much wheezing in her respiration during the night, and frequent cough, with but little expectoration. Upon exposing the chest and abdomen with a view to make a more particular examination, the former presented an unusually good formation; it was equally and uniformly convex, and the outlines of what we supposed a much enlarged liver could be traced through the parietes of the abdomen. The child lived about a week after these notes were taken."

## DISSECTION.

The lungs were sound, but the pericardium was more enlarged than I had ever seen it, and contained, I am sure, about 20 ounces of purulent fluid, much resembling that which we are familiar with, as proceeding from scrophulous diseased joints. The organized membrane which invested the heart's surface, and which lined the reflected layer of the pericardium, was granulated, and presented much more the appearance of that membrane which lines a fistulous abscess than the yellow tenacious lymph, which we uniformly see in cases of true acute pericarditis. The lungs were sound generally, although a few



scattered tubercles confirmed the suspicion of a scrophulous constitution, which her general appearance indicated. The liver was perfectly sound, but a quantity of fluid, which the pericardium contained, acting through the diaphragm on the liver, had depressed that organ, and caused it to present itself in an unusual manner towards the anterior part of the abdomen, by which we were led into the error of imagining that the liver was enlarged; whereas the true seat of the disease was the pericardium, and the evident cause of death was to be found in a species of chronic strumous inflammation of that membrane.

#### ACUTE PERICARDITIS.

In January 1824, I was called upon to examine the body of a young lady aged 16 years, who died of an illness of only 14 days duration. My attention during this examination was particularly directed to the brain and lungs, which were supposed to have been the seat of the fatal illness. I found, however, the brain and abdominal viscera perfectly sound.

Upon raising up the sternum a large mass of yellow tenacious lymph covered the pericardium, and filled the cellular membrane which connects this bag to the back part of the sternum. Upon cutting into the pericardium a quantity of sero-purulent fluid flowed out, the whole of the

heart's surface was covered with a thick tenacious layer of organized lymph, rough, and reticulated on its surface. The concavity of the pericardium presented the same appearance, and several minute red specks denoted the organized state of the new membrane, which had been produced by very active inflammation, yet the exact seat of which had never once been suspected by two very eminent medical gentlemen who had seen this lady in her short illness. The lungs in this case were perfectly sound; the vessels of the bronchial membrane, particularly at the bifurcation of the trachea, were in a slight state of congestion.—It may not be uninteresting here to relate some of the particulars of this case. The young lady's health had been uninterrupted until about a week before her last illness; at a time when her catamenia were present, she imprudently plunged her feet and legs into cold water; a slight pulmonic attack, as it was supposed, immediately succeeded, from which apparently she recovered. Her spirits, however, which were not naturally high, were observed to droop, and she became averse from exercise. The catamenia did not recur at the usual period; but about this time she became affected with oppression of her breathing; frequent short cough; she was pale and languid, had a hot skin; a small, quick, and irregular pulse; total loss of appetite; and in short had many of the symptoms of ordinary fever, which compelled her at once to take to her bed. She had, however, neither headach



nor pain any where ; her tongue was not foul, nor was she thirsty.

She expressed no wish for any thing, but lay all day on her left side, or on her back, teased almost continually with a short dry cough, she had occasional paroxysms of dyspnœa, which were not very urgent, and had much the appearance of being the result of nervous debility. She had frequent weaknesses, which never amounted to complete syncope ; her mind was perfectly calm, and never wandered ; her intellect was perfect up to the few moments before she breathed her last.

It was remarkable that during her whole illness she scarcely got two hours sleep. With respect to the treatment, it consisted in two large bleedings from her arm, and in the frequent application of leeches and blisters to her chest, and purgatives. To procure rest anodynes in different forms had been exhibited.

Thus while the dissection in this case gave us an instructive, and at the same time an humiliating lesson, it also afforded a consolation to the medical attendants and friends of the lady by showing that every measure had been resorted to which a better knowledge of the actual seat of her fatal illness could have suggested.

All cases of acute pericarditis are not so obscure



nor so likely to be overlooked. I have seen many cases of metastasis of rheumatism to the heart which could not be mistaken. The sudden cessation of pain elsewhere, and the concentration of the distress and suffering about the heart, with the difficulty of breathing, and appearance of anguish in the countenance, are in many instances so striking as to fix the observation of the most inattentive, and to excite the physician to meet in a prompt and decisive manner such threatening symptoms ; his utmost efforts however will often prove unavailing in these cases.

METASTASIS OF ACUTE RHEUMATIC INFLAMMATION  
FROM THE SYNOVIAL MEMBRANES OF THE EX-  
TREMITIES TO THE SEROUS MEMBRANE OF THE  
HEART.

Rose Fox, ætat. 6 years, in the month of March 1825, was afflicted with a very severe attack of acute rheumatism, which engaged successively the principal joints, and shewed itself also in most of the muscles. Active measures, consisting of venesection, purgatives, together with the use of mercurials and the warm bath, proved successful. The child's convalescence was not, however, rapid; it was not for two months that she was restored to perfect health. In the latter part of August she became again afflicted with pain and swelling, and redness of the ankle and knee joints ; the least motion was insupportable. There was great

heat of skin, more particularly of the affected articulations; and remarkable frequency and hardness of the pulse, a loaded tongue, anorexia, in short a combination of symptoms denoting high inflammatory action; although these were actively met by the appropriate remedies, they changed but little until the fourth day, about which time the inflammation leaving its original seat passed along the muscles forming the parietes of the abdomen and thorax, and in the latter region very particularly fixed itself on the left side over the heart. Presently, in addition to the hardness and frequency of the pulse, it presented a remarkable tremulous vibratory feel, and the little patient exhibited more general distress. The horizontal position could not be borne, the limbs could now be tossed about without the slightest pain, the heat, redness, and swelling had disappeared from the joints; there was however neither mitigation of pain, nor of tenderness on pressure of the abdominal muscles, nor relief from the deep distressing anxiety and pain of the heart, to which the little patient usually pointed when asked about her sufferings. The breathing was hurried and distressed; not simply as in ordinary fever, but there was a corresponding anxiety of countenance; and she continually maintained the sitting posture, the head inclined forwards, and required support of the hand of her attendant, such was the debility. She had at this period some cough, and expectorated with difficulty a viscid mucus. She



died on the 18th day of her illness, having preserved her mental faculties in a perfect state throughout. The same remedies were tried in this latter illness which had been found useful to the patient on a former occasion, when labouring under similar symptoms. In short every measure which a firm conviction that the heart was now implicated could suggest was resorted to. In addition to mercurials, combined with Dover's powder and antimonials, and active venesection, blisters were applied to near, and also to distant parts. The warm bath was had recourse to, the colchicum was fully tried; and every effort made to produce salivation, but all were in vain.

#### DISSECTION.

The body was remarkably pale, and had rather a bloated appearance. The abdomen, particularly examined, exhibited no trace of inflammation. The lungs were perfectly healthy; but the pericardium was much enlarged and evidently distended by a fluid. On opening this bag, a quantity of sero-purulent fluid, with flakes of lymph floating in it, poured out. The surface of the heart and corresponding part of the pericardium were coated with lymph, and presented the usual appearances of acute pericarditis. Indeed I never saw the anatomical characters of acute pericarditis better expressed: and I have preserved it as a specimen of the post mortem appearances which



correspond accurately to the description which Baillie, Corvisart, and Laennec have given of them.

I have seen some cases, which I have not the smallest doubt were cases of rheumatic pericarditis, yield to active medical treatment timely resorted to : but have often seen others, as will be, I fear, the fate of most, terminate fatally, and have ascertained the correctness of my conjectures by examination of the body after death. Sometime ago a boy about fourteen years of age died of this disease in Jervis-street Hospital ; but the progress of the case and the appearance on dissection were so similar to the foregoing, that I shall not take up time by relating them.

Indeed it is scarcely necessary to dwell upon this subject, as rheumatism of the heart, since Doctor Baillie introduced the subject to notice, has been much spoken of.

But it would appear that the distinction between simple rheumatism of the heart and the dangerous case of rheumatic inflammation has not been sufficiently insisted upon. In the one case the organ is simply, and often but transiently affected, just as any other muscle is, the person has perhaps been affected with rheumatic pains in the loins, with but little fever ; these suddenly leaving this region run to the diaphragm, and cause a temporary affection of the breathing, with what the patient calls spasms in the chest. The coun-

tenance undergoes sudden changes: there are at such moments strong beats of the heart, and intermissions of the pulse sensible to the patient; and in females I have sometimes seen such attacks end in an hysteric paroxysm, and all symptoms subside when the lumbar pains returned. In such cases, the tongue is somewhat foul, the skin is frequently relaxed by profuse perspiration, and the urine is remarkably turbid; but the pulse has neither the frequency, hardness, nor peculiar vibratory feel that it has in the other, and more dangerous case: the countenance does not betray that anxiety, or, as it is denominated by some authors, that anguish which it almost uniformly expresses when the membranes of the heart are affected with acute inflammation, from whatsoever cause proceeding. Although simple rheumatism of the muscular structure of the heart may occasionally pass on to carditis, or to an inflammatory affection of the serous membrane of the heart, there cannot be a doubt that the two cases are very distinct from each other, and require treatment so different as to make it highly important for the practitioner to be aware of the risk of mistaking the comparatively simple case of rheumatism of the heart, for the far more urgent and dangerous one of rheumatic inflammation of its serous membrane. The latter disease I have usually seen in children, and persons about, and under the age of puberty, in whom, metastasis seems much more liable to occur, than in those more advanced in life; and the sudden

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translation of the rheumatic inflammation to the heart has usually occurred where the synovial system of the extremities was the original seat of the disease: when the muscles have been affected with acute rheumatism, metastasis to the heart has not, to my knowledge, been frequent, although I have seen the diaphragm affected by it in such a manner as to excite apprehensions for a time, that the former more important organ was implicated. There seems to be a greater disposition in the acute inflammation to pass from the synovial membranes to the serous, than to any other tissues; which is not so much to be wondered at, when their great similarity of structure, appearances, and functions, is considered.

If rheumatism affect the heart in this two fold manner, it may be asked whether this important organ is ever similarly affected by gout. That this disease does very frequently affect the heart, exciting agonizing pain in the breast, and giving rise to every species of irregularity in the heart's action, is well known to physicians: but whether any fatal case of metastasis of true arthritic inflammation to the serous membrane of the heart has ever been observed, I am unable to affirm from my experience or enquiries; yet I think it probable if such a case has not as yet been seen or described, that at some future day the attention of the physician will be called to it: gout, above all other diseases, being prone to metastasis, I cannot conceive that the heart



should escape ; the comparative rarity however of gout in these latter times may account for such a case not having been seen, or more properly speaking, not having been yet observed upon. If this were not a just view of the case, gout would form an exception to every other species of inflammation liable to metastasis.

Erysipelas undoubtedly affects the heart ; I have myself known two cases of erysipelas of the head and face which terminated fatally by metastasis to the heart. In one the erysipelas succeeded to a wound in the head, in the other, it came on spontaneously. In both, as soon as the external redness receded, the breathing became distressed, the countenance agitated, and rest in the horizontal position impossible. Yet the general symptoms of pericarditis were so obscure, as to excite no suspicion in the mind of the attendants as to the real nature of the case. Both were weak and debilitated patients, in which this affection supervened towards the close of a long illness : neither lived more than two days after the sudden disappearance from the surface of the erysipelatous redness. The countenance, the breathing, the state of the pulse, and apparent debility in both, seemed to forbid any active interference on the part of the medical attendants, who had no suspicion of the real nature of the case, (so obscure were the symptoms of pericarditis) until the examination of the body disclosed it. The pericardium contained

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some turbid fluid, but had contracted no adhesions to the heart. A quantity of lymph, evidently recently effused, lined the concavity of the pericardium, and thickly and unequally covered the surface of the heart itself: appearances which left no doubt as to the immediate cause of the death of these individuals. The late Mr. Thomas Roney and Mr. Cusack met with similar cases; and the latter preserves a specimen of the morbid appearances which the dissection of a similar case presented, in the Museum in Park-street.

These cases, though quoted from memory, and not accompanied with all the necessary details, appear to my mind, to afford very sufficient evidence of such a metastasis; or as some would call it, conversion of disease: such cases have been hinted at, by authors, as having sometimes occurred; but as far as I know, no authentic instances of erysipelas transferred from the surface to the serous membrane of the heart, have ever been laid before the public.

