men would be as important, for they would not leave with the impression that they were unfit for work and the victims of heart disease and military service. The Army would also gain, for the criticism sometimes made that men are first broken down and then discharged would fall to the ground.

The prevention of disordered action of the heart could no doubt be extended by more attention to progressive training in the gymnasium and in route marching. The soldier would profit by more constant and harder work, as against work suddenly undertaken without adequate training.

DISCUSSION.

Dr. James Mackenzie asked whether men were admitted to hospital or rejected for service because they had a murmur, or because they broke down; many healthy hearts did show a murmur, and he thought the rejection of recruits for a murmur alone was a mistake.

Surgeon-General Branfoot attributed disordered action of the heart to cigarette smoking.

Dr. Moir asked whether anyone had noted a connection between tall men and disordered action of the heart; he thought small men were likely to make better soldiers so far as the heart was concerned. An abnormally slow pulse was bad: such cases were liable to syncope.

Lieutenant-Colonel Deane said he no longer believed that the position of attention had anything to do with soldier’s heart, nor overtraining, since the men affected were soft, flabby men. Swedish exercises were no better than any other. He thought that clothing might have something to do with the causation.

Lieutenant-Colonel Melville suggested that the apparent increase in heart diseases in the third year of service might be attributed to the rejection of men coming up for foreign service. He attributed soldier’s heart to the over-exercise of recruits before they were properly fed; and suggested that recruits should be fed up for a month before any serious work was given to them. It was necessary to reject men with heart murmurs, since one could not separate injurious from harmless murmurs in a recruiting station.

Major W. S. Harrison referred to the work of Davy in 1876. Davy attributed soldier’s heart to the compulsory position of attention, which, as he pointed out, was accompanied by an habitual semi-expansion of the chest and loss of action of the respiratory pump. He also referred to a personal experiment where he found that his pulse-rate was increased by fifteen beats when he put on a tight jacket.

Lieutenant Hayes had made some experiments for Major Harrison,
Observations upon Disordered Action of the Heart

Counting the pulses of men "standing easy" (in which position it was impossible to expand the chest in the soldier's habitual manner) and after five minutes' standing at attention; in twenty-nine observations there was an average increase of 7·5 beats in the pulse-rate after standing at attention, the maximum increase being twenty beats, while in only three instances of the twenty-nine was there no increase in the pulse-rate.

Fleet-Surgeon Hume thought that Marines suffered more from heart trouble than bluejackets, and attributed the difference to the better feeding of the latter.

Colonel Sir David Bruce said that the distinction between valvular and functional disease of the heart was often a matter of idiosyncrasy in diagnosis. He related a personal observation when shooting. Whilst he was wearing his coat he was much oppressed and almost fainted, but when he removed his coat he was able to shoot for the rest of the day in comfort. He suggested that the proper way to solve the etiological problem was by means of a series of well-conducted experiments.
Clinical and other Notes.

A CASE OF TRAUMATIC RUPTURE OF THE ILEUM—
OPERATION TWENTY-FOUR HOURS AFTER THE INJURY
—RECOVERY.

By CAPTAIN F. W. LAMBELLE.
Royal Army Medical Corps.

At Bridlington, about 7 p.m. on July 9th, 1910, No. SS. 902, R.L., Northumbrian T. and S. Column A.S.C. (T.), was kicked in the abdomen by a horse. He was helped back to his tent, but as there was no external wound it was thought that there was no severe injury. He felt sick, and vomited frequently all through that night. The following morning his condition was regarded as unsatisfactory and he was brought to York by motor car, a distance of some forty miles.

At 3 p.m. on July 10th he came under my care; his condition then was as follows: very ill and restless, presenting a facial appearance of internal hemorrhage and severe shock. On inspecting the abdomen only a very slight abrasion was to be found, 3 inches below and to the left of the umbilicus. The abdomen was everywhere rigid, tender and motionless, showing that acute peritonitis had commenced and was becoming general. There were signs of gas and fluid in the peritoneal cavity.

At 6 p.m. the abdomen was opened through the right rectus sheath from the umbilicus to the pubes; distended small intestines prolapsed into the wound. On examining the gut three ruptures were found in the ileum. At one of these the bowel was almost completely severed, except for an inch of tissue at the mesenteric border; the second rupture extended half-way round the gut; the third at the free border of the gut would admit an index finger. Bleeding was taking place from the injured mesenteric vessels. The peritoneal cavity contained much blood and bowel contents. All attempts at emptying the distended gut failed owing to the rigidity of the intestinal wall due to the acute peritonitis. At the end of the operation great difficulty was experienced in returning the gut and closing the abdominal wall.

The largest rupture was repaired by cutting away all damaged tissue and making an "end to end" anastomosis, two layers of fine silk suture being employed without any mechanical appliance. The other ruptures were repaired by paring and suturing. An abundance of hot normal saline solution was used for flushing out the peritoneal cavity and three large drainage tubes for the right and left iliac fossæ and the pelvis were inserted.

One pint of saline solution was injected into the subcutaneous tissues
of the right axillary region just before the patient was removed from the operation room.

July 10th, 10 p.m.—The patient has recovered from the effects of the anesthetic; the following treatment was ordered:—

(1) Coffee and saline enema per rectum, half a pint every fourth hour; (2) nothing by the mouth; (3) the following mixture to be given every fifteen minutes until midnight, then every half-hour until 4 a.m., and afterwards every hour:—

\[
\begin{align*}
&\text{R Liq. morphia hydrochlor. } \frac{1}{2} \text{ st. xxiv.} \\
&Tinct. belladonnae \quad \frac{1}{2} \text{ st. iii.} \\
&Tinct. aurant. \quad \frac{1}{2} \text{ st. iii.} \\
&Aq. ad. \quad \frac{1}{2} \text{ st. iii.}
\end{align*}
\]

One teaspoonful for a dose.

