prevent this patient-to-patient infection, and when combined with the method I adopt of dressing all the serious cases myself and leaving the bandaging to an assistant, often an orderly, and washing the gloved hands well with a cotton-wool dab in a strong antiseptic after each case, time is saved and perfect safety from multiple infection is assured.

Before the wound shows the purplish granulations described, and before the patient complains of the smarting, and in all wounds where the exposed surfaces are living tissues, hypertonic solutions are contraindicated. The saline method of Wright requires careful watching by the surgical specialist, who must see every case so dressed daily. It is not, therefore, suitable for routine work in a casualty clearing station, nor even in a base hospital. I have said nothing of the normal saline, with which everyone is familiar.

II. Hypochlorous Acid.

Hypochlorous acid has been used in the forms eusol and eupad. The deodorizing effect is sometimes magical, especially when the dry eupad is applied to stinking, bruised, and dead tissues. But eupad so used is very caustic and very painful, and should only be applied by the surgeon himself. Eusol solution, on the other hand, is seldom painful, and is a good routine application, but some skins are very susceptible to it, and it must not be applied for long periods to wounds of the back of the hand, dorsum of foot, and of the neck, forearm, and wrist. It should always be freshly mixed, applied once or exceptionally twice daily, and should not be covered by protective. The drip method is specially useful in compound fractures, and in all lacerated wounds of the limbs where there is gas gangrene and foul smelling sores. Eusol is one of the best methods we have tried, and it need not be continued after the wound is fairly clean and free from smell. A sterile dressing is then quite sufficient.

III. Iodine.

Iodine in spirit or watery solution acts pretty much like hypochlorous solutions as a deodorant, while the spirit preparations act like the hypertonic salines, by inducing a serous flow. Iodine is very irritating to most skins, and the pain continues for some time after the dressing is applied.

IV. Spirit: Glycerine.

Methylated spirit or glycerine, alone or charged with antiseptics—for example, biniodide spirit, glycerine and ichthyol—both act like the hypertonic saline in producing free discharge, and require frequent changing. They do not cause so much pain, but are expensive to use in routine work.

V. Carbolic Acid.

Carbolic acid, when used pure, cauterizes the surface, and is only feebly antiseptic, as its combination with albumin dams back all discharges. It is a useless application where there is deep destruction of tissue. It runs over and destroys the skin, and cannot be recommended as a first treatment for wounds of any kind. In solutions of 1 in 60 on double cyanide gauze it is quite good in a rush. Large quantities of the gauze can be kept moist in this solution in small enamelled marmites, as recommended to me by Colonel Wallace, and this method is specially useful in busy times. It is painless, can be applied to most wounds indiscriminately, and the dressing can be left entirely to nurses and even to orderlies in emergencies without risk. But carbolic is a weak destroyer of putrefactive organisms. The greatest danger in its application is the wringing of the gauze with the bare hand; this can be avoided by gloves or by applying the dressing moist with sterile forceps.

VI. Sterile or Double Cyanide Gauze.

Dry sterile gauze or the double cyanide gauze are both quite good dressings for visibly clean wounds, and if removed by hydrogen peroxide when too adherent are suitable for dressing such cases, and convenient for rushes. They are safer than moist dressings when applied with the bare hand carelessly.

VII. Hydrogen Peroxide.

Hydrogen peroxide cleans a cavity or surface quickly, and is a good deodorant, but is not satisfactory as a wet

dressing applied on gauze. The under layers become clogged and non-absorbent. It is a weak antiseptic, which at once produces its total effect if thus applied. Like protective, it checks drainage of discharges and promotes absorption. Its mechanical effect is practically its only recommendation as a lotion for dressing. It is quite good as a bath for foul-smelling wounds, either alone or with boracic.

VIII. Continuous Irrigation.

I have not said much regarding continuous irrigation of wounds, as only exceptional cases in quiet times can be so treated in casualty clearing stations. This is especially true in a tented unit.

IX. Vaccines and Serums.

Injections of polyvalent serum has seemed to do good in many cases, especially when used before an operation on a granulating wound where bone has to be removed or a plastic operation done. There is less local reaction and less general disturbance if a full twenty-four hours is allowed to elapse between the injection and the operation.

CONCLUSION.

It is not so much the antiseptic dressing used as its intelligent application that matters. Almost any one of the methods we have tried will give average good results, but there are cases in which one application is more suitable and more easily applied than any of the others, and it is right here, to use an Americanism, that the specialist in surgery in a casualty clearing station comes in. He should never become an enthusiast in any one method of dressing, as he is then a danger to his patients and an embarrassment to his colleagues, to whom freedom of choice is as necessary to secure their intelligent interest as a change of method of dressing may be to the patient. No surgeon or dresser in a casualty clearing station should try to drive a one-horse shay and so become a menace to the recovery of not a few of his patients.