## II.—OF CHANGES AFFECTING THE MUSCULAR STRUCTURE OF THE HEART.

The muscular structure of the heart, from various causes which tend to excite a more active nutrition in it, may become increased in its thickness, and the cavities of the organ may at the same time become enlarged. The causes of these changes are sometimes very evident: thus, for



instance, the active enlargement of one of the auricles or ventricles immediately contiguous to a narrowed aperture, sufficiently demonstrates that the parietes of this cavity have become increased in thickness, in obedience to a well known law, to which all the muscular system yields; a law which invariably adapts the power of the muscular fibre, to the resistance it has to overcome. Thus, when an aneurism exists at the arch of the aorta, there is a difficult transmission of blood through it: the left ventricle uniformly increases in thickness, and its cavity at the same time becomes dilated, affording us an example of the active enlargement of this ventricle. If there be a contraction between the left auricle and ventricle, the latter is diminished in size, while the former becomes actively enlarged; the pulmonary veins are dilated as well as the pulmonary artery and whole of the right side of the heart, as may be proved by repeated examples.

Sometimes, without our being able to detect any organic cause, we shall observe cases of active enlargement of the heart, in which all the cavities are equally concerned: here follows a well marked instance of this description in which the increase of the whole organ amounted to such a degree, that the left lung was nearly obliterated by the pressure of the heart, in which there was no valvular disease, no adhesion, in short, to our senses, there was no apparent organic cause for the enlargement.



CASE OF ACTIVE ENLARGEMENT OF THE HEART  
WITHOUT ANY VALVULAR DISEASE.

No. 1. A medical gentleman æt. 60, of a sanguineous temperament, and remarkably anxious turn of mind, had, during the earlier part of his life enjoyed good health, with the exception of three rheumatic fevers; the last terminated in a severe attack on his chest, from which period he never was affected by rheumatism either in its acute or chronic form, but his chest became particularly delicate, and during the winter months he was very susceptible of cold; he had habitually a severe cough, and complained of palpitation of the heart and difficulty of breathing, which was much increased by a dense or smoky atmosphere, by going up stairs or any ascent; he was heretofore fond of horse exercise, but he could not ride at a trot, as any rough or jogging motion invariably induced a strong paroxysm of palpitation of the heart. His appetite was good, but his digestion was wretched, and except when he paid the greatest attention to his diet, he was greatly distressed by flatulence: his sleep was very disturbed and uneasy, and he never could rest, except when lying on his left side. His pulse was generally about 70 in a minute, regular, but always remarkably strong, full and vigorous. The chest was well formed, the pulsations of the heart were inordinately strong, and extended over the whole left side of the chest, and

often excited a good deal of alarm in his mind, and more than any other of his symptoms impressed him with a dread that the heart was the seat of his disease ; although usually said to be asthmatic, his breathing was at times tolerably free ; when interested by any favourite professional subject, I have known him speak for more than an hour without interruption ; the difficulty of breathing, however, used to come in violent paroxysms, and on these occasions he always experienced some relief from leaning forward : when obliged to go a distance into the country, he would sometimes seek relief by kneeling down in his carriage, and resting his elbows on the seat would travel miles in this attitude.

Towards the latter period of his illness his cough became very distressing, and the dyspnœa more continued ; he was obliged to confine himself entirely to the house, his limbs began to swell, and the abdomen to fill with water ; his stomach became very irritable, and refused all medicine, and the pulse which was heretofore regular though remarkably strong, full and vibrating, became latterly intermittent ; his intellect was undisturbed until the last 24 hours, when he lost all external sense, became comatose, and died in a subapoplectic state.

#### DISSECTION.

The external appearances were those which are usual where dropsical symptoms have been pre-



sent before death; a double inguinal hernia (caused probably by the cough and distress in breathing) remained unreduced; the internal organs were all sound except those contained in the thorax; the cartilages of the ribs were completely ossified, and required the use of the saw; the left lung was compressed and reduced to so small a size, and was so condensed in its structure, that it was evident it must have been incapable of performing any function; there was no water in the chest. The heart was enlarged to more than twice its natural size, but differed in no other particular from a well formed heart, proportioned in every respect as to itself, but only disproportioned to the structure, and probably also to the delicate tissues of the individual who was afflicted with this most distressing disease. There was in this case no adhesion of the pericardium to the heart, no valvular disease nor contraction to account for the increased growth of the organ, nor could the compressed lung, or its obstructed vessels, be assigned as its cause: this probably was only secondary, and rather the consequence of the enlargement, and at all events could only account for the increase of size of the right ventricle. Mr. Wilmot made the dissection in the presence of Dr. Perceval, Mr. Duggan, and myself.

With respect to the treatment, it was so nearly similar to that which was for a time found useful in the following case, that I shall omit to



dwelt on it here ; I may observe, that the decided benefit he occasionally derived from losing some blood from his arm was most remarkable. From having been much with this gentleman for the last two years of his life, and so often observed the great difficulty of breathing ; I may state my conviction, that on different occasions he would have been suffocated had it not been for the timely and decided relief venesection afforded him. I shall now copy from my notes the following case, a little more at length than I would otherwise wish to do, because I conceive it presents a very striking example of that too common disease, active enlargement of the heart, and in the various changes which these notes record, are to be seen the occasional benefit to be derived from judicious medical management of a disease, which, like most other organic affections of the heart, is incurable.

No. II.—CASE OF ACTIVE ENLARGEMENT OF THE  
HEART WITHOUT ANY VALVULAR DISEASE.

A gentleman, æt. 60 years, of high stature, and a spare though muscular frame, who has led a life of much anxiety and care, the traces of which are observable in his countenance, came to Dublin for medical advice : he was afflicted with severe cough, difficulty of breathing, and palpitation of the heart ; he was restless and irritable during the day, and at night such imperfect sleep as he could take, was frequently interrupted by

unpleasant dreams, out of which he would start up with strange imaginations: his stomach was out of order, and he was much distressed after his meals by flatulence, rendering his respiration at these periods more difficult; his skin was cool; his tongue white, though not loaded; his appetite tolerable, and he bore a journey of 30 miles to town without feeling fatigued; the chest was large and well shaped, except that there was an unusual prominence in the situation of the cartilages of the lowest ribs at the left side. The pulsations of the heart were so widely extended as to occupy before and behind the whole left side of the chest, and beat with such force, that the patient's bed appeared to shake at each pulsation. The pulse at the wrist was remarkably full and strong, 90 in a minute, with one regular intermission in each 20 pulsations. This gentleman was himself conscious of every motion of the heart, and he told me, whenever he lay down its pulsations became slower. I found, upon making the experiment, that his remark was correct; while I felt the pulse at the wrist he suddenly assumed by my desire the horizontal position; for the first moment the pulse was irregular and tremulous, and fell exactly to the rate of 30 for a minute, and again resumed the former number of its pulsations. I made the experiment different times with the same result. Anxious to compare his symptoms with those observed in the preceding case; I asked him could he rest at night indifferently upon either side, or bear any rough or



jogging motion? he told me, for many years he could not sleep upon his right side, that he used to be fond of horse exercise, but latterly could not ride at a trot, as it instantaneously brought on violent palpitation of the heart, with an attack of breathlessness. The nature of the disease was now too evident. The previous history of this gentleman's case was, that he had been always tolerably healthy, but that in the last fifteen years he had two attacks, very different from each other, which threatened his existence from their duration or violence. The first was a profuse epistaxis, supposed to be connected with some derangement in his liver. The account of the quantities of blood he lost on this occasion is nearly incredible; ever since he has been sensible of the unpleasant symptom which he now has to so great a degree, the palpitation of the heart. The last attack was supposed to be a violent pneumonia; it was attended with high delirium, and was combated with the most active venesection; in one day it was thought necessary to take away 60 ounces of blood.

Although there was now every reason to believe that active enlargement of the heart was fully established, and that to this might be referred all the symptoms under which this gentleman laboured, still his physicians had a hope that many of them were of the nervous character, and that medicine was available to relieve them. The faulty condition of the digestive organs was first



considered in the treatment ; to procure rest, the want of which was most complained of, the extract of henbane was prescribed ; every effort was made to compose him and remove his own apprehensions ; he was ordered to return to the country and amuse his mind, but avoid business.

October 10, he returned to town worse, and much disappointed at having derived no relief from the medicines prescribed. His countenance, naturally pale and sallow, was now generally livid from excessive coughing, and was at the same time expressive of much anxiety. He was restless, and unwilling to remain more than a few moments in any one position ; and he affirmed, that for several nights he did not enjoy one moment's sleep. His cough was very severe, attended with a thick viscid expectoration, and lasted in fits for hours ; his breathing too was very difficult ; his pulse 100, remarkably firm and full, and now there was no intermission. Various anodynes were fruitlessly tried to procure rest ; æther did not for a moment relieve the dyspnœa : smoking the stramonium, recommended by a friend, was nearly producing suffocation.

Such were the distressing symptoms this gentleman laboured under, when, on consultation his medical attendants determined to try the effect of venesection, and the most rigid antiphlogistic plan of treatment ; to exhibit active purgative medicine ; and in addition, it was

thought advisable to place a caustic issue under the left breast; all which means were immediately resorted to, but without any sensible benefit for some days, when from the distress in the chest, and the urgency of the cough, it became necessary again to bleed him, which was attended with some little relief.

October 16th.—His illness now assumed more of the febrile character, and it became necessary to confine him to bed; his body became hot; his tongue foul and coated, to the point brown and dry; he was disposed to sleep a little, but was repeatedly roused by fits of coughing. In those short intervals of sleep he raved a good deal; his wanderings were rather disposed to a pleasant than melancholy turn. He knew his medical attendants, was quite collected in their presence, but was reported not to be so in speaking to those constantly about him; his pulse ranged about an hundred, and was still without intermission; his breathing was heaving and irregular, and very frequently suspended for a moment or more. He had yesterday a profuse perspiration, after which his fever subsided much, and he awakened perfectly collected in his mind.

He had no consciousness of the last fortnight, he complained now of being very weak; his flesh was greatly reduced, and he desponded much about himself, but his tongue was clean, his pulse about 82 (the regular intermission returned), his



cough much softer and less frequent, and the dyspnœa altogether forgotten, nor was it brought on by the presence of much smoke occasionally in his chamber. During this illness he had been bled twice, had active purgative and diaphoretic medicines, and he drank nothing but whey or barley water. The bowels were now attended to, and easily acted upon by medicine; the secretion of urine was scanty and the œdema of the feet and ancles was increasing. The tincture of digitalis was exhibited, and he took half a grain of opium every night, he was now allowed to leave his bed, and to take vegetables for dinner; his strength daily amended until the 10th of November, when his cough had become troublesome, and there was some bloody expectoration; it again became necessary to bleed him.

From this time he improved progressively; for three weeks he was able to be out in the open air for several hours during the day, and a slight opiate at night procured rest; his cough and dyspnœa were no longer complained of. He felt so well he became anxious to dine at his usual hour, and resume his ordinary regimen. In a few days the effect of the animal food, which was reluctantly allowed him, was quite perceptible on his person, but it was also remarked that his countenance became anxious, his breathing hurried and irregular, his cough returned, and his rest was nearly as bad as heretofore; the state of his pulse, together with the other symptoms, again

called for the lancet ; venesection was now (27th of November) performed, and was soon followed by the accustomed relief.

R. Calomel gr. iij. Pulv. Ipecacuanhæ Comp. gr. iv. divide in pilulas duas hora somni sumendas.

Animal food was altogether prohibited ; a small quantity of white fish allowed for dinner occasionally, and for the swelling of the feet and legs, the tincture of digitalis was in increasing doses daily exhibited. In this way was this gentleman's life prolonged, every symptom was palliated as it presented itself, the cough and dyspnœa were always more or less relieved by venesection : the swelling of the limbs would remain obstinate for a time, and general dropsy be apprehended, then the kidneys would act, and the quantity of urine which would be evacuated was surprising. We ascertained that for several nights in succession above four quarts of urine were evacuated : at this time the thirst was not urgent, and he drank but little ; the œdema of the feet and legs, after these extraordinary evacuations, would totally disappear, and perhaps for weeks there would be no return of the swelling.

