There were 89 octogenarians between 80 and 90 years of age, and 13 bordering on this age, in their eightieth year. Amongst these there were 12 deaths, or 11½ per cent.

In 274 instances the prostatic enlargement was complicated by the presence of stone in the bladder, mainly of the phosphatic variety, due to cystitis, the calculi varying in number from one to hundreds; and in one case, reported in the *Lancet*, April 12th, 1913, there were sixteen calculi weighing 8 oz. Amongst these 274 patients there were 21 deaths, or 7½ per cent. I may draw attention to the fact that, though the operation in these cases involved a suprapubic lithotomy as well as enucleation of the prostate, the whole of the mortality has been accepted in connexion with the latter.

It will have been observed that in practically all the cases detailed in this paper—and they are typical of scores of others—the prostatic disease had been allowed to advance to such a degree that grave complications had supervened before surgical relief was sought. It is, of course, mainly amongst cases of this kind that a fatal result occasionally follows operation. I would, therefore, once more appeal to the profession at large to advise early operation, before the vital organs, and particularly the kidneys, become secondarily affected. When undertaken whilst the general health is sound and the kidneys unaffected there is scarcely any danger attached to this operation in experienced hands, even in advanced old age.

A NOTE ON THE STATE OF THE URETERS AND THEIR ORIFICES IN CASES OF GUNSHOT WOUNDS OF THE SPINE.

BY

COLONEL ANDREW FULLERTON, C.B., C.M.G., A.M.S.,
CONSULTING SURGEON, BRITISH EXPEDITIONARY FORCE.

ONE of the most frequent causes of death in cases of gunshot wounds of the spine is infection of the bladder and kidney, attributable in most cases to the use of the catheter for retention of urine. It is well known that obstruction to the urinary outlet is a predisposing cause of infection, and this state of affairs is present to a certain degree in spinal injuries. Fearnside¹ points out that after gunshot wounds of the spinal cord complete retention occurs in practically every case, commencing from the date of injury and lasting for a variable time. During this period a lax condition of the bladder musculature as a whole is found, accompanied by a considerable amount of spasm at the neck of the bladder, and of the urethra. To the first stage of complete retention there succeeds, after days, weeks, or months, a second stage of periodic spontaneous micturition or of active reflex incontinence which is entirely involuntary.

It is important to ascertain whether any relaxation or paralysis of the ureters or their sphincters is present in view of the frequency of "ascending" infection of the kidney. If it could be demonstrated that incompetence of the uretero-vesical sphincter and dilatation of the ureter occurs it would be easy to understand the frequency of kidney involvement following on bladder infection. A few observations were made in 1916 with the object of clearing up this point, but for various reasons their publication was delayed. It has been assumed that ascending infection of ureters and kidneys may be due to paralytic relaxation of the ureteric sphincters,² and as my observations bear on this subject I have thought it well to record them so that they may be corrected or confirmed by those interested.

It is easy to see how regurgitation of infected bladder contents into the renal pelvis could take place if the uretero-vesical orifice and the walls of the ureter were paralysed or relaxed. The object of this article is to show that there is no evidence that such a state of affairs is present. Physiologists are familiar with the fact that the ureters can carry on their functions independently of the central nervous system by virtue of an intrinsic neuromuscular or muscular mechanism upon which their rhythmical movements depend, and this is to be expected as the ureter simply serves as a channel down which urine secreted by the kidney is propelled to the reservoir provided for its reception until a convenient opportunity offers

for its discharge from the body. Elliott,³ experimenting on the innervation of the bladder and urethra in animals, incidentally investigated that of the ureter, but could not find any proof of the control of its peristalsis by the sympathetic nerves. The spinal segments connected with the ureters are the tenth, eleventh, and twelfth thoracic (Head). Cases with injury at or above this region were therefore chosen for investigation.

CASE I.—Cervical Region.

Pte. K., wounded with high explosive, September 17th, 1916. Complete lesion of the cord at the level of the fifth cervical segment. Complete retention of urine. The patient had been catheterized. Cystoscopy, September 22nd, five days after injury. Intramuscular injection of indigo-carmin. Colour did not appear in half an hour, though ureters discharged clear urine in jets, with normal movements of the ureteral orifices. The blue colour of indigo-carmin came through later in the day and the urine remained tinted for twenty-four hours. A mild cystitis was present. The delay in the appearance of the dye was doubtless due to the serious general condition of the patient who died two days later. *Post-mortem* examination revealed complete lesion of the cervical cord.

CASE II.—Upper Dorsal Region.

Pte. G., wounded by bullet, August 22nd, 1916. Diagnosed as a complete lesion of the cord at level of fourth dorsal segment. The patient had been catheterized for complete retention. Cystoscopy, August 24th, two days after injury. Already there was extensive cystitis, with ecchymoses, which formed slate-coloured patches in places. Ureteral orifices buried in oedematous mucous membrane. Intramuscular injection of indigo-carmin. No colour at end of thirty-five minutes, when a second injection was given. Ten minutes later colour appeared at both orifices. The urine issued in jets, which were short and abrupt and not definitely finished off as in a normal case. The area round the ureteral orifice moved only slightly upon closure of the latter. The alteration in behaviour of the ureteral orifice was probably due to the swelling of the mucous membrane present. The jets were irregular in rhythm, the intervals varying on the right side from two to thirteen seconds, and on the left from twelve to thirty-eight seconds. There was no escape of urine from the ureteral orifices in the intervals between the jets.

