As soon as these women notify their pregnancy, even though they have not reached the end of the fourth month, an attempt is made to give them light work within the factory while still working night and day shifts. They are removed from any process which involves heavy lifting or sudden strain. The operating of a capstan lathe involves the tightening and loosening of the chuck, which in many cases requires great physical effort to move it. For this reason pregnant women are taken off lathe work as soon as possible after notification. Some automatic machines, electric crane driving, and some labouring inspection processes involve no such straining and are quite suitable employments for women in the early months of pregnancy.

On reaching the end of the fourth month of gestation, or earlier if there is any medical reason, these women are transferred to light sedentary work at a factory engaged in the gauging and assembling of fuse parts. They work from 7.30 a.m. till 5.30 p.m., with the usual factory breaks for meals. They are given the less skilled operations in this factory, as it is not worth while devoting much time to teaching them any work at which they will be employed only a few months. They are paid at the ordinary standard rate for their work, and the only difference in their treatment from the other employees is that they remain constantly on day work instead of being on night shift on alternate weeks.

At the end of the seventh month, or earlier if there is any medical reason, these women are transferred from the fuse factory to a department which for convenience is described as the general clothing store and sewing dépôt. Here they work from 9 a.m. till 5 p.m., with breaks for meals as in the factory. They are engaged upon the making and mending of overalls, caps, trouser suits, gloves, etc., supplied by the factory management for the use of their workers. The last hour of the day is given up to the making of clothes for the baby under the help and guidance of the sewing dépôt forewoman. The sewing is carried out by hand or with the help of hand sewing machines and the pressing with a gas iron.

The sewing dépôt consists of a forewoman's office, a dining-room, cutting out room, storeroom, workroom, lavatory, cloakroom, and rest room. The women have low tables specially made for their work, comfortable chairs, and footstools for the workroom. They are encouraged to lie down in the rest room during part of their dinner hour, and at any other time if they are temporarily indisposed. They are paid while at this work at the rate of 7d. an hour, which equals 22s. 2d. a week, and, in addition, are supplied with half a pint of milk in the middle of the morning and a two-course dinner from the canteen every day as a free gift from the management.

The medical officer sees any woman scheduled under this scheme at any time if this is necessary for any special reason, and visits the sewing dépôt regularly once a week. At this weekly visit she takes a general survey of the health of the women, examines a specimen of urine from each for the presence of albumin, and gives advice to any special case that is in need of it.

The women make their own arrangements for attendance during confinement. They may remain at work until labour begins, if they wish to do so; one woman has been sent home half through the first stage of labour protesting that she would like to stay and have her dinner before leaving.

Since this scheme has been in actual working order one or two points have impressed themselves very much upon our notice. The early notification of pregnancy is entirely a new phenomenon since the workers have come to know that their condition will not lead to the loss of their employment, and the number of applicants for enrolment exceeds greatly the expected number as calculated from the numbers leaving the factory on account of pregnancy previous to the starting of this scheme. This second result is due to two causes: First, there is no object in concealment, as unmarried girls with their first pregnancy are equally cared for with the married women; and, secondly, there seems less anxiety on the part of the married workers to terminate a pregnancy in the early months before its existence can be suspected by any one but themselves. Before this scheme began its operations pregnancy was looked upon as a calamity to be avoided by all possible means, as it inevitably prevented the continuation at work when it became obvious to the factory authorities.

The women working under this scheme appear entirely contented with the conditions of their work and the pay they receive; the only anxiety they show is that they shall be able to find employment somewhere in the factory after their children are born.

At the present time it is too early to make any dogmatic statement about the condition of the children born of these mothers, but even now the general well-being of the mothers is very apparent. Though the period since its opening is so short, the accommodation for applicants has been found to be too small, and it has become necessary to consider the establishment of a much larger workroom. As this workroom is the only one of its kind in the country, the management has already been approached by other factories to admit expectant mothers from outside to its workroom, but naturally without large extension this is impossible.

It seems highly desirable that these mothers shall not be separated from their children when they return to work, so that it is hoped in the near future to establish a post-maternity department, with work for the mothers and a nursery for the children, where they may be breast-fed at suitable intervals.

This whole scheme, which is still in the experimental stage, has been worked out on the assumption that it is no charity, but rather sound business, for a large factory to care for its workers who are expectant mothers, and up to the present this assumption has proved true. The women fully earn their wages, and the factory has the benefit of their work. They themselves are healthy, and it is our confident expectation that in due course the children will show the results of the care bestowed upon their mothers before they were born.

