the casualty clearing station in excellent, clean condition, a sufficient number have reached us with necrotic tissue in the wound amply to satisfy us of the rapidity with which the dead tissue is freed under the dichloramine-T. The tendency to secondary haemorrhage is certainly not increased. We have had only one secondary haemorrhage in the series, which includes a number of deep buttock wounds, and cases of exposed great arteries of the arm and leg.

The solution is not irritating to the skin or mucous membrane, except possibly in the rare individual who possesses an idiosyncrasy to the eucalyptus oil. Such individuals have been reported in dermatological literature. Among the patients treated here we have encountered only one case of dermatitis, but since it did not develop until after two weeks' use of the solution and was accompanied by high temperature, it is not clear that it should be ascribed to the eucalyptus oil or to the well-known action of wound excretion.

The constituents of the solution are stable although the final combination is not indefinitely stable nor can it be exposed to strong light. It is easily prepared from the constituents. The dichloramine-T which I have was put up in packages of 10 grams each; the content of one package is dissolved in 75 c.cm. of chlorinated eucalyptol and diluted with equal parts of chlorinated paraffin oil as needed, making, therefore, approximately a 6.5 per cent. solution of dichloramine-T.

The first application of the solution to a fresh wound produces a smarting or burning sensation, which passes away in a very few minutes; in some individuals this seems quite severe, but I have yet to see the patient who does not prefer this slight smarting to the real pain of removing a wet dressing which has dried around the edge of the wound. After the second or third application this smarting sensation on applying the solution seems to have disappeared.

Since the time to treat an infection is before the infection starts, it is hoped that the dichloramine-T solution can be given an early trial at the field ambulance and casualty clearing stations.

Conclusions.

Dakin's "dichloramine-T," in solution in eucalyptol and paraffin oil, is of great advantage in wound treatment—even if the final results in wound healing were no better, because—

1. It saves the pain of wound dressing.
2. It effects an appreciable saving of dressing material.
3. The amount of solution needed is of small bulk.
4. The number of wounds which a surgeon can dress in a given time is far greater than by any other method.
5. The elimination of the Carrel tube simplifies the dressing and the problem of transportation of the wounded.
6. The elimination of the Carrel tube saves the time taken by the nurse for the periodic flushing.

AN EXPEDITIOUS METHOD FOR THE STUDY OF ENTERIC STOOLS:

A REPORT ON THE EXAMINATION OF 1,200 SPECIMENS OF FAECES FOR ENTERIC ORGANISMS.

BY

F. B. BOWMAN, M.B.TORONTO, MAJOR C.A.M.C.,

OFFICER COMMANDING NO. 2 CANADIAN MOBILE LABORATORY.

(Report to the Medical Research Committee.)

DURING six months in 1916 the examinations of faeces for enteric organisms (*B. typhosus*, paratyphoid A and B) made at this laboratory numbered 1,200. No claim for originality is made for the technique adopted, and the procedure is reported as having been, in my experience, efficient as well as simple. A minimum of culture media, glass-ware, etc., is required, and the culture media are easily prepared.

Nearly all the samples were sent from a hospital which admitted only patients convalescent from enteric fever or dysentery, and Army Council instructions in regard to the routine examinations were carried out carefully.

Each patient was given a numbered basin, and the specimen was obtained from this. We have always used

specimen containers (supplied by Messrs. Baird and Tatlock) consisting simply of small, wide-mouthed bottles, well stoppered with an ordinary cork, in the centre of which is fastened a small child's toy tin spoon, the whole enclosed in a wooden case.

Materials Required.

1. Peptone Water.

Peptone (Baird and Tatlock) ...	10.0
Sodium chloride ...	5.0
Water ...	1,000.0

To dissolve, place in autoclave for five minutes. Shake well, filter, and tube. Sterilize in autoclave at 15 lb. for fifteen minutes. Each tube should contain about 5 c.cm.

2. Endo's Medium.

Liebig's extract of beef ...	10.0
Sodium chloride ...	5.0
Peptone ...	10.0
Water ...	1,000.0

Dissolve in autoclave at 120° C. for five minutes. Add 30 grams of washed agar, and autoclave at 120° C. for fifteen minutes. Filter and neutralize to litmus. Add 10 c.cm. of a 10 per cent. solution of sodium bicarbonate and 10 grams of lactose. Place in steamer for one half-hour. When plates are to be poured, the above stock (1,000 c.cm.) should be melted and 5 c.cm. of alcoholic basic fuchsin solution (basic fuchsin 3 grams, alcohol 57 c.cm.) added, and 25 c.cm. of a 10 per cent. solution of sodium sulphite. Then steam for fifteen minutes and pour into plates. Allow to cool and store in the dark till ready for use.

