

The Irritable Heart of Soldiers and the
Hampstead Heart Hospital

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Soldier's Heart—Editorial Note

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THE IRRITABLE HEART OF SOLDIERS AND THE HAMPSTEAD HEART HOSPITAL.

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Under the stressful conditions of modern warfare, in which exposure to the continuous fusillade of our own and the enemy's guns is combined with the depressing influences of the cold, darkness and moisture of life in the trenches, it is only natural that the soldier in the field should suffer greatly in that most delicate part of his body mechanism, his functional nervous system. Even the strongest men cannot endure the hardships of the firing line for long without respite, and a continuous relief system whereby the men in action are withdrawn to rest-billets at short, regularly recurring, intervals, has of necessity been enforced. In spite of all precautionary measures, however, War Neuroses abound both in base hospitals and convalescent camps, and are especially frequent among the men of less robust physique or less stable mental fibre. The differentiation of such functional conditions from organic troubles or from malingering, the treatment necessary for the improvement of the patient and his rehabilitation as a soldier, and the final decision as to his future capacity for duty at home or abroad according to the extent of his cure, are problems which have taxed the best judgment of the Army Medical Service, and their successful solution promises to be one of the triumphs of military medicine in the present campaign.

One of the most important and efficient measures that has been taken by the British War Office with this end in view, has been the organization of special hospitals under the care of medical experts, and especially equipped, where disorders of various kinds can be studied, classified and treated in a properly scientific manner. Notable examples are the Ramsgate Hospital for Nervous Disorders at Ramsgate, the Bramshott Eye Hospital, and the Military Heart Hospital at Hampstead in London.

It is with this last named institution and with the class of work done there and in the Cardiac Department of other Military hospitals in London, that we are concerned in this communication. Early in the second year of the War the attention of the public was drawn by leading articles in the London Times and in British medical periodicals, to the large numbers of soldiers who were being invalided home from the Front by the now well-

recognized disorder known as Soldier's Heart, in which symptoms of a more or less transient cardiac exhaustion without evidence of organic disease, form the predominant feature. The need of such patients for special study and treatment, and the evident possibility of their rehabilitation under suitable conditions, led to a demand for an investigation. This was opened by the Medical Research Committee of the National Insurance Act, on the initiative of Sir Alfred Keogh in the autumn of 1915, and was entrusted in the first place to Sir James Mackenzie (1), who with Dr. R. McD. Wilson (2), opened a discussion on this subject before the Royal Society of Medicine on January 18th, 1916, and reported the results of observations made by himself in collaboration with Dr. Wilson on 400 cases. He pointed out that the large class of patients under consideration differ essentially from the subjects of organic heart disease both in the milder grade of symptoms, the more favorable prognosis and the form of treatment indicated. In the latter connection he laid down the important principle that complete rest was not advisable except in the early stages, and that fresh air, graduated exercises, recreation and cheerfulness take an important part in the rehabilitation of the patient, so that officers should be sent off on golfing or fishing tours, and light games in out-door surroundings should be provided for the private soldiers, with the one injunction to both that such occupations be carried on only to the point of pleasurable enjoyment and never to fatigue. In addition he stated that the proper investigation and treatment of such cases required the provision of a special hospital with complete equipment and in suitable surroundings.

These views were shared by Sir Clifford Allbutt and Sir William Osler who, with Sir James Mackenzie, organized the new Hospital, and with Major J. C. Meakins and Captain F. C. Cotton of Montreal, and Captain Parkinson were members of its organizing staff. An article in the Times at this time may be abstracted thus: "Sir Alfred Keogh (Director General of the Medical Forces), decided to open a special hospital of a very special kind, and recognizing the value of a bright and bracing situation chose the Military Hospital at Hampstead for the new Heart Hospital. It is fully equipped with bacteriological laboratory, electro-cardiograph with wired connections to the wards, orthodiagraph, and X-ray installment. The Mackenzie ink polygraph is in active operation and individual assistants are giving their whole time to the study of vasomotor reflexes, demographic and precise orthodiagraphic cardiac tracings, exercises,

gas-analysis, and other phases of the many problems investigated. Here the scientist and clinician are united, and the mental factor, which means so much, especially in this type of case, is given due prominence. As in all army hospitals military considerations, of course, take first place in the handling of the patients, the cases being as far as possible classified on arrival into those who will be again fit for active service and those who will not. In subsequent treatment the latter class are boarded out of the army, while in the former the myocardium is re-educated by graduated exercises to a point where the definite amount of exertion, such as half an hour's strenuous Swedish drill, or a seven mile route march with a 25 pound pack, can be undergone without symptoms. When this point is reached the men are considered fit to return to their units."