The diuretic medicine would now be laid aside, but its effects would continue; and whenever the quantity of urine flowing naturally, or produced by medicine, was abundant there would be no œdema. He rallied so much that from January



to the middle of May, he was capable of attending to business: he had returned to the country early in the spring; he no longer required an opiate to procure rest. The cough, dyspnœa, and palpitation, were not troublesome so long as he strictly adhered to the vegetable regimen; but the slightest deviation from the general plan laid down did not fail to be followed by some threatening of his former symptoms.

Although he could not now be said to enjoy health, still he would have felt greatly satisfied with the comparative freedom from illness which he enjoyed, if it were not for the constant intrusion on his mind that he was altogether indebted for it to the strict regimen he observed.

About the middle of May the swellings again appeared in his limbs, and increased rapidly; and all his former symptoms returned.

The dyspnœa was particularly urgent; a large bleeding was now performed, at his own request, without the least benefit. Towards the latter end of June, the diuretic medicine, no matter how varied, produced no other effect than to sicken the stomach. The abdomen became much distended with water, and there was sufficient evidence of effusion into the chest having taken place.

On the 7th of July his countenance changed

suddenly ; he complained of violent pain in the abdomen, which would not bear the slightest pressure ; every remedy that was tried failed to alleviate it even for a moment. In this manner an unexpected mode of death by peritonitis supervened, which terminated the sufferings of this gentleman on the 8th of July, 1819.

EXAMINATION OF THE BODY,  
*twenty-seven hours after death, July 10th 1819.*

*External surface.* The inferior limbs anasar-  
cous. The face bloated. The abdomen much  
swollen, as if distended by air and water.

*Cavity of the abdomen.* The serous surface of  
the stomach and intestines presented evident  
marks of recent inflammation ; coagulated lymph  
of a dark brown colour covered in patches the  
ileum and stomach ; and beneath and about this  
lymph the small vessels were injected with blood.

The liver was changed to a light brick colour ;  
and was connected by old adhesions to the con-  
cavity of the diaphragm, from which it was insepa-  
rable. The serous covering of the liver was  
opaque and thickened ; and this membrane, where  
it covered the gall bladder, was whitish, and  
did not permit the usual transudation of bile.  
Sections of the liver exhibited no morbid altera-  
tion of its interior.



The spleen was pale and much contracted in size. The right kidney, smaller than natural, contained hydatids. The left kidney, was quite natural; as were the ducts and vessels of both organs. A turbid brown coloured serum occupied the cavity of the abdomen.

*Thorax.* The cartilages of the ribs were completely ossified, and required the use of the saw. The cavity of the right side contained about seven quarts of whey-coloured serum. Two-thirds of the right lung were converted into a solid substance; which portion sunk in water, the rest floated, and was pervious to air. The left lung was perfectly sound, and had contracted no adhesions to the side.

When the sternum was raised to which the pericardium was strongly adherent, it was evident that the heart was greatly enlarged.

Almost the entire of the contiguous surface of the heart and pericardium was firmly connected by a cellular adhesion. The heart itself was fully three times its natural size: the parietes of both ventricles were greatly thickened, but particularly the left; at one spot only, towards the root of the pulmonary artery, the right ventricle appeared thin and weak. The muscular structure of the interior of the organ was much developed. The carneæ columnæ of the right side were remarkably

prominent, and those of the left also were greatly thickened and enlarged. The valvular apparatus of both sides was perfect : we could discover no bony or earthy deposition either in the heart or in any part of the arterial system. All present agreed that they had never seen a heart so much enlarged.

In these two cases of active enlargement of the heart, there were many points of resemblance. They were both men of the same temperament, and anxious turn of mind so often found associated with this disease ; the same description of motion and exercise brought on in each an increase of their most distressing symptoms, and the same remedies, or rather palliatives, were resorted to for a time with the same success in both.

In the first case, the origin of the disease was referred to rheumatism in some shape, as the rheumatic fevers which used to visit this gentleman at stated intervals ceased to recur from the time his chest became engaged, an effect which has been before observed ; and if it be admitted that repeated attacks of simple rheumatism of the heart may cause its enlargement, it places in another point of view the propriety of keeping distinct in our mind the two forms of rheumatism of the heart, viz. that wherein the muscular structure alone is the seat of the disease, and the far more urgent one of rheumatic inflammation of its



serous membrane, an example of which, page 365, I have before given, and which may be contrasted with that now under consideration.

In the 2d case, the symptoms which first announced that there was something irregular in the action of the heart, were referred to a very early date, even to the time when this gentleman was only recovering from the profuse and continued hæmorrhage with which he had been afflicted at a remote period before his last illness. It appears to me by no means irrational to conclude that the very excited condition of the heart, which always attends and succeeds profuse bleeding, must in certain constitutions be favourable to the development of such a disease as this patient laboured under.

The acute attack, attended with high delirium and great vascular action, supposed to have been pneumonia, which a year before he died, visited him, was no doubt pericarditis, which terminated in extensive adhesion of the pericardium to the heart, a new cause for the increase of growth of the organ, and the more rapid progress of the disease afterwards.

Although we not unusually find the heart enlarged where the pericardium is adherent to it this has never been, as far as I know, referred to, as a cause of its inordinate growth; yet when we reflect that in the natural state the heart has

no vascular connexion with the surrounding organs, and is only supplied with two small arteries, we can readily conceive what a new impulse its nutrition must derive from the immense number of vessels which from the adherent pericardium will pass directly into the muscular substance of the heart. Under such circumstances we may as fairly attribute enlargement of the heart to the pericardium, as the unlimited growth of a tumour to the organised cyst which contains it.

In this latter case, No. 2, there was more inflammatory action than in the former ; hence probably the great benefit derived from rigid abstinence for a time, and the very strict antiphlogistic regimen that was observed, the least departure from which brought back a renewal of the symptoms. In the former case diet was not so much attended to by the patient ; and the relief he so frequently, and so immediately obtained from bleeding was to be accounted for, not so much in that it counteracted inflammatory action as that the irritability of the heart was diminished by it, and the compressed lungs relieved of too great a quantity of blood circulating through them. In these two cases, towards their close, dropsy supervened, which for a time was controlled by diuretic medicines ; these, at length, the stomach, in every shape, rejected. The limbs then swelled, and the breathing became difficult at a time when, from the general debility, bleeding could not, as before, be resorted to.



In the first case, for 24 hours before death there was complete insensibility, and loss of voluntary motion, &c. and the subject of it died, as it is stated, in a subapoplectic state, in which there was nothing very unusual. But in the history of the termination of the second case, it may excite surprise that acute peritonitis should have visited a person so worn out, and debilitated by the combined effect of his original disease, and the symptomatic dropsy; yet I have seen acute inflammations of the serous membranes set in with violence and rapidly put a fatal end to chronic disease; I have moreover known many instances of dropsy to merge spontaneously in acute peritonitis.

Although active enlargement of the heart, like most of the diseases of the organ, is towards its close usually attended with dropsy, yet sometimes before the period that disease might be expected to set in, life is brought to a sudden termination by apoplexy.

The opinion has not obtained universal assent, that in such cases enlargement of the heart is the cause of the sudden event; yet it would appear to me that the observations of Bricheteau, Richerand, Corvisart, and Johnson, are conclusive on this head.

In the following case, although apoplexy was not the immediate cause of death, it is probable

that such would have been its mode of termination, had not the aorta given way. This case strikingly elucidates the connexion between apoplexy and active enlargement of the heart.

February 20th, 1822. I was called to visit a gentleman in my neighbourhood, aged 50 years; who had suddenly fallen down, as reported to me, in an apoplectic fit. I found him in a state of complete insensibility; his face (naturally pale and sickly) was now red and bloated; his breathing stertorous, with a slow pulse, the action of the heart and carotid arteries unusually strong. I lost no time in taking away blood from his arm, and in resorting to the usual means in such cases; he slowly recovered his senses; not however without its having been found necessary to repeat the venesection, which was determined upon in a consultation between Mr. Carmichael and myself. Leeches were also applied to the temples. Upon inquiry into this gentleman's mode of life and state of constitution, I was informed that he had been tolerably healthy, except that he was liable to slight attacks in his chest: that he led a very active life in the country, and was accustomed to much exercise: that about the year 1819, his affairs suffered a great reverse, and that ever since that period his spirits drooped; he became averse to exercise, and complained of palpitation of the heart; that in the last year he had two apoplectic attacks, exactly resembling that which I had just wit-



nessed : from these he recovered without any paralysis of the muscles, except that his mouth was drawn a little to one side ; and after each attack his articulation became less intelligible, his mind became childish, his temper irritable, and his memory failed him. The effects of this last attack of apoplexy passed off like the former, and he remained for three months much as he had been before it. In April I was again called upon to visit him, as he was taken alarmingly ill. I found him in a faint, though not insensible ; his countenance ghastly, his pulse weak and rapid, his extremities cold. Venesection, which on all former occasions seemed to afford him almost immediate relief, from the state of the circulation was not now resorted to. He lived but fourteen hours.

#### DISSECTION.

The brain was of a yellowish colour, and somewhat looser in its texture than natural ; but there were no apoplectic cells, no effusion of blood, nor appearance of there ever having been any extravasation of blood in it. The lungs were sound, but the pericardium was largely distended with blood, partly fluid, and partly coagulated ; when this was removed it was found to have proceeded from a rent in the aorta about a quarter of an inch in length. The whole heart was greatly enlarged, and the left ventricle was much increased in thickness, the heart was otherwise natural ; the remaining viscera were sound. Dr. Law assisted me in this dissection. The specimen is preserved by

Dr. Macartney, Professor of Anatomy and Surgery in Trinity College.

In this case it appears but rational to conclude that the apoplectic symptoms and attacks with which this gentleman was visited, arose from the too great violence with which the left ventricle poured the blood upon the brain, and which might have produced death as in ordinary apoplexy, by distending so as to rupture some of the capillary vessels of this organ, had not the great trunk of the arterial system first given way.

There is a sufficient number of cases before the profession to prove beyond all manner of doubt this connexion between apoplexy and active enlargement of the heart ; but it appears to me that the attention of the physician has not been sufficiently directed to the fact, that apoplexy may be the result of a state of the heart altogether different from that we have been just considering ; I shall however reserve any observations I may have to make upon this subject, until I shall have related the succeeding case, which bears upon this point, and at the same time exhibits an example not very common of a change of the muscular structure of the heart into fat. I shall merely premise, that in this case the impulse a tergo could have had no influence in producing the apoplectic death by which this case terminated, indeed the left ventricle was so weak, and its parietes so reduced, that at first sight it excited



our surprise that it was at all capable of carrying on the circulation, which was not a little increased, when on a close examination it was discovered that the valves of the aorta had become, from cartilaginous and earthy depositions, so rigid as to retain water, whether poured upon them from the artery or from the ventricle, the contact of their edges was preserved in such a manner that it required that a fluid should be injected from the heart with some little force to render this arterial opening pervious.

That the muscular fibre entering into the composition of the muscles of the body was occasionally to be found converted into fat, has been long known, but that the internal muscles, or those more essentially concerned in carrying on the vital functions were subject to this change, seemed until lately to have wanted the confirmation of a single well authenticated fact. We find late authors, no doubt, frequently alluding to such a morbid condition of the heart; but they rather refer us to older writers, than adduce examples of it from their own experience. Corvisart, alluding to this state of the heart, says modern anatomists have observed it, "no doubt they will some day publish these interesting facts, but speaking for myself, I have never seen this change." Later writers express their opinions, that some mistakes may have arisen from the distinction not having been made between the case of true conversion of

the muscular tissue into fat, and that in which a thick layer of adipose matter envelopes the whole of the heart's surface; they doubt whether this latter condition of the heart should be considered pathological, or could produce symptoms immediately depending on this accumulation, and look upon this case as very different from that degeneration of the muscular tissue into a fatty substance, which in the external muscles, as the *solæi*, &c. is so often observed. Although such observations may be in a great measure true, and it may be difficult to demonstrate the exact difference between these cases, or how such changes take place, it is no less certain that the muscular substance of the heart occasionally disappears (the thin reticulated lining and weakened septum alone remaining), while true adipose substance is found to have taken possession of the place which muscular fibre before occupied. it seems moreover proved that this morbid condition of the organ may produce death, which from the few facts of this nature with which we are yet acquainted, we suspect will be sudden, and generally preceded by the usual symptoms which attend apoplexy.