ACUTE URINARY INFECTION WITH PARATYPHOID B BACILLUS.

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It is now generally recognized that the differentiation between typhoid and paratyphoid fevers is a problem that can only with certainty be solved by the bacteriologist. It has been said that some distinction may be made clinically, in so far as cases of paratyphoid fever usually run a much milder course. Recently, however, several deaths from paratyphoid fever have been reported, and it is probable that this clinical distinction will prove unreliable; further, with the more detailed study of all febrile cases, it seems likely that anomalous forms of the latter will be recognized.

The case herein reported illustrates acute urinary infection with the *B. paratyphosus B.*, and, while exhibiting little in common with ordinary paratyphoid infection as hitherto recognized, presents several additional interesting features worthy of record.

The patient, a private in the A.S.C., aged 17, was admitted to hospital on December 31st, 1915, for "abdominal pain and incontinence of urine." He had had no previous illnesses, and had never been abroad. He was quite well up till the morning before admission, when he was seized with intense and frequent desire to micturate, but was unable to pass more than a small quantity of urine at frequent intervals. This condition persisted throughout the day, and he experienced a certain amount of pain across the lower part of the abdomen. During the night he was unable to sleep, and felt "shivery." The following day the abdominal pain was rather more severe, and the slightest desire to micturate was always associated with inability to control the flow. There was no vomiting, no diarrhoea, and he complained of only slight headache.

On admission, the skin was hot and dry, the tongue very furred, the temperature 103° F., and the pulse 112. There was some tenderness in the region of the bladder, but nowhere else in the abdomen, and a quantity of albumin was found on

examination of a catheter specimen of urine. Nothing could be made out in any of the other viscera, the heart and lungs were normal, and the spleen was not enlarged. The next day (January 1st) the patient was rather drowsy, incontinence of urine was present, and a specimen, on standing, showed quite an appreciable deposit of pus.

The patient's condition remained much about the same until January 6th, on which date bladder control was regained although frequency of micturition continued and pus was still present in the urine. There was some diarrhoea on January 5th only, but at no other time. On January 8th a small quantity of blood appeared in the urine and persisted until January 12th; but the pus persisted in considerable quantity until January 17th, when it was noticed to be very much diminished. On this latter date a few hyaline casts were observed.

On January 1st the patient was placed on treatment with the following mixture, which was continued three times daily throughout the illness:—Hexamine gr. x, sodii acid. phosph. gr. xv, syr. aurantii ʒi, aq. ad ʒi.

On January 3rd *B. paratyphosus* B was recovered from the urine in pure culture; it gave the usual sugar reactions and agglutinated strongly only with a specific paratyphoid B agglutinating serum. The same organism was again isolated from the urine in pure culture on January 10th. A blood culture on January 5th proved negative.

A vaccine was prepared from the *B. paratyphosus* B recovered from the urine, and on January 11th an initial dose of 50 million was administered. On January 13th the agglutination reaction of the patient's serum against his own *B. paratyphosus* B was tested, using the macroscopic method, and a completely positive result was obtained up to a dilution of 1 in 100. On January 12th *B. paratyphosus* B was again recovered from the urine in pure culture. By January 12th the patient was free from pain and stated he felt much better. On January 16th 100 million of the autogenous vaccine were given as a second dose, and on the following day it was noticeable that the amount of pus in the urine was enormously diminished.

There was continuous fever from the onset up to January 7th, the temperature varying from 104° F. to 101° F., and from January 7th to January 15th there was an habitual evening rise to 100°–101°, although the morning temperature was normal. From January 16th onwards the temperature remained normal. The pulse-rate varied with the temperature. During the first three days it ran between 100 and 120 per minute, then tended to be a little slower, and on January 7th it varied between 80 and 90. From January 7th to January 15th the pulse ran between 80 and 100, on three occasions only going beyond 100. From January 16th onwards the pulse varied between normal and 100, surpassing this limit on only nine occasions.

On January 18th no paratyphoid B or other organisms could be recovered from the urine, and no pus cells were observed on microscopical examination. On January 20th tenderness over the bladder had disappeared, frequency of micturition had gone, and the patient felt quite well; a very faint cloud of albumin only was present in the urine.

On January 22nd we again failed to recover any organisms from the urine, but a few pus cells were seen on microscopical examination of the centrifugized deposit. On January 23rd the third dose of vaccine was given—namely, 250 million. On the 27th a trace of pus could still be made out in the urine, and on the 29th a 500 million dose of vaccine was administered. On February 1st a slight local reaction to the vaccine was noticed for the first time, and the patient's serum was found to completely agglutinate his own *B. paratyphosus* B in dilutions up to 1 in 400. On February 5th no organisms could be recovered from the urine, and a fifth dose of vaccine, consisting of 750 million, was given. On February 13th 1,000 million of vaccine were given as a sixth dose, and on this date the urine was found to be free from albumin, although a few pus cells could still be detected. On the following day bacteriological examination of the urine failed to show any organisms.