NOTES ON THREE FATAL CASES OF *B. AERTRYCKE* INFECTION.

BY

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MORE or less severe outbreaks of diarrhoea and of gastro-enteritis are common among soldiers in camps, but it is not often that the infecting agent can be found and identified. The three fatal cases of acute gastro-enteritis we are about to describe were admitted to hospital from a large convalescent dépôt near by, in which several hundred other (but milder) cases of the same disorder occurred. The very complete investigations of Captain Perry, R.A.M.C., and Captain Tidy, R.A.M.C. (T.), have proved that the infecting agent in these milder cases was, as in our three patients, *B. aertrycke*.

CASE I.

Pte. D. H., aged 27. Admitted April 17th in a state of collapse; grey in colour with sunken eyes, cold extremities, no pulse at the wrist, weak heart sounds (rate 130), temperature 95° F. Stated that he had had continual diarrhoea and vomiting with much abdominal pain since April 13th. During the day the patient took nothing but cold water, vomiting without effort yellowish-green mucous fluid, and passing several greenish pea-soup-like stools containing no solid particles or blood. In the evening he became unconscious, with infrequent shallow respiration, but was much improved by the intravenous infusion of three pints of 6 per cent. gum acacia solution combined with 1½ drachms of sodium bicarbonate.

April 18th. Temperature 96.4° F., pulse 150. Extremities cold; abdomen retracted, tender, rather rigid, spleen not palpable, borborygmi. Diarrhoea and vomiting continue uncontrolled by morphine given under the skin.

April 19th. Temperature 97.2° F. last night, 95.8° F. this morning; pulse 92. Patient has vomited ten times and had his bowels open thrice in the last twenty-four hours, thin yellow-green fluid in each instance. He prefers cold water to all other forms of fluid offered him; and complains much of abdominal pain, unrelieved by hot applications.

April 20th. Temperature 96.8° F. last night, 96.0° F. this morning. Patient is weaker, lies with his eyes half open. The diarrhoea and vomiting continue unrelieved by morphine hypodermically or Dover's powder by the mouth. Abdomen retracted, soft, tender. Fluids taken badly.

April 21st. Mucous râle in the throat, much râle in the lungs; incontinence of urine and faeces, no pulse at the wrists; heart beating 78, regular. Patient died suddenly in the afternoon.

CASE II.

Lce.-cpl. J. A. M., aged 30. Admitted April 17th, collapsed, rather grey. Temperature 98° F., pulse 124. Stated that he had had diarrhoea and vomiting since April 13th, with much abdominal pain.

April 18th. Patient looks worse. Temperature 96° F., pulse 140, voice reduced to a whisper. Diarrhoea and vomiting continued uncontrolled by morphine gr. $\frac{1}{2}$ hypodermically. Abdomen full, general tenderness and slight rigidity, borborygmi; spleen not felt.

April 19th. Temperature 97.6° F. last night, 96° F. this morning, pulse 88. The vomiting of thin yellow bilious fluid continues about hourly unchecked by morphine or Dover's powder. Patient is listless, unwilling to take anything but cold water. Abdomen a little retracted and rigid, has been very painful. Occasional attacks of hiccough last night and to-day.

April 20th. Temperature 96.4° F. last night and this morning. Patient is losing ground. There is weakness of left upper eyelid and tendency to upward and outward squint of left eye, both disappearing when his attention is fully roused; attributed to muscular weakness. Vomiting six times, diarrhoea twice in the night.

April 21st. Patient is weaker; the diarrhoea and vomiting have ceased; there is urinary incontinence; liquids are taken very badly. Abdomen soft, rather hollow; no rose spots, spleen not felt. Later the patient was pulseless, cold, with spasmodic respiration; the intravenous infusion of two pints of 6 per cent. gum acacia, with four ounces of champagne, produced a weak pulse and brief return of consciousness, but death occurred two hours later.

The symptoms presented by these two patients were those of acute gastro-enteritis, with grave toxæmia and great bodily weakness. The temperature was constantly subnormal. Both patients took water freely, and, in spite of the frequent vomiting and passage per anum of what appeared to be pure bile and water mixed with a little mucus, did not waste away very considerably during their nine days of illness.

The third patient had a milder attack of gastro-enteritis, complicated with bronchitis and pneumonia, for which he was admitted to hospital thirty hours before he died.

CASE III.