There is a remarkable case of this description given by Dr. Cheyne, in the 2d volume of the Dublin Hospital Reports; he prefaces the history of this case with the remark that doubts have been entertained of the conversion of the heart into fat, and that only one case as far as



he knew, had been published illustrative of that very curious morbid alteration.—In Dr. Cheyne's case the patient died of apoplexy, which he supposes must have depended upon encreased action of the vessels of the head, as the heart itself was apparently incapable of communicating much impetus to the circulating mass.

The following case, in many particulars, and in its termination, resembled that above alluded to :

An officer in the revenue, aged 68 years, of a full habit of body, had for a long time been incapable of any exertion, as he was subject to oppression of his breathing and continued cough. In May 1819, in conjunction with his ordinary medical attendant, Mr. Duggan, I saw this gentleman: he was just then recovering from the effects of an apoplectic attack, which had suddenly seized him three days before. He was well enough to be about his house, and even to go out. But he was oppressed by stupor, having a constant disposition to sleep, and still a very troublesome cough. What most attracted my attention was, the irregularity of his breathing, and remarkable slowness of the pulse, which generally ranged at the rate of 30 in a minute. Mr. Duggan informed me that he had been in almost continual attendance on this gentleman for the last seven years; and that during that period he had seen him, he is quite certain, in not less than twenty

apoplectic attacks. Before each of them he was observed, for a day or two, heavy and lethargic, with loss of memory. He would then fall down in a state of complete insensibility, and was on several occasions hurt by the fall. When they attacked him, his pulse would become even slower than usual; his breathing loudly stertorous. He was bled without loss of time, and the most active purgative medicines were exhibited. As a preventive measure, a large issue was inserted in the neck, and a spare regimen was directed for him. He recovered from these attacks without any paralysis. Œdema of the feet and ancles came on early in December; his cough became more urgent, and his breathing more oppressed; his faculties too became weaker.

November 4th, 1819, he was suddenly seized with an apoplectic attack, which in two hours carried him off, before the arrival of his medical attendant.

#### DISSECTION,

##### *56 hours after death.*

The dura mater presented a natural appearance. The arachnoid membrane was separated from the pia mater by a fluid of gelatinous appearance. The substance of the brain was watery and of a yellowish white colour. There was some water in the ventricles. These cavities did not appear enlarged, but the foramen



of communication between them was dilated. The coats of the carotid and middle arteries of the dura mater were quite white and opaque from bony deposition, but were pervious.

The right lung was sound. The left was compressed, and adhered to the side of the thorax: about a pint of serum and quantities of soft fat, of a very deep yellow colour, filled up the space between the anterior mediastinum and the compressed lung, which was impervious to air, and must have been totally useless.

The right auricle of the heart was much dilated. The right ventricle externally presented no appearance whatever of muscular fibres: it seemed composed of fat through almost its whole substance, of the same deep yellow colour as that which occupied the place of the left lung. The reticulated lining of the ventricle, which here and there allowed the fat to appear between its fibres, alone presented any appearance of muscular structure.

The left ventricle was very thin, and its whole surface was covered with a layer of fat. Beneath this, the muscular structure was not a line in thickness; it had degenerated from its natural state; was soft, and easily torn, and a section of it exhibited more the appearance of liver than of a heart. The septum of the ventricles presented

the same appearance. In both ventricles, even in the lining fibres, yellow spots, where fat had occupied the place of muscular structure, were to be observed. The whole organ was remarkably light; the valves were all sound, except those of the aorta, which were studded with specks of bone, but elsewhere were cartilaginous and elastic, from which they derived a disposition to remain closed; a fluid gently injected from the ventricle would pass them; still, when the heart was reversed and water poured from the ventricle upon them, their valves retained it; its weight was not sufficient to separate the edges of the thickened valves. There was much fluid blood contained in the heart.

The liver was natural; the vena porta was unusually distended. The spleen was healthy in its structure, although enlarged; the other viscera presented nothing unusual.

In both these cases, No. 1 and No. 2; apoplexy must be considered less a disease in itself than symptomatic of one, the organic seat of which was in the heart; although during life there was much analogy in their symptoms, the examination of the bodies after death disclosed a state of the heart altogether different; in one the ventricle was found nearly an inch in thickness, while in the other, fat had so accumu-



lated at the expense of the muscular structure, that it was scarcely a line in depth. The explanation of the fact how causes so different could have produced effects nearly similar, will, I imagine, be found in the reflection, that any thing occasioning an undue distention of the vessels of the brain, may be followed by apoplexy. This over distension may arise from the impulse a tergo being preternaturally strong, or on the contrary, it may be the result of some obstruction in front, as that arising from a contracted arterial opening, or some state of the ventricle incapacitating it from emptying itself with sufficient quickness to relieve the brain. Indeed, upon considering the latter condition of things, where the heart is slow in transmitting the blood it receives, we find, I imagine, even in this a means of accounting for the lethargy, loss of memory, and vertigo, which attends these cases. For the venous blood, which under such circumstances, is supposed to accumulate in the brain, is evidently ill-suited to the functions of this organ. Although the quality of the blood may thus be supposed to have some influence in producing these bad consequences, yet it is probable that the principal causes determining an apoplectic attack where the heart is either actively enlarged, or in a state of atrophy, are mechanical and referable to circumstances in the heart, directly or indirectly producing a state of congestion of the vascular system of the brain.

## OF RUPTURE OF THE HEART, ANEURISM, AND RUPTURE OF THE CORDÆ TENDINEÆ.

Sometimes the muscular substance of the heart, constituting the whole thickness of the ventricles, at a certain point gives way, and death instantaneously occurs; there are however cases on record wherein this event did not so immediately follow the rupture of the heart, in which it is supposed that the blood has quickly coagulated, and thereby effected such pressure on the lacerated aperture in the ventricle as for several hours to retard the fatal result.

From some cause not as yet sufficiently known, perhaps from some weakening or rupture in the muscular fibres of the heart, an aneurismal cavity is formed, which communicates with one of the ventricles; the walls of this cavity, however constructed, are partially projected into a tumour which is covered by the membranes of the heart, and has been found to contain within it laminated coagula as in arterial aneurisms: the tendency of this disease is to go on encreasing until the sac bursts, as in ordinary aneurism, when death immediately ensues.

By the proofs of the existence of such a state a complete analogy is established between this disease of the heart and aneurism, as it exists in the arteries; and the impropriety of the applica-

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tion of the term aneurism of the heart, as used by many authors to denote enlargement of the organ, is consequently evinced.

Lastly, the *cordæ tendineæ* which connect the auriculo-ventricular valves to the walls of the ventricles are sometimes torn, and the accident is soon followed by a train of the most distressing symptoms, which art can but little alleviate, and which speedily terminate in death.

#### RUPTURE OF THE HEART.

For the following case I am indebted to Dr. Cheyne, Physician General, I beg leave to give it in his own words.

A gentlewoman, upwards of sixty years of age, of a corpulent habit of body, and confined bowels was, on the 8th of August 1825, attacked with pain in the epigastrium. Fomentations and liniments were applied to the abdomen, and pills were taken containing blue pill and calomel. On the morning of the 9th, the evacuation from her bowels, not being considered sufficient, a purgative draught, consisting of infusion and tincture of senna and Rochelle salts, was given, and a terebinthinate enema, and she was bled. No relief having been obtained, I was called to see her at 5 o'clock, and considering the pain to be seated in the gall duct, and probably to arise from the

obstructed passage of a gall stone, I prescribed an opiate, which however she never took, for I had scarcely left her house when she had a fit of vomiting attended with some straining, at the end of which she sighed once or twice, and expired.

#### DISSECTION.

There was an unusual quantity of fat under the skin. The pericardium was distended with blood, partly fluid and partly coagulated. The blood had escaped from a rupture, nearly an inch in length, on the anterior part of the left ventricle. The muscular fibre of the heart was remarkably soft in its structure, so as to admit of being broken down between the finger and thumb. The heart was unusually loaded with fat; the liver was irregular in its surface, and rather enlarged; the gall bladder was contracted, and contained three calculi, the largest of which was lodged in the mouth of the cystic duct, and completely obstructed the passage of the cystic bile.

#### RUPTURE OF THE HEART.

Mr. Colles, Professor of Anatomy and Surgery to the College of Surgeons, informs me of the case of a gentleman who had marked apoplectic symptoms, for which he was bled, and had an issue inserted in his arm; about a week afterwards, one morning while this gentleman was in the water closet, he suddenly fell down dead.



## DISSECTION.

The contents of the cranium were sound ; the pericardium was distended with blood ; when this was removed, the whole surface of the heart was found coated with fat ; on the anterior and upper part of the left ventricle there was a large bloody spot, immediately beneath which there was a laceration of the left ventricle, through which a large bougie could be readily passed ; through this the blood had escaped, which accounted for the sudden death of this gentleman : the substance of the organ was soft and flabby ; there was no disease of its valves or vessels.

The specimen is preserved in the Museum of the College of Surgeons.

CASE OF ACTIVE ENLARGEMENT OF THE HEART WITH  
RUPTURE OF THE CORDÆ TENDINEÆ OF THE  
MITRAL VALVE, COMMUNICATED BY DR. CHEYNE.

In the beginning of September a musician, 34 years of age, of a very robust frame, sanguine temperament, and corpulent habit, being at Limerick, where he belonged to the orchestra, and leading a life of irregularity and intemperance, exposed to heats and colds, was seized with a most acute pain in the left side of the thorax, precisely in the region of the heart ; at one time it was so acute as to render him nearly frantic ; five or

six persons could scarcely hold him down in bed; he had a dry cough, his breathing was oppressed, from which oppression he had most relief when leaning forward inclined to the left side, in which position he usually sat. He recovered partially and went to Cork, the pain continuing in a degree, with some *stuffing*, as he called it, and cough; towards the end of September, he went to Cove with the intention of returning by sea to Dublin. He there lived on board a coasting vessel for a fortnight waiting in vain for a favourable wind, much exposed to cold, and daily becoming worse; at last, impatient of the delay, he walked back to Cork, to return on the Mail and it was after this walk that he first observed an œdematous swelling of his ancles, which gradually extended to his thighs.

On the 12th October 1813, this poor man had been free from pain for several days. The stroke of the heart was indistinct, tremulous, and appeared to extend over the whole of the left side of the chest, from above the clavicle to below the scrobiculus cordis; at no one part between these points was the stroke more distinct than at another. His pulse was 148, unequal, irregular and indistinct; his complexion was of a leaden colour, his countenance bloated, his eye staring and wild. His recollection was becoming indistinct; unable to lie down, he passed the night in his chair. His appetite was not much impaired, but he was flatulent and costive; his tongue was furred, its edges



were livid. His urine was scanty, high coloured and lateritious.

A walk of not more than a few hundred yards wonderfully added to the disturbance of the vital functions. While such an exertion increased the dyspnœa, it gave strength and distinctness to the stroke of the artery. His abdomen was swelled, and evidently contained a fluid. He died without a struggle on the night of the 15th of October.

The following were the appearances on the dissection, which the Surgeon General, who had humanely visited this man, permitted me to attend. On cutting through the cartilages of the ribs the fluid, which was in immense quantity, spouted up to some height—in the right cavity of the thorax there were several quarts of fluid. There were no adhesions between the pleuræ, the lungs were sound. The pericardium contained a considerable quantity of fluid. The heart was so large that it resembled the heart of a bullock, the parietes of the left ventricle were thickened, its internal surface much inflamed, various irregular excrescences grew from the mitral valves and semilunar valves of the aorta, and the cordæ tendineæ, which connect the larger portion of the mitral valve to the walls of the left ventricle, were torn off just at the point of their insertion into the edge of the valve; at this point there were also some of the above mentioned excrescences; four of the broken cordæ tendineæ hung loose into the ventricle.

## ANEURISM OF THE HEART.

There is no disease more familiarly spoken of than aneurism of the heart, yet the affection, which is with propriety so denominated, is exceedingly rare. Corvisart and Baillie have each seen but a single instance of it. In Sir Astley Cooper's Lectures it is stated, that he has known three examples of this disease, one of the cases which he had an opportunity of seeing was that of a soldier who had suffered a severe flogging, and during the punishment he held his breath : he shortly after complained of a violent pain in his chest, which was quickly followed by ascites and œdema of the inferior extremities. He died suddenly, and on inspecting his body it was reported to him that an aneurism, which had been formed in the left ventricle, had burst into the cavity of the pleura on the left side.

