SOLDIER'S HEART

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In considering the subject of heart affections as they are encountered in soldiers it will be desirable in the outset to say a few words about the term "soldier's heart"; one which has now acquired an accepted position in our nomenclature of diseases; one which certainly appears to supply a definite need in corresponding to a definite condition; but unfortunately also one which is employed with so much abuse that it is impossible not to regret that such a term should ever have been introduced. We ought to restrict its application to patients who are suffering from cardiac affections, or at any rate cardiac symptoms, due in some way to military service. In this sense, soldier's heart would be an occupation disease as we speak of miner's nystagmus, scrivener's palsy, or housemaid's knee. But whereas there exists a special group of cases which in my opinion corresponds to such a restriction even though the exact determining cause is still a subject for contention, the term is applied indiscriminately to a large variety of symptoms which are evident in men who happen to be temporarily khaki-clad, and most of which have nothing whatever to do with the heart, nor for that matter with military service.

And this reminds me to refer briefly to that question-begging epithet which is so conveniently employed in these days, D.A.H. (disordered action of the heart). Now whatever word of depreciation may be considered suitable to apply in the case of the aforementioned "soldier's heart" these fade into insignificance when you select those condemnatory enough for its blood-relation, D.A.H. I do not hesitate to say that I have seen men complaining of symptoms referable to every disease above the umbilicus sent in as D.A.H., and I am not at all sure that a certain number below this anatomical landmark have not been included. But even if one eliminates those cases of so-called D.A.H. which pass the first portal re-labelled N.Y.D. (not yet diagnosed), and are finally discharged as N.A.D. (no appreciable disease), what exactly does an honest attempt to use the words involve? What precisely is orderly action of the heart and when does chaos usurp the place of cosmos in the circulatory world? And in the second place is it not absurd at this stage of our knowledge of the etiology of disease to imagine that a diagnosis of tachycardia is a diagnosis.

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or that it is sufficient to say that a pulse is irregular or intermittent without taking the trouble to see what is the nature of the irregularity and if as a matter of fact its existence is of the slightest consequence?

In recalling to your memory the copious literature which has already appeared on the subject of "soldier's heart" during the last couple of years, I would suggest to you that a large variety of different conditions have been at various times described as if they were all the same thing. And I think the best way to support this proposition is to enumerate a representative collection of the causes which have been advanced.

First and foremost very naturally is the endeavour to ascribe all cases to exertion. Here then is our old friend "strained heart" or "athlete's heart" in modern form. To adapt the conditions to military circumstances such features are introduced as marches with weights, shoulder straps and the other paraphernalia of service and service kit.

The subject of heart-strain I will postpone to consider later in detail.

As a sort of corollary to this school, there is another which pre-supposes the existence of a great deal of latent unsuspected cardiac disease which only manifests itself in consequence of the strain, physical or mental or both physical and mental of military life.

To other authorities the condition is due to a toxemia. If microbial influence is demanded, well, organisms are so easily introduced, from the teeth for example, or from the food itself; and even if you are deprived of organisms there are always toxins to fall back upon. And if toxins likewise are denied, there are perverted products of metabolism, and some authors blame the excessive protein diet of the soldier.

Another large group of authorities attribute the condition to the thyroid gland. The majority think there is hyperthyroidism, though a few believe the secretion to be normal in quantity but of pathological quality. The soldier's heart to this school is simply larval Graves's disease.

At least every other week somebody writes to the medical journals explaining "soldier's heart" to be due to excessive cigarette smoking; and considering the almost universal prevalence of this vice such an opinion has at least the support of reasonableness.

Recently "soldier's heart" has been attributed to deficiency of buffer salts in the blood, and such an explanation is not without its inconvenience in view of the difficulty in technique in estimating these salts, more especially as I will be impertinent enough to hint that the majority of us are more than vague as to what a buffer salt is, what it does, and why its absence should produce symptoms of cardiac disease.

