With regard to the cholecystectomy, I found it a much simpler operation than I had expected, and as the patient seems to do quite well without her gall-bladder, I should not hesitate to perform it again in any case in which the bladder was much damaged, or in which it was impossible to properly secure it into an external wound. Looking to the tedious convalescence in the cases in which the gall-bladder is sewn into the parietal wound, and to the possibility of re-formation of stones, I think the question of cholecystectomy versus cholecytostomy as a rule of practice will have to be seriously considered.

Watching these various cases, and the nature of the fluids contained in the distended bladder and discharged during healing, I cannot help having doubts as to whether physiologists are right in regarding the gall-bladder as a storeroom for bile; it seems to me that it is very likely intended to secrete a mucous fluid to mix with the bile, and render its passage through the duct more easy; the fact that bile finds its way into it and through it when it is cut open does not militate against this suggestion, because any slight obstruction or closure of the outlet of the common duct would naturally cause the bile to flow back along the cystic duct and in the direction of least resistance when the bladder is open, and when it is closed it must act somewhat like one of the little rubber bottles with which we are all familiar, and squeeze out fluid through its muscular coat, and suck it in when it relaxes. Whatever its function, it is to many a source of infinite pain, and trouble, and danger, and if it is found that they get on as well without it, so much the better for their future peace. I do not wish it to be thought that I am advocating the passage of the stone, thus alluding to the rule of practice: I merely did in this particular case what seemed to me at the time to be best, and the sequel proved that I did right.

These remarks I have to make about the fifth case, the simple cholecystotomy, is that the breaking down of the wound from the passage of the bile over it, and the slow closure and great discomfort suffered by the patient from the large quantity of discharge soaking through everything, made me often think whether it would not have been better for her if I had removed her gall-bladder. However, she has got the stone out, and the wound has healed, and she is as well as her companion in misfortune who is without her gall-bladder. Since this was written she has been to see me, complaining of a good deal of pain about the site of the sutures on the gall-bladder to the peritoneum, but I can detect nothing wrong, and think it must arise from the drag on the gall-bladder.

CARDIAC FAILURE AND SUDDEN DEATH.

By JOHN A. McWILLIAM, M.D.,
Professor of the Institutes of Medicine in the University of Aberdeen.

No doubt there is often a considerable amount of looseness in the use of such phrases as "death from sudden failure of the heart's action," "death from syncope, occurring in a weak heart," etc. Such conclusions are often made to cover cases in which the fatal issue has, in all probability, resulted from other (unascertained) causes; but when all such instances are excluded there remain a large number of cases, accurately observed and carefully recorded, in which there is every reason to believe the occurrence of death to be directly determined by a sudden and complete cessation of the cardiac function—a catastrophe attributed sometimes to the influence of more or less slight causes (for example, increased strain on the organ), at other times remaining apparently mysterious.

The organic lesions most commonly associated with sudden cardiac failure are well known, namely, degenerative changes of a fatty or fibroid nature in the muscular walls, aortic regurgitant disease with its more or less effective compensatory changes in the organ, and diseased conditions (atheromatous, calcareous, or sclerotic) of the coronary arteries. But sudden stoppage of the heart's action has often been observed apart from the occurrence of gross structural lesions, associated with no very obvious or extensive alteration in the cardiac tissues. All that has been noticed in some cases has been a "flabby condition of the muscular tissue," and other appearances of more or less uncertain significance; not infrequently the cardiac substance has exhibited no pronounced morbid change.

Sudden cardiac failure is usually assumed to take the form of quiescent standstill in a state of diastole, as a result of the action of one or more causes, often a vast of causes—over-distension or strain of the organ due to sudden exertion or excitement, pressure on the heart or rupture of its walls, inhibitory influences transmitted by the vagus nerve, or some cause involving an abrupt loss of contractile power from failure of the intrinsic mechanism; for example, impairment of the reflex or of the coronary blood-supply, or exhausting influences of a more obscure character.

A long series of experiments on the mammalian heart has convinced me that in ordinary circumstances sudden cardiac failure does not usually take the form of a simple ventricular standstill in diastole; indeed, such a mode of failure is, by experience, very exceptional, if one exclude those cases in which there has been some very obvious cause acting from without upon the heart, for example, excess of chloroform, profound hemorrhage, asphyxia, etc. When sudden failure of the heart arises from the influence of such gross causes,—when the cardiac collapse has been due to more obscure and impalpable changes—the state of the organ is, as a rule, entirely different from simple standstill in a state of diastolic quiescence. It assumes, on the contrary, the form of violent irregular action, inco-ordinated, inco-ordinated, twitching contraction of the ventricles.

Such an irregular phase of cardiac activity was first described by Ludwig and Hoffa many years ago, as the result of the application of strong galvanic currents or faradic currents to the ventricles of the dog's heart. Kronecker found more recently that he could induce a similar state by puncturing with a needle a certain part of the ventricular substance.