By placing a circle of blotting paper in the lids of the Petri dishes before sterilizing them, all the water of condensation is absorbed; this aids greatly in making successful cultures.

3. Hiss Medium.

Liebig's extract ...	5.0
Sodium chloride ...	5.0
Distilled water ...	1,000.0

Dissolve in autoclave at 120° C. for five minutes, add 8 grams of washed agar and melt in autoclave at 130° C. for five minutes. Add 20 grams washed gelatine, dissolve and cool to 45° C. Clear with the white of one egg in the autoclave at 120° for five minutes, filter, and to filtrate add 1 per cent. of dextrose and sterilize in the steamer for one half-hour. Put about 5 c.cm. into each tube and sterilize in the steamer again. This medium at 37° C. remains quite solid, and will retain gas bells.

I have found that the following procedure saves twenty-four hours in the examination of suspected colonies.

The tubes containing the Hiss medium are placed upright in a basket in a basin containing ice water, and a few cubic centimetres of a fairly stiff plain agar is poured into each tube and the tube immediately sloped, producing the result shown in the diagram.

4. *Standard Agglutinating Serums.*—We have obtained these from the Royal Army Medical College, Millbank, and from the Standard's Laboratory, Oxford.

Procedure.

Each specimen is given a number and a peptone water tube the same number. A piece of faeces the size of a pea is removed with a wooden applicator from the specimen bottle and thoroughly emulsified in a tube of peptone water. Each specimen is allowed to stand about half an hour and is then ready for plating.

The Endo's medium having been poured, the plates should be a very faint pink in colour and as dry as possible. A curved glass rod is passed through a flame and when cool plunged into the peptone water emulsion and then removed. The lid of the Endo's plate is removed with the left hand, and while revolving the plate the glass rod is smeared from the centre to the margin like the spokes of a wheel; the same procedure should be carried out on a second plate without recharging the rod.

These plates are incubated overnight and examined for suspicious colonies. *B. coli* being an acid producer will appear as beautiful golden metallic-looking colonies, and streptococci as small crimson dots; any colonies grey in colour with no metallic lustre should be regarded as suspicious. These are fished off with a platinum needle and stab cultures made into the Hiss tubes, and at the same time streaks are made on the superimposed agar

A. Plain agar slope.
H. Hiss medium.

slopes. These are now placed in the incubator at 37° C. overnight. If any gas bubbles appear in the medium, the tube is discarded. If the stab shows a clean growth with no bubbles the tube is set aside for further examination.

Having arranged the suspicious cultures in a rack, the next procedure is the agglutination of these organisms to identify them definitely.

Different dilutions of the standard serums are made, say from 1 in 20 to 1 in 500. Drops of the serum in these different dilutions are placed on a clean slide and a small loop of twenty-four hour culture of the homologous organism is emulsified in the serum dilution. The slide is now rocked from side to side, and in a satisfactory dilution agglutination of the organisms should be seen easily in a few seconds. Each serum is tested in this way with each type organism, to learn the proper titre to use in testing the unknown cultures.

Having obtained the proper titre, the same procedure is adopted with regard to all the unknowns, and although in some instances agglutination reactions may overlap, the culture may be called positive and higher dilutions used in definitely determining the organisms as being "para" A or "para" B. An emulsion of *B. coli* should also be used each day as a control with each serum dilution.

Of 1,200 specimens examined from enteric convalescents, 45 were found positive for paratyphoid A, 12 positive for paratyphoid B, and 13 positive for typhoid bacilli. Two cases were definite carriers of paratyphoid A, and from these occasionally plates showed pure cultures of this organism.

Following the publication of the paper by Leitch,¹ who used brilliant green and telluric acid with excellent results, we began a series of experiments, using these substances in the peptone water; unfortunately, the cases were suddenly ordered to be sent elsewhere, and we could not continue the work, but 100 specimens were put through in this way, and one positive was found which had been overlooked by direct plating on Endo's medium.

In examining specimens of urine about 2 c.cm. is added to a melted Hiss tube, and plates are poured and smears made on Endo's medium at the same time. Suspicious colonies are then treated in the same way as the cultures from faeces.

Summary.

In a laboratory where pathological examinations of all kinds are asked for, and where a large amount of work is done with a small and sometimes inexperienced staff, a routine as uncomplicated as possible must be used. The procedure for examination of faeces as described here is not recommended as being the best, providing one has time to prepare other media, such as the different sugars; but where a large number of men may be waiting for release, the reports must be given in as short a time as possible, so long as this does not interfere with their reliability.

