is not likely that the bladder will endure an astringent solution of sufficient strength to close the bleeding vessels; and failing in this object, the presence of the injection seems to be positively injurious.

Original Communications.

THE PATHOLOGY, DIAGNOSIS, AND TREATMENT OF CARDIAC DISEASES.

By W. O. Markham, M.D., F.R.C.P., Physician to St. Mary's Hospital, London.

VI.—Treatment of Pericarditis. General Remarks; Bleeding; Mercury; Opium; General and Local Treatment; Paracentesis of the Pericardium; Pericardial Adhesions.

[*Concluded from p. 997 of vol. for* 1859.]

The *treatment of non-rheumatic pericarditis* requires no special consideration. The treatment is mainly that of the particular disease with which it happens to be associated.

Paracentesis of the Pericardium has been recommended and practised in certain cases where large collections of fluid have taken place in the pericardium, and have resisted the ordinary methods of treatment employed for promoting their absorption. The results of the operation in the limited number of cases hitherto recorded cannot be considered as satisfactory; but it must be admitted that no just conclusions as to its real value can be drawn from them, for they were cases in which the effusion was excited and maintained by the presence of tubercular or carcinomatous disease, in which the lungs and pleura were also more or less seriously damaged, and in which, therefore, a permanent cure was not to be expected.

The operation, as far as we can judge of it *à priori*, does not appear likely to be productive of any injurious consequences, if carefully performed; and the only objection to its use, in such cases, seems to be, that it holds out no hope of permanent benefit. But there are cases, undoubtedly rare, in which I should not hesitate to recommend its performance—cases, for instance, in which a large quantity of fluid has been rapidly exuded into the pericardium, and, by its mechanical pressure upon the heart and lungs, seriously interferes with their actions. The simple puncture of the pericardium, inflamed and distended with fluid, can hardly be considered, under such circumstances, as even so important an operation as puncture of the pleura. It must be admitted, however, that in the acute and early periods of the pericarditis, the absolute necessity for the performance of the operation can with difficulty be shown. In one case, in which I contemplated the performance of the operation, I found the patient, on the following day, so much recovered as to render its performance inadmissible.

Still I am inclined to think that the operation was called for in the following case. The patient had been ill four or five weeks, and died at last furiously maniacal. Here, during life, extensive dull percussion had been observed across the front of the thorax. After death, the pericardium was found distended with three pints and a quarter of yellow lymph, and stretched twelve inches across the thorax; the pericardial surfaces were covered with false membrane. There was no other disease whatever to account for death. The lungs were remarkably compressed upwards and backwards by the pericardial effusion, but were otherwise perfectly healthy. The following case, recorded in the seventh volume of the *Pathological Transactions* by Dr. Barker, is also one in which we may fairly surmise that the operation would have been of service. Here the pericardium contained about four pints of pus, and the lungs were much compressed. There does not seem to have been any other disease. The man was young and healthy, and his prominent symptom was oppressed breathing. In fact, it would seem as though, in this case, death had been caused by the mechanical pressure of the purulent fluid on the heart and lungs.

J. F., aged 26, a labourer, never very healthy, was attacked with pain of the left side of the chest three weeks ago. Breathing, 45 per minute. Front part of the left side of the chest larger than the right. Excessive dulness on percussion, reaching above to the lower margin of the left first rib; below, to the lower margin of the thorax; an inch to the left of the left nipple; and an inch to the right of the sternum. Elsewhere, the chest was resonant. The heart's impulse nowhere perceptible; its sounds feeble and distant. He died six days after admission into St. Thomas's Hospital.

The most appropriate spot for puncturing the pericardium is in the fourth left intercostal space, about three-quarters of an inch from the sternum, in order to avoid the internal mammary artery. Iodine injections have been thrown into the pericardium by Aran and others; but their use does not appear very clear.

I have not thought it necessary to say anything of what is called chronic, as distinguished from acute pericarditis. The term is now nearly obsolete. In both cases, the inflammation and its consequences are alike; the difference being, that in the one case—the acute—the inflammation runs its usual course; whilst in the other—the chronic—the cause provoking the inflammation continues still in action, and therefore prevents the inflammation coming to its ordinary, and so to say, natural conclusion.

VII.—Prognosis of Pericarditis.

It may be gathered from the above, that rheumatic pericarditis usually runs a rapid course, and that the subject of it, in a first attack at least, almost invariably recovers from its immediate effects. Judging, indeed, from the past history of this inflammation, we may infer, that since the use of large bleedings and mercurial salivation have been abandoned in its cure the disease has become much less fatal.