One turns next to an entirely different interpretation of "soldier's heart" in introducing the school which support a psychical origin. Its disciples see no necessity to invoke the existence of any organic pathological cause. In fact they see no necessity to suppose the existence of any sign of heart disease. They point out that the symptoms, although equally familiar in genuine heart trouble, are quite easily or at least specifically
explainable on a non-organic basis, and that a man who has hitherto adapted himself to the most sedentary life, suddenly forced into the activity of unaccustomed exercise, pants and puffs and finds it much easier to sit down than to try to keep going. The symptom of precordial pain in such cases is generally indigestion due to bad teeth. Now it seems to me that every one of these explanations is probably right, that is to say that among the enormous number of cases one meets in the Army with symptoms of breathlessness on exertion, or precordial pain and of general so-called cardiac distress, there are some which may be explained in every one of these ways. And if I may venture to criticize those of far greater experience to whom we look for guidance, I think they have often made the mistake of laying too much emphasis upon the particular condition they are describing to the exclusion of absolutely all else; and, unconsciously and of course unintentionally, giving the impression that they were dealing with the whole of the cases comprised under "soldier's heart."

I hold the view that the large majority of cases which are labelled "soldier's heart" and condemned as unfit for active service have a perfectly normal myocardium, and suffer from symptoms which have no organic basis. I would then suggest to you that we may classify the cases which are sent up to us with symptoms or signs which might be referable to the heart in the following way:—

(1) Functional cases. A large number of men at the outset of their military duties who are free from any organic disease, but who have hitherto been quite unused to any form of exertion and readily display symptoms of distress or of fatigue.

(2) Cases with symptoms due to excessive smoking or other drugs, and disappearing upon appropriate treatment.

(3) Organic disease. (a) Valvular disease—(i) compensated, (ii) uncompensated; (b) myocardial disease; (c) adherent pericardium; (d) Graves's disease.

(4) Genuine soldier's heart.

I shall not deal with these groups seriatim, but I shall refer to them indiscriminately in considering general principles. The first general principle with which we should be concerned is the fundamental question of so-called overstrain of the heart. I would mention in passing that Sir Clifford Allbutt points out that this expression is tautologous, since all strain must be overstrain.

When one has the support of Sir James Mackenzie one need not hesitate to state dogmatically a disbelief in "heart strain" or "athletic heart." As a matter of fact, on purely empirical and not clinical grounds, I never have believed in it, but it is one thing to state what is regarded as a worthless opinion based on inexperience and differing from common acceptance, and another to express a point of view which receives the cachet of the doyen of cardiologists. And Sir James Mackenzie says of "athlete's heart": "Personally I have never seen such a thing, and when
my opportunities of observation are considered, I think it will be allowed
that I would have seen it if it had really existed." He says further:
"I have had brought to me great numbers of young people of both sexes
with hearts said to have been impaired by overstrain; I have not found
a single case of dilatation with heart failure. That dilatation can be pro-
duced in a healthy heart as a result of overstrain, more particularly among
the young and athletic, is a belief widely held. I am convinced that it is
a view which is not justified. I never saw a single individual who suffered
from heart dilatation as the result of over-exertion. I think I may fairly
say that this was not due to inability to recognize overstrain." With such
a sentiment as the last is there anybody who will disagree?

I cannot lay claim to an experience which would justify me in
the presumption of endorsing an opinion of Sir James Mackenzie's, but I can
at least claim a special experience which is in its way even greater than
his. For eight years there has been practically no prominent athlete in
any country in Europe (and a good many from the Colonies and from
America) whom I have not had an opportunity of examining before and
after exercise. I have been hunting the "athletic heart," all this time in
sprinters, middle distance runners, Marathon runners, and I have never
cought it. And yet it will be urged, our eminent predecessors published
cases of dilated heart and overstrain which were clearly the result of
exertion. In some cases a comparatively recent antecedent infection is
definitely stated, in others it is hinted at, and in others again a coincidence
is well worth noting, that both Sir Clifford Allbutt and the late Sir Lauder
Brunton, describe cases of acute dilatation occurring during mountain
climbing. Now the physiology at high altitudes is rather queer in itself;
a large increase in red corpuscles has been shown to occur, and it is quite
possible that by mere mechanical friction they retard circulation to some
extent.