July 11th, 2 a.m.—The patient is restless, cold, with feeble pulse and hiccup. Temperature 97·6° F., pulse 136, respiration 32. Condition improved after coffee enema.

9 a.m.—Restless and cold. Temperature 96° F., pulse 136. Ordered a dry hot-air bath, temperature 90° F.

1 p.m.—Patient's temperature has risen to 99·2°, pulse-rate now 132, and with the reaction he has begun to vomit copiously without effort the dark green bile characteristic of acute peritonitis. Hot water given in large quantities to aid the evacuation of the bile and mucus in the stomach.

6 p.m.—Temperature 100·4° F., pulse 132. His condition now seems to be a little more hopeful, but he is still vomiting. Hot-air bath discontinued.

10 p.m.—Continuous saline injection per rectum begun.

July 12th, 4 a.m.—Continuous saline stopped. Temperature has again fallen. Temperature 98° F., pulse 126. Hot-air baths again employed.

10 a.m.—Temperature 99° F., pulse 110, respiration 28. Some improvement in his general condition. Still the same copious vomit, hiccup and flatulency. Small feeds by the mouth, 1-ounce quantities hourly. Tea, fresh lemonade, champagne, beef-tea in rotation.

6 p.m.—Temperature 100° F., pulse 116, respiration 24. Hot-air bath discontinued.

July 13th, 2 a.m.—Vomiting and hiccup have stopped and the patient has fallen into a sound sleep.

10 a.m.—Temperature 98·8° F., pulse 92, respiration 26. The bowels have moved naturally. Mixture of the 10th and the rectal saline enemata have been discontinued.

July 14th.—Decidedly better. He has slept all last night. Bowels open naturally, four times. Temperature 98·6° F., pulse 84, respiration 20. Now given 2-ounce feeds. Milk and hot water, beef-tea, and tea. Fresh hot lemonade ad lib.

July 15th.—Temperature 98·8° F., pulse 76, respiration 24. Doing well.
Subsequent progress uneventful. The patient made an uninterrupted recovery, the operation wound healed by second intention and gave a sound, strong scar. He was fit to leave hospital on September 3rd, 1910.

Remarks.—This case was a desperate one, and I attribute the recovery in no small measure to the after-treatment employed, especially the use of the hot-air bath, which by conserving the body heat tides the patient over dangerous periods of shock and threatening collapse. The use of opium as a stimulant and not as a narcotic is worthy of consideration. So much has been said in our time about opium in abdominal cases to its detriment that its usefulness is almost forgotten. The physicians of fifty years ago used it with advantage, and knew that where one-sixth of a grain of morphia would do harm, this amount split into ten or more doses and given at regular intervals did good. In this case, after some fifty hours the acute symptoms of peritonitis—viz., hiccough, flatulency and effortless vomiting—ceased and the bowels moved naturally a little later.

REFERENCES.

NOTES ON SURGICAL OPERATIONS IN THE MILITARY HOSPITAL, EDINBURGH.
By Captain E. G. FFRENCH.
Royal Army Medical Corps.

Cases of Appendicitis.—Gunner P. was admitted to hospital from an out-station, suffering from appendicitis. He had been ill for some days before reporting sick. The operation was performed soon after admission. On reaching the appendix it was found to be in a gangrenous condition, and the intestines showed signs of general peritonitis. There was a considerable amount of pus in the region of the appendix, and the intestines were greatly distended with gas. The appendix was removed and the pus mopped up with gauze pads. The wound was closed, with the exception of the lower portion, in which a large Paul's tube was inserted. The patient was in a desperate condition, and was kept alive by saline injections into the rectum and axilla until the fifth day after the operation, when death took place.

Driver S., admitted suffering from severe pains all over the abdomen. Appendicitis was diagnosed and an operation performed soon after his admission. On reaching the appendix, it was found to be gangrenous and ruptured towards the tip, a concretion the size of a small pea adhering to the edge of the rupture; there was also evidence of localised peritonitis. A fairly large abscess was evacuated. The appendix was removed and the pus mopped up with gauze, after which the wound was irrigated with warm saline solution, and then closed layer
Clinical and other Notes

by layer. It healed by primary union, and after a month at the convalescent home, the patient returned to duty.

Private F., admitted to hospital suffering from pain in the region of the appendix. On exposing the appendix in the usual way it was found to be matted to the surrounding structures and its removal impossible without injuring the intestines. An abscess was found behind the appendix; this was drained and the wound closed excepting at the lower angle where a drainage tube was inserted. The abscess drained satisfactorily and the wound closed after a short time. He is now quite well and has returned to duty.

Cases of Inguinal Hernia.—In eight cases a modified MacEwan's method was performed. All of them healed by primary union, with the exception of one which developed a small hematoma; a couple of stitches were removed and the clots turned out, the wound soon closed.

Tubercular Disease of the Left Knee; Amputation.—Pensioner McK. was admitted to hospital suffering from tubercular disease of the left knee-joint. He had five discharging sinuses, three on one side and two on the opposite side of the joint. Two years ago an arthrectomy for tubercular disease was performed in a military hospital. On recovering from this he was invalided out of the Service. He stated that he always suffered pain in the joint on trying to walk, and life became a burden to him. The sinuses appeared seven months ago, and discharged quite freely. After some considerable attendance at a civil hospital, he was ordered into the Military Hospital, Edinburgh, with a view to further treatment. He had a hectic temperature and the discharge was profuse; he had also lost 2 stone in weight. Five probes were introduced into the sinuses, and an X-ray photo was taken of the joint. It was then seen that the sinuses communicated with the joint and that both condyles of the femur showed marked evidence of tubercular disease. He was advised to have the limb removed, and he consented. It was accordingly amputated at the middle third of the thigh, long anterior and short posterior flaps. A point of interest in this case was an abnormal profunda artery, which was situated very close to the femur and gave us a deal of trouble in securing it. The wound healed by primary union, with the exception of one stitch which suppurated and formed a small sinus. This closed after a time and the stump is now a firm one with the cicatrix retracted well to the posterior aspect of the limb. He has gained over a stone in weight since the operation and has been fitted with an artificial limb.