The condition in question has been studied by various investigators, and its general characters are now clearly ascertained. The normal beat is at once abolished, and the ventricles are thrown into a tumultuous state of quick, irregular, twitching action; at the same time there is a great fall of blood-pressure. The ventricles become distended with blood, as the rapid quivering movement of their walls is wholly insufficient to expel their contents. The muscular action partakes of the nature of an arhythmic, inco-ordinated, and rapidly-repeated contraction of the various muscular bundles. Some bundles are in a state of contraction while other bundles are relaxed, and so, instead of a co-ordinated contraction leading to a definite narrowing of the ventricular cavity, there results an irregular oscillation of the ventricular walls which remain in a position of diastole. This condition is very persistent, and it is easy to kill a dog by applying a faradic current to the ventricles. Various names have been applied to denote the peculiar form of action under such conditions of cardiac paroxysm, devitalization, intervermiform, etc. In regard to the readiness with which the heart assumes this peculiar and disastrous mode of action, I have been able to form some important conclusions in the course of a long series of experiments on the mammalian heart, conducted with the organ exposed, the thorax being laid open, and artificial respiration kept up through a cannula in the trachea. I have again and again been impressed with the fact that in certain conditions of the cardiac tissue, the fibrillar mode of contraction (delirium cordis) may be induced with the greatest ease; it may occur as a result of apparently trivial causes. Gentle handling of the organ, contact with the cut end of a rib, slight friction of the ventricular surface at any part, or indeed a mere touch with the finger, may be the immediate result by producing this remarkable form of inco-ordinated action. And not only is this the case—that extremely slight causes are often sufficient to induce the fibrillar condition—but a similar phenomenon not very infrequently occurs in the absence of any distinct and tangible excitation; the ventricle may go into fibrillation quite apart from the operation of any recognisable irritant or immediate disturbing agency. It is thus quite palpable that in certain circumstances the readiness of the ventricles to assume the fibrillar form of contraction is strikingly augmented; their susceptibility becomes so heightened that the sudden change in

2 Sitzungsberichte d. Berliner Academie, 1884.
their mode of action occurs as a result of very slight causes, which would be entirely insufficient to bring about such a result in ordinary circumstances, or even in the absence of any direct recognisable cause.

Such a heightened ventricular susceptibility is associated with circumstances and constant cases of sudden death, which are distinctly different in the physiological and clinical experience; an imperfectly-nourished tissue usually shows, at some phase or other, a pronounced alteration and temporary exaltation of its excitability. The liability of the mammalian heart to sudden failure from the superincumbent fibrillar mode of contraction (dilium) has often been unpleasantly impressed upon me by the not infrequent interruption of experiments depending on the normal mode of action of the heart, in the few cases of sudden dissolution. It is strange indeed if the phenomenon of fibrillar contraction is never manifested in the human heart, in any of the various conditions of altered and disordered nutrition to which it is liable. For this phenomenon has been observed in all warm-blooded animals examined; it is as far as I am aware, a universal feature in the behaviour of the mammalian heart; and at the same time it is much more readily induced and much more persistent in the higher mammals than in the lower forms. In the hedgehog, guinea-pig, and rat, for example, ventricular fibrillation occurs in nearly every direction; the normal mode of action is after a time recovered. In the cat delirium is easily induced and is very persistent, generally, if not uniformly, fatal in the absence of remedial measures; and in the dog all observers concur in regarding it as invariably destructive of life.

It is hardly to be expected that such a widespread and probably universal feature of mammalian cardiac action should be unrepresented in the case of man. It probably does occur in man, and as a rule, if not invariably, with fatal result. In this way can be explained many instances of ventricular fibrillation observed in the ordinary life of the individual; that is, so many ventricular fibrillations as to be sure cause a distinct element, which can be represented by an explanation that without such an explanation must be regarded as inexplicable and mysterious. For anyone, I think, who has looked closely into the mechanism of abrupt cardiac failure as the direct result as it may be of any cause, it is manifestly clear that there are many things very hard to explain, or rather unintelligible, when viewed in the light of the usual hypothesis of diastolic standstill from such causes as the following; inability to contract against the arterial pressure, from over-distension of the cavities, from reflex inhibition, from an interference with the coronary blood-supply, from direct pressure on the organ, from rupture, or from some obscure cause such as an abrupt (and accountable) loss of the "intrinsic irritability."