The importance of such a hospital, which was in a sense a departure, can hardly be overrated. By accelerating the return to duty or the invaliding from the Service of the disabled soldier, it meant a saving to the State, and constituted one of the most interesting examples we know, of the remarkable organization that has taken place in this war, of preventive and therapeutic forces for the mitigation of the effects upon our soldiers of the terrible conditions of modern warfare. In this way also the powers of the trained specialists who have placed their services at the disposal of their Country, can be utilized with true economy. Moreover, the establishment of this particular form of heart hospital in England, which may be called the home of graphic methods, under the leadership of men who are themselves leaders of thought in the new school of cardiac pathology, and with the control of a wealth of clinical material consisting chiefly of soldiers suffering from functional disorders of the cardiac mechanism, opened an extraordinarily productive field of study which is bound to bring far-reaching advances in our knowledge of cardiac pathological physiology on the one hand, and its therapeutics on the other.

The Hampstead Hospital was opened in the early part of the winter of 1915-16. After little more than a year's work important results are already in hand, and the literature is enriched by numerous observations along new and suggestive lines. Of these the most valuable are the formation of a definite system of graduated exercises of use both for diagnostic tests and for therapeutic purposes, and the establishment of a definite standard in the reaction both of pulse rate and blood pressure to such exercise tests, and the estimation of present and future cardiac disability along

these lines. In this connection the series of articles published in *Heart* on May 20th, last, "On the after effects of rest-exercises and slight exertion on pulse rate and systolic pressure and the P-R interval in irritable and healthy hearts;" "On the occurrence of hyperalgesia in irritable hearts of soldiers;" and "On the effects of atropine, digitalis, amyl nitrate and pilocarpine nitrate on such cases," are of immense interest (13).

The history of the subject of soldier's heart is as follows. The "Irritable Heart of the Soldier" is no new condition, but was recognized as far back as the American Civil War, when it attracted wide attention. A classical description, corresponding in all respects to the picture as presented to-day, is given by Dr. Hathorn in the *American Journal of Medical Sciences* for 1864, and in the same journal for 1871 Da Costa reviewed the subject upon the basis of a series of three hundred cases collected in a hospital in Philadelphia. The condition is characterized by signs of vasomotor instability, aching precordial pain, a sense of exhaustion amounting often to giddiness or faintness, general malaise, rapid pulse on exertion, slight breathlessness, at times slight oedema of the feet, mental depression, and nervous irritability. There is usually a slight rise of temperature especially at the onset, which is often with diarrhoea and other digestive disturbances.

An interesting discussion upon the etiology of Soldier's Heart has occupied several of the British journals during the past two years. Sir James Mackenzie with W. Bezley Thorne (6), R. McD. Wilson, and others, regarded it as one symptom of a general physical exhaustion, the result in the majority of the cases of a latent infection which becomes active under the effect of strain or shock and produces effects of a toxæmia, which yields to the raising of the resistive powers of the individual by good hygiene, fresh air, and cheerful occupation.

The application of this theory of latent infection to all the cases was disputed by Poynton (7), Morrison (8), and others. They pointed out that identical symptoms come on quite suddenly after shell shock and other states in which the predominant feature is nervous or physical strain, and raised the question as to whether, under these circumstances, the shock itself might not generate toxins within the body producing a similar result upon the tissues as those having a true infective origin. In this connection an interesting suggestion has been brought forward by Young, (15), that toxins from the numerous insect parasites

which abound in trench life, and so often infest the soldiers there, may be in many cases an exciting cause.

The fact that chemical poisons, especially nicotine, produce a condition practically identical in the so-called tobacco heart, and that the practice of cigarette smoking is practically universal along the Allied Front, leads to the inference that at least a certain number of the cases of soldiers must be traced to this habit. A careful study to determine the immediate effect of cigarette smoking on healthy men and on cases of Soldier's Heart was made by Drs. Parkinson and Hilman Koefod (12) at the Hampstead Hospital recently upon thirty cases of whom twenty were patients with soldier's heart and ten were normal subjects. The conclusion reached was that excessive cigarette smoking was not the essential cause of most cases of "soldier's heart," but that it was an important contributory factor in the breathlessness and precordial pain of many cases.

Finally, it has been shown (White & Johnston (3), Stoney (5)), that a number of cases of Soldier's Heart present the same symptoms as the early stages of exophthalmic goitre, what may be called a pre-Graves condition of hyperthyroidism and which yields to X-ray treatment of the thyroid gland. When it is remembered that shock or emotion of any kind is a strong predisposing cause of goitre this forms a comparatively small but suggestive group.

The true explanation of the etiology of Soldier's Heart will probably be found to lie in some factor common to all the above mentioned cases which acts within the organism producing analogous states of cardiac and physical exhaustion. Such a point of view was brought forward by Crile (16) in his "Mechanistic View of War and Peace," in which he suggested that latent infection, powerful emotion, physical strain, exaggerated harmonic action, are each and all to be recognized as "activators" which set the pace for an undue transformation of energy leading to alterations in the relation of the volatile and non-volatile acids of the blood and other disturbances of the metabolic equilibrium and chemical changes that constitute fatigue.

It is too early for conclusions on this or even less remote problems, but there can be no doubt that the path of real advancement is being followed at such special hospitals as that we have reviewed here, and that the careful methods that are being applied there and elsewhere in the study and treatment of functional disorders in the wealth of military clinical material available today, have widened already our knowledge very much. The

Profession of the future is likely to be permanently enriched by the results of such organized application, by experts, of the principles of scientific medicine to the problems of the functional disorders of the present war, and students of cardiac pathology and therapeutics will owe an incalculable debt of gratitude to such men as the originators of the Hampstead Hospital, Sir William Osler, Sir James Mackenzie, Sir Clifford Allbutt, and Sir Alfred Keogh.