Partial dilatations of the left ventricle, as in Dr. Baillie's case, are sometimes, though very rarely, met with. Dr. Cusack shewed me a specimen preserved in the museum in Park-street, in which the left ventricle is partially dilated into a pouch large enough to contain a walnut ; there were no laminated coagula contained in it. Of the history of the case nothing very particular could be collected, the man died suddenly. A large quantity of water was found in the pericardium.



The most perfect specimen of this disease that has come to my knowledge was met with by my friend Mr. Harrison, Demonstrator of Anatomy to the Royal College of Surgeons, who has deposited the heart in the Museum of the College of Surgeons ; and I subjoin, in Mr. Harrison's own words, the history of this case, with an account of the dissection.

#### CASE OF ANEURISM OF THE HEART.

Jane Halfpenny, æt 39, was naturally of the sanguineous temperament, but her appearance had been altered by habits of profligacy and dissipation of the lowest description ; her flesh was flabby, and her countenance was somewhat of a purple cast. This unfortunate woman was deaf and dumb, and seemed to have no friend in the world, consequently but a very imperfect account could be obtained of the history of her health previous to admission into the hospital ; her pulse was full and quick, her tongue white, most of her distress seemed confined to the chest, her breathing was difficult, her lips livid, and she pointed to the region of her heart, when attempting to give an idea of her situation to her medical attendant. She was discharged in ten days from the hospital, having obtained great relief from medical treatment, rest, and confinement in a place where she was restricted from the use of spirituous liquors, to which she had been for the

last five years addicted : her treatment consisted in the application of a blister over the region of the heart, two large bleedings, and the daily exhibition of purgative medicines. On the 19th of July 1823, she was again admitted into hospital with all the symptoms formerly complained of, now greatly increased ; the action of the heart was so violent as to be perceptible through the patient's dress. When the hand was applied over the region of the heart, she was reluctant to allow the least pressure to be made, as it seemed to give intolerable pain : the pulsations of the organ against the 5th and 6th intercostal spaces were unusually strong and distinct ; her countenance was bloated, and of a livid hue ; she was afflicted with paroxysms of difficult breathing, her feet and limbs were anasarcaous ; her pulse was feeble, rapid and intermitting : she apparently underwent a temporary improvement for a day, from the good effects of bleeding, blistering, and small doses of the tartar emetic solution ; but on the succeeding day she suddenly became restless, her countenance indicated great distress in the chest, she seemed each moment on the point of suffocation, and could only breathe when raised up and supported in bed ; her extremities became cold, her pulse weak, indistinct, too rapid to be counted ; and on the following night, the 23d of July, she expired.



## DISSECTION

*Of the body 36 hours after death.*

The thorax was well formed ; in raising the sternum, I was struck with the unusual size of the pericardium, its opacity and great firmness, particularly towards the apex of the heart, where it was distended by a tumour of considerable magnitude ; the internal surface of the left lung (which did not collapse when exposed, in consequence of a firm adhesion to the parietes of the thorax) was so intimately connected with the pericardium, that it was difficult to separate it ; the phrenic nerve was imbedded in a quantity of adhesive matter, the result of inflammation, which connected the lung to the pericardium, and was thrown from its usual situation backwards and behind the apex of the heart ; except for the adhesion above mentioned, the lungs were healthy. The pericardium was found unusually adherent to the heart ; when it was removed from the anterior part of the heart, this organ being now more clearly exposed, was found to be thrown forward by a large round tumour of a very firm consistence, which was situated behind and below the apex of the heart ; this tumour was nearly as large as the heart itself, and much more firm to the touch ; it was inseparably attached to the left ventricle, and to the pericardium ; in some parts it was as firm as bone, and small patches of calcareous matter could be felt in different situ-

ations. Inferiorly the tumour rested on, and was closely attached to, the central tendon of the diaphragm; anteriorly it was intimately connected with the pleura, the cartilages of the 5th, 6th and 7th ribs, and the intervening muscles; this latter connexion required to be cautiously dissected through, as the sac was here very thin, though as hard as bone. Upon making a small incision into the tumour posteriorly, I found that the sac was very thin, and similar to that of an old arterial aneurism; it was lined with a stratum of chalky or calcareous substance, which in some spots was so firm as to resist the knife; the sac in this situation was about the thickness of a wafer, and appeared to be formed solely of the condensed and altered pericardium; elsewhere the sac was found much thicker, and appeared to have been formed not only by the pericardium, but also by the fleshy substance, and lining membrane of the heart; in some places the fleshy fibres, after a short course, became so condensed and pale as to lose all appearance of muscle; in all other situations the pericardium and lining membrane of the heart were closely connected, except where, in a few small patches, some earthy depositions intervened; at the lowest part of the tumour the sac appeared to be formed solely of the thickened pericardium.

From this examination I was disposed to infer that the aneurismal sac had been formed in the first instance by a dilatation of the three structures;



viz. the pericardium, the muscular substance, and the lining membrane of the ventricle; but that, as the tumour increased in size, the lining membrane and muscular substance were absorbed, so that the pericardium alone remained to circumscribe the disease and to confine the blood within the cavity; which purposes had been accomplished by the process of interstitial growth which nature had actively excited, thereby rendering this membrane so extraordinarily dense and strong that it was enabled to resist (probably for a long period) the action of the heart itself.

The sac was filled with a firm coagulated mass of a greyish colour and of a laminated texture, like the ordinary coagula in arterial aneurism. I next examined the cavities of the heart, and found nothing unusual in the right or left auricle, or in the auriculo-ventricular valves: the right ventricle was healthy, as also the valves of the pulmonary artery and aorta. Having divided the anterior part of the left ventricle, I remarked the lining membrane of this cavity to be unusually dense and white; its muscular structure was natural, perhaps it was somewhat increased in thickness: at the inferior part of this cavity, that is, near the apex of the heart, I observed a circular clot of blood about the size of a half crown; this clot filled the mouth of the aneurism, and appeared to have been recently coagulated; its surface was cupped and not very firm; its circular edge, which was well defined, was nearly in

apposition with, and did not adhere to the edge of the opening: on making a section of the tumour anteriorly, I discovered that a considerable portion of the parietes of the sac had been formed by a dilatation of the muscular substance of the heart. At the upper part of the tumour the lining membrane was peculiarly firm, and the muscular coat very distinct: lower down, the latter became condensed, and was converted into a cartilaginous substance with bony plates dispersed through it; and still lower, the sac was formed merely of the condensed pericardium, lined with some calcareous matter: this part of the sac was in very intimate adhesion with the parietes of the chest, and from the extent to which the process of interstitial absorption had been carried, there can be no doubt but a short period would have brought it to the surface as, in the 5th and 6th intercostal spaces, the tumour was only covered by the integuments and by the intercostal muscles, which had become pale and thin. On examining the cut edges of the coagulated mass which filled the tumour, the whole appeared to be formed of successive layers of coagulated blood; these farthest from the heart were pale and firm; while those nearer the cavity of the ventricle being more recently formed, were softer and of a redder colour. In the abdomen no morbid appearances were observable; the urinary bladder was distended with clear urine; the uterus appeared healthy; the right ovarium



was distended into a sac filled with about four ounces of albuminous fluid.

On examining the contents of the cranium, I observed the arachnoid or serous membrane of the brain, on the upper surface of each hemisphere, particularly near the longitudinal sinus, to be more dense and white than natural, also a slight gelatinous effusion beneath it: no other morbid appearance was observable in the membrane of the brain, and the structure of that organ itself appeared perfectly healthy.

### III.—OF ORGANIC CHANGES AFFECTING THE ARTERIAL AND AURICULAR OPENINGS OF THE VENTRICLES.

The arterial and auricular openings of the ventricles are liable to contractions, which are invariably combined with some cartilaginous or osseous depositions. Such alterations in the structure of the heart disturbs the circulation in a very remarkable manner, and produces great derangement in the functions of almost every organ in the body. It has been remarked by Bichat, that the right side of the heart is never to be found the seat of the cartilaginous or earthy depositions in which these contractions originate; but subsequent observers have seen the valves of the pulmonary artery, and the tricuspidal valves also, encrusted with bone. In my own experience,

some instances have occurred, in which the tricuspidal valve was beset with bony specks, and I have known the pulmonary artery to be similarly affected; but I have never found the right auriculo-ventricular aperture, the seat of that peculiar organic change which is so often to be met with at the left side of the heart, and I am therefore inclined to believe it to be exceedingly rare; on the contrary, the organic disease which consists in a narrowing of the left auriculo-ventricular aperture, I have reason to believe, is much more frequent than is generally supposed; a conclusion I have come to from the number of such cases I have met within a few years.

This is a disease which, according to my observation, shews itself at all periods of life occurring in the young as well as the old, and unlike other diseases of the heart and vascular system, it manifests itself as frequently in the female as the male. The signs of this complaint in its first stage are so vague and equivocal, that they are usually set down as nervous symptoms; unfortunately the prognosis is generally unguarded, and a line of treatment calculated to aggravate rather than relieve the organic disease, is prescribed.

We seldom have an opportunity of ascertaining the actual state of the auriculo-ventricular opening in the early stage of this disease, as death



rarely occurs until the person is worn out by a long train of suffering, and the aperture of communication between the left auricle and ventricle is converted into a mere fissure ; I have however known two instances in which the patients were suddenly carried off early in this disease ; the one by apoplexy, the other by epilepsy, which were evidently the consequence of the difficult transmission of blood through the left side of the heart, by which, the functions of the brain were so disturbed that these fatal effects were produced.

I shall briefly give the history of these two cases :

**No. I.—CASE OF CONTRACTION OF THE LEFT AURICULO-VENTRICULAR OPENING.**

I was requested to examine the body of a lady aged 45, who had died suddenly in an apoplectic fit, as reported to me. The body was remarkably fat. In the brain there was no effusion of blood or water in the ventricles, nor in fact was there any thing different from the natural state observable, except that the arachnoid membrane was slightly raised from the cerebral convolutions by a turbid serous effusion ; nothing however, was remarked sufficient to denote an apoplectic death, which was the more carefully sought for, as it was expected we should find in the brain appearances to account for the fatal termination.

The lungs were natural ; there was much fat

in the mediastinum. The heart appeared remarkably short and was rounded towards its apex; in the interior of the organ every thing was natural except the mitral valve, which as yet, was not beset with earthy concretions, but was shortened to more than half its natural depth. It was yellow, opaque, and at the same time thickened as if a cartilaginous substance had been deposited between its laminæ; the aperture which the edges of this valve circumscribed was sufficiently open to allow the blood a free passage from the auricle into the ventricle; but it was manifestly incompetent to perform the full office of a valve, or prevent a regurgitation of blood into the auricle during the contractions of the ventricle.

Such a state of the heart accounted for many ill-defined sensations about the precordial region, which were called nervous, of which this lady had habitually complained for nearly a year before her sudden dissolution. She had occasional oppression of breathing, palpitation of the heart, with a small pulse; but the symptom of moment (from which some warning of what did so unexpectedly occur might perhaps have been taken) was, that while her countenance did not wear the least sign of indisposition, and while she had every external appearance of health, her pulse was weak, small, and never to be felt beating less than 120 in a minute. Although this state of the pulse was habitual, there was no other symptom of pyrexia present; the body



was rather disposed to fatness and plethora than to wasting; the spirits, rest, and appetite good, and the countenance did not betray the least sign of indisposition; but the constant palpitation of the heart, the quickness of the breathing whenever the least exertion was made, and vertigo, were most distressing, and gave the lady apprehensions about herself that others did not feel, but which the sudden result justified.

No. II.—CASE OF CONTRACTION OF THE LEFT AURICULO-VENTRICULAR OPENING.

Anne Conroy, aged 45 years, accompanied by Mr. Michael Moore, one of my class pupils, called at my house in June 1824: this woman had been a cook, and was then in service; she had enjoyed tolerable health until within the last year; she complained now of a sensation of weight in her right side, of palpitation, uneasiness and weakness about her heart, of occasional severe cough, always accompanied by a frothy expectoration. She particularly mentioned that the tone of her voice was constantly varying, sometimes so hoarse she could scarcely be heard, and again it would become shrill; her breathing was perfectly natural while she was speaking to me, but I learned from her that she had occasional paroxysms of dyspnœa, yet with such symptoms she had not the appearance of an invalid in her countenance, except that her complexion had too much of a livid hue. She felt herself capable

of going through her ordinary business; her appetite was good, and she was rather disposed to be fat; her rest at night was perfect; indeed she complained of having an inclination to sleep too much.