Pte. J. McG., aged 32. Admitted for acute on chronic bronchitis, having had diarrhoea and vomiting for a few days (period uncertain). Patient was a stout man, cyanosed and orthopnoic on admission, too ill for a thorough examination. Temperature 103° F., pulse 106, respirations 32. The pulse was very weak, moist râles were heard over the chest, and twenty-eight pea-soup-like stools were passed during the last twenty-four hours of life. There was no vomiting.

The patient died of heart failure with increasing cyanosis and dyspnoea the day after his admission, much exhausted by the diarrhoea.

Post-mortem Examinations.

CASE I.—Pte. D. H. Examined twenty hours after death. Thin body, sunken eyes, rigor mortis present, much *post-mortem* staining of the dependent parts of the body. The lungs showed adhesions in front on both sides; on section the lung tissue was congested and friable, and a little mucus could be expressed from the tubes. The heart showed a few ecchymoses on the surface of the right ventricle; there was much clot in the left ventricle; a little in the right and in the auricles. The liver was pale and firm on section; the edge showed cloudy swelling. The gall bladder was full of thick yellow mucous fluid, tense and congested, with a few adhesions to the omentum. On section a few ecchymoses were seen at the fundus; the mucous membrane was not swollen. The spleen was small, with wrinkled capsule, tough on section. The pancreas, suprarenals, kidneys, and bladder showed nothing abnormal.

Alimentary Tract.—Oesophagus normal. The stomach showed congestion and ecchymoses on the greater curvature. Duodenum congested, with many ecchymoses. Jejunum slightly congested throughout, especially on the valvulae conniventes. The ileum contained reddish fluid; it was slightly congested throughout, lymphoid follicles not prominent. Caecum intensely congested; appendix normal; ascending colon intensely congested, transverse and descending colon not abnormal. The rectum was normal. No ulceration found in any part of the alimentary tract.

Peritoneum normal, mesenteric glands a little enlarged. Brain normal, cerebro-spinal fluid opalescent.

Pure cultures of *B. aertrycke* were made from the bile and spleen; the urine was negative.

CASE II.—Lce.-Cpl. J. A. M. Examined thirteen hours after death. Well nourished body, sunken eyes, rigor mortis present; slight *post-mortem* staining of dependent parts.

Trachea and vocal cords normal; lower lobes of the lungs congested and friable. The heart showed a few petechial

haemorrhages on the ventricles; the left ventricle contained much clot. The liver was natural; gall bladder congested, full, and on section showed a few petechial haemorrhages. The spleen was a little enlarged; firm on section. Pancreas, suprarenals, kidneys, and bladder not abnormal.

Alimentary Tract.—Oesophagus normal; stomach somewhat congested at the pyloric end. Duodenum normal; jejunum and ileum for the most part intensely congested, with two or three segments a couple of feet long free from congestion. Lymphoid follicles prominent throughout as small white raised spots; Peyer's patches not conspicuous. Caecum intensely congested, marked with many sago-grain lymphoid follicles; appendix normal. The ascending and transverse colon intensely congested, with conspicuous sago-grain follicles. The splenic flexure also intensely congested, with sudden transition to the descending colon and sigmoid showing slight congestion and prominent lymphoid follicles; the rectum was normal; no ulceration was found in any part of the alimentary tract.

The peritoneum was normal; many of the mesenteric glands enlarged to the size of beans or peas, hard and white on section. The brain was normal. *B. aertrycke* was cultivated from the spleen, bile, and urine.

CASE III.—Pte. J. McG. Examination seventeen hours after death. The right upper lobe was in a state of red hepatization, the middle and lower lobes congested and partly hepatized. The left lung was oedematous, and showed emphysema at its margins. The heart, pancreas, suprarenals, and kidneys were not abnormal.

Alimentary Tract.—The cardiac end of the stomach showed ecchymoses and congestion, the duodenum congestion. The upper end of the jejunum was normal, the lower part showed patches of congestion. The ileum was congested in patches, and exhibited a few petechial haemorrhages, but no obvious lymphoid follicles. The caecum was congested; the ascending colon was slightly congested, the transverse normal. The splenic flexure and descending colon were deeply congested; plaques of greyish-white mucus adhered to the deeply congested mucosa of the sigmoid, while the rectum was normal.

B. aertrycke was grown from the sigmoid mucosa, but was not obtained from the spleen, gall bladder, or urine.

Bacteriological Examination.