A priori there should be no expectation of the heart failing through
pressure of work any more than of a diaphragm becoming fatigued. Nature
is not likely to jeopardize the well-being of the most important
muscle in the body, but safeguards it by ensuring that everything else shall
give in first. When a man is badly done up as the result of a big effort, it
is not cardiac failure but vasomotor exhaustion from which he is suffering,
and his symptoms are due to nothing more serious. Personal experiences,
however feeble, have at least a certain peculiar merit which is my excuse
for obtruding these. During sixteen years of practical continuous com-
petitive athletics, I have known frequently what it feels like to be badly
run out or rowed out, but I remember only two special instances which
stand out prominently. On the first occasion I had won a particularly
hard 200 yards race, and I can only attribute the nausea, dyspnoea, and
dreadful headache, from which I suffered the rest of that day, as due to an
extra effort induced by an exceptional keenness to win. Had I sought
advice for my symptoms, I might still be in bed or just beginning graduated
exercises; but as this was the middle of a big athletic season, I determined to adopt the best form of investigation I could think of, and the following morning I went out and ran, with very great relief to my doubts, one of the finest quarter-miles I have ever run. The second occasion was six years ago. Starting from Grindelwald, I went up the Faulhorn and down, practically without a stop, in four and a half hours. One hour after I had reached the bottom, I began to experience intense nausea, and I fainted. I believe that these symptoms were due to the exhaustion from want of food. Once again alarm demanded a critical investigation, and forty-eight hours later I went up the Faulhorn as hard as I could go; but on this excursion I ate a good déjeuner and rested for an hour at the top before running down, and I had not the slightest symptom of distress of any kind.

It is easy to understand how soldiers on the march faint, especially in hot weather, when their peripheral vessels are dilated to such an extent as to deplete the brain. Of course some people are much more liable than others to these attacks from the particular tendency of their blood to drain into the large abdominal veins. Such attacks too are largely precipitated by the boredom of a march. The fatigue of disheartenment is a very well-recognized thing.

I put it to you that physical exertion is mainly a matter of will-power. Some men have the will to drive the engine harder than others. But, granting no flaw in the machinery, nobody can drive it to breaking point.

In the consideration of organic disease of the heart we have first to deal with the question of cardiac murmurs. Sir James Mackenzie says: "The presence of a murmur is often considered to be inconsistent with the idea of a healthy heart, and the great bulk of the profession and the teachers of the profession do adhere to this view." Further he says, "Every graduate leaves hospital with but the vaguest notion how to assess the value of a murmur."

I think I may assert that there is not one of us here who does not almost every day see at least one striking example of the absurdity of worrying about the existence of a murmur quod murmur—a survival of student days when prolonged arguments were wasted upon the exact timing of some miserable squeak, to say nothing of the decision whether there was any murmur there at all. As a consequence we gained the impression from our teachers that the slightest alteration in the character of the heart sounds meant serious organic cardiac mischief, and the fruit of this teaching has been, in civil life, the obstacles placed in the way of such people ever getting insured, and in military life the wholesale rejection of perfectly healthy subjects physically fit for anything; so depriving the country of a number of efficient soldiers, and, what is even worse, condemning to a serious restriction of useful and wholesome activity many men who for the rest of their lives walk about gingerly with the sort of sensation that they have a bomb inside them with the perpetual dread of sudden death.
Now so long as the heart does its work properly what does a little music in its mechanism matter? Some motor engines purr, others bark, and others roar, yet all may be equally efficient; and the murmur in the heart may bear no more relation to the heart’s capacity for work than, to continue the parallel, need a squeak in a spring have anything to do with the engine.

Many murmurs are, of course, not cardiac at all but due to pressure relations of the pulmonary artery and the chest wall, or to some other simple extra-cardiac cause. The distinction of physiological murmurs is usually quite easy if one is not wedded to the idea that heart disease is so common that it must always be suspected. And although organic murmurs must in any case denote a certain degree of disability, even organic murmurs are not necessarily of much consequence. As a convenient rule, Sir James Mackenzie has said that a systolic apical murmur may always be disregarded when there is no sign of enlargement of the heart, for, as he says, “If a murmur is caused by a lesion which embarrasses a chamber in its work, that chamber will alter in form either by dilating or becoming hypertrophied.” So that to talk of V.D.H. (valvular disease of heart) as a definite condition always calling for discharge from the Army as permanently unfit is quite unreasonable. To put it in the terms of common pleasantry, there is V.D.H. and V.D.H. The heart’s capacity for doing work is the vital criterion and I am quite sure that many cases of well-marked valvular disease are little if any handicapped by their disability.

The heart muscle is of course the great factor in cardiac efficiency. If we could always measure the quality of the muscle we should find it easy to estimate the general condition of the heart, and the discovery of myocarditis with corresponding prognosis would be a simple matter. But a person’s description of his inability to exert himself is in my opinion a very poor guide, although as you are well aware more than one cardiologist has stated that we are to accept a complaint of pain, dyspnœa, giddiness, etc., as absolute evidence of cardiac disability even in the absence of abnormal physical signs in the heart.