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EDITOR'S NOTE:—*The Revue de Cardiologie de Guerre* by Weil was not accessible to Dr. Abbott in the preparation of her paper. Weil gives a summary of the French literature upon this subject for the first two years of the War. From this experience he concludes that organic cardiopathies, even those well compensated, do not stand the stress of active service and, therefore, should be placed in the auxiliary service. The myocardial cases are less favorable than the compensated aortic and

mitral valvular lesions, which are, on the whole, fairly well borne, but which, even when compatible with a certain amount of effort, react badly to over-strain and emotion, and are a coefficient of aggravation in the traumatisms and infections of war.

Weil also claims that the differential diagnosis of functional and organic cardiac murmurs can be easily made by a new diagnostic procedure; namely, auscultation of the heart during compression of the eye-balls. There exists normally an oculocardiac reflex. The compression of the eye-balls modifies the heart beat so that it becomes slower by ten beats or more, or rarely accelerated to the same degree. In subjects who show functional murmurs the myocardium is in a state of especial erethism. Under compression of the eyes the accelerated rate (100-120) may drop to 80, 60 or 40 beats. At the same time the functional murmur becomes weakened, inconstant or disappears completely. Organic murmurs, on the contrary, become more intense and precise during ocular compression. Weil claims that auscultation of the heart during compression of the eye-balls is a procedure of great value, as the compression slows the heart and renders it more clearly audible, and, that through the employment of this method it has been possible for them to differentiate easily all heart murmurs.

Weil also regards the static and dynamic tests of Martinet of great value in determining the functional value of the heart, and, therefore, in differentiating the normal weak and erethistic heart. Lian's and Martinet's observations upon functional disturbances of the heart and cardiac neuroses associated with nephritis, infections (rheumatism), tuberculosis, nasal defects, multiple glandular insufficiency, and adrenal insufficiency, are abstracted in Weil's review. "*Les insuffisants cardiaques*" described by Guillet and Boyé fall into the same category. These writers, as well as Lian and Weil separate their hypotensive, tachycardiac, acrocyanotic and instable cases from the cardiac neuroses. Martinet discusses this group of functional disturbances that appear usually suddenly after intense emotion or commotion. They do not follow infections. They develop upon a neuropathic foundation (psychical state, nervous crises, distress, trembling, dyspepsia, instable cardio-vascular apparatus, etc.). Gallavardin discusses the tachycardias of Basedow's disease. Aubertin's article on "*la recuperation des faux cardiaques*" is of great value from both military and civil points of view. Finally the relation of cardiac affections to the infections of war (scarlatina, rheumatic fever, typhoid and paratyphoid fevers, bacillary dysentery, enteritis, pneumococcus infection, etc.) has been discussed by Nobecourt, Florand, Carnot, Oppenheim, Minet, Carles, and others. (See references below.) Gouget has studied the bradycardia of fatigue, as well as the relative bradycardia associated with some fevers. To the latter he attributes a nervous origin. Vaquez and Donzelet review the tests for the heart to be used in military service, and conclude that the only way to estimate the reserve force of the heart and its functional value is to make a thorough clinical examination of each case, completed by radioscopy and sphygmomanometry.

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Tedeschi holds that in the discussion on "soldier's heart" too little attention has been paid to the influence of digestive disturbances on the cardiovascular system. He has observed in the Italian Army cases sent back from the front as suffering from heart disease (palpitation, pain in precordium, arrhythmia, weak pulse, etc.) in which the symptoms occurred only during digestion and were due wholly to distension of the stomach with gas, fermentation, aerophagia, motor disturbance, etc. Nasal obstruction due to hypertrophic rhinitis was often associated with aerophagia, and with the removal of these conditions the supposed heart disease also disappeared. In all of these cases the nervous or psychological element played a part.

Syphilis is ignored by practically all of the writers on "soldier's heart". The writer (Warthin) believes that both congenital and acquired syphilis play a very large part in the production of myocardial weakness in young men. Observations upon students developing myocardial insufficiency under the strain of athletic or field work have confirmed this view. A personal communication from Dr. Mortensen of Battle Creek, who has been engaged in cardiac examinations at Camp Custer states that a history of streptococcus infection (rheumatism, tonsillitis, etc.) is found in about 50 per cent of the cases of myocardial tachycardia, and that he believes syphilis to be responsible for the greater part of the remaining cases, although a definite history of syphilitic infection is usually not obtainable. On the other hand practically all cases of aortic valvular disease have given a history of syphilis. It is most probable that the streptococcus and the spirochete of syphilis are the two most important etiologic factors in cardiac infections; and examiners of drafted men and soldiers should bear this possibility in mind when examining. The gonococcus, pneumococcus, etc., probably play minor roles, although we have no data of value as to their relative importance.

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