On April 18th the stools and vomit of D. H. were planted out on MacConkey bile-salt-lactose-agar plates. An exceedingly large number of non-lactose fermenting colonies developed—in fact, the faecal specimen yielded as many of these colonies as of *B. coli*. Subcultures gave the usual characters of the *B. paratyphosus* B group, and our R.A.M.C. paratyphoid B serum agglutinated the bacilli in a 1 in 5,000 dilution. This result indicated that the organism was either *B. paratyphosus* B or *B. aertrycke*, as it was unlikely that *B. enteritidis* (Gaertner) would be agglutinated in this manner. It was soon found that *B. enteritidis* serum of a 1 in 12,000 titre had no effect on the bacillus of D. H. in a 1 in 50 and higher dilutions.

To determine whether the micro-organism should be classed as *B. paratyphosus* B or *B. aertrycke*, absorption experiments were carried out in conjunction with Captain Perry, R.A.M.C., to whom we were indebted for a supply of *B. aertrycke* serum. The absorption tests demonstrated that the bacillus was of the *B. aertrycke* type and not a true *paratyphosus* B, although very closely related to the latter. These findings were in complete agreement with the clinical condition, which suggested a diagnosis of food poisoning rather than of paratyphoid fever. In our work the Dreyer technique was employed throughout.

On April 20th blood was taken from D. H. and J. A. M. for culture and agglutination tests.

Culture Results.—Enterococci were present in the blood of D. H.; that of J. A. M. was sterile.

Agglutination with Oxford Standard Emulsions.

	1 in 25.	1 in 50.	1 in 125.	1 in 250.
<i>D. H.'s serum:</i>				
Typhoid ...	+++	+++	++	—
Paratyphoid A ...	+++	+++	—	—
Paratyphoid B ...	+++	+++	++	—
<i>J. A. M.'s serum:</i>				
Typhoid ...	+++	+++	—	—
Paratyphoid A ...	++	++	—	—
Paratyphoid B ...	+++	+++	++	—

H.'s culture from faeces was then employed and a fairly thick emulsion from an agar slope yielded with the serums the following results:

H.'s Bacillus with Serums.

	1 in 25.	1 in 50.	1 in 125.
D. H.'s serum	+++	-	-
J. A. M.'s serum	++	-	-

The bacilli being recently isolated were much less readily agglutinated than the Oxford emulsion.

For twenty-four hours before his death J. A. M. ceased to have diarrhoea and to vomit, so no material was obtained until the autopsy. On April 22nd *post-mortem* examinations were made; an account of the findings has already been given.

On April 23rd the agglutination of cultures from the spleens of D. H. and J. A. M. was tested with a *paratyphoid* B serum which was supposed to be effective up to a dilution of 1 in 8,000 (R.A.M. College serum).

Paratyphoid B Serum.

	1 in 500.	1 in 1,000.	1 in 2,500.	1 in 5,000.
D. H.'s bacillus from spleen ...	+++	+++	+++	+++
J. A. M.'s bacillus from spleen	+++	+++	+++	+++

Absorption Experiments.

The results of a few out of many tests were as follows:

The *paratyphoid* B serum which agglutinated D. H.'s bacillus up to 1 in 5,000 and the Oxford *B. paratyphoid* B emulsion up to 12,500, was stated on the bottle to agglutinate *B. paratyphoid* B up to 1 in 8,000. It was a year old, and was diluted 1 in 20 in the bottle.

Experiment 1.—Dilutions of 1 in 100 of this serum were made, and were saturated with (1) growth from stock *paratyphoid* B agar culture, and (2) a similar culture of D. H.'s bacillus, and kept for two hours at 37° C.

	1 in 200.	1 in 500.	1 in 1,000.	1 in 2,000.
(1) Serum saturated with <i>paratyphoid</i> B. bacillus:				
D. H.'s bacillus	-	-	-	-
<i>Paratyphoid</i> B	-	-	-	-
(2) Serum saturated with D. H.'s bacillus:				
D. H.'s bacillus	-	-	-	-
<i>Paratyphoid</i> B	+++	+++	+++	-

It would seem that D. H.'s bacillus in two hours can remove four-fifths of the *paratyphoid* B agglutinins, whilst *B. paratyphoid* B under the same conditions removes all the agglutinins.

Experiment 2.—A serum which agglutinated the Oxford emulsion *paratyphoid* B up to 1 in 12,500 and D. H.'s bacillus up to 1 in 5,000 was saturated with (1) *B. coli* and (2) D. H.'s bacillus, exposed to two hours' incubator temperature, and then left in the laboratory overnight at room temperature.