As aids in estimating the cardiac efficiency various tests have been elaborated, e.g., Grapner’s, and various instruments have been invented such as the Bock stethoscope, the application of which has been particularly encouraged of recent date by Dr. O. Leyton. The tests depend upon the differences observed between the pulse-rates and blood-pressures in the resting state in the horizontal and erect positions and in the reaction to exercise. The Bock stethoscope is an arrangement which gives a numerical value to the audibility of the first sound at the apex and the second at the aortic base. A heart with normal musculature yields a ratio of 60:40. The nearer the ratio approaches unity the more the myocardium is affected. We have used the instrument fairly extensively here and have come to the conclusion that it has a useful application. The chief difficulty in our experience is the necessity for absolute silence during observation, other-
wise the error may be so great as to render the result quite useless. The instrument is said to be inapplicable when murmurs are present. It is unnecessary to deal with the well-known signs of obvious cardiac distress, e.g., cyanosis and oedema. It might be thought that dyspnœa is equally obvious as a sign of cardiac inefficiency, but in this sign there is the possibility of a large functional element. The majority of the ill-fed, flat-chested, poorly developed men who enter the Army after an uneventful sedentary life, and are then plunged into what is to them unaccustomed strenuous activity, naturally puff and blow and complain of pain in the chest. Again, the dyspnœa of what I call a case of real soldier's heart is often an hysterical polyphœna and calls for vigorous physical and mental discipline.

Pain on exertion is again a very vague symptom. The pain complained of by false cardicaths is usually precordial and not substernal as in true angina, and the pain does not radiate. It often disappears after effective dental treatment and especially if the man can be persuaded to overcome the inevitable distress of his first exertions and persevere. But once let a man get the idea that he has a weak heart and any hypochondriacal "pain in his heart" speaks to him of sudden death. Speaking generally we do not think of cardiac disease as associated with pain in the chest and when a man complains thus of his heart one is justified in thinking of his stomach.

Irregularity of the Pulse.—It is one of the most important and often one of the most difficult things to decide the meaning of a cardiac irregularity. The general tendency is to regard any divergence from a perfectly regular rhythm as evidence of cardiac disease. But, on the contrary, some forms of irregularity are of no pathological importance whatever; indeed, one form, sinus arrhythmia, is even stated to be a particularly good sign that the heart is normal, a sort of hallmark of a healthy heart. On the other hand there are types of irregularity which give an absolute indication of serious myocardial change, and their determination is far more useful than that of the size of the heart or of any murmur.

Sinus irregularity is a variability in the intervals of diastole. It can be produced in susceptible subjects by stimulating the vagus centre, e.g., by swallowing or deep breathing, for it is due to irritability of the centre. It can be completely abolished by exertion. Such an irregularity is as I have said of no pathological importance.

Extra-systoles, or, as they are more correctly termed, premature contractions, are recognized by the circumstance that the extra beat anticipates a regular contraction and is followed by a longer pause than after an ordinary beat. It is the long pause which is so unpleasantly apparent to the subject himself. Extra systoles are often of no pathological consequence and can be abolished by exercise. On the other hand they may indicate myocardial disease. They constitute therefore one sign only which has to be taken into consideration with all the other cardiac phenomena.
Pulsus alternans is a condition in which alternate beats are of unequal volume. It is a very grave sign of myocardial disease. It is obvious that some care is necessary to distinguish this condition from one in which premature contractions occur after every full beat. In the latter there is always a longer pause after the weaker (the premature) beat. In pulsus alternans the beats are regular and the intervals equal.

Auricular fibrillation is a condition of irregularity in which beats vary in frequency and volume in a completely irregular manner. It is not decreased but generally increased by exercise, and it is a sign of serious organic disease.

Heart-block in which the rhythm is disturbed at regular intervals by the dropping out of a beat is always a sign of serious heart disease.

