entirely due to the complete retraction of the uterus, which resulted in a want of elasticity in its walls. From a number of cases recorded it would appear that incarceration may be also due to constriction by the cervix, which, on forcible dilatation or incision, allows of ready reduction, and which may occasionally be so tight as to seriously interfere with the circulation through the uterus and cause sloughing and gangrene. Reduction in this latter class of case must, therefore, be a much more simple process than in the former. When due to retraction one is apt to forget that the uterus is not, as it is so often defined, a hollow organ in the true sense: its cavity is merely potential and depends entirely on the elasticity of its walls. The nearer they approach to rigidity the more must the difficulty of reduction increase, till eventually reinversion must be impossible.

When irreducible by manual means, in most cases replacement may be secured by steady continued pressure upwards of the fundus which gradually overcomes the muscular retraction and stretches the muscle fibres, as recommended by Aveling, but in a few instances this would appear to fail and incision of the uterine wall alone can prove efficacious.

This has been successfully done by Kustner, Piccolli, and Dührssen who, after opening the vaginal roof, incised the uterine wall from fundus to cervix and then reinverted, after which the uterus was pulled into the vagina and the incision stitched.

Abdominal section and replacement from above by stretching the constricting ring and pulling on the round and broad ligaments was successfully performed by Thomas, who, however, failed on another occasion and had to resort to removal of the uterus, a fate which also befell Kelly in a similar attempt. It is probable in Thomas's successful case, the incarceration was due simply to a tight os internum, and while the second case was similar to the conditions in my case where complete retraction of the uterus prevented its reduction.

In my case I first attempted a similar procedure without success and therefore proceeded to posterior incision of the uterine wall as detailed. It was indeed surprising to note with what ease reposition was thus accomplished.

The abdominal route presents, to my mind, three distinct advantages to the vaginal as recommended by Kustner and Piccolli: (1) The uterine incision is reduced to a minimum, the extent being regulated by the organ becoming reduced the moment it is the necessary size, (2) the assistance acquired by being able to pull on the broad and round ligaments as well as by pushing up the fundus, (3) the more efficient control of hæmorrhage which can be acquired by stitching the incision in the uterus with the organ in its normal position, and not in an exaggerated state of ante flexion or retro flexion, when necessarily its circulation must be seriously interfered with.

This last advantage is perhaps the main one and was strongly impressed on me by the case described where the difficulty of controlling the bleeding was considerable. In fact, in some cases cited where operation by the vagina has been performed, it has been found necessary from the serious nature of the bleeding to remove the uterus subsequently.

Reduction by uterine incision or hysterotomy is indicated in most cases only after a fair trial has been given to elastic continued pressure, but when the patient is much reduced by hæmorrhage and other causes, it is open to question whether immediate operative treatment is not preferable, especially when we consider the simplicity of the operation and the small risk which is now run by the modern methods of abdominal surgery.

Forcible replacement, as by White's method, appears to me unjustifiable under any circumstances, while hysterectomy and amputation, except when the organ is gangrenous or otherwise extensively diseased, should be altogether discarded. It is naturally premature to draw conclusions from such a limited experience as afforded by one case, but from the extreme rarity of the condition and the happy result obtained I would myself have little hesitation in resorting to a similar procedure should a like condition present itself.

Professor C. J. WRIGHT (Leeds) much regretted that time did not permit a fuller discussion upon the three last papers, which referred to subjects of the greatest interest. He men-

tioned a case of intractable prolapse which a ventrifixation and a subsequent colpo-perineorrhaphy had apparently cured; but in which prolapse of the pelvic floor recurred; vaginal removal of the uterus was commenced, but, on finding the abdominal adhesion perfect, a long cervix was removed and the fundus uteri left—the case promised to do well. Mr. Wright hoped to give a trial to Dr. Inglis Parsons's injection method. He congratulated Dr. Haultain upon the success of his operation for inversion, and upon the ingenuity of his descriptive models. He mentioned a case of chronic inversion in which Aveling's repositor was used with success.

NOTES ON ENTERIC FEVER AT THE IMPERIAL YEOMANRY HOSPITAL, PRETORIA.

By H. D. ROLLESTON, M.D., F.R.C.P.,

Physician and Lecturer on Pathology, St. George's Hospital; late Consulting Physician Imperial Yeomanry Hospital, Pretoria.