The symptoms which most distressed her were palpitation of the heart and vertigo, with which last was generally associated the awful idea that she was about to fall down dead. Upon laying my hand over the precordial region, I discovered that the action of the heart, as to force and frequency, was indeed extraordinary, whilst the pulse, felt at the wrist, was a mere thready stream, unequal and irregular, beating at the rate of 150 in a minute. There was not as yet the slightest disposition to œdema. There was no deformity of the thorax observable.

From the irregularity and want of correspondence between the force of the pulse of the heart, and that of the artery at the wrist, it seemed probable, that these symptoms depended on some organic affection of the valves of the heart, which deranged *mechanically* the circulation of the blood; this suspicion was encreased upon considering, that the quickness of the heart's action could not be *sympathetic* with any disease elsewhere in the system, as none such was observable; the prognosis therefore was unfavourable.

I advised her to be bled from the arm; that her

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diet should be strictly vegetable ; that she should take the tincture of digitalis in small doses, and above all things give up her laborious occupation. None of these directions was followed : I apprehended, from the severity of the symptoms, that she would be suddenly carried off in an apoplectic fit ; and having announced my opinion to her master, I begged to be informed of it, should such an event occur.

On the second of July, at 4 o'clock in the morning, I was called upon by my pupil Mr. Adam Fuller to visit this poor woman ; she had taken a fit in her sleep. I was surprised on my arrival not to find her in a fit of apoplexy, but seized with a regular epileptic paroxysm. Instead of all or one of her limbs being flaccid and paralyzed, she lay extended in a state of universal convulsion ; her limbs were inflexible ; her countenance was turgid and livid, and she forced a whitish foam from her mouth : her pulse was small, frequent, and irregular ; as to force and frequency it was constantly vacillating.

I hastened to relieve the brain, which I judged to be oppressed, by abstracting about ten ounces of blood. I ordered a purgative and a foetid enema ; but the same continued convulsion did not alter its character for a moment, and she expired at eleven o'clock.

DISSECTION *performed on the third of July.*

In the brain no ruptured vessel was discovered, but the general venous congestion was remarkable. There was a slight opacity of the arachnoid membrane. There was some water in the right side of the chest. The heart was of a peculiar form, owing to the greater capacity of the right side than the left. The pulmonary artery was unusually dilated; the aorta contracted; the left ventricle was diminished in size; the auricle a little dilated; the mitral valve was not half its ordinary depth; its borders were shrivelled and puckered up as if a thread were drawn through them, and contained some spiculæ of bone, it was manifestly incompetent to do more than half guard the aperture of communication between the auricle and ventricle; this aperture was contracted, but was still large enough to admit easily the extremity of the index finger to the first joint, and it must have permitted the blood to pass without much difficulty from the auricle into the ventricle. In consequence of the shortening of the valve, it imperfectly covered the auriculo-ventricular opening, and too readily allowed of a reflux of blood into the left auricle during the contraction of the ventricle; hence the effort of the heart, instead of being as it is in the natural state, expended in propelling onwards the blood through the aorta, was partly lost, because of the imperfect state of the valve admitting a regurgitation of some



of the blood which was destined to pass into the aorta; the heart was therefore obliged to reiterate its beats, to compensate by its quickness for that small quantity of blood it was capable of forwarding at one contraction through the aorta. In this organic change of the valvular apparatus at the left side of the heart, by which a return of blood from the brain and lungs was impeded, we find the source of the quickness of the pulse, the vertigo, the dyspnœa and the sudden termination of these cases. In both we found the mitral valve and auriculo-ventricular opening in a state nearly similar, although the effects of this organic change were so dissimilar, the one having died of apoplexy, the other in an epileptic fit: it would not be easy to assign any reason for these differences, nor to explain why the cases terminated so speedily. They are useful however in showing, that even in the first stage of this disease, life is very insecure, and the dissections present us with what we have not often an opportunity of seeing, namely, the change of the mitral valve which takes place when this disease is in, what may be termed, its first stage.

When the disease is fully established, the signs of the contraction of the left auriculo-ventricular opening are by no means doubtful. The person affected with it has the general symptoms of diseased heart; there are paroxysms of dyspnœa hæmoptysis; much uneasiness also is experienced in lying in any but one position; some-

times the patient can only lie with ease on the right side ; he more commonly prefers the left, but the cause of these varieties I am unable to explain. The palpitations of the heart are irregular, widely extended ; they are seen underneath the lower extremity of the sternum, and the heart beats with considerable force against the side of the chest. As the disease advances, all the above mentioned symptoms are aggravated ; the limbs become anasarcaous, and the abdomen fills with water. Towards the latter period of the disease I have seen jaundice set in, and in so many cases that I cannot look upon it as an accidental circumstance, but rather as a symptom occasionally to be found attending the very last stage of this disease. Strong pulsations are seen in the jugular veins, and there appears a general thrill through the branches of the arterial system as in aneurisms ; when the ear is attentively applied to the side of the thorax, a very complex kind of movement, hard to describe, is heard,—a hissing purring noise as it has been denominated, caused by the transmission of blood through a narrow orifice, is in most cases very evident. The more decided symptoms of this affection are to be found in the peculiar irregularity and want of correspondence in the pulse, as felt at the wrist, and examined simultaneously at the heart ; the latter often beats so violently against the sides of the thorax as to shake the patient in his bed, while at the same time the arterial pulse is small, weak, and irregular ; indeed such is the state of the pulse in the arteries, that the physician attending



to this only, and overlooking the state of the heart, might readily suppose his patient in the last extremity, and dread to have recourse to those remedies from which alone any relief is to be expected.

This irregularity, want of correspondence, and disproportion between the force of the beat of the heart and the pulse as felt at the wrist, are not the only circumstances worthy of our attention ; for such a set of symptoms are common to the contraction of the auriculo-ventricular opening, and the narrowing of the aortic aperture ; but the pathognomonic sign of the former disease will be found in this, that the heart will sometimes give two, three, or even four beats in succession, which are not perceptible to the hand examining the pulse in the arteries ; the pulse at the wrist is very peculiar, and a knowledge of its character will assist us much in forming our diagnosis. I know not how to describe it otherwise than by saying, that it appears to the person examining it as if there were two pulses, one slow and deliberate for two or three beats, which is succeeded by three or four rapid and indistinct pulsations ; the heart upon the whole generally pulsates ten or fifteen times more in a minute than the artery, and its stroke is often more distinct in one arm than another.

The length of time a patient may be afflicted with this disease will be found to be very various ; it is, generally speaking, slow in its pro-

gress, and its severity can be greatly mitigated by proper medical treatment, if the patient can submit to confinement, rest, and a strict vegetable regimen; even after the dropsical symptoms have shewn themselves, he may live for a number of years: it is surprising to what a small fissure the left auriculo-ventricular aperture may be reduced before death supervenes. I may here remark that the dropsy, which, without exception, I have found to attend on the last stage of this disease, seems to me to be much more tractable than the same symptom when it shews itself towards the close of any organic affection of the liver or lungs.

No. III.—CASE OF CONTRACTION OF THE LEFT  
AURICULO-VENTRICULAR APERTURE.

Three years ago I was consulted by Jane Gibson a poor shop-keeper, living No. 15, Fisher's Lane; she had great difficulty in breathing, and constant palpitation of the heart, head-ache and vertigo; the limbs were anasarcaous and much distended, and the abdomen evidently contained water; there was a deficient secretion of urine; the countenance was natural, except at times when the breathing and palpitation were unusually distressing; there was little or no cough, but the slightest mental agitation or exercise of the body, as that even of walking a few streets, would aggravate all her symptoms; in bed she could only rest upon her right side, and she preserved, most of the day, the sitting posture: this woman had been



for the last year much in this condition, having had, all her life previously, excellent health, nor could she assign any satisfactory cause for the origin of her complaint.

I found, upon exposing her chest, that it was well formed, the action of the heart was rapid, strong, and irregular, while the pulse at the wrist was weak and thready, and although its beat was for the most part synchronous with that of the heart, there were often two, three, or even four pulsations of the heart, at a moment when all pulsation was suspended in the arteries, and could not be felt by the finger placed accurately over the radial artery: the pulse counted here, ranged at the rate of about 120 in a minute, and the beats of the heart, during the same time, exceeded by ten, twelve, or fifteen, that number. I have never seen the pulsations in the jugular veins more evident than in this case, and I ascertained that their beats corresponded accurately with every pulse of the heart, even with those which were not felt in the arteries; moreover when pressure was made on the external jugular veins, two or three inches above the clavicles, the veins became distended beneath this point during their pulsations, even more than when the pressure was omitted.

Having seen such an exact combination of symptoms as this in many cases which terminated fatally, and ascertained by an examination after death that their source was to be found in

the narrowing of the aperture of communication between the left auricle and ventricle, I have little doubt as to the real nature of this case. This woman is still alive, and in conjunction with my friend Dr. M'Donnell, I this day visited her, and found her nearly in a similar state to that I have above related, save that her dropsical symptoms are less pressing, in consequence of her daily use of diuretic medicine. She has been strictly attentive to her regimen, and has confined herself almost exclusively to vegetables. Fortunately it has been her lot to be in a condition of life suitable to her complaint; she has now no anxiety, and her business seldom puts her to the necessity of leaving the sitting posture, the only one in which she can obtain any relief from that source of continual annoyance, the palpitation of the heart, which, whenever it becomes urgent, to use her own words, "takes away her breath." Some time ago, in conjunction with Mr. Wilmot and others, I attended a lady aged 60, who laboured under a similar train of symptoms, in whom also the pulsations in the jugular veins were very remarkable: after a year and a half of severe suffering she died dropsical, and, upon examination of the body, the source of her symptoms was found in the narrowing of the aperture of communication between the left auricle and ventricle, the edges of the mitral valve being puckered up, and a fissure of a semilunar form about half an inch in length, the edges of which were beset with bony specks, being the only space which permitted



the blood to pass from the auricle to the ventricle. The left auricle was largely dilated, while the corresponding ventricle was diminished; the right side of the heart was actively enlarged, or in a state of hypertrophy, and the pulmonary artery and aorta were in size proportioned to the ventricles from which they respectively arose; in short, the heart had acquired the usual form it, after a time, assumes when this organic alteration in the mitral valve has been fully established. I shall not detain the reader by an unnecessary detail of cases of this too common disease, but will content myself with mentioning one out of a great many which I have met with.

#### No. IV. CONTRACTION OF THE LEFT AURICULO-VENTRICULAR OPENING.

Dr. William Hamilton, now Surgeon of the Wicklow Infirmary, attended with me a youth aged 15 years. He was, we were informed, delicate from his infancy, liable to breathlessness, cough, and palpitation of the heart, from the slightest causes. He was incapable of engaging in the amusements natural to children of his age; his symptoms, however, never confined him wholly to the house, until within the last year of his life. His urine became scanty and high coloured; all his symptoms grew worse, his limbs became anasarcaous, and he was visited, every evening, with a paroxysm of difficult breathing.

When I saw him, which was about six weeks before his death, I found him in the following state: his countenance shewed the distress and difficulty of breathing under which he laboured; his eyelids were swollen with a watery effusion; his inferior limbs were anasarcaous: there was an unusual prominence of the left side of the sternum to be observed: the pulsations of the heart extended themselves widely over the thorax, and at a distance could be heard beating with considerable force against his breast. That this organ performed some kind of complex double movement, and that its motions were accompanied with a purring sound, as in varicose aneurisms, was plainly audible, and could be also recognized when the hand was placed over the region of the heart; the pulse at the wrist was very weak and irregular, sometimes very obscure, and always manifestly disproportioned to the powerful action of the heart. There was often a double pulse at the heart for the single beat in the arteries; pulsations were also seen in the veins of the neck. Upon a careful consideration of all the symptoms, I concluded that the contraction of the left auriculo-ventricular aperture, if not congenital in this case, had been for a long time completely established; the prognosis given was unfavourable; all that remained to be done was to palliate symptoms as they occurred. The dropsical swellings were often evacuated by the administration of diuretic medicines, and the breathlessness was as repeat-



edly relieved by venesection. But these palliatives, after a time, ceased to be of use: the effusion became general, and the dyspnœa which used to occur in paroxysms only, now became habitual: he was incapable of assuming an horizontal posture. From this miserable state he was relieved on the 12th July 1824. He suddenly became jaundiced; in three days afterwards he died in a subapoplectic state.