Fractures.—A boy aged 16 was admitted from an out-station suffering from dislocation of the left elbow-joint, the result of a fall from a bicycle. An X-ray photo was taken, which showed a small piece of bone wedged in the joint. The internal lateral ligament of the joint was ruptured, and the ulnar was out of its normal position. The joint was opened and it was found on examination that the small piece of bone was the inner border of the trochlear surface of the humerus. This was firmly wedged into the joint, and had to be removed with Lion forceps. The joint was
closed and the wound healed by primary union. The arm was put up in a splint at right angles, and passive movement of the elbow-joint started on the fourth day. He is not able to straighten the arm to the full extent, but all the movements are good and the limb is quite useful. Massage was carried out daily.

Private A. was sent into hospital from an out-station with a diagnosis of fracture of the elbow-joint, the result of a fall from a fence. The elbow was fixed and any attempt at passive movement caused him great pain. An X-ray photo was taken of the joint, and it could be seen that there was a fracture of the internal condyle of the right humerus. An incision of about 3 inches in length was made over the site of the fracture and the piece of bone which had been pulled down by the flexor muscles of the forearm was carefully removed. The wound was closed and the arm put up in a splint at right angles; on the third day the splint was removed and passive movement started and continued daily. The wound healed by primary union. He is now able to straighten his arm to the full extent, and all the movements are good.

**Empyema.** —Private R. was transferred from an out-station suffering from pain in the left side of the chest and a hectic temperature. He had recently recovered from an attack of pneumonia. Two days after admission a large swelling made its appearance in the interval between the seventh and eighth ribs, in the mid-axillary line. An exploring needle was introduced and pus was withdrawn. The patient was prepared for operation and 3 inches of the eighth rib in the mid-axillary line removed. Pus to the extent of seven pints was allowed to come away slowly. There was a good deal of collapse of the lung. A biflange drainage tube was inserted; the discharge was very profuse for the first five days, and the dressings had to be changed three times daily. The discharge gradually grew less and the patient improved rapidly in his general health. The wound healed, and the peristeum which was left behind at the operation formed new bone and filled the opening. He was in an emaciated condition on admission, but is now looking quite fit and has put, on a stone and a half in weight. He has been sent to the convalescent home before returning to duty.

**Mastoiditis.** —Lance-Corporal P., admitted to hospital suffering from a discharge from the right ear associated with a good deal of pain. He was treated for two or three days with local remedies, but the pain increased instead of getting better. On the third day the pain became very severe over the region of the mastoid process. On examination there was slight redness and tenderness on pressure. He was prepared for anaesthetic and Schwartz's operation was performed; a curved incision was made behind the ear down to the bone, the ear was pulled well forward and the periosteum detached. The bone was chiselled away down to the mastoid cells. On reaching the cells there was evidence of pus formation. All the cells were completely scraped away and the cavity of the wound stuffed with sterilised iodoform, and allowed to granulate,
the wound being dressed daily. The discharge from the middle ear stopped immediately and his temperature fell to normal; the pain also disappeared entirely. The wound granulated very rapidly and had completely closed before he was discharged from hospital. His hearing has not been impaired and he is now doing duty.

SARCOMA OF THE UPPER JAW.

Photo of Ex-Pensioner D. T., taken on October 14th, 1910, whose case was reported in the Journal of the Royal Army Medical Corps, vol. xiv., p. 316.

An extensive round-cell sarcoma of the upper jaw was removed on January 12th and on March 2nd, 1909; it was followed by recurrence, the site of the growth precluding any operation. Treatment by Squire's trypsin and amylopsin apparently effected a cure, and it is gratifying to note that there has been no further sign of any recurrence. The man now is in robust health.
NOTE ON RE-INOCULATION AGAINST TYPHOID FEVER.

By Lieutenant J. du P. Langrishe.
Royal Army Medical Corps.

It has been stated by Netter that a small dose of anti-typhoid vaccine is sufficient to re-establish immunity in those previously inoculated against typhoid fever. In consequence of this I decided to carry out an investigation into the effects produced on the specific agglutinins by re-inoculations with single small doses of varying strengths on different individuals.

I therefore selected about a dozen men who had been inoculated together two years previously with the same vaccine, and in response to a call for volunteers from amongst their number five expressed themselves as willing to undergo the experiment. A sample of blood was first taken from each and the end-points of the agglutinating power of their sera determined. As will be seen from the table, they each gave the same low reaction. They were then given doses of vaccine varying from 0.125 cc. to 0.5 cc. The resulting malaise and local reaction were not observed, and when seen a few days later the "subjects" stated that they had experienced little or no inconvenience beyond slight headache and a "sore arm." The emulsion of Eberth's bacillus used in the subsequent agglutination tests was that prepared by March under the direction of Professor Ficker, of Berlin, and called by the title of "Typhus-dagnostikum."

