

special destructive action on the infecting parasite. But vaccines are only active against bacteria mediately in that they stimulate the production of bodies which possess special destructive powers toward particular organisms. Vaccines are, therefore, in a sense only specific at second-hand.

As the action of vaccines is merely stimulative of certain natural powers of the body, it is clear that if the body is already exhausted, if it is no longer able to produce the substances, the vaccine fails. Moreover, in cases where it does not fail, its success is proportional to the power of the tissues to respond to its call. To expect uniform success from vaccines is therefore as unreasonable as to suppose that the body can never fail in its defence against attack.

It follows that the cases in which we may expect the best results of vaccine treatment are those in which (1) the body has not yet lost its natural power of resisting infection, and (2) in which there has not been great tissue change. If the body has no power of resisting infection the vaccine is quite inert. It is as useless as a trumpet-call in a deserted barrack-square. It is not possible to tell whether such cases really occur, nor how to recognise them if they do. We must, however, be prepared to meet them and not to be disappointed if the inevitable happens.

The second qualification is of more practical interest. When grave tissue changes have taken place we cannot hope by any method of treatment either to restore lost tissue or to cause the absorption of masses of new tissue of a degenerate order. Vaccines can only produce a resistance to an infective process—they have no effect in dealing with the results of that process after the process has ceased. I do not suggest that there are not other agencies in the body at work to restore damaged tissue to the normal, but these agencies are neither helped nor hindered by vaccines. Let me take one example:—

A Fallopi tube becomes infected by, let us say, the gonococcus and suppuration follows. While the infection lasts, its progress may be hampered or prevented by vaccine treatment. But once the gonococcus loses its vitality, vaccines give no help to the tissues in their struggle to return to the normal. Neither will vaccines cure a stricture of the urethra consequent on gonorrhoea. This is so obvious as to appear commonplace. But let us supply the same reasoning to the effects of rheumatic infection, whether on the joints or on the valves of the heart. We may reasonably hope to hamper the progress of rheumatic injury or to arrest it altogether. But if gross tissue changes have occurred, they cannot be repaired by vaccines. It would be as reasonable to suppose that, if the invaders were to-morrow driven from the fields of Flanders, those fields would be restored forthwith to the condition in which they were three years ago. The battle may be over, and the invaders destroyed, but many of the traces of battle are ineradicable, while others will persist for years. Louvain and Ypres will never be again what they were three years ago. Neither will the heart valves that have been eroded and fibrosed in the battle between the infecting cocci and the protective agencies of the body be the same again.

#### SCOPE OF VACCINE TREATMENT.

The question is not infrequently asked, What class of diseases should vaccines be employed in? The answer, bearing in mind the limitations I have already suggested, is, Every infective disease due to bacterial origin in which the bacterial cause can be discovered. The acuteness or chronicity of the condition is beside the point, though it may have much to do with the method of administration. A similar remark applies to the question whether the disease is general or local. In every case where a fight is going on between the body and an invading bacterium there is reasonable hope that the defensive forces will be strengthened by the administration of a vaccine. But, as vaccines are specific, a correct bacteriological diagnosis is necessary. In this vaccines are at a distinct disadvantage if contrasted with other methods of treatment. By rest, suitable food, good nursing, and relief of unpleasant symptoms we cure, or rather assist nature to cure, many of our patients. If before treating them an accurate diagnosis were necessary how many successes would we have? But if vaccines are to have any effect at all their use must be preceded by correct diagnosis. We must be sure that we are treating with the infecting organism. Of course, if the infection be mixed, as

is so often the case, we must often be content to treat with a group of organisms—i.e., with a mixed vaccine—being assured that at least one element in our vaccine is specific for the infection, and that the others, if not helpful, are at least harmless.

No greater misconception can exist than the notion that vaccine treatment is incompatible with the use of other methods of treatment. On the contrary, one rarely gets the best results from vaccine treatment unless one makes full use of whatever concomitant measures his own experience or the accumulated experience of others may suggest. Few drugs are in any way inimical to the action of vaccines, and those that are, are depressant to the natural resistive powers of the body, and are therefore contra-indicated in the class of diseases in which vaccines are employed. Of these the only drug in common use is alcohol, the employment of which in septic diseases should by now be obsolete except under rare conditions. Vaccine treatment, therefore, goes side by side with treatment by drugs.