A LARGE number of cases (681) of enteric fever have been treated in this hospital, but of these more than half were transferred for change in a condition of convalescence from other hospitals; while a number of patients removed their notes from the hospital when they went. The notes of all the cases in the hospital are therefore not available for examination and analysis.

The following remarks on enteric fever in South Africa are based on observation of the disease in Pretoria during the months of May to September, 1901, and on analysis of 244 cases, the notes of which are available.

The enteric fever met with in South Africa often differs in some respects from the disease as seen in England; but the resemblance in the clinical aspect, morbid anatomy, and bacteriological characters is so close as to leave no shadow of doubt as to their essential identity. There are, indeed, different types of enteric fever in South Africa which resemble or differ from the usual type seen in England.

ACQUIRED IMMUNITY.

A previous attack of enteric fever in England, India, Egypt, or even in South Africa itself does not necessarily protect the individual against enteric in South Africa. There have been numerous cases in this hospital in which the same patient has had two attacks during the present campaign.

Example.—A lieutenant, aged 20 years, inoculated March, 1900, had enteric in May, 1900, and was invalided home. He returned to South Africa, and in May, 1901, had a second and mild attack of enteric fever. The second attack may be more severe than the first and prove fatal.

The failure of a previous attack of enteric fever to protect the patient may be said to be dependent on the very slight degree of immunity possessed by that patient, but this does not carry us very far. Durham's new theory of relapses in enteric fever offers a more feasible explanation. According to this view, a typical attack of enteric fever is due to an infection with several strains of the *B. typhosus*; the different strains, say seven in number, are equally represented, and produce antibodies sufficient to protect against further infection by any or all of these strains. But should one or more of the different strains of the *B. typhosus* be feebly represented there will be a deficiency of the corresponding protecting or antibodies; and in the event of this same strain or strains subsequently gaining a hold on the organism there will be nothing to oppose their growth. In other words, there are varieties in typhoidal infection, just as there are in streptococcus infection, only in a less marked degree, which do not mutually protect against each other. It follows that atypical cases of enteric fever should be more often followed by relapses than the typical straightforward cases. Now, as will be seen later, the general run of enteric cases in South Africa presents features of difference from cases in England, while relapses are more frequent in South Africa.

ANTITYPHOIDAL VACCINATION.

Though this method of treatment is still on its trial and must be judged by statistics showing the incidence of enteric fever in large bodies of men, inoculated and not inoculated, it may be of interest to refer to the question here. Personally I was, like most medical men, prejudiced in its favour, and

was both disappointed and surprised at the experience of my predecessor here, Dr. Washbourn,² that the incidence of enteric fever does not seem to be diminished by inoculation, and that it does not modify the disease.

Among the *personnel* of the hospital (17 medical officers, 50 nursing sisters, and 83 orderlies, etc.—total, 150) there were 22 cases of enteric fever, or an incidence of 14.6 per cent. Of the 150, 35 were inoculated, and of these 6, or 17 per cent., suffered from enteric; while of 115 non-inoculated members of the *personnel* 16, or 13.9 per cent., suffered from enteric fever; the percentage is therefore higher among the inoculated. There were 2 deaths, both in non-inoculated patients. In 100 cases of enteric fever among non-commissioned officers and men, taken mainly from convalescent patients, only 8 had been previously inoculated; there were 3 fatal cases, all among non-inoculated patients.

Among 42 officers who had enteric, no fewer than 19 had been previously inoculated, 6 of these 19 cases were severe in character, but none were fatal; of the 23 non-inoculated cases 7 were severe, and of these 7, 3 ended fatally. The interval between inoculation and the subsequent incidence of enteric fever varied between one and twenty-one months, but in only 4 instances was the interval less than six months. The average interval between inoculation and the onset of enteric fever in these 19 cases was thirty-eight weeks.

As far as these scanty figures go they point to the conclusions (1) that antityphoid inoculation does not absolutely protect against a future attack of enteric fever; (2) that when enteric occurs in an inoculated person there is, as a rule, an interval of at least six months; (3) that inoculation protects against a fatal termination to the disease.

The explanation of the occurrence of enteric fever after inoculation is much the same as that of the occurrence of a relapse or of a second attack of that disease, and may be briefly summarised by supposing that the individual has been rendered immune against some, but not against all the strains of the typhoid bacillus.