Unfortunately, however, rheumatic pericarditis rarely fails to leave behind it, and especially in the young, marks of permanent mischief done to the heart, pericardial adhesions, disorganisation of its muscular structure, and above all injury of its valves, caused by the endocarditis, which so very frequently accompanies pericarditis. It is impossible, therefore, to form a favourable prognosis of the health of a person who has been once attacked with rheumatic pericarditis, for the heart, in such cases, appears especially predisposed to a repetition of the attack. Rare, indeed, are the cases in which the heart once attacked, escapes permanent injury; rarer still those in which it remains ever after free from a repetition of the attack. Sometimes the injury is too slight to occasion symptoms such as may warn the patient of its presence, but is still marked enough to declare itself to the ear of the physician. Sometimes, again, when the injury has been more severe, the patient is conscious in himself, that he is not the man he was before the attack; his breathing is shorter and quicker; he has an occasional cough; he is not able to undergo the exertion which he was once equal to; occasional palpitations also trouble him, especially if he walk fast or run. In short, he now bears about him, in a more or less marked form, the symptoms of heart disease. In all such cases, when positive signs of injury done to the heart remain—irregular action, or abnormal sounds—the patient must ever be the subject of watchful care. To him, if to any one, the motto of Corvisart is truly appropriate—*adhæret lateri lethalis arundo*. A second attack of inflammation will, we must fear, still further disable the heart's textures; or gradually, and in a chronic way, a slow process of disease—degeneration—may affect the imperfect valve or the injured muscular structure; and thus the imperfection will be increased, so as at length to manifest itself in symptoms to the patient, as well as in signs to the physician's ear.

Happily, there is no class of chronic maladies in which the medical art is of more avail in the relief of symptoms, and by its prophylactic measures in warding off further attacks of the inflammation, than in this, provided only the subjects of them are willing to submit to treatment, and are, by social position, enabled to bestow the necessary attention to their bodily condition. Under such favouring circumstances, it is really surprising how life may be long preserved, even when the structural disorganisation of the heart is very considerable. But, among the poor, those who are thus affected have but small chances of prolonged life. They are still exposed to the causes which were the original sources of their malady; and their very exertions to gain the means of living increase the severity of the symptoms, which are destroying them. There are no cases, met with in hospital practice, whose early progress is more sad to watch than these. Removed from the immediate provoking causes of their sufferings, and subjected to proper hygienic rules, the improved change in the bodily condition of such patients is often surprising. The dropsical symptoms, the difficult breathing, the præcordial pain, the

palpitations, etc., quietly disappear, and the patients after a time leave the Hospital, with the belief that they are cured of their disease. Then, once more they return, as they must, to their labours, and once more these labours, and the other attendant circumstances of their condition, provoke the rapid recurrence of the evils, which they vainly hoped they had for ever left behind them, when they quitted the Hospital. From such persons prognosis has nothing favourable to offer.

THE PHYSICAL CONDITION OF THE MUSCLES DURING MYALGIA.

By Thomas Inman, M.D., Physician to the Liverpool Royal Infirmary.

In a series of short papers, and at greater length in a book, I have endeavoured to call the attention of the profession to the fact, that a vast number of symptoms once supposed to indicate inflammation of internal organs, rheumatism, neuralgia, hysteria, and a variety of other diseases, are due in reality to painful affections of the fleshy or tendinous parts of muscles.

The main points established are, that whenever muscles have been excessively used (proportionally to their strength) they become the seats of pain, tenderness, etc., which last a variable time, and that this is attended with cutaneous soreness and tolerance of steady pressure; and while, in some instances, the extension of inflammation from neighbouring parts to the muscles causes the preceding symptoms to be produced, so, in other instances, overexertion in muscles may be carried to such a point as to give rise to genuine myositis.

I have long been seeking for an opportunity to ascertain the probable condition of the muscles in myalgia from excessive action, and having obtained it, I think that the profession will be interested with the result of the investigation.

Two methods are open for adoption; one, to examine into the physical condition of the muscles in those who have died of tetanus, in which we have most intense muscular overexertion; another, to examine the muscles of animals in whom, prior to death, circumstances assure us that there must have been excessive muscular action. The sole difference between these two is that in the former case the muscular action is continuous, and the circulation of the blood comparatively inactive, while in the latter it is intermittent, and the circulation is energetic. As this difference is one of degree rather than of kind, it is natural to conclude that there will be certain resemblances between the appearances in one set and the other, though at the same time certain differences might be anticipated from the differences between the circumstances.