In surgical conditions, operative measures, or anything else that surgical knowledge suggests should, of course, be practised when required. The only precaution to be observed is to withhold inoculations in immediate proximity to any manipulative proceeding which may give rise to auto-inoculation. Otherwise vaccines, of course, act in their normal manner of increasing the protective power of the body.

I said at the beginning that much misjudgment of vaccine treatment by the profession has been due to the treatment being so largely committed to men unaccustomed to clinical work. It cannot, however, remain in the hands of a special class. As an important branch of therapeutics it must become familiar to every practitioner. No student can be considered to have gained a sufficient knowledge of therapeutics who has not become familiar with both the doctrine of immunity and the practice of immunisation. In this way vaccine treatment will come to take its proper place—not as something peculiar and special, but as an essential part of the treatment of infective disorders of bacterial origin.

Dublin.

#### A VARIETY OF WAR HEART

WHICH CALLS FOR TREATMENT BY COMPLETE REST.

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Two chief factors are concerned in bringing about the heart troubles of soldiers. One of these, the physical and emotional strain of military life, has attracted much attention since the war began, and the group of symptoms named by Dr. T. Lewis and his fellow-workers the "effort syndrome" has been treated of by many medical writers. The second factor, the temporary weakening of the heart muscle by campaign diseases, has received much less notice.

Among soldiers of the Mediterranean Forces the effort syndrome has been as much in evidence as on the Western front, but we have also seen very many cases in which malaria and some in which other epidemic diseases, such as dysentery and trench fever, have left the myocardium damaged for a time.

It is the aim of this note to call attention to these cases and to emphasise the fact that treatment by graduated exercises, which has proved so useful in the differentiation and cure of the functional cases, is unsuitable and *does actual harm* in the organic cases, so long as the physical signs of damage to the heart muscle persist.

The symptoms described by the patients are shortness of breath on exertion, inability to walk any distance, and, in some cases, præcordial pain. The physical sign is an extension of the cardiac dullness towards the right, often to  $1\frac{1}{2}$  or 2 inches beyond the mid-sternal line. Only in extreme cases is there any conspicuous extension towards the left. The dull area has a clearly defined outline, and yields a sense of resistance on percussion. The resistance can also be appreciated by dipping, with the pads of the fingers, along the course of the ribs or intercostal spaces. This method of palpation was taught me, years ago, at the Hospital

for Sick Children, by an American friend and pupil, Dr. T. Wood Clark, and I am convinced that, as a means of marking out the cardiac area, it supplies a valuable control to percussion. It is better to mark out the area by palpation first, and to check the findings by percussion.

I am well aware that some physicians, whose opinions are entitled to all respect, deny the possibility of determining the right border of the cardiac area by percussion, let alone by palpation, but this is wholly at variance with my experience. Many of us working in association here (as previously in England) have examined cases and have checked each other's findings, with open eyes and blindfold. We have agreed in our markings, have watched the drawing-in of the area of dullness under treatment, and its re-expansion after renewed strain or relapses of malaria, and are confident of the correctness of our observations. My colleague, Colonel H. H. Tooth, allows me to quote him as endorsing this statement. Murmurs are not often heard in the cases under discussion, and when present are of the functional kinds, so common in soldiers. The patients are many of them anæmic, but there is no obvious relation between the degree of anæmia and the increase of the cardiac area. Their blood pressure is often above the normal for their ages, as is usual in soldiers who have recently been on active service, and often fluctuates widely with position, emotion, or exercise. The great majority are of the younger military ages.

The signs described are such as my late colleague, Dr. D. B. Lees, taught us to look out for in rheumatic children, in whom the enlargement of the cardiac area, ascribed to myocarditis, often precedes any indication of endocardial lesion.

The X ray shadow of a normal heart extends some way beyond the right border of the sternum, and the right auricle, to which this shadow is mainly due, is covered by the edge of the lung. Extension of the cardiac dullness to the right must indicate a pushing aside of the lung and the bringing of a larger area of the heart's surface into direct contact with the chest wall. My assistant, Major G. Graham, has pointed out that the abnormal dullness is abolished when the patient draws and holds a deep breath. Presumably the dullness results from dilatation of the auricles, especially of the right auricle, and it does not necessarily follow that such dilatation will cause a conspicuous extension of the cardiac shadow. Major Graham is making a series of accurate measurements of the shadows of such hearts and of normal controls. His results, which are as yet incomplete, will be recorded by him in due course.