CASE III.—Mid-dorsal Region.

Pte. W., wounded with shrapnel ball, August 27th, 1916. Diagnosed as a complete lesion of the cord at level of sixth dorsal segment. Complete retention of urine. Catheter twice a day. Evening temperature varied from 103° to 104° F. Cystoscopy, September 1st, four days after injury. Intramuscular injection of indigo-carmin. Coloured urine emitted ten minutes later. Very vigorous jets from both ureteral orifices, with normal movements of the latter. Rhythm very irregular, three minutes elapsing on one occasion between two successive jets. At other times the rate was much more rapid. A mild degree of cystitis was present.

CASE IV.—Lower Dorsal Region.

Sergeant K., gunshot wound in dorsal region. Admitted base hospital, August 16th, 1916. Diagnosed as a complete lesion of the cord at the level of the eighth dorsal segment. Complete retention of urine, for which the patient had been catheterized. Cystoscopy, August 18th, a few days after injury. Slight degree of cystitis. Ureteral orifices perhaps slightly patulous. Intramuscular injection of indigo-carmin. Twelve minutes later coloured urine appeared in jets which were not very vigorous. No leakage from orifices of ureters in the intervals between jets.

CASE V.—Lower Dorsal Region.

Pte. K., wounded by shell, June 25th, 1916. Diagnosed as a complete lesion at level of tenth dorsal segment. Complete retention for which patient had been catheterized. Cystoscopy, a few days after injury. Small punctate ecchymoses. Floating flecks of mucus. Cystitis. Ureteral orifices appeared to be patulous, but there was distinct systole and diastole of the uretero-vesical sphincter. Intramuscular injection of indigo-carmin. Eight minutes later coloured jets with a thin stream appeared at intervals of twenty seconds.

Indigo-carmin was used in these cases to study more easily the shape and size of the issuing stream and to ascertain if any leakage occurred through an incompetent valve.

CONCLUSIONS.

A study of the foregoing cases justifies the conclusions that in complete transverse lesions of the cord in the cervical and dorsal regions, examined a few days after injury:

1. Peristalsis of the ureters continues, as evidenced by the rhythmical discharge of urine rendered more visible by indigo-carmin.
2. Normal movements of the lips of the ureteral orifice take place, as evidenced by the visible systole and diastole present in all the cases.

3. The tone of the uretero-vesical sphincter is maintained and the valve is competent. This is shown by the shape of the jets, which demonstrates that the urine has been ejected against the resistance of a narrow opening, and by the absence of leakage in the intervals.

The irregularity in rhythm and in the amount of fluid ejected in some of the cases was probably due to alterations in the rate of renal secretion. It is well known that the peristaltic movements of the ureter are originated by the presence of drops of urine in its lumen. I have noticed similar irregularity in conditions quite unconnected with spinal injury.

PRACTICAL CONSIDERATIONS.

The observations just described have a practical bearing on the treatment of patients with retention of urine due to spinal lesions. In order to avoid the disasters likely to result from the use of the catheter, other methods of treatment (pending the establishment of spontaneous micturition) have been suggested by various surgeons. One is to allow the bladder to distend until overflow takes place through the urethra (paradoxical incontinence). The urine is received into a receptacle placed between the patient's thighs. A second is to endeavour by pressure in the suprapubic region, combined, perhaps, with counter-pressure by two fingers in the rectum, to overcome the resistance at the vesical outlet, and so to empty, partially at least, the bladder. The important point to consider here is whether such distension or pressure is likely to force urine through the uretero-vesical orifices towards the pelvis of the kidney. With this end in view the following observations were recently made.

CASE VI.—Integrity of Uretero-Vesical Valvular Mechanism.

Pte. J. K. was wounded by bullet in the lumbar region on October 22nd, 1918. He had complete retention of urine, for which he was catheterized from October 23rd onwards. Admitted to a base hospital October 29th. Examination showed loss of sensation below the level of the iliac crest and motor paralysis of the right lower extremity and of the left below the knee. Slight voluntary movement of left thigh. The urine contained pus, albumin, and a few red blood cells. Cystoscopy, November 2nd, eleven days after injury. The bladder at this moment contained 900 c.cm. of turbid, foul-smelling fluid. Irrigation with warm water was carried out until the medium was sufficiently clear to see the ureteral orifices, which were almost hidden by oedematous mucous membrane. There was a severe degree of cystitis, and many flecks of pus floated in the injected fluid.

