ments that cats and rabbits bore a simple invagination with remarkable freedom from symptoms, and that after a varying period of time the invaginated bowel could be excised and the animal would recover. All the animals, however, to which purgatives were administered after the intestines had been invaginated died when enterectomy was performed. Clinical evidence teaches the same lesson, for all the records of cases show that the symptoms have been seriously increased when the patient has been purged. The routine treatment of intussusception is to chloroform the patient, and steadily to fill his large intestine with hot salt solution under a hydrostatic pressure, of not more than 3 feet in a child, the fluid being allowed to remain in the intestine at least ten minutes. The earlier this method is adopted after the appearance of the symptoms the better are the results obtained, but it should not be adopted in enteric intussusception, in cases where the symptoms are very acute, or in those where the absence of signs or symptoms, with a subnormal temperature, leads the surgeon to suspect that the intestine is becoming gangrenous. In these cases, and when the intussusception is not reduced after irrigation has twice been tried, and when after reduction the intussusception has thrice occurred, the abdomen must be opened. The surgeon must then be prepared to deal effectually with the conditions he may find by such operative means as he can carry out with the least amount of shock and in the shortest space of time that is compatible with the safety of the patient. This will be ensured if he uses the method with which he is the most familiar. But he should bear in mind that hardly a case can arise in which he is justified in closing the abdominal wound without at least an attempt to complete the operation by reducing or removing the intussusception. Such half measures as the formation of an artificial anus are hardly ever justifiable, and the results obtained by them are usually most disastrous. In the light of our present knowledge it appears that the use of a button or bobbin is most likely to give good results when enterectomy has to be done for an enteric intussusception, whilst Maunsell's operation is best adapted for the cure of ileo-cæcal and colo-colic forms of intussusception.

REFERENCES.

- ³⁰ *Lancet*, i, 1891, p. 368. ³¹ *Trans. Clin. Soc.*, xxii, 282. ³² *Phil. Trans.*, vol. lxxvii, p. 305. ³³ *Deutsches Arch. f. klin. Med.*, xii, 1874, p. 381. ³⁴ *Lancet*, i, 1889, p. 171. ³⁵ *Lancet*, i, 1892, p. 79. ³⁶ *Surgical Diseases of the Stomach*, 1892, p. 133. ³⁷ *Abdominal Surgery*, ed. 5, 1896, vol. ii, p. 675. ³⁸ *Pamiętnik i Zjazd chirurgów polskich*, 1890, quoted by Rydygier in the *Verhand. d. deutsch. Gesell. f. Chir.*, 24, 1895, p. 439. ³⁹ *Trans. Path. Soc.*, viii, 179. ⁴⁰ *American Journ. of the Med. Sci.*, vol. xliiv, 1887, p. 437, and *Bull. of the Johns Hopkins Hospital*, ii, 1891, page 1. ⁴¹ *Medico-Chir. Trans.*, vol. lix, p. 94. ⁴² *Verhandl. d. Deutsch. Gesell. f. Chir.*, xiv, 1885, p. 475. ⁴³ *Lancet*, i, 1887, pp. 780, 1124, and 1177. ⁴⁴ *Med. Chir. Trans.*, vol. lxxix, 1896, p. 255. ⁴⁵ *Verhand. d. Deutsch. Gesell. f. Chir.*, xiv, Berlin, 1885, p. 491. ⁴⁶ *Verhand. d. Deutsch. Gesell. f. Chir.*, xxiv, Berlin, 1895, pp. 446-459. ⁴⁷ *Annals of Surgery*, vol. xxiii, p. 440, and vol. xxiv, p. 733. ⁴⁸ *Lancet*, i, 1895, p. 487, and the *BRITISH MEDICAL JOURNAL*, ii, 1896, p. 1197. ⁴⁹ Published, since the above was written, in the *Quarterly Medical Journal*, vol. v, 1897, p. 121.

THE VALUE OF THE ELECTRIC LIGHT CYSTOSCOPE IN LOWERING THE MORTALITY OF NEPHRECTOMY.*

By E. HURRY FENWICK, F.R.C.S.,

Surgeon to the London Hospital: Surgeon to St. Peter's Hospital for Urinary Diseases.

It is accepted that the high death-rate of nephrectomy is largely due to the ablation of kidneys which have become affected by tubercle or by advanced malignant disease. When criticising in 1890¹ the influence of the Nitze method upon our knowledge and treatment of urinary disease, I pointed out how valuable the cystoscope would prove in helping us to determine the presence and the working capacity of the kidneys, a point of paramount importance in cases in which nephrectomy is contemplated. I have waited until I had completed 100 operations of all kinds on the kidney to sustain this contention. I am now sure that a judicious and skilful use of the instrument not only renders the surgery of the kidney more precise, but tends also to lower the death-rate, especially the high mortality of nephrectomy.