<table>
<thead>
<tr>
<th>Subject No.</th>
<th>Dose of vaccine in cc.</th>
<th>20 days after</th>
<th>30 days</th>
<th>3 months</th>
<th>5 months</th>
<th>7 months</th>
<th>8 months</th>
<th>Reaction prior to re-inoculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.125</td>
<td>1 in 40</td>
<td>1 in 600</td>
<td>1 in 800</td>
<td>1 in 320</td>
<td>1 in 320</td>
<td>1 in 240</td>
<td>1 in 20</td>
</tr>
<tr>
<td>2</td>
<td>0.25</td>
<td>1 in 80</td>
<td>1 in 320</td>
<td>1 in 800</td>
<td>1 in 320</td>
<td>1 ± 80</td>
<td>1 in 40</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>0.25</td>
<td>1 in 80</td>
<td>1 in 320</td>
<td>1 in 800</td>
<td>1 in 160</td>
<td>1 in 80</td>
<td>1 in 80</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>0.375</td>
<td>1 in 40</td>
<td>1 in 200</td>
<td>Absent</td>
<td>1 in 80</td>
<td>Absent</td>
<td>Neg.</td>
<td>&quot;</td>
</tr>
<tr>
<td>5</td>
<td>0.5</td>
<td>1 in 80</td>
<td>1 in 800</td>
<td>1 in 1,000</td>
<td>1 in 240</td>
<td>1 in 240</td>
<td>1 in 320</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

It will be seen from the above that there was a very sharp rise in each case from the twentieth to the thirtieth day; after this the end-point rose more slowly to the third month, when it apparently reached the maximum, and then fell quickly in the fifth month, to a more or less constant level, prolonged until the eighth, in which the last observation was made.

A point of considerable interest in the results is the individual variation of the agglutinating powers at the same period. Subject No. 4, whose agglutinins have been low throughout and entirely absent in the eighth month, shows a sharp contrast to No. 1, in whom they have maintained a high level. The latter is a robust, healthy individual, who has not had a day's sickness, while the former is a debilitated worshipper of Bacchus. His first absence was due to an attack of malarial fever, and on the second occasion he was away recruiting his health at a hill station. The remaining three are all sound, healthy men.
Although so few cases have been investigated there would appear to be some ground for concluding that a small dose of vaccine administered two years after the first inoculation is sufficient to re-establish the specific agglutinins at a high level. It would be interesting to learn if others have had the same experience, as the advantages of re-inoculating with one dose in place of two are obvious.

A CASE OF CONTINUED FEVER ASSOCIATED WITH THE PRESENCE OF A BACILLUS RESEMBLING BACILLUS COLI IN THE BLOOD, AND COMPlicated WITH MALARIA (RAWALPINDI, INDIA).

By Captain R. E. U. Newman and Major F. Smith, D.S.O.
Royal Army Medical Corps.

This was a case of typhoid-like fever of the constipated type, in which there was clinically nothing very unusual except a copious eruption of smallish papules, fading on pressure. The spots were first noticed on the abdomen and back, afterwards they were to be seen over the whole body. The tongue was much furred, but moist. There was frontal headache, and pains in the back and limbs; the neck muscles were stiff and painful, and there was slight sore throat.

On the day following admission malarial crescents were found in the blood. Quinine was given hypodermically and by the mouth. Whey diet was ordered.

The Widal examination with Bacillus typhosus proved negative in dilution 1 in 10 on the tenth day of illness, and on the fourteenth day of illness there was no Widal reaction with B. paratyphosus A and B. Various diseases were discussed in connection with the case, but eventually it was styled "Pyrexia of Uncertain Origin."

The following chart shows the character of the fever:—
Blood taken from a vein on the eleventh day and incubated in bile broth in the divisional laboratory showed a pure growth of a non-motile bacillus, which formed red colonies on bile-salt neutral-red lactose agar plates. The bacillus was completely agglutinated by the patient's serum in a dilution of 1 in 320, and showed a definite positive reaction in a dilution of 1 in 640. It was not agglutinated by a control serum. The stock *B. coli* did not react except in a slight degree with the patient's serum.

The behaviour of the bacillus in various media was as follows:

<table>
<thead>
<tr>
<th>Media</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broth</td>
<td>Even turbidity</td>
</tr>
<tr>
<td>Agar</td>
<td>Smooth whitish surface</td>
</tr>
<tr>
<td>Peptone water</td>
<td>Indol</td>
</tr>
<tr>
<td>Milk</td>
<td>Acid and coagulation</td>
</tr>
<tr>
<td>Neutral red broth</td>
<td>Fluorescence</td>
</tr>
<tr>
<td>Lactose</td>
<td>Acid and gas</td>
</tr>
<tr>
<td>Dulcite</td>
<td>Acid and gas</td>
</tr>
<tr>
<td>Glucose</td>
<td>Acid and gas</td>
</tr>
<tr>
<td>Saccharose</td>
<td>Acid and gas</td>
</tr>
</tbody>
</table>

**Progress of the Case.**—The rash was present on admission and disappeared fourteen days later, having faded slowly.

On the seventh day of treatment (eleventh day of illness) the notes on the case were: Rash almost purpuric, abdomen a little tympanitic, still complains of pain in back and neck; 25 cc. anti-typhoid serum injected under the skin.

The next day there were rhonchi in both lungs, and dulness over the right base; mental dulness was marked.

On the thirteenth day of illness retention of urine was noted, and on the fourteenth day the patient was delirious, but on the fifteenth day there was improvement which was maintained to recovery.

On the sixteenth day of illness a second injection of 25 cc. anti-typhoid serum was given.

**Remarks.**—This being our only case of its kind, we bring it forward with some diffidence as regards the bacillus, having in view the possibility that the organism was a contamination and not a bacillus from the blood. One cubic centimetre of a twenty-four-hour living broth culture of the bacillus, injected subcutaneously, produced no apparent effect on a guinea-pig. Moreover, the bacillus may not have been the cause of the symptoms. Nevertheless we have thought fit to publish the case as being interesting apart from the question of the micro-organism.

A fortnight after defervescence was complete, the Widal reaction for *B. typhosus* was positive 1 in 10, negative 1 in 20. This slight reaction may have been the result of the injections of anti-typhoid serum.

Since the patient's recovery his serum reaction with his own bacillus has declined in intensity, and three months after the onset of illness the record was complete 1 in 40, a trace 1 in 80.
REPORT ON THE CONGRESS OF THE ROYAL SANITARY INSTITUTE HELD AT BRIGHTON, SEPTEMBER 5TH TO 10TH, 1910.