#### DISSECTION.

Assisted by my friend Dr. Hamilton, I examined the body 24 hours after death. The whole surface was of a deep yellow colour; limbs œdematous; the abdominal organs were sound; the liver was of a livid colour, greatly gorged with blood, yet its ducts were pervious, and there was an abundant quantity of bile in the intestines; the lungs were perfectly sound; there was about a pint of yellow serum in the cavity of each pleura; the cartilages of the ribs, cellular membrane, in fact, every tissue were dyed yellow; the pericardium contained a small quantity of serum, there was no adhesion of this membrane to the organ.

The heart presented an unnatural appearance, yet had a form similar to what I have in other instances observed impressed on it, in consequence of a permanent contraction of the left auriculo-ventricular aperture; the auricles were

greatly dilated ; the right ventricle seemed unusually convex and enlarged, it having equally contributed with the left, as in the fœtus, to form the apex of the heart : the latter was rounded off in this direction, and the whole organ presented more of a circular or oval form than it naturally does. The increased capaciousness of the right side over the left was so remarkable, that the latter was entirely concealed behind the former.

The right ventricle in fact presented much the appearance which the left does when enlarged, so rounded and convex did it appear. This no doubt was partly owing to a great accumulation of blood in its cavity ; but in part it arose from a dilatation and increase of substance of the parietes of this side of the heart.

The left ventricle, as it was so much diminished, was not near so long as the right, which terminated in a rounded pouch-like extremity, not at all resembling the natural apex of the heart, which in a well formed adult heart, the left ventricle chiefly constitutes. The two large arteries were in exact proportion to the ventricles from which they respectively arose. The pulmonary trunk was dilated nearly to twice its natural size ; the aorta was diminished to about half its ordinary calibre. In the interior of the organ nothing was remarkable at the right side but an unusual prominence of the *carneæ columnæ* ; the valves here were all perfectly sound.



The left auricle was largely dilated, and contained a quantity of grumous blood: the left ventricle was of its natural thickness, but shortened and diminished a little in capacity. The communication between these was greatly interrupted, not by any contraction resulting from bony depositions, or by narrowing from any cause commencing in the zona annularis of the ventricle; but it appeared as if the contiguous edges of the left auriculo-ventricular valves had, as it were, coalesced (or had never been separated); and thus was formed a transverse septum, constituting at once a floor to the auricle, and roof to the ventricle,—concave towards the former, convex towards the latter; perforated by an oblong opening, bearing in its appearance some resemblance to the rima of the larynx. There was not to be discovered in the valves a speck of bony or earthy deposition. A few yellow cartilaginous excrescences, preparatory to such a state, alone occupied the broadest extremity of the narrow opening.

As the appearances which the heart in the dissection of the foregoing case exhibited, resembled so much what I have observed to be constantly the state of the organ in those who have died in the advanced stage of this disease, I have but very few additional observations to make upon this subject. The appearance however of the contracted opening of communication between the left auricle and ventricle deserves a moment's

attention as in this organic change, I believe, is to be found the immediate mechanical cause of the new form which the heart acquires, and of all the symptoms which characterise this peculiar affection. When the dilated auricle is cut into and cleared of the blood it contains, at its lowest part, instead of the mitral valve, a concave membranous septum of a yellow colour is seen, which is perforated by an oblong fissure, about half an inch in length, and one or two lines broad ; this fissure I have observed to be always obliquely situated, and to run parallel to the septum of the ventricles ; it generally is of a semilunar form, the concavity of the curve looking towards the root of the aorta, the convexity backwards ; the first formed by the larger portion of the mitral valve, the latter by the smaller ; the edges of this oblong fissure are generally studded with bony depositions ; viewed from the left ventricle the membranous septum is convex, and the angles of the fissure are connected by shortened chordæ tendineæ, with two very thick fleshy columns, the one in front, the other behind ; this I think it necessary to mention, as, from the enlargement of these carneæ columnæ, it is manifest that they must have had to exert some inordinate effort to make the imperfect valve capable of acting its very important part in the mechanism of the circulation.

The cavities of the heart I have in general found filled with coagulated blood, which in some

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cases I have seen assume the appearance of the polypi-form concretions, which so much attracted the attention of the older pathologists: most of these coagula had the appearance of recent formation, but my friend Mr. Mc Dowell last winter found in the left auricle of a subject who died of the disease we are now considering, a ball as large as a pigeon's egg; it was formed of the fibrine of the blood, was very firm in its consistence, and of a figure perfectly spherical, except that there was an oblong depression on it, which corresponded accurately to the form of the edges of the fissure by which the left auricle and ventricle communicated; small fossæ also, which must have been produced by the frequent contact of the bony spiculæ, were seen upon its surface; from all which it was manifest it could not have been of recent formation: we examined this curious specimen of polypi-form concretion too accurately to be deceived upon these points, and this, and the heart in which it was found we have preserved. Although the history of this case was not entirely unknown, nothing sufficiently precise could be elicited to authorise me in giving a summary of the symptoms, the prognosis formed, or the treatment which was adopted. This example of contraction of the left auriculo-ventricular opening serves to shew what struggles the heart will make, under the most unfavourable circumstances, to support life.

Let us now consider how far the new form the

heart has acquired will enable us to account for the peculiar symptoms which attend this disease ; among the most remarkable is, first, the want of correspondence between the force of the heart and strength of the arterial pulse ; secondly, the irregularity of the latter, and occasional double beat of the heart for the single pulsation in the artery.

First, when we recollect that the right ventricle is actively enlarged, and at the same time pushed forwards towards the sternum by the dilated auricles above and behind it, and moreover, that these three cavities just mentioned have a resistance to overcome at the left auriculo-ventricular aperture, we have no reason to be surprized at the vigorous pulse of the heart, to which the diminished left ventricle can contribute but little, as it is placed so much behind its usual situation : secondly, the pulse in the arteries is small, weak, and irregular, and less frequent than that of the heart, because the pulse of the former is the indication of the state of the left ventricle, which, as has been already mentioned, is reduced in size. and we can account for the irregularity of the pulse in the arteries when we bring to mind that the left ventricle derives from the auricle above it a very precarious supply of blood, which is probably often inadequate to fill its cavity ; under such circumstances, the left ventricle may contract in unison with the right, but the stream it has to transmit will not be sufficient to distend the



arteries, or make their pulsations sensible ; at such a moment there is a total failure of the arterial pulse, while that of the heart (caused by the action of the right ventricle) is strong and vigorous, hence the phenomenon characteristic of this disease, the occasional double pulse of the heart for the single pulse in the arteries.

This opinion is, I am aware at variance with that which refers the double pulse to the contraction, first, of the auricle, and next of the ventricle ; but as far as I have seen, the double pulse never occurs with the regularity which such an explanation would suppose ; besides, it has always appeared to me difficult to conceive how the pulsations of the left auricle could be felt by the hand placed on the breast, as that cavity is situated so close to the spine, and so far from the surface.

Lastly, the pulsations seen in the jugular veins demand our consideration : the cause of this symptom has been much disputed ; to me it appears most probable that it results from the regurgitation of blood from the right ventricle into the auricle, by which the current descending from the jugular veins is repelled back into these vessels during the systole of the ventricle. The pulsations in the jugular veins I have always observed to be synchronous with the action of the heart, even with the pulsations which were not perceptible in the arteries.

Mr. Hunter, in his Treatise on the Blood, has remarked that the valves of the right side of the heart did not so completely close the arterial and auricular openings as those of the left; but this circumstance, in my opinion, has not been sufficiently noticed, nor the influence that such a structure may have on the circulation in its natural or morbid state considered. I look upon this difference in the valves of the right and left side of the heart to be a natural provision to allow of a partial reflux into the right auricle, on those occasions when from any cause the passage of the blood through the arterial opening is retarded. Such a provision was absolutely necessary in the right or pulmonary ventricle, as various natural causes must momentarily retard the passage of blood through the lungs.—Let us suppose the right ventricle to contract vigorously at such a crisis.—Some part of the valvular apparatus (which is not very strong at this side) or the ventricle itself might give way, were there not some other course for the blood than through the pulmonary artery: in the natural state of the heart it is probable that there is constantly some little reflux into the right auricle during the contraction of its corresponding ventricle, as the valves readily admit it, but the great swelling of the jugular veins is only seen when extraordinary efforts are made, or when, from any enlargement of the right side of the heart, it is capable of containing a larger quantity of blood than it can readily transmit through the lungs, or the left receive;



on these occasions it is that the pulsations in the jugular veins become evident; they are synchronous with the action of the heart, and can more readily take place when the right ventricle has been preternaturally dilated, as it is not likely that the valve will increase in size and breadth in proportion as the auriculo-ventricular aperture enlarges.

Upon the whole, therefore, I would conclude that the pulsations in the jugular veins, viewed as a symptom of the disease we have been just considering, depend upon this, that the right ventricle, unable to transmit all the blood which distends it, through the pulmonary artery, part of it must regurgitate towards the auricle and displace a column of blood descending into this cavity from the jugular veins, causing thus a momentary reflux or pulse in the veins nearest the right auricle. Such observations, however, are not meant to apply to, or explain venous pulsations in general, but merely comprehend those which I have witnessed in cases where the left auriculo-ventricular aperture was contracted. In all cases, however, in which evident pulsations are seen in distant branches of the venous system, I think it would be highly satisfactory that the relative proportion between the auriculo-ventricular aperture and the valve designed to cover it, should be accurately examined when opportunities occur of inspecting the bodies after death, and that more than ordinary care

should be taken to discover whether any permanent obstruction had existed in any portion of the pulmonary circulation.

Before I conclude these observations on the healthy and deranged action of the auriculo-ventricular valves, I may remark that the mitral valve so perfectly closes the aperture of communication between the left auricle and ventricle, that, in the natural state, no reflux whatever is admitted; this, so useful at the right side of the heart, would have been not only useless, but injurious at the left side of the organ, as we find the general arterial system at all times equally ready to receive the blood during the systole of the left ventricle; and if the mitral valve did not perfectly close the left auriculo-ventricular aperture, a great deal of the force of the aortic ventricle would be wasted, whereby it would be incapable of moving the mass of blood which was destined to fill the arterial system. Pathologists, in looking to the different nature of the lining membrane at the two sides of the heart, as a means of explaining the greater liability of the left side to disease, have perhaps too much overlooked this circumstance, that while, from the unyielding nature of the mitral valve, all reflux into the auricle is prevented, from this very cause, which renders it effective in the circulation, is it exposed to more frequent injury from which organic disease may arise and the ventricle to which it belongs become more liable to be ruptured by its own efforts.



However we attempt to account for it, the fact is undeniable that rupture of the right side of the heart, and injuries and diseases of the tricuspidal valve are as rarely as such accidents and lesions of the left side of the organ are frequently to be met with. I shall conclude the observations I had to make on the morbid contraction of the left auriculo-ventricular opening, by considering how far this obstruction in the heart can account for some of the other symptoms of that disease.

The brain, the lungs, and the liver, more or less, feel the injurious effects of this obstruction to the free circulation of the blood through the left side of the heart ; the former is oppressed by an undue quantity of blood, the quality of which is ill suited to the function of the organ ; hence the vertigo, and sometimes the sudden termination by apoplexy or epilepsy already alluded to. The lungs and the liver are better able to accommodate themselves to this local plethora, but their functions are more or less disturbed. Hence the dyspnœa, hæmoptysis, deranged digestion and jaundice, which I have remarked in many instances. Lastly, the general capillary system suffers from a double cause ; the circulation of blood through these vessels must be languid, because the impulse a tergo which they can derive only from the left ventricle is weak, while there are numerous obstructions in front, but all arising from the one cause, namely, the con-

traction of the left auriculo-ventricular aperture. These vessels are probably relieved of their plethora through the exhalants, which open on the cellular membrane and serous surfaces, hence the anasarca first, the ascites and hydrothorax last, the constant attendants on the final stages of this disease.

ON OSSIFICATION OF THE AORTIC VALVES, AND  
CONTRACTION OF THE ARTERIAL OPENING OF  
THE LEFT VENTRICLE.