On February 20th the urine was still free from albumin, and no pus cells could be detected whatsoever. On February 24th the seventh and last dose of vaccine was given, namely, 1,500 million. On March 10th a careful search was made of the urine and only a few degenerate bladder epithelial cells were found after centrifugalization. No pus cells or organisms were seen, and cultures proved sterile. The patient, perfectly well, left hospital on this date for a convalescent home.

The faeces were examined bacteriologically on February 22nd, March 1st, 5th, and 14th, but on no occasion was the *B. paratyphosus* B or other member of the typhoid group recovered.

The infection in this case appears to have chiefly affected the bladder, although one cannot exclude an associated pyelitis which possibly was also present, but in a considerably slighter degree. The onset of the illness in its suddenness resembled ordinary paratyphoid fever, and in which "a feeling of chilliness is also common."¹ Apart from the localization of the infection the present case was markedly atypical in other respects. The pulse was not relatively slow (80 per cent. of cases), but was increased in rate in proportion to the rise in temperature; the spleen was at no time enlarged (50 per cent. of cases); there were no "spots" during the course of the illness (75 per cent. of cases), and no vomiting or abdominal tenderness beyond the early tenderness over the hypogastrium. In typical

paratyphoid fever diarrhoea is common during the first second, and third days, and it is a striking feature of our case that diarrhoea should not have occurred until the sixth day and then ceased on the day following.

It has been observed that in certain cases the *B. paratyphosus* B shows a marked tendency to pus formation; thus, among the purulent infections described are splenic abscess, suppurative orchitis, empyema, liver abscess, lung abscess, and peritonitis without perforation.² All these conditions, however, occurred following, or as a complication of more or less typical attacks of paratyphoid fever. H. Robinson,³ in commenting on a long series of paratyphoid cases, mentions, among complications, the fact that cystitis occurred once, and in this case *Bacillus paratyphosus* A was isolated from the urine. Stolkind,⁴ who is convinced that paratyphoid as well as typhoid infections are symptom-complexes, also states that cases of infection of separate organs have been met with—for example, appendicitis paratyphosa, cystitis paratyphosa, etc. He also describes, *inter alia*, an influenzal or respiratory form, but even in these cases the patients seem to show a large spleen and "spots."

It would appear, further, from a perusal of the literature, that it is by no means common to find paratyphoid bacilli in the urine during the course of an ordinary attack of paratyphoid fever. Fortescue-Brickdale,⁵ Dawson and Whittington,⁶ and others mention cases, but references are not numerous. As far as we are aware, urinary carriers of *Bacillus paratyphosus* B—that is, the bacillus occurring in the urine of otherwise healthy subjects—have not yet been reported. Wiltshire,⁷ in an examination of 98 cases of paratyphoid fever, says: "Kidney and bladder complications were very rare. In many cases . . . the urine was examined carefully for possible renal complications, always with negative results." Incontinence, apart from pyuria, sometimes occurs in severe paratyphoid, and was present in a few of Willcox's cases.¹

In connexion with our case it is interesting to recollect that in urinary carriers of typhoid the *B. typhosus* has its habitat generally in the renal pelvis, which is usually chronically inflamed, and it has also a secondary habitat in the chronically inflamed bladder.⁸ In fatal cases of typhoid fever the renal pelvis is often found congested, but the ureters and bladder are usually normal, though signs of cystitis may be found at times. In contrast to paratyphoid, bacilluria occurs in about one-third the cases of typhoid, although pyuria is recognized as a rare complication. Pyelitis sometimes occurs (Osler), and Patrick⁹ has recorded one fatal case of typhoid in which multiple abscesses were found in the kidneys *post mortem*.

In conclusion, to summarize the chief features in the case recorded above, we note:

1. Pyuria due to a pure infection with *B. paratyphosus* B.
2. The absence of the usual signs of paratyphoid fever.
3. The successful treatment with autogenous vaccine and hexamine.
4. The patient had not been abroad.

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A CASE OF GANGLIO-NEUROMA OF THE SYMPATHETIC.

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ABOUT six cases of ganglio-neuroma have been recorded in Great Britain.¹ The history of this case is as follows:

A well-developed male child, aged 3 years, was admitted to Kilmarnock Infirmary on October 2nd as a case of acute intestinal obstruction from intussusception.

Twenty-four hours previous to admission he began to complain of severe pain in the abdomen, which was observed to be swollen and hard. Blood and mucus, with a small quantity of faeces, were passed several times by