An intramuscular injection of indigo-carmin was given, and blue jets were seen to issue nine and a half minutes later. There was no leakage in the intervals between the jets. Gradually increasing pressure was made by introducing fresh fluid through the cystoscope and the effects observed. The ureteral orifices were so indistinct that accurate observation of changes in their shape, due to increased intravesical pressure, was impossible. The jets, however, continued to be vigorous even when the bladder had been so distended that it could be felt to reach half way between the pubis and the umbilicus. The intravesical pressure thus produced supported a column of water 29 cm. in height. This was increased to 91 cm. by firm abdominal pressure, such as is recommended for evacuation of the bladder contents in these cases, with no visible result as regards the issue or the colour of the jets.

Though I have found that the presence of the ureteral catheter in the uretero-vesical orifice sometimes interferes with the valve-like action of the latter, I determined to try the effect in this case. Accordingly small catheters which did not tightly fit were inserted, and passed for about one and a half inches along the ureter. The jets were now transformed into a series of drops, three or four at a time, from the distal end of the catheter. No amount of abdominal pressure, within the limits of safety, was capable of forcing fluid up into the ureters and out through the catheters which drained them. Urine was collected from each side while pressure was being made, and was found, notwithstanding all the manipulations carried out, to be clear, though the bladder contents were turbid from the presence of minute floating particles of pus.

The integrity of the uretero-vesical valvular mechanism in this case was demonstrated by the following tests:

1. Increase of pressure did not cause any appreciable alteration in the character of the jets.
2. No accentuation of flow through the ureteral catheters occurred on pressure over the bladder through the abdominal wall.
3. The fluid issuing from the catheters throughout the observations remained of the same colour, and free from pus, which could not have been the case had it been diluted by admixture with the contents of the bladder.

It is also interesting to note that in this case apparently the kidneys were not yet affected. Indigo-carmin appeared in normal time, and the specimens from both sides had a specific gravity of just under 1015 and were free from pus and albumin.

There are three obstacles to the passage of fluid from the bladder to the ureter in a normal man. First, the peristalsis of the ureter, which is continually driving its contents towards the bladder; secondly, the tonicity of the uretero-vesical sphincter; and, thirdly, the valve formed by the oblique course of the lower end of the ureter through the coats of the bladder. The last-named arrangement is such that increased intravesical pressure, whether produced by urine or by fluid introduced through the urethra, actually tends to increase the efficiency of the valve, provided that the ureteral orifice is not paralysed or dilated. There is no evidence that in a normal subject the ureteral openings can be forced by distending the bladder from without. Having regard to the state of the ureters and their orifices as observed by cystoscopic examination in the cases mentioned, it would appear to be safe, from the point of view of forcing the uretero-vesical orifices, to attempt to empty the bladder by manual massage or pressure. It has been proved in animals that with moderate intravesical pressure, regurgitation of air, milk, and coloured fluids introduced into the bladder may take place from the latter into the pelvis of the kidney. It is quite possible that under certain circumstances a similar regurgitation takes place in man, but the observations here recorded would appear to show that it is not favoured by any abnormal relaxation of the uretero-vesical orifice special to spinal injuries.

REFERENCES.

- ¹ E. G. Fearnside: *Brain*, vol. xl, Parts II and III, November, 1917.
- ² *Manual of Military Urology*, published for the American Expeditionary Force, 1918. ³ T. R. Elliott: 'The Innervation of the Bladder and Urethra,' *Journ. Phys.*, vol. xxxv, Nos. 5 and 6, July, 1907.

MANAGEMENT OF VENEREAL DISEASES IN EGYPT DURING THE WAR.

BY

SIR JAMES W. BARRETT, K.B.E., C.B., C.M.G., M.D.,
F.R.C.S. ENG.,
MELBOURNE, VICTORIA.

THE efforts made in Australia to deal with venereal diseases on a comprehensive scale date from the Dunedin Session of the Australasian Medical Congress (1896), and culminated in the comprehensive investigation made by the Government of Victoria in 1910 and 1911.

From 1911 to 1914 a good deal of educational work was done. Clinics were provided, but the Government did not move as fast as the Advisory Committee to the Ministry of Public Health (of which I was a member) thought necessary. Accordingly, a committee of medical men and women was formed, and drafted a circular, and arranged with the leading chemists that prophylactic outfits, each accompanied by one of these circulars, should be sold. Before, however, actually taking action, the circular was sent to every member of the medical profession and to every minister of religion in the State. They were asked to express approval or disapproval of the step proposed to be taken; if they disapproved they were asked to indicate a better method of controlling these diseases. All the medical men who replied expressed their approval. Of the 800 ministers of religion, about sixty replied; a strong minority replied in dignified language expressing approval, but at the same time regret that such a step should be necessary; a majority disapproved, whilst a few were simply abusive.

A deputation from the Council of Churches met the Medical Committee and a frank discussion ensued. The venerable president stated that he did not approve of the method proposed, but that he had no alternative to suggest. The committee asked him whether the churches felt any responsibility for the wholesale infection of the innocent which goes on at present and whether he could withhold assent from measures which would save them. Finally, the committee invited the Council of Churches to visit the asylums, the women's hospital, and the venereal clinic, examine the facts and meet again. At this juncture and