BY CAPTAIN C. H. STRATON.

Royal Army Medical Corps.

The Congress was held in the Royal Pavilion, which provided ample accommodation for all meetings, with reception rooms, bureau, and post office. The exhibition was in The Dome in the same grounds.

Brighton is in many ways very advanced in its sanitation, its late medical officer of health, Dr. Newsholme, now Medical Officer to the Local Government Board, having led the way in many branches of preventive medicine and having been fully supported by the local council. The present medical officer, Dr. Duncan Forbes, has followed and extended the lines laid down by his predecessor.

The work of the Congress was divided into two main sections, those of (1) Sanitary Science and Preventive Medicine, and (2) Engineering and Architecture; while there were in addition eight conferences: (1) Municipal Representatives; (2) Port Sanitary Authorities; (3) Medical Officers of Health; (4) Engineers and Surveyors to Municipal Authorities; (5) Veterinary Inspectors; (6) Sanitary Inspectors; (7) Women on Hygiene, and (8) The Hygiene of Childhood.

There were many social functions which need not be touched on here. There were three lectures and addresses to the whole Congress: the inaugural address by Sir John Cockburn, the lecture to the Congress by Dr. Newsholme, and a popular lecture by Dr. Alexander Hill. The remainder of the work was done in the sections and conferences. These three lectures and the presidential addresses of the sections and conferences were the only ones that were read or delivered in full; all other papers being printed and distributed beforehand; the author was allowed five minutes to introduce his subject, the discussion followed, the paper being taken as read.

In the following pages a précis of the more important papers will be given, with any notable comments made on them in the course of the discussion; the papers will be published in due course in the Journal of the Institute.

Dr. Newsholme's lecture to the Congress was on the subject of "The National Importance of Child Mortality," and was of considerable interest. He drew attention to the remarkable fall in the birth-rate that has taken place in recent years, in practically all civilised countries except Germany, showing that this was the result of voluntary reduction, and had so far...
extended that are long the natural increase of population of this country would practically cease. This movement had served to concentrate our attention on infantile mortality, and had increased the importance of the reduction of such mortality to a minimum. It had been said, with regard to the prevention of infantile mortality, that all such work would, inasmuch as the mortality is highest among the lower strata of society, dilute our increase of population with a large number of the most inferior kind. Others would encourage child-bearing among the physically fit while forbidding unsuitable persons to propagate. Two points in connection with these criticisms needed discussion: (1) Is it certain that the population is being recruited in an increased proportion from the lower grades of society? (2) Is it certain that a lower infantile mortality will produce a survival of an increased proportion of physically inferior children?

The lecturer showed that at present the fertility rate was nearly as low in the large textile centres, such as Bradford and Halifax, as in the residential suburbs, such as Hampstead. He did not consider that poor physique and low mental possibilities were necessarily hereditary or dependent on social position so much as on environment during pregnancy and after birth; while he thought it probable that in the future the birth-rate would be artificially reduced among all strata of society.

It had been stated that although the infantile mortality was higher in some places than in others, yet this was only a slightly premature weeding out of the unfit, who would in any case succumb in the course of the first five years of life. By statistics Dr. Newsholme proved that, so far from this being the case, the truth lay in the contrary direction, and the mortality between the ages of 1 and 5 years varied directly, and not inversely, with that under the age of 1 year; in fact the conditions producing a high mortality among infants under 1 year continue to produce a high mortality up to the age of 20, and the superiority of "healthy" over "unhealthy" districts continues steadily from birth up to the age of 85.

From this it followed that districts having an excessive infant mortality were preventing the attainment of the highest possible standard of physique and health of the country, and the lecturer proceeded to point out the differences between the administrative counties in this respect, the colliery counties having the highest mortality and the agricultural the lowest. The mortality was very largely due to preventable disease, and was not due to dense massing of population on a small horizontal area, but rather to insanitary conditions. In colliery districts the enormous infantile mortality (Glamorgan 154, Durham 131 compared with Oxford 73 per 1,000 in 1908) was apparently due largely to the system of insanitary and overcrowded "tied" houses provided by the colliery owners, and to the highly paid miner being apparently satisfied with an inferior home.

In fine, healthy adult life depends very largely on healthy childhood; low infantile mortality does not produce national decadence, but high
infantile mortality is associated with national inferiority in health. Lowered infantile mortality has, of recent years, been associated with increased sobriety, but alcoholic habits are favoured by municipal dirt and insanitary conditions.

The subject of schools in relation to medical inspection of school children gave rise to two papers; these did not bring out any special points, but served to show the progress made by this new branch of preventive medicine. In connection with schools a paper by Dr. D. A. Carruthers, Education Medical Officer for Bucks, on "The Cleaning and Disinfection of Schools," gave rise to an interesting discussion. Dr. Carruthers advised the daily disinfection of schools by sprinkling the floors of rooms and passages with a solution equivalent to 1 in 20 carbolic acid before sweeping, and subsequently dusting desks and woodwork with a cloth damped in the same solution. To this process he attributed reduction in the number of cases of infectious disease and cessation of outbreaks. Dr. C. J. Thomas, in the discussion, entirely opposed this procedure, saying that disinfection of buildings and furniture was absolutely useless, and that disinfection of a school was impossible. The personal factor was far more important than the environment, and the range of infection was in all cases very small, probably not more than 2 feet. Drs. Collingridge, Barlow, Savage, Handford, Meredith Young and Professor Glaister also spoke. It seemed to be generally agreed that such measures as had been described were useful for cleansing, but were of no value for disinfection, and Professor Glaister was the only speaker who considered disinfection of school buildings to be necessary or of any value.