There appears to be no disease of the heart or its vessels more generally to be met with than ossification of the valves of the aorta; this organic alteration is the cause of an obstruction to the free passage of blood through the arterial opening of the left ventricle, from whence, in most cases, remarkable symptoms arise. Some writers consider this change of structure to be so common in the old subject, that they look upon it less as a disease than as the natural consequence of age. When an ossified condition of the aortic valves occurs gradually at an advanced period of life, it is wonderful what little disturbance in the system at large is produced; when on the contrary it appears in the young, which is not very common, or about the middle period of life, it is in such patients attended with well marked symptoms. There are strong palpitations of the heart, and dyspnœa complained of, which are much increased by the slightest exertion; in a word, the



ordinary signs of active enlargement of the left ventricle are present, except that the force of the arterial pulse is not proportioned to the action of the heart. It is irregular, and its contractions are accompanied with an hissing or purring sound, which can be clearly heard when the ear is applied to the side of the thorax, and a peculiar thrill is felt as in varicose aneurism, when the hand is laid on the præcordial region. With such a combination of symptoms this disease may be readily confounded with that which consists in a contraction of the left auriculo-ventricular opening, which we have just been considering: it is said, however, that the diagnosis will be found in this circumstance, that in the latter disease there is generally a double pulse to be felt at the heart for the single pulsation in the artery.

In the cases I have witnessed, in which calcareous depositions were discovered after death in the aortic valves, there had never been venous pulsation observed. The pulse had been weak and intermittent, but it presented neither the quickness nor peculiar irregularity which was constantly remarked in those cases in which, on dissection, the mitral valve was discovered to have been the seat of the organic change before described. When the heart has been examined in those who have died of the disease, which consists in a contraction of the arterial opening of the left ventricle, this cavity has been found to be actively

enlarged, or in a state of hypertrophy, and to exceed in length the neighbouring ventricle, so that the whole organ seemed elongated, and the apex formed exclusively by the left ventricle was remarkably pointed, and of a contorted form, which is strongly contrasted with the shape the heart after a time acquires in consequence of a contraction having existed at the left auriculo-ventricular opening.

Such are the symptoms which generally attend a contraction of the aortal opening of the left ventricle, and the appearances which I have observed the heart to present in those who have died of this organic affection. The Profession is already acquainted with the ordinary forms of this disease, which it therefore becomes unnecessary to exemplify by cases ; but I believe the following instance of ossification of the aortic valves and coronary arteries was attended with some remarkable peculiarities which render it worth noticing.

CASE OF COMPLETE OSSIFICATION OF THE CORONARY ARTERIES OF THE HEART AND OF THE AORTIC VALVES.

A gentleman, *ætat.* 68, of a pallid countenance, yet full and corpulent, while exerting himself in arranging some books on a high shelf in a library, suddenly felt severe pain in his chest, extending down his right arm, accompanied by a sensation of numbness : his sight became dim, he had



vertigo, but did not fall. From that moment his breathing became oppressed, and in a little time he discovered that his pulse, which was unaccountably weak in his left arm, was altogether imperceptible in the right.

On the following day, the 18th of October, he had still further grounds for alarm; the most careful examination could not detect the least pulsation in any artery in the body; nor was the movement of the heart sensible to the hand laid over the breast; an obscure undulating motion could alone be heard when the ear was for some moments attentively applied to the side of the thorax.

His breathing was high and laborious, and could only be performed when the body was nearly erect, inclined a little backward or forward. At night he became worse, and enjoyed no sleep: he occasionally turned on his side with a wish to rest, but this posture encreased the dyspnœa, and could be preserved only for a few moments.

Although this gentleman was perfectly aware of the alarming nature of his symptoms, being himself a physician, he was cheerful, and his countenance was but little disturbed. His appetite was not good; but he was able to eat some chicken or fish for his dinner daily. His digestive organs performed their functions but imperfectly; he suffered great distress from flatulence: thus he re-

mained for six weeks, with little alteration in his symptoms, except that his strength was observed declining daily and his breathing becoming more difficult : his rest during the night was still more imperfect : during the entire of this distressing period, *no pulse was to be felt in any artery in the body* : although I daily made the most careful examination, it was in vain. It would be useless to particularize the various remedies which were ordered from day to day ; enough to mention generally, that to procure rest, the compound powder of ipecacuan, lactucarium, and laudanum, were prescribed successively, but with little advantage. The flatulence and derangement of the digestive organs partially yielded to warm cathartic medicines. Purgative and foetid enemata were exhibited every evening. Æther, and repeated blisters, were fruitlessly prescribed to relieve the distressing dyspnœa : venesection was not resorted to.

This gentleman had been fond of society, and lived too fully, however in the previous history of his health, but little presented itself to throw light on his present situation.

Although always an inhabitant of the City, his chest never shewed any delicacy until within the six weeks previous to his sudden illness, when he had a troublesome cough, which yielded to a change of regimen, blistering, and one small bleeding. It was learned however, that three or four



times, within the last ten years of his life, he had suddenly fallen to the ground in the most unaccountable manner, without getting notice by any previous sensation, or losing consciousness, except for the few moments while the syncope lasted, nor did he experience any unpleasant effect from it. When raised from the ground he felt quite as well as if nothing had happened. In the sudden and unexpected manner in which this syncope occurred, and went off again, it was altogether unlike a common faint.

From all that could be learned, it was plain that to some organic disease of the heart could alone be attributed the remarkable symptoms observed in this case; but the nature of the lesion was altogether concealed. It appeared however too certain that medicine would prove totally unavailing to relieve him. After having laboured under the symptoms already detailed for seven weeks, this gentleman, on the morning of the 6th of December, having passed the previous night wretchedly, was observed, for the first time, to wander a little in his mind: he then fell into a state of stupor, his upper lip became suddenly swollen, and a large livid spot appeared on it. His breathing at first became hurried, then irregular, and finally at 12 o'clock ceased altogether. He expired without appearing to suffer any pain.

## DISSECTION.

*The Body was examined the following day.*

There was slight œdema of the lower limbs. The abdomen was much distended with air, and contained a small quantity of serum.

There were adhesions of the right lung to the side of the thorax ; on separating these, a cavity was discovered containing about a pint of a yellow sero-purulent fluid. This cavity was lined by a membrane of organized lymph, evidently of recent formation. The substance of this lung exhibited in no part any traces of inflammation. The left lung was not adherent ; it was perfectly healthy ; yet a small quantity of serum was contained in the left cavity.

The heart was large, flabby, and of a yellow colour from fatty deposition : all its cavities were distended with fluid blood ; the semilunar valves of the aorta were completely ossified ; but this bony or earthy deposition was not confined to the aorta ; it extended to the coronary arteries, which were so completely converted into bone as to be quite solid, having no perceptible cavity except at the distance of an inch from their origin : beyond this these vessels were at intervals completely interrupted by small bony specks.

Most of those who were present at this dissec-



tion went away dissatisfied, as the mystery did not appear explained,—why for so long a period no pulse could be perceived in the arteries. Some expressed their conviction that the contraction, the result of ossification of the aortal orifice of the ventricle, was sufficient to interrupt the stream of blood, so as to render the effect of the systole of the heart imperceptible in the arteries. But such an explanation was in my mind unsatisfactory, as the usual signs of this very common disease were not observed during the life of this individual; nor were the changes in the form of the heart, which it very generally induces, remarked after death. In those cases I have witnessed, when the aortic orifice of the ventricle was narrowed by the slow deposition of bone, the heart struggling to overcome the resistance, palpitated violently against the side of the chest; whilst the radial pulse, though small and weak, was always perceptible. But in the case I have just related, no pulse whatever was to be felt in the arteries, and the action of the heart was so weak and indistinct, that it could not be felt by the hand placed on the breast; indeed it was doubtful to many whether its motions could be perceived by the ear attentively applied to the side of the thorax. The very unusual symptoms observed in this case do not admit of so very simple an explanation, as I believe there is no pathological state more common than ossification of the aortic valves; while I know of no case recorded in which there was such an unaccount-

able absence of all pulse in the arteries remarked for so long a period. I have repeatedly observed such state of the valves after death in those in whom, during life, the pulse might have been irregular in every respect, but still always perceptible.

I have already adduced a case, page 396, in which, on dissection, the semilunar valves of the aorta were found in such a state from bony deposition, that water poured from the ventricle or through the aorta was equally retained by the valves. Yet the force of the heart, much debilitated by disease, was sufficient to open these valves at each systole; and although a slow and slender stream was thus circulated, the pulse both at the heart and arteries was always sufficiently distinct.

Such considerations induced me at once to dissent from the opinion that the unusual symptoms which this case presented depended altogether upon a contraction of the aortic orifice of the ventricle.

While the symptoms were so peculiar during life, in the dissection I could observe nothing very unusual, except the total obstruction of both coronary vessels. I have often seen a portion of the root of the aorta, including the semilunar valves, nearly converted into bone, while the ori-



fice and continued trunk of these vessels were perfectly natural ; but I have never witnessed an ossification of the coronary arteries so complete or extensive as in this instance. Such a fact was naturally calculated to make an impression on my mind seeking for some elucidation of the question ; but it has only suggested the hypothesis difficult to be sustained, that the heart, directly deprived of its due supply of blood by the obliteration of its proper nutrient vessels, might have been suddenly thrown into a state of partial paralysis ; hence the feebleness of its efforts, which were inadequate to excite the slightest movement in the arteries. This hypothesis may derive some little support from the consideration, that if the natural supply of blood be entirely cut off from a muscular organ, paralysis will as speedily and certainly follow as if all communication with the brain were interrupted by a division or injury of all the nerves which supply it.

Thus, for instance, let us tie the aorta, or inflict an injury on the spinal marrow of an animal, immediate paralysis of the inferior limbs will as certainly follow the first, as the second experiment. When we reflect that the heart can derive no supply from any other source than its coronary vessels, it will not appear then so extraordinary that partial paralysis should be the immediate consequence of the complete obstruction of these channels upon which the heart is evidently so dependent. The paralysis, if we dare so deno-

minate it, was not in this instance, and indeed seldom is in any case, so complete as to deprive the muscular organ of all power of motion. The heart was still just capable of contracting, and thus passing onwards the blood it received, but so feeble was its impulse, that the slightest motion was not perceptible in any branch of the arterial system.

The syncope which occurs in angina pectoris (an irregular form of which this case is to be considered) I am aware has been ascribed to a temporary spasm of the organ; a state exactly opposed to the paralytic condition into which I have imagined the heart to be thrown in consequence of its coronary vessels refusing to transmit to the heart its proper nutrient fluid. But the length of time during which the heart was apparently at rest in this case, precludes the idea of spasm; indeed it evidently supposes a condition exactly the reverse of it. It should be recollected however that these opposite conditions of convulsion and paralysis are occasionally associated in disease in a manner we are totally unable to account for, and sometimes the one, though more frequently the other, is produced by causes which, were we not to judge by their effects, we might suppose similar. But while I would suggest that the total failure of the pulse in this instance might have resulted from the defective nutrition and paralysis of the heart, I am not at the same time disinclined to admit that the state of



the semilunar valves of the aorta, *in combination* with the ossified condition of the coronary vessels, might have greatly contributed to impede the circulation or rather suppress the pulse; indeed it is evident that there must have been something mechanical in the cause which thus impeded the action of the heart. Its weakness was not sympathetic, for there was in this case, at first, no symptom of pyrexia. The spirits were cheerful, the appetite good, and debility was not complained of until this gentleman was beginning to feel the consequences of the distressing dyspnoea which affected him. The disease at first appeared evidently local, but the suddenness of the cessation of the pulse precludes the possibility of our accounting for it on \* mechanical principles. Pathological anatomy has indeed informed us that a certain condition of the heart and its coronary arteries is generally found in those who die of angina pectoris (an irregular form of which this case is to be considered) but it cannot explain to us the *modus operandi* of such organic causes in producing those symptoms or external signs by which that disease is recognized. Thus, although we can have but little doubt that in the case we have been just considering the organic seat of the gentleman's com-

\* Dr. Cheyne informs me that he knows two individuals still living in whom for two days there was a failure of the pulse; in one which occurred during an attack of misplaced gout, it was complete; in the other, after an attack of cholera, a faint pulsation could be discovered about four or five times in the minute.

plaint was to be found in an ossified condition of the coronary arteries of the heart and aortic valves, we are not by such a consideration furnished with any certain means of knowing why the pulse suddenly ceased in every artery in the body at a time when the general health seemed unimpaired.