RELAPSES.

Among 244 cases there were 52 relapses, a percentage of 21. This is a high percentage, and its significance has already been pointed out. In his recent analysis of 829 cases of enteric fever, Osler³ found the percentage of relapses to be a little more than 10.

REMARKS ON PECULIAR FEATURES, SYMPTOMS, COMPLICATIONS, AND SEQUELÆ.

In some, though in a considerable minority, of the cases where the onset could be observed there was quite a sudden onset. In a certain number of cases already in the hospital for dysentery, enteric fever developed. In many of these it appeared that dysentery and enteric fever had been contracted at the same time, and that the comparatively long incubation period of enteric fever (eight to twenty-three days) accounts for the fact that the enteric fever appeared a considerable time after the dysentery. In connection with this subject it is interesting to note that observations made on enteric fever during the Spanish-American war of 1898⁴ make it probable that when a mixed infection of saprophytic germs and typhoid bacilli attacks the alimentary canal, the diarrhoea which rapidly results may so thoroughly remove the typhoid bacilli that that disease does not develop, and that for the time being at least a certain degree of immunity to typhoid fever may result.

Diarrhoea.

Diarrhoea was decidedly exceptional, and, as in some epidemics in England, constipation was the rule during the fever. Transient attacks of diarrhoea during convalescence were comparable to the diarrhoea that so commonly attacks newcomers in South Africa.

The temperature of the enteric fever patients was often extremely irregular, extensive and rapid oscillations occurring within twenty-four hours without any manifest cause. Concomitant malaria was, of course, a manifest explanation, but was only proved to be so in a few instances.

Pulse.

A noticeable feature in many cases was the rapid-pulse-rate during convalescence, becoming more manifest when the patient was first allowed to get up. Very possibly this

rapidity of pulse, which often reached 120 without any evidence of dilatation or of organic valvular disease of the heart, was connected with the continued hard work involved in "trekking" previous to the onset of enteric, and is a manifestation of the disordered action of the heart of soldiers. In fact, one could generally guess correctly whether a convalescent enteric patient had or had not been on the "trek" shortly before his illness by the pulse-rate. In patients who had not been marching or undergoing severe exercise for some time before admission for enteric, the pulse was slow in convalescence; it, therefore, seems improbable that the altitude of the hospital (4,000 feet above sea level) had anything to do with increased pulse-rate.⁵ In many instances this rapid heart's action was associated with flatulent dyspepsia, and seemed to be aggravated by it, inasmuch as treatment of the dyspepsia was often followed by slowing of the pulse-rate.

The quickened pulse-rate was not accompanied by unpleasant subjective symptoms, and the patients were often unconscious of it.

As regards treatment, a return to bed was usually, but by no means always, followed by a fall in the pulse-rate. Tincture of belladonna, *mv* three times daily, seemed to have a beneficial influence, while the treatment of any concomitant dyspepsia had, as already mentioned, a good effect.

Hæmorrhage.

Considerable hæmorrhage from the bowels occurred in 21 cases out of 244 cases, or in a percentage of 8.7, which is above the general average. Thus in Osler's 829 cases the percentage was 6.

Of these 21 cases, no fewer than 16, or 76 per cent., were fatal—a very striking mortality. In Osler's cases of hæmorrhage only 10 per cent. were fatal. In some few cases, most, but not all, of which were fatal, there was a purpuric condition of the rose spots.

In patients who had been on "trek," and had not been able to obtain vegetable food for some time, there was often a scorbutic tendency, which showed itself by a spongy or foul condition of the gums, and occasionally by purpuric spots. Such cases were naturally much benefited by lime-juice or lemon-juice.

Perforation.

Perforation of the intestines was curiously rare, and only occurred in one case. Several cases of undoubted perforation of the intestine in enteric, however, occurred during the same period in the Volks or Civil Hospital, Pretoria, under Dr. Thornton, who is reporting them in the *Lancet*.

Phlebitis.

Phlebitis was the commonest sequela met with after enteric. I regret that reliable statistics as to its frequency are not available. It not infrequently occurred in both legs, one after the other, and sometimes gave rise to very great pain, which might be due to a direct extension of the inflammation of the coats of the vein to the adjacent nerves. The commonest situations were the deep veins of the leg and the femoral vein. In some instances relapses of the phlebitis took place. A not uncommon event was to get œdema and increased firmness of the legs without pain or tenderness, or evidence of cardiac dilatation during convalescence. This may possibly be the result of thrombosis in the deep veins of the leg, but it certainly differed from the more evident and painful phlebitis usually seen during the fever or very early in convalescence.