In the Conference of Sanitary Inspectors, Mr. Lewis, of Walsingham, contributed a paper on "Dry Excreta Closets for Rural Schools." He recommended a galvanised pail with a perforated bottom, to stand over a stoneware channel draining to a cesspool, the excreta remaining uncovered and being removed weekly; his objection to earth closets was that the pails require to be emptied almost every day, "as mischievous youngsters fill them with earth." He also described, but did not recommend, a "dry excreta bin system," wherein excreta fall on an inclined surface and are scraped off once a week with a hoe. This process is said to be recommended by the Board of Education.

In the second section Mr. W. H. Webb, of Wimbledon, dealt with designs for large public elementary schools for towns, and Mr. R. G. Kirby discussed designs for open-air schools, and Mr. E. Willis spoke on the conversion of schools to be used as special subject centres.

Tuberculosis.

In one way and another a considerable amount of attention was given to tuberculosis. An interesting paper, contributed to Section 1 by Mr. G.
Morgan, dealt with the factors which prepare the soil of the lymph glands for tuberculous infection. He laid stress on the influence of acute infectious diseases in this connection, and pointed out that the date at which children should return to school after an attack of measles or whooping-cough must not be fixed only by the question of infectivity, but a reasonable period must be given to allow of recovery of general health, and a period of open-air convalescence should be permitted.

"The Municipal Control of Phthisis" was dealt with in a paper in Section 1, by Dr. W. Robertson, Medical Officer of Health for Leith, in which he described the methods adopted in his district. Early cases are taken into a sanatorium, where, at one time, old horse tramway cars were used as shelters. Advanced cases were visited in their own homes, or came under the Poor Law authorities. A general discussion ensued, which was contributed to by Drs. Willoughby, Corbin, Parkes, Kenwood, and Hope. The main difficulty appeared to be with the advanced, and consequently most dangerous cases, who could not be induced to take advantage of Poor Law accommodation, and who, in many cases, died of starvation in their own homes, which were, as a rule, quite unsuited for them. Visitation by health visitors was a valuable measure.

At the Conference of Municipal Representatives there were three papers on municipal sanatoria and treatment for phthisis. In Brighton there has been a voluntary notification system for this disease for the past ten years, and, excluding Poor Law cases, 54 per cent. of the cases notified during the past eight years have passed through the municipal sanatorium. The sanatorium is a block of the municipal hospital for infectious diseases, and is available for other purposes in periods of epidemics. There has been no instance of a consumptive patient, of whom there has been over 1,200, contracting any other disease. The cost of food, nursing, heating, and lighting for twenty-five patients is 25s. per patient per week. At Lewes the small-pox hospital is used in the summer for cases of phthisis at a total cost of 30s. a week per patient, of which 10s. 6d. a week is paid by the patient, the balance being obtained from subscriptions.

The Conference of Medical Officers of Health had before it an interesting paper on carriers of disease, by Dr. Davies, Medical Officer of Health for Bristol, which brought up to date a paper read by him at the Cardiff Congress in 1908. He said that although typhoid carriers had been most generally considered, yet probably all the infectious diseases, with the exception of small-pox, furnished similar phenomena, and the recognition of this had altered our views as to the relative importance of the personal and environmental factors in infection. Ample credit was given for the work done by the Army Medical Service in this direction, and it was urged that the system carried out at Naini Tal should be adopted by municipalities in this country. Dr. Stott, of East Sussex, described a sequence of fifty-eight cases in one district, extending from 1893 to 1910, due to a
cowman, infected by his master, who got the disease in the Worthing outbreak. From 1894 to 1899 this man was employed as a baker, and there were no cases; in 1899 he milked and there were four cases; after an interval he milked again in 1900, and four more cases occurred. In 1901 he went to a large farm where the milk was consumed on the premises, and whilst he was milking there four cases occurred in the house. In 1902 he returned to his former employer, and there were four more cases among the consumers of the milk. He stayed there till 1904, there being thirteen cases in all. Between 1904 and 1909 he acted as a labourer only, and during this period the only case of enteric fever in the district was a stroller who had apparently acquired the infection elsewhere. Within a month of his resumption of milking in 1909 further cases occurred, and it was not until July of this year that he was proved to be a carrier. He is now employed on road work.

Dr. Watts, of Aberdeen, had had a similar experience, and related the case of a woman who became infected in 1877 apparently from another carrier of long standing, and who between 1877 and 1908 had apparently infected seventy-one persons, including twenty-five farm servants connected with the dairy where she was employed; twenty-six of these cases occurred in one outbreak. Dr. Hay said that he had had success in the treatment of early carriers from the use of an ounce of magnesium sulphate in an ounce of water in the early morning, followed by 6 grains of calomel three or four hours later, all on an empty stomach. It was agreed that treatment must be undertaken early to be effective, and in the absence of legal powers voluntary co-operation was necessary. An instance of a grant of a small pension to a carrier to prevent her from engaging in the milk trade was cited.

In the Conference of Veterinary Inspectors Mr. Hunting, the President, opened a discussion on scarlet fever in relation to cow's milk. He entirely discredited the idea of any connection between eruptions on the udder of the cow and scarlet fever in man, and showed that in the London and Surrey cases of June, 1909—investigated by Hamer and Jones—there were equal possibilities of human infection. He also disputed the conclusions come to by Sir W. Power in the Hendon outbreak of 1895, and pointed out that scarlet fever had occurred within 600 yards of the cowsheds at this time. The disease affecting the cows in question was, he pointed out, diagnosed by the Veterinary Department of the Privy Council as cow-pox, and the infection was traced to the cows from Derby, which had been sold to four different cow-keepers, to each of whose farms the cows carried the latter disease, in one case infecting the hands of two milkers. No cases of scarlet fever occurred in connection with the other farms. He further pointed out that no attempts to infect cows from scarlet fever patients have been successful. In the 1909 cases he considered that the lesions noticed on the cows were the usual cracks and abrasions caused by the milkers' hands. In the discussion
Dr. L. Parkes agreed that the disease originated from human sources, and Mr. Roberts pointed out that, as eruptions and soreness of the udder were found on all milch cows, scarlet fever would be universal if there were any connection between the two conditions. Other speakers thought that the cow could not be freed entirely from suspicion whilst liable to suffer from a disease which had not been fully explained.