For the sake of the heart which has been doing its work sufficiently, and has been enabled through a measure of relaxation to discharge all the duties of a fairly active, though not laborious, life, it seems incomprehensible how an abrupt, utter, and irretrievable collapse should occur even in the absence of any sudden and material increase in the amount of work to be done by the organ; how abrupt death may happen as a result of any apparent abnormality or any other cause. The lowest arterial pressure compatible with the normal life of the individual should all of a sudden become incapable of maintaining in favourable circumstances even the lowest arterial pressure compatible with the very existence of life. The examples of fatal heart-stoppage, even under favourable conditions (for example, during periods of inaction or even during sleep) will readily prompt themselves in the minds of my readers, and also the occurrence of cardiac failure in circumstances of so slight a favourable character as to make it hard to conceive how these could be entirely dependent on purely physical grounds; and it seems plain that the causes responsible for such a very few brief statements bearing on this point, and applicable to heart failure in different classes of cases. Dr. Gairdner3 (writing on angina pectoris and sudden death) observes: "In some of the very worst cases indeed it has been clearly ascertained that very shortly before a fatal paroxysm the patient has been in a state of entire composure, with a regular and strong breathing, and all the functions apparently so well adjusted as to involve no appearance of any disease tending to shorten life. It is plain out of the question to suppose that this is a chronic, and in its very nature gradually advancing lesion like those of the heart, or disease of the coronary vessels, is the direct and immediate cause of a death which occurs in a moment... The cardiac fibre which carried Dr. Chalmers safely over the last three weeks of his life, with its harassing duties and active exertions in various places, cannot be reasonably supposed to have become suddenly so much morbid disease (physically speaking) that it must needs be disabled to the extent of ceasing to act altogether in the absolute quiet of an undisturbed night, after a day peacefully and happily spent in his own home. Hilton Page4 referring to fibroid disease of the heart, remarks: "There is no doubt that syncope of a non-fatal character is associated with an inefficient action of the heart, which may depend on one or more of a number of different causes, such as inhibitory influences exerted through the vagus nerves, and dependent on reflex excitation on the blood-supply, or on the heart itself by virtue of any exertions that have been made. In particular, it is manifestly the case that in those cases where the heart has been over-distended or struggling against a high arterial resistance. Many temporary attacks of syncope met with in the course of organic cardiac disease and in other conditions are probably of this character. Indeed, it would seem probable that an essential difference between the state of the heart in many cases of non-fatal syncope and that present in other cases that prove fatal, is that in the former instance the cardiac insufficiency is due to a change in the rhythm and force of the ordinary movements of the organ; while in the latter the condition is such as to present an extraordinary change in the character of the ventricular activity, involving a practically irredeemable abolition of its function as a muscular pump. In other words, it is probable that fatal syncope often differs from non-fatal syncope in the superinfection of the fibrillar mechanism, apparent in the suppression (or delirium) in the ventricular muscle; this seals the fate of the depressed heart by arresting the circulation and in causing a rapid exhaustion of the ventricular power in consequence of the violent and continued excitement of the latter. In the great majority of cases where sudden death is caused by

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3 Reynolds's System of Medicine, p. 892 and pp. 559-560.
5 Pathological Transactions, xxi.
cardiac failure, there is, no doubt, an altered and impaired state of nutrition in the cardiac tissues, sometimes rendered palpable by degenerative changes recognisable with the microscope or pointed to by the presence of disease in the coronary arteries or conditions indicating a changed coronary supply (for example, aortic regurgitation, baseline). In other instances there is no doubt, a disorder of nutrition, which gives no outward and visible sign to histological examination, just as conditions of defective nutrition (attended by a striking increase in the ventricular susceptibility) occur, without recognisable structural changes. The fibrillar contraction is determined or ensured by the occurrence of fibrillar contraction in the ventricles. Moreover, there is reason to assume that, in a certain number of instances, where none of the above-mentioned causes are present in any marked or dangerous degree, a sudden, unexpected, and irretrievable cardiac failure may, even in the belief that exciting cause, present itself in the form of an abrupt onset of fibrillar contraction (ventricular delirium). The cardiac pump is thrown out of gear, and the last of its vital energy is dissipated in a violent and prolonged turmoil of fruitless activity in the ventricular walls.

AN ANOMALOUS FORM OF ECZEMA.1

By E. D. MAPOTHER, M.D.,
Ex-President R.C.S.I.; Consulting Surgeon to St. Vincent's and the Children's Hospitals, Dublin.

Last January I was consulted about a raw surface involving the right tragus, and the hairless skin in front of it, and at once its likeness to Paget's disease of the mammary areola struck me. It was oval, about 1½ inches vertically and an inch transversely, florid and moist, and a red and pinkish glistening elevation. The patient was a married woman of 40, long troubled with uterine maladies. Referring to my notes, I found records of two very similar cases, unilateral and in females, but of diverse ages—45 and 12. In the latter there was also a small patch a little above the eyebrows. The uterine granulations were hard and slightly raised, but without the rolled over edge of rodent ulcer, without pain or much itching, stubbornness to treatment, without occasional disappearance, characterised all the cases. Dr. Crocker has observed a like condition on the scrotum.

Some physiological analogies group these regions; in all the sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. The sebaceous glands are very large; those round the nipple were, by Bidloo in 1885, described as supplementary mammary glands. 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1 I have used the term "syncope" in the general sense in which it is often employed to indicate the failure irrespective of the cause of whether the heart's contractions are entirely abolished, or are merely so much enfeebled as to be ineffective.

2 Read in the Section of Pathology at the Annual Meeting of the British Medical Association held at Glasgow, August, 1888.