It is noteworthy that pulmonary embolism was not seen in many cases; this freedom from an event which might naturally have been expected at any rate in a few of the numerous cases of phlebitis raises the question as to the existence of actual thrombosis, and if so, what its degree? Was there merely a parietal thrombosis not completely excluding the lumen? In favour of this is the frequent absence of œdema of any intensity until the patient got up and the fact that it was usually difficult to feel a distinct cord. As an explanation of the frequency of phlebitis Dr. Washbourn suggested that something in the food—the absence of fresh vegetables or the presence of some ingredients in tinned foods—was the disposing agent. A natural hypothesis is that it depends upon the veins of the legs being a place of least resistance as a result of fatigue consequent upon

trekking. There have been two fatal cases of gangrene of the leg during enteric fever, one due to embolism, the other presumably from arteritis.

Neuritis.

Signs of neuritis, though looked for, were seldom seen. The so-called "putty paralysis" that has been described in patients suffering from enteric fever in South Africa, and referred to the pressure of the putties on the peroneal nerve, though expected and looked for, has not been observed. In a few instances tender toes have been met with, but the tenderness may in some of these cases have been due to peeling of the thickened epidermis from the feet. In a man, aged 31, signs of disseminated sclerosis developed after an attack of enteric fever, but diminished, and were passing away before the patient left the hospital.

Epilepsy.

A man, aged 22 years, who never had epilepsy previously, had a relapse ushered in by an epileptic fit. During convalescence he had two more epileptic fits, which were accompanied by an epigastric aura. There was no case of hemiplegia following or arising in the course of enteric fever.

Mental Change.

Insanity after enteric fever was extremely rare. After severe attacks a certain degree of mental weakness was not uncommon, in the more marked instances the patient was silly, and made mistakes which showed he was not in touch with his environment. In other instances there was depression, or merely loss of will power, the patient changing his plans from day to day.

Respiratory Complications.

Bronchitis, which is usually such a common accompaniment of enteric fever, was decidedly rare; probably this was due to the usually excellent climatic conditions.

Pneumonia occurred during the fever in 4 cases, and was fatal in 2 of the 4.

Pleurisy, as a rule of slight degree, was not uncommon. It occurred more often on the right side; in 1 case it was double; in a case of perforation of the vermiform appendix about the twentieth day of enteric, with the subsequent formation of a large abscess on the right side of the abdomen, there was a large empyema on the right side.

Arthritic Sequelae.

These fall under two heads:

1. Definite inflammatory changes in the joints—arthritis.
2. Pain without any objective changes in the joints—arthralgia.

Arthritis was much rarer than arthralgia. Occasionally during advanced convalescence synovitis, which might have been other than typhoidal, was met with. In 1 case there was acute arthritis of the left hip-joint.

A man aged 20 became ill with dysentery on May 1st, and said that he then passed blood. He had not previously had enteric fever, and had not been inoculated. When admitted to this hospital on May 16th, the symptoms of dysentery had disappeared, and he was manifestly suffering from enteric fever. The temperature touched normal on June 20th, but was unstable for weeks afterwards. On June 25th he had a rigor and a temperature of 103°, and on June 26th there were signs of acute synovitis of the left hip-joint, which became immobile. On July 22nd the thigh was put on an extension to prevent fixation in the flexed position. On September 4th he went as a lying-down case in hospital train and hospital ship to England. The thigh was still on a long Liston splint.

Arthralgia.

During convalescence pains in the joints, without any objective signs such as swelling, creaking, or limitation of movement, were sometimes met with. This arthralgia was very probably merely the same condition as the chronic rheumatism so commonly seen in South Africa.

Myositis.

Myositis after enteric fever is very rarely described. Osler⁶ mentions a case of extreme tenderness of the calf muscles without any special swelling as probably one of myositis. Possibly some cases of tender, painful, and swollen legs, without any palpable veins, are due to myositis, and not to thrombo-phlebitis of the deeper veins. The following appeared to be an example of

Localised Myositis.—A trooper, I.Y., was admitted into the hospital with tuberculous glands in the groin, and was successfully operated upon.