We have had opportunities of watching the effects of various treatments in these cases of post-malarial dilatation, and in one of our military hospitals wards have been set apart for them under the care of Dr. Prudence Gaffikin. It is to be hoped that she will publish an account of her results later on, and it is only necessary to give a few general conclusions in this note.

Our experience has convinced us that the fitting treatment for such patients is complete rest until the cardiac dullness has returned to its normal limits and for at least a week afterwards. The hearts of many patients which have not responded to modified rest have come in after complete rest has been imposed. The patient is not allowed to rise from his bed for any purpose, nor even to sit up in bed for his meals, nor is he permitted to smoke. We have seen patients who have been treated by exercises *ab initio*, and others who have been allowed up after a short period of rest, although their hearts were still dilated. Neither plan has anything to recommend it, and the results have been wholly unsatisfactory. When the dilatation is recent the cardiac area may return to its normal limits within as short a period as a week. In cases of longer standing, in which rest has not been imposed at the outset, longer periods, up to six or eight weeks, have been required. In no case has the heart failed to come in sooner or later.

In Dr. Gaffikin's wards the patients have begun gentle resistance exercises in bed 10 days after the cardiac dullness has come in. Then follow graduated exercises in the erect posture, and, if all goes well, they are sent to a convalescent camp, where the exercises are continued, under careful medical supervision, in an organised heart clinic.

As a rule, under such treatment, the heart does not re-dilate. If the area of dullness should again spread to the right a further period of rest is imposed. In some cases a relapse of malaria has caused a return of the signs, even

during the period of complete rest. A few patients show a great liability to repeated re-dilatations under very slight provocations—a condition for which the apt nickname of "concertina heart" has been coined. Drugs play a comparatively small part in the treatment. Some of us advocate digitalis, and others nux vomica, but I am not convinced of the efficacy of either. Major Graham believes that digitalis lessens the chance of re-dilatation.

To sum up, the "soldier's heart" is not a clinical entity, but includes a variety of morbid states. Even amongst those patients who exhibit what is called the "effort syndrome," some respond well to exercises and others do not, and it is one of the chief claims of the exercises that by their means we are able to sort out the fit from the unfit. Again, as I have tried to show, we meet, in the course of our military work, with cardiac troubles in the treatment of which the most important factor is rest.

Malta.

## AN ANALYSIS OF CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS

DURING AUGUST, SEPTEMBER, AND PART OF OCTOBER, 1916.

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Two analyses of cases of tetanus treated in home hospitals have been published in THE LANCET—one on Oct. 23rd, 1915, the other on Dec. 2nd, 1916. This paper continues the subject, and gives an analysis of the cases which occurred in August, September, and part of October, 1916. During this time reports on 200 cases have been received; of these, 127 recovered and 73 died—a mortality of 36.5 per cent.

In the first analysis there were 231 cases, with a mortality of 57.7 per cent.; and in the second 195 cases, with a mortality of 49.2 per cent. This shows a regular and satisfactory fall in the rate of mortality, which it is hoped will continue until the 20 per cent. aimed at is attained. This fall is probably due to the introduction of the primary prophylactic injection of antitoxin, and also to the earlier diagnosis and earlier specific treatment of the disease. If the fall continues it will depend on the introduction of multiple prophylactic doses, the vigilance of nursing sisters in detecting early symptoms, and the prompt and thorough treatment by medical officers by means of antitoxin.

It had been intended to give an analysis of cases of tetanus treated in home hospitals at the end of each year of the war.

Now it is thought better to give one at more frequent intervals. This is due to the great interest taken in the subject by medical officers in charge of wounded at home. It ought to conduce to the keeping up of this interest if the results of new recommendations made by the Tetanus Committee be reported on at more frequent intervals than one year. In fact, the intention at present is that in future each series of 100 cases as they are completed will be shortly reported on.

During the same time two analyses have been published by Colonel Sir William Leishman on the cases of tetanus occurring among the British troops in France. In the first, 179 cases were dealt with, with a case mortality of 78.2 per cent. In the second, in collaboration with Major A. B. Smallman, 160 cases were analysed and gave a case mortality of 72.7 per cent. The cases dealt with in France are naturally more acute and severe than the cases which arise in England.

THE DISTRIBUTION OF CASES OF TETANUS DURING AUGUST, SEPTEMBER, AND OCTOBER, 1916.

Diagram 1 represents the number of cases which occurred in each month. Sixteen of the cases which occurred at the end of October do not come into this analysis. The diagram

DIAGRAM 1.