Endo's medium I have always found superior to any other for plating, and it is the most easily prepared. The slope agar Hiss tube is a valuable adjunct, and saves at least twenty-four hours in identifying a suspicious colony.

The results of these examinations would seem to compare favourably with those reported when other methods have been used.

June 1st, 1917.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, September 2nd, 1916, p. 317.

In 1913 (*Deut. med. Woch.*, March 15th, 1917) there were 620,455 deaths in Prussia—321,980 males and 298,475 females. In 1914 the deaths increased to 766,828 (males 449,645, females 317,183). The average relative mortality of males and females in the period 1886-1913 was as 109 to 100. According to this ratio, the deaths among males in 1914 should have been 345,729. By subtracting from this hypothetical figure the actual number of deaths among males in 1914, the figure 103,916 is obtained, representing the number of deaths due to the war. The death-rate per 1,000 in 1913 (not including stillbirths) was 14.9. In 1914 it had risen by 3.2 to 18.1. It was, however, almost as high (17.9) in 1906, and in 1905 it was higher (19.6).

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

DISORDERS AND DISEASES OF THE HEART IN SOLDIERS.

No one engaged in military medical work could fail to read with interest and advantage Sir T. Clifford Allbutt's article in the *BRITISH MEDICAL JOURNAL* of August 4th. The responsibility of estimating the degree of disability in cases labelled "D.A.H." (disordered action of the heart) and "V.D.H." (valvular disease of the heart) is no light one, and it has been some consolation to read Sir T. Clifford Allbutt's very modest statement in his article "Overstress of the Heart" (Allbutt and Rolleston's *System of Medicine*, 1909) that, after an experience dating from 1870, he still approached with diffidence the problem of distinguishing the "functionally fretful" from the "strained" heart. This attitude of a very eminent authority, one of the pioneers of investigation of "the soldier's heart," is in striking contrast to certain loose but confident opinions, as to diseases and disorders of the heart, expressed during the war.

No doubt undue importance was at one time attached to murmurs, and the value of concomitant physical signs and symptoms was not fully appreciated. Nevertheless one has viewed with uneasy suspicion Sir James Mackenzie's dictum that bruits may be disregarded (wherever they may be heard) in estimating capacity for military service. Safe enough in Sir James Mackenzie's hands, this doctrine seemed calculated to engender a too cheery optimism in practitioners called upon to form (without the polygraph or the electrocardiograph) a prognosis as to the patient's capacity for further military service. Moreover, it is a moot point whether the practitioner's duty ends with a prognosis "for the duration of the war." The patients in 90 per cent. of cases are young men, and they may claim not unreasonably that more remote effects of wear and tear demand consideration.

During the winter of 1916-17 I gave all the time I could spare to the investigation of myocardial efficiency in cases of "D.A.H." and "V.D.H." under my care, employing, in addition to the usual physical examination, Dr. Strickland Goodall's exercise-blood-pressure test, with certain modifications.¹ My results were embodied in a short paper, read before the Reading Pathological Society, and I showed charts in which the systolic and diastolic pressures, pulse, and respiration rates were recorded before and at intervals after exercise. I drew attention to the fact that in a considerable proportion of cases of "D.A.H." a murmur is audible, which in my opinion is too lightly dismissed as "functional," "haemic," "transitory." The murmur is systolic in time, and it is audible in the third, fourth, and fifth left intercostal spaces along the left border of the sternum—that is, in the tricuspid area. The cases presenting this murmur (and others in which it does not occur) show an increase upwards of superficial cardiac dullness in the left parasternal line; the dullness extends usually to the upper border of the third interspace. In most of these cases there is a variable degree of displacement of the apex beat outwards. It seems difficult to resist the conclusion that the murmur indicates dilatation of the right heart and regurgitation through the tricuspid valve. Sir T. Clifford Allbutt explains the importance of such murmurs, even when they are transitory, and he points out that "the efforts cast upon such a heart should not be immoderate"—in other words, the murmurs have a significance, and are not to be disregarded.

The important part played by infections in causing disability of the myocardium and rendering it liable to strain is duly emphasized in the article under consideration. Unfortunately, both in civil and military practice, the more remote effects of acute infections, apart from rheumatic fever, upon the myocardium are apt to be forgotten.

Reading.

• GORDON LAMBERT.

In the correspondence in the *BRITISH MEDICAL JOURNAL* on soldier's heart it has been stated that the systolic murmur heard at the base over the pulmonary area is due, in the vast majority of cases, to the friction between the

¹ Dr. Strickland Goodall: The Estimation of Myocardial Efficiency, *BRITISH MEDICAL JOURNAL*, October 14th, 1916.