Of the 100 renal cases² in which I have operated I have lost 9. Of these 4 were *in extremis* at the time. I wish, however, to limit this article to the use of the cystoscope in nephrectomy, an operation I have performed 21 times with 2 deaths.

CYSTOSCOPY AS A FIRST STEP IN NEPHRECTOMY.

There should be no misunderstanding about what ought to be considered a judicious cystoscopy. No patient with tuberculous deposits in the epididymis or prostate or obvious malignant disease of the bladder should be examined. Cystoscopy in other cases should be done with a perfect instrument, in a clear medium,³ by a skilled hand, backed by an educated eye. Moreover, it is of the greatest advantage if the surgeon be prepared to operate directly the cystoscope is withdrawn. Rightly used the cystoscope is of the utmost value; carelessly employed it is mere meddling, and has a death-rate of its own. It would be better to do exploration on both kidneys rather than damage both these organs by those ascending septic changes which are induced by bungling on with the bladder. Some renal changes which call ultimately for nephrectomy commence very insidiously, and evoke no symptoms beyond an occasional appearance of blood or pus in the urine. Thus tubercle and carcinoma of the kidney, which are the very diseases which swell the mortality of nephrectomy, may be almost symptomless at first, and that time, "the psychological moment," in which an operation would be of use, is frittered away in hesitation and in doubt. Cystoscopy permits us to detect these cases in their early stages if blood or pus has been passed.

ILLUSTRATIVE CASES.

Calculus Pyonephrosis.—I found five stones in a left-sided pyonephrosis in a patient who had no guiding symptoms to the cause of his extreme malaise and evening temperature. His urine contained flakes of pus. On cystoscopy, I, and several others, saw a thick white pipe of inspissated pus, being forced out of the left ureteral orifice (Fig. 1). This was just

Fig. 1.

like soft macaroni being forced through its gauge. As it slid down the bladder wall—for the pelvis was raised—it arranged itself in rolls, like the figures which treacle forms when dropped from a spoon.

Tubercle.—A lady, aged 32, was brought to me by Dr. Delamotte, of Staines, with pyuria, frequency, pain, and blood. She had been diagnosed to have a movable right kidney, also a displacement of her uterus, for

Fig. 2.

* Abstract of paper read before the Medical Society of London, February 22nd, 1897.

which she was six months under a gynaecologist. The light revealed the left ureteral orifice to be patent and tuberculous (Fig. 2). This was confirmed by finding the bacillus in the urine. The left kidney was removed. It was entirely transformed into tuberculous abscesses, with "dirt" stones.

Early Malignant Growth.—Dr. Boissier, of Banbury, brought me a patient, aged 59, with a diagnosis of papilloma of the bladder. Symptomless hæmaturia had been present for nine months. I cystoscoped, having obtained permission to do what was thought advisable after the examination. No papilloma was seen, but a jet of arterial blood poured from the opening of the right ureter. Then a clot (Fig. 3) was forced out of the

Fig. 3.

orifice as if from a mould, and its exit was succeeded by another spurt of blood. I turned the patient on his side and removed the right kidney. The growth occupied the middle of the gland (Fig. 4).

Fig. 4.

I was asked to cystoscope a patient, aged 70, who had been bleeding two years. The hæmaturia was symptomless. Blood was seen issuing from the right ureter. The patient was promptly turned on to his side, and the surgeon in charge of the case explored the kidney. Finding a healthy kidney he doubted the source of the hæmorrhage, and closed the wound. The hæmorrhage never ceased, and a year afterwards a villous growth was discovered in the urine. As villous growth of the bladder is comparatively common and that of the kidney very rare (8 cases) my diagnosis of the source of the blood was viewed with even greater suspicion. Four years after the onset I was again asked to see this patient and suggest treatment. He had not ceased bleeding for two years. His pallor was remarkable. I obtained permission to nephrectomise. Again the cystoscope revealed the hæmorrhage issuing from the right ureter, and I therefore turned the patient over, and removed the kidney. Its

pelvis was filled with villous growth, its cortex was honeycombed with cavities, and lined with the same growth (Fig. 5).

Fig. 5.

A patient, aged 32, introduced by Mr. Howse, had had profuse hæmaturia for eight weeks. The kidney was removed. The carcinoma was bulging the anterior surface (Fig. 6.)

Fig. 6.

Deaths.—I have had two deaths in the series of nephrectomies, one after removing a kidney with a carcinomatous nodule the size of a walnut. This death, which occurred among my earliest cases, was probably due to faulty technique, and a cystic kidney, which became inflamed after I had explored it for stone. The man died some weeks after with hectic symptoms. No post-mortem examination was allowed.

I submit that all cases of profuse hæmaturia—either symptomless or accompanied by slight renal pain—should be judiciously examined with the cystoscope without delay, an operation on the kidney or bladder being permitted and carried out coincident with the cystoscopy.