Forty-three days after his admission to the hospital his temperature rose, and he passed through an ordinary attack of enteric fever. During convalescence he developed localised myositis of the exterior brevis digitorum muscle on the right foot; the muscle was swollen, tender, and stood out in relief. It yielded to rest and treatment with glycerine and belladonna.

Periostitis.

There was one marked example of periosteal nodes on the right ulna of a man who had a relapse and parotitis. There were two cases of perichondritis of the costal cartilages and one of the thyroid cartilage.

Parotitis.

There were three cases of non-suppurative parotitis, in one of these there was orchitis also on the same side.

Orchitis and Epididymitis.

There were three cases of enteric fever in which the testes were inflamed. On one the orchitis (left side) occurred in a convalescent patient shortly after parotitis, also on the left side. In the second case both testes were inflamed during the period of fever, but only for a short time—about a week. In the other case—an officer, aged 28 years, of a decidedly gouty history—acute epididymitis and orchitis on the left side occurred during the fever. The urine was highly acid, and contained pus and staphylococci, probably from pyelitis, but no typhoid bacilli. Subsequently a small abscess in the left epididymis discharged externally. There had been no exposure to any venereal infection for three years.

Osler,⁷ in his recent analysis of 829 cases of typhoid fever in the Johns Hopkins Hospital from 1889-99, records two cases of combined epididymitis and orchitis, which, like the majority of the examples of this rare typhoidal phenomenon, occurred in convalescence. Of Eshner's⁸ 42 cases, 29 occurred in the convalescent period.

Hepatic Complications and Sequelae.

In the 244 cases of enteric fever, there was one case of jaundice; it was a mild form, probably of catarrhal origin. No cases of cholecystitis during the course of enteric fever were observed.

Solitary abscess of the liver as a sequela of enteric fever is so rare that it may be worth while to give brief details of such a sequela:

A man, aged 30, inoculated in July, 1899, who had never had dysentery, had typhoid fever for the second time in this country within twelve months, on May, 1901. On July 3rd, when about to leave the hospital, he was attacked with acute lobar pneumonia of the right base with well-marked physical signs. On July 10th there was an imperfect crisis. After this his temperature gradually assumed a hectic type, and dulness remained in the right axilla; there was no displacement of the heart's apex, no downward enlargement of the liver, and no albumose in the urine. He was thought to have developed an empyema, and on July 29th, in the right axilla, resulted in the withdrawal of a pint of sanious pus. The trocar seemed to go through a tough membrane.

On the following day Mr. D. Drew excised part of the sixth rib in the axilla, and found that the abscess cavity was not in the pleural cavity, but under the diaphragm and in the right lobe of the liver near the anterior surface.

The abscess was drained and the patient recovered.

Multiple Abscesses.

A man, aged 23, had a severe attack of enteric fever, during which there was incontinence of urine. Probably, as a result of this, the skin became infected, and ten subcutaneous abscesses developed; they were mostly about the buttocks, but there were three on the back and one on the right axilla. After being opened they rapidly healed. This patient had some mental weakness when he left the hospital on his way to England.

REFERENCES.

- ¹ *Journ. Path. and Bacteriol.*, April, 1901.
- ² Washbourn, *BRITISH MEDICAL JOURNAL*, 1901, vol. 1, p. 941.
- ³ *Johns Hopkins Hospital Reports*, vol. viii, p. 430, 1900.
- ⁴ *Abstract of Report on the Origin and Spread of Typhoid Fever in U.S. Military Camps during the Spanish War of 1898*, by Walter Reed, Victor C. Vaughan and E. O. Shakespeare, pp. 78, Washington, 1900.
- ⁵ Cf. *A Civilian War Hospital (The Portland)*, p. 84.
- ⁶ *Johns Hopkins Hospital Bulletin*, vol. viii, 1900, p. 486.
- ⁷ *Johns Hopkins Hospital Reports*, vol. viii, 1900, p. 469.
- ⁸ *Philadelphia Med. Journ.*, 1888, vol. 1.

INTERNATIONAL CONGRESS ON HYDROLOGY.—The meeting of the International Congress of Hydrology and Climatology will be held at Grenoble in 1902. Dr. Albert Robin, of Paris, is President of the Central Committee, and Dr. Fernand Berlioz, Professor in the Medical School of Grenoble, is the general secretary.