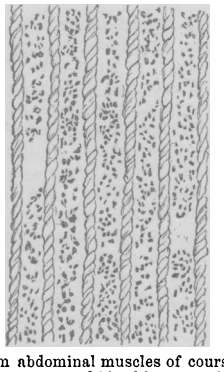
We will adopt both methods, and examine first the condition of the muscles in those who have died of tetanus. Externally we find them firm in texture, pale in colour, and marked by purple spots. Microscopic inquiry shows that their blood-vessels have been emptied, that many of the muscular fasciculi have been ruptured, and that each of these fractures is attended with laceration of blood-vessels, and extensive extravasation of blood between and around the broken fibres. As far as my observation has gone, ecchymosis into the sheaths of muscles, or between the muscle and the skin, is not common in tetanus. In case of recovery from tetanus, the muscles remain rigid and useless for a long period, but rarely, if ever, inflame and suppurate.

I have known two instances in which rupture of fibre, and probably intramuscular ecchymosis, have occurred during life. Both were in gentlemen, and the occurrence took place while running for a long leap. The fracture occurred half way down the biceps cruris; it was attended with sudden and acute pain, and followed by local rigidity and tenderness for many weeks.

We have, then, the broad fact before us, that excessive muscular action will produce rupture of muscular fibres and their associated blood-vessels; and we have reason to anticipate that a similar effect may be produced by a smaller, yet still excessive, amount of such action. We call all muscular action *excessive* which is followed by stiffness, pain, soreness, cramp, or genuine inflammation.

As sportsmen say that after a hare has been well "coursed," or hunted with beagles, if she escape, she is next day, and for a long period afterwards, so stiff (and sore?) as to be unable to move, and that very frequently she evades the dogs only to die from her exertions to escape, it became a desideratum with me to secure a well-coursed hare, one in whom, had it lived, stiffness and immobility would certainly have ensued. Such an animal I have, through the kindness of a friend, recently obtained, with the assurance that none, during the season, had given the dogs a longer run.* On removing the skin, the following was the appearance presented:—The whole of the muscles, where there was no ecchymosis, were as pale as the breast of a fowl, instead of the ordinary red brown colour usually presented by hares. Excessive ecchymosis existed about the head and neck, which was due to the greyhounds' teeth; and there were some other spots about the loins, which were probably due to a similar cause. In addition to these, however, there was very extensive extravasation of blood above the shoulders, along the whole course of the longissimi dorsi, and about the upper parts of the thighs, both on the posterior and the ventral aspects. The whole of the abdominal muscles were covered, externally, with a layer of extravasated blood, and the muscles themselves were purple-black. The peritoneum and bowels were of an equally dark colour, with extravasated blood. The legs and shoulders were apparently healthy, yet a close investigation showed that there were small ecchymoses in the substance of the muscles, and under the fascia. On cutting open the longissimi dorsi, they were found to be very dark in colour, very soft, and so brittle in texture that the fibres readily broke during manipulation. The fibres of the white muscles were also very friable. There was no physical change noticed in the tendons and fascia, except where they were bathed with blood, bloody serum, or simply serum.

On making sections for the microscope, the greatest care was taken not to destroy the natural appearance during manipulation; and sugar and water were employed to prevent the blood from being dissolved out. The first thing noticed (with a half-inch object glass of Powell and Lealand's) was that lines of extravasated blood accompanied every muscular fibre in the abdominal muscles, and about every third fibre in the longissimus dorsi, and every tenth fibre in the crural muscles. This



Muscular fibres from abdominal muscles of coursed hare, shewing absence of striæ, extravasated blood between the fibres, and ruptures of various kinds. When the human heart is soft, partly fatty or atrophied or very feeble, the muscular fibres have an appearance very similar to the above.

gave sections, of the first, an appearance similar to that of the pyramidal bodies of the kidneys. The next thing which attracted attention was that the transverse lines were very indistinct in the vast majority of the fibres in all the muscles. After a close investigation, it was seen that many of the muscular fibres were ruptured through their "sarcine," the sarcolemma remaining entire. At first, I attributed this to some accidental violence during manipulation, and made a series of observations accordingly. The question was ultimately set at rest by my finding, in an abdominal muscle, a ruptured fibre with an accumulation of extravasated blood around the fractured portion. The sarcolemma being entire, no globules were seen between the divided "sarcine". I found no fibres ruptured completely across.

On carefully examining sections from various parts, it was ascertained that ruptured fibres were most common in the abdominal muscles, where the amount of ecchymosis was the greatest; next to these, fractures were most common in the lumbar region; and next to these, in the crural extensors. I found no fractures in the scapular region, nor did I find any laceration of fasciculi. In every instance the rupture was confined to individual fibres. In some there was a bulging of the

* It was run for twenty minutes, and completely exhausted the dogs After being killed, it was marked, and forwarded to me.