Mr. Morgan Hopkins, of Swansea, contributed a paper on the question of tuberculous milch cattle, advocating vigorous measures for the eradication of the disease from our shorthorn herds. Two papers on this subject were also read in the Conference of Veterinary Inspectors. The general feeling was that the question of compensation was so enormous that it could hardly be faced.

In the Conference of Sanitary Inspectors Mr. J. Weathercott, of Southwark, read a paper on adulteration of food. He stated that a very great improvement had resulted from the Act of 1860, and suggested legislative improvements. He mentioned that in most cases "special" milk for infants consisted of the ordinary milk without added colouring matter.

Mr. A. J. Martin, M.I.C.E., of the 2nd London Sanitary Company, Royal Army Medical Corps, Territorial Force, contributed a paper to Section 1 on sanitation in peace and war. Free use was made of lectures to the Institute by Sir A. Keogh and Lieutenant-Colonel Melville. The paper hardly lent itself to discussion, and, owing to the lateness of the hour, there was no opportunity for this.

In the Section of Architecture and Engineering a paper was read by Mr. Baldwin Latham on the influence of ground water on health. He pointed out that great epidemics had invariably broken out in periods of drought, and considered that this was due to pollution from the surface of a limited volume of ground water, the first water percolating after a dry period being the most foul and least diluted. He had paid some attention to the effect of exhalation from the ground as measured by the tensiual difference between the temperature of the ground and that of the dew point. He showed a chart demonstrating a remarkable coincidence between the diarrheal death-rate and the tensiual difference. He remarked on the especial dangers of soak-away cess-pits in the chalk, oolite, and new red sandstone formations, and said that he had in some cases found old deep wells used as cess-pits.

Mr. Shenton read a paper on the sterilisation of water and sewage effluents, laying stress on the importance of filtration before the addition of sterilising agents. It was stated that at Shrewsbury, where there was previous filtration by the Candy process, one part of available chlorine in two million was sufficient to obtain sterility—i.e., no Bacillus coli in 500 cc. The quantity required increased rapidly with the amount of organic matter, so that at Guildford, while 0·5 part per million was sufficient to reduce the B. coli content of the effluent of a fine third contact bed to
less than 0.2 per cc., 10.6 parts were required for that from the second contact bed, 20 for that from the first, 25 to 44 for the septic tank effluent, and 50 to 70 parts for the crude sewage.

Mr. C. Chambers Smith dealt with economy in sewage disposal, pointing out that undue expenditure in first cost and extravagance in working had occurred in many small installations. Ample records were necessary to check the working. The system of percolating filters was more satisfactory and economical than contact beds and the change to the former from the latter at Sutton, Surrey, had been fully justified. Double filtration was not as a rule necessary, though in some cases final filtration through sand was advisable. In comparison with the tables of cost of dealing with sewage given in the report of the Royal Commission, he stated that the cost of working at Sutton was, exclusive of loan charges, £2 16s. 6d. per million gallons, or a 1d. in the £1 rate, as compared with £4 7s. 2d. given for the same process in the Commission's report. In the discussion it was pointed out that much of the high cost of working previous installations was due to a striving after cheapness of construction.

Mr. Edgar Newton dealt with some dangers of sewage pollution of the sea. He held that the practice of sending untreated sewage into the sea was a danger to health from contamination of shell-fish, to fisheries from depletion of fish, and to sea-bathing from pollution of the water and foreshore. He said that sewage was often brought to the foreshore and not, as supposed, carried out to sea. Speakers in the discussion considered that very careful observations should be made of tides and currents before fixing on an outfall, but that if this was carefully placed, there was no more satisfactory method of dealing with sewage.

In the Conference of Engineers and Surveyors Mr. H. Thomson Lyon, late Chairman of the Highways Committee, City of Westminster, contributed a paper on the collection and disposal of house refuse, describing the process in Westminster, where there is a daily collection finishing at 10 a.m., chiefly carried out by direct labour. In some districts "flushing dustmen" are employed who flush roadways during the early part of the night and collect the refuse later; by increasing the number of flushers the roads are done earlier, and have time to dry, the dust collection is got over in good time, and a full "day's" work is provided for both classes of men. As to plant, motors are preferred to horses, and the tipping apparatus is confined to the wharf, and not attached to the wagon. For wagon-covers a plain, large canvas sheet is preferred to any other, and no complaint has ever been received that the dust blows about. He considered destructors expensive.

Dr. G. W. Eustace read a valuable paper on the effect of hygiene on the wage-earning capacity of the people. He instanced Port Sunlight and Bourneville, where good wages, good houses at low rents, and short hours of work, had benefited employer and worker equally, and had led
C. H. Straton

Dr. Kenwood, in the discussion, quoted cases in his experience in which improved conditions of ventilation in factories had led to improved commercial results. In this connection Mr. J. J. Robinson, editor of the "West Sussex Gazette," urged that friendly societies, who are at present in great difficulties through sickness claims, should organise the study of hygiene, and so reduce the amounts expended on sick pay.

Mr. A. Saxon Snell contributed a paper entitled "Some Notes on Fever Hospitals," in which he recommended buildings constructed of a steel framing filled in with light concrete construction, formed of two thin slabs over the steel work, with an intervening air space, finished outside and in with hard plaster; the floors to be of concrete between steel joists and covered with an impervious composition. He would also reduce the number of separate blocks, providing a number of small wards separated by plate-glass walls fixed in steel frames, the glass being obscured to the height of 30 inches, the patients being easily kept under observation whilst different diseases could be treated in the same block.