	1 in 250	1 in 500	1 in 1,250	1 in 2,500	1 in 5,000	1 in 12,500
(1) Serum saturated with <i>B. coli</i> .*						
<i>Paratyphoid</i> B Oxford emulsion	+++	+++	+++	+++	+++	+
D. H.'s bacillus	+++	+++	+++	+++	+	-
(2) Serum saturated with D. H.'s bacillus:						
<i>Paratyphoid</i> B Oxford emulsion	+++	+++	+++	+		
D. H.'s bacillus	-	-	-	-		

* Neither *paratyphoid* B Oxford emulsion nor D. H.'s bacillus agglutinated at 1 in 25,000.

The conclusion is that D. H.'s bacillus can absorb at least four-fifths of *paratyphoid* B agglutinins from a *paratyphoid* B serum, whilst *B. coli* has no such effect.

Experiment 3.—The same serum as in Experiment 2 was saturated with J. A. M.'s bacillus (spleen), with *paratyphoid* B.

and with another strain of *B. coli*. Instead of the Oxford emulsion, an emulsion of laboratory strain of *B. paratyphoid* B was employed.

End point for B. paratyphoid B:

Before saturation	1 in 5,000
After saturation with <i>B. paratyphoid</i> B	1 in 500
After saturation with J. A. M.'s bacillus	1 in 500
After saturation with <i>B. coli</i>	1 in 5,000

End point for J. A. M.'s bacillus:

Before saturation	1 in 5,000
After saturation with <i>B. coli</i>	1 in 5,000
After saturation with J. A. M.'s bacillus	1 in 500
After saturation with <i>B. paratyphoid</i> B	1 in 500

Experiment 4.—This experiment proved that D. H.'s bacillus was of the *B. aertrycke* group.

A sample of *B. aertrycke* serum was obtained from Captain Perry and was found to cause standard agglutination of D. H.'s bacillus, and of the Oxford *B. paratyphoid* B emulsion in 1 in 25,000 dilution, and of the laboratory *paratyphoid* B culture in 1 in 12,500 dilution.

When the serum was diluted to 1 in 200 and equal volumes of it saturated with the growth from three agar slopes of D. H.'s bacillus and three agar slopes of *B. paratyphoid* B, the agglutination results after two hours at 37° C. and twenty hours at 22° C. were as follows:

	1 in 500.	1 in 1,000.	1 in 1,250.	1 in 2,500.	1 in 5,000.	1 in 6,250.
(1) Serum saturated with D. H.'s bacillus						
D. H.'s bacillus	trace	-	-	-	-	-
<i>B. paratyphoid</i> B emulsion...	-	-	-	-	-	-
Oxford emulsion of <i>B. paratyphoid</i> B	-	-	-	-	-	-
(2) Serum saturated with <i>B. paratyphoid</i> B:						
<i>B. paratyphoid</i> B	trace	-	-	-	-	-
Oxford emulsion of <i>B. paratyphoid</i> B	trace	-	-	-	-	-
D. H.'s bacillus	+++	+++	+++	+++	+++	+++

There was standard agglutination of D. H.'s bacillus with a 1 in 12,500 dilution of the serum saturated with *B. paratyphoid* B.

The conclusion to be drawn from this experiment is that from a specific *B. aertrycke* serum (type B, Lister Institute) D. H.'s bacillus can remove all the agglutinins, whilst *B. paratyphoid* B leaves unabsorbed those for D. H.'s bacillus, and that in consequence D. H.'s bacillus is not identical with *B. paratyphoid* B but is of the *B. aertrycke* group.

VENTRAL HERNIA:

A DEVICE TO STRENGTHEN THE ABDOMINAL WALL.

BY

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LEEDS.

REPAIR of the majority of cases of large ventral hernia can be adequately effected by one of the established methods or by a judicious combination of several, but occasionally one is encountered so extreme in degree, so crippling in its results, that life becomes a burden to its unfortunate owner, and the surgeon views with dismay the huge tract of thinned abdominal wall, beneath which movements of intestine are disconcertingly evident.

These extreme cases are usually the sequel of sepsis. In Stanton's report¹ on 500 laparotomies, of which 24 developed ventral hernias, it is stated that 21 out of the 24 were due to sepsis. Such was the sequence of events in the case to be described. Hysterectomy for impacted fibroid tumour of the uterus was performed in February, 1913, by the abdominal route. This was followed by sepsis of the wound and the discharge of urine through a fistulous opening, which finally closed; the weak scar allowed the formation later of a huge ventral hernia in the middle line, reaching from above the umbilicus to the pubes.

Locomotion grew more and more restricted, so that finally the patient could only walk some fifty yards without assistance. Various types of abdominal belt were tried without avail; operation was discouraged for a long time, but she still urged that an attempt should be made.