Whilst it is the rarest possible thing for a soldier to be sent up as D.A.H. with bradycardia, the number sent up as tachycardia far exceeds the total of all the other cases. (I mean by tachycardia simply undue acceleration of the rate, whilst I would remind you that some authorities restrict the term to a special type of acceleration-paroxysmal tachycardia.) Now to speak of tachycardia as a distinct condition when it may be due to such diverse causes as acute peritonitis and drinking too much tea is as absurd as to label a case abdominal pain when this symptom may be due to indigestion, appendicitis, caries of the spine, pneumonia, or a host of other things. In the first place some people appear to have a physiological tachycardia and own a heart which runs normally at 110 perhaps and gives rise to no symptoms. When a patient complains of the usual cardiac symptoms it is clearly necessary to exclude all organic causes of tachycardia—e.g., tuberculosis, valvular disease, myocardial degeneration, adherent pericardium, Graves's disease, and any obvious functional cause, such as excessive smoking. We are then left with a residue of cases about which it seems impossible to decide, in which there is nothing definitely organic unless you invoke larval Graves's disease. In this type of case there is of course no exophthalmos and no enlarged thyroid to aid the diagnosis, but the presence of tachycardia, of tremors and of nervousness justifies one in diagnosing, according to inclination, larval Graves's disease or a neurotic condition, with, as Sir Clifford Allbutt puts it, "diffuse assemblage of mere accelerations."

And this brings me finally to what I think may legitimately be called "soldier's heart." I premise as the patient a man who really has been a soldier and exposed to the vicissitudes of warfare. Is the influence of warfare physical strain, toxin or psychic trauma? The factor of strain I have done my best to eliminate. A few words will deal with the other possibilities that have been raised. The patient presents symptoms generally of dyspnœa, always of fatigue on slight exertion, lassitude, persistent tachycardia without cardiac enlargement and perhaps a variable number of neurotic manifestations.

There is invariably a history of psychic trauma—it may be one
acuse occasion or a long-continued bombardment by greater or smaller shocks.

These are the cases for exhaustive investigation, for the detection of toxins, for the estimation of buffer salts, for the consideration of the balance of the ductless glands, for inquiry into the previous psychical history.

It is unsatisfactory to invoke toxemia, for surely this factor can never be eliminated and must play a part more or less in the production of any morbid state. The system is probably in a condition of auto-intoxication whenever it falls a victim even to psychic disturbances.

In some of these cases the antecedent history clearly exhibits the presence of some infection, e.g., influenza, dysentery, or toxic state, e.g., constipation or some other cause of auto-intoxication. In other cases it does not.

As regards the ductless glands I do not see how it is possible to deny or to prove their influence in this condition. What is the effect of the secretions upon the emotions? What is the influence of the emotions upon their secretions? Suppose the psychic disturbance does lead to some alteration in the glands, to the production for example of hyperthyroidism. Are we to suppose that such alteration is the principal result of the shock and that treatment directed to the gland will relieve symptoms? I personally have never seen the slightest benefit derived from this or for that matter any other form of treatment. There is, it seems to me, a great deal to be said in favour of a purely nervous origin. In the first place, a very large proportion of sufferers are of a distinct type of mentality, men with shallow reservoirs of nervous energy; the neurasthenic soil in fact. I yield to nobody in my admiration of the spirit which has animated the majority of sufferers from "soldier’s heart" and all other forms of war neurasthenia when I describe them in this way. The symptoms correspond to a failure in vasomotor and cardio-inhibitory control. The obstinate resistance to any form of treatment supports the idea of a nervous origin, a shock to the nerve centres which persists, who can say for how long?. It is a very striking feature that men who sustain a definite somatic injury do not manifest "soldier’s heart" nor any other presumably nervous symptoms. In these cases of injury the immunity of the nerve centres to shock may be explained by the dissipation of the shock elsewhere, as the delicate works of a watch are spared in an accident in which the glass is smashed. It may even be explained without detriment to the hypothesis of neurosis by the mere circumstance of an injury having occurred satisfying the subconscious with the realization of something definite and not presenting to it only the sensation of some vague disturbance the uncertainty of which prejudices recovery.

Reviewing with not unnatural pessimism the persistence of symptoms, one cannot help thinking that only termination of hostilities could cure these sufferers, in whom with the best intentions there must continue to run a subconscious current of defence-neurosis telling them that recovery means
a return to the hell from which they have escaped. Treatment of such cases appears to have the sole effect of perpetuating their neurosis by fixation of the attention, although whether immediate vigorous treatment of them as of purely neurotic origin would yield better results we here have no opportunity of observing, since the cases we see are, so to speak, chronics who are left *in statu quo* after a great deal of practically every form of therapy that has been recommended.

As we see them, at any rate such cases are of no further use for active service, but given sedentary work they continue on a very low level of activity with the tachycardia and other symptoms unrelieved, but, so far as we can see, executing very light duties with comparative cheerfulness and apparently without any ill effects.