Dr. Symons contributed a paper on ventilation of ordinary rooms. He said that windows should as a rule only be closed when the room is unoccupied, so that it feels warm on entering. He mentioned three useful devices for improvement of window ventilation. The first was the addition of a third sash to the ordinary double casement which would unite the other two when they were open and prevent the wind from blowing directly into the room. The second was a double fan window; the outer half hung from above, the inner fitted with weather guards and hung from below. The third device was a baffle-plate sash window, the baffle-plate being a piece of glass fitted into the outer stone frame of the window, occupying the whole width of the opening and 9 inches deep, fixed flush with, or not more than 2 inches below, the window head. The glass of the upper sash terminates 9 inches from the top of the sash.

Fleet-Surgeon Home, R.N., read a paper on the ventilation of ships, particularly merchant ships. After discussion of various theories of ventilation he briefly described three mechanisms for delivery and exhaustion of air—the Thermostat, adopted by the Cunard Company for the "Mauretania," which can be used either to deliver or exhaust air, the Sirocco fan for taking in and distributing air, and the Utley porthole ventilator, which consists of a passage over the top of the side light defended by cork floats against the waves.

A useful paper entitled "Mothercraft," was contributed by Dr. Sykes of St. Pancras, to the Conference of Municipal Representatives, in which he described the work done with a view to reduce the infantile mortality in his borough. The work is based largely on the Notification of Births Act of 1907, and is carried out under his supervision by women sanitary inspectors, and women health visitors, official, professional, voluntary, and philanthropic. A school has been established for mothers, young
wifes, and prospective brides, providing instruction in food and feeding, food values and prices, simple cookery, cutting out and making baby clothes, preparation for the care of babies, and general housewifery and domestic health. Breast-feeding is the fundamental tenet of the school, and its lady medical officer is the judge as to the necessity for weaning, hand-feeding, use of special infants' milk, and so on. The work of the school was followed up by home demonstrations, and efforts were made to keep in touch with the children till they reached school age. Every care was taken to encourage the maintenance of a home and to avoid resort to institutional methods. The establishment was supported by voluntary contributions.

Dr. Boobyer described the "Mothers' and Babies' Welcomes" established at Nottingham in 1908. The Corporation provided a house and the salaries of two nurses, the remaining expenses being paid from voluntary sources. Instruction of mothers and feeding of those that are necessitous were the main objects.

Other speakers preferred the establishment of milk depôts, particularly in factory districts, it being said that under industrial conditions many mothers were physically unable to nurse their infants.

Drs. Bushell and Hall read a paper urging the establishment of public bacteriologists on the same lines as public analysts, and a resolution in favour of this was passed by the conference of Medical Officers of Health.

Many other papers of less general interest were read at the different meetings, but those that have been mentioned above will give an idea of the wide scope of the Congress.

In connection with the Congress a number of excursions of sanitary and engineering interest were arranged. Of these two may be here mentioned. The first was to the outfall of the Brighton and Hove sewers near Rottingdean. The sewage is conveyed by gravitation in a 7-foot brick sewer to a spot on the coast about five miles east of Brighton where it is discharged into the sea through three 4-foot pipes protected by flap valves, and discharging throughout the ebb tide. There are storm overflows in the town which come into action after heavy rainfall. The sewage is said to be carried well out to sea in a south-westerly direction.

The other excursion was to the Brede waterworks for the supply of Hastings where there is an installation of Candy's high-pressure filters. The water here contains a very considerable quantity of iron which renders it, before treatment, unfit for drinking purposes. It is thoroughly aerated and passed through the polarite filters with excellent result, the iron and other impurities being removed and a drinking water of excellent quality produced.

The Health Museum did not contain many features that were new to those who had visited the Ideal Home and similar exhibitions. Among the more notable exhibits were Lovibond's Tintometer as applied for the detection of adulteration of milk by charting its colour when layers of
different thicknesses are examined. It may be mentioned that this instrument is invaluable for all colorimetric analytical processes.

The Interoven Stove Company showed a combined sitting-room stove and cooking range, fitted with a large oven and hot plate with, or without, a high-pressure boiler. It might be useful for warrant officers' and other quarters, as it can be instantly converted from a cooking range into what is apparently an ornamental sitting-room grate.

Messrs. H. Lowry, Ltd., of Belfast, exhibited "The Cobra Drain Cleanser" which consists of a flexible steel spring tube fitted with toothed jaws actuated by a wire passing through it to the handle, similar to a "Bowden" bicycle brake. The apparatus can be passed through any trap or round any bends, and will remove obstructions without breaking open the pipes. There are other forms of head and extra lengths of tubing which can be attached. With 6 feet of tubing and accessories the price is 25s.

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\[ \text{Lecture.} \]

INTER-COMMUNICATION AND ORDERS.\(^1\)

BY CAPTAIN AND BREVET-MAJOR W. H. ANDERSON, p.s.c.

1st Cheshire Regiment.

SYLLABUS.

The system of inter-communication and of writing field messages, reports, &c., in order that medical officers may be capable of communicating with other branches of the Army in the field when required. The principles regulating the communication of orders, the different kinds of orders issued, and the points that should be attended to in writing them.

The first subject of the lecture I have been asked to give to-day is—

(1) The System of Inter-communication of the Army in the Field, and to make that clear I have drawn up a rough diagram showing the means at the disposal of the Commanders of a Division and of the Cavalry Division for transmitting orders, messages, and reports forwards and backwards. These means comprise Telegraph, Wireless, Telephone, Motor Cars, Bicycles, Signalling, Despatch Riders or Mounted Orderlies, and Foot Orderlies, and efforts are now being made to organise a corps of Motor Cyclists. The details of means of communication available with each unit will be found in War Establishments.

At present the Signallers, Bicyclists, and Telephonists are regimental and distinct from the Telegraph Companies, which are R.E.; but the

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\(^1\) Lecture to Officers, Royal Army Medical Corps, Belfast, May 2nd, 1910.