All cases of severe symptomless pyelitis without implication of the lower urinary or genital tracts should be judiciously cystoscoped to demonstrate the presence and working capacity of the kidneys and to locate the diseased kidney. In women Kelly's method⁴ of catheterising the ureters is probably a more certain form of exploration.

When the kidney is not enlarged, as happens in such early stages, the lumbar incision is the better route for removal.

Nephrectomies.

SEPTIC.

Initial.	Age.	Medical Attendant.	Diseased Condition.	Result.
C. B.	24	Dr. Percy Kidd	Enormous pyonephrosis	Cured.
B.	44	London Hospital	Left calculous pyonephrosis	"
D.	36	Dr. Welsford, of Tiverton.	Right calculous pyonephrosis	"
C.	50	Dr. Fitzgerald	Right pyonephrosis	"
Miss W.	28	Dr. H. W. Webster	Left pyonephrosis	"
G. W.	70	Dr. Robb	Right pyonephrosis and villous growth	"
T.	54	Dr. F. W. Foott, of Enfield	Right pyonephrosis	"
S.	26	St. Peter's	Inflamed white kidney	"
H.	45	"	Right calculous pyonephrosis	"
J.	36	Dr. Stenson Hooker, of Hastings	Cystic kidney, nephritis, due to operation	Died eventually of septicity.
B.	3	Dr. A. Brown	Septic tuberculous pyonephrosis	Healed.

ASEPTIC.

H.	35	Mr. Waren Tay, Dr. Sutton.	Enormous hæmohydro-nephrosis	Cured.
H.	19	Dr. Percy Kidd	Calculus hydronephrosis	"
T.	37	Dr. Samuel Fenwick	Advanced hydro-nephrosis	"
H.	46	—	Carcinoma, lower end	Healed rapidly.
D.	54	Mr. Hall	Carcinoma of middle	Died of shock.
B.	59	Dr. Boissier, of Banbury	Papilliferous carcinoma	Healed rapidly.
Mrs. C.	32	Mr. Howse	Malignant adenoma	"
Mrs. C.	50	Mr. Jekyll	Carcinoma of a dilated calyx	"
K.	35	Dr. Nethercliff	Tubercle	"
Mrs. R.	31	Dr. Delamotte, of Staines	Tubercle and stone	"

21 cases. 2 died.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, 1890, Part ii, p. 894. ² These 100 cases form a consecutive series, and were reviewed in a paper read before the Brighton and Sussex Medical Society, February 4th, 1897. ³ The more I cystoscope patients in their own urine, and the less I wash out the bladder, the better are my results. Of course if there is blood or pus the bladder must be thoroughly washed out before the cystoscope can be used. In this case I do not undertake to cystoscope unless I am allowed to operate coincidentally, or unless the surgeon in charge is ready to start there and then with the operation. I never touch a case of obvious tubercle of the lower urinary tract. ⁴ Author, *Medical Annual*, 1896, p. 597.

CONTRIBUTION TO OUR KNOWLEDGE OF SOLUBLE URATES: PRELIMINARY NOTE.

By F. W. TUNNICLIFFE, M.D., M.R.C.P.,
From the Scientific Workroom, St. Bartholomew's Hospital.

My attention having been drawn to a letter in the *Chemiker Zeitung* of January 20th, 1897, by Dr. C. Goldschmidt on piperidine as a uric acid solvent, I desire to publish the following results which have been obtained by me, in conjunction with my chemical collaborators, Drs. Rosenheim and Schidowitz, independently. Our original intention was to complete, before publishing, our researches in regard to the solvency of the respective urates in the various media of pathological and physiological interest, as well as to determine the toxic equivalents of the respective bases. These researches, which we regard as of interest and importance, are at present approaching completion. The urates, the solubility of which we have determined, are (1) piperidine urate, (2) hexamethylenamine urate.

1. *Piperidine Urate*.—If 10 g. of uric acid be added to a solution of 5 g. of piperidine in about 50 c.cm. of water, the uric acid is completely dissolved in a very short time in the cold. The resulting urate of piperidine can be completely precipitated by a strong solution of sodium chloride, and can be subsequently purified by washing with alcohol and ether, in which liquids it is insoluble. The most interesting property of this salt is its solubility in distilled water, which

we have determined at the following temperatures:—The solubility at 17° C. or 62° F. is 5.3 per cent., at 36° C. or 98° F. is 9.1 per cent., at 100° C. is 25 per cent. A solution of the salt in water has a slightly alkaline reaction to litmus.

2. *Hexamethylenamine Urate*.—If 4 g. of uric acid be added to a solution of 3.5 g. of hexamethylenamine in about 100 c.cm. of water, and the mixture kept for some time on a water bath, a clear solution is obtained which does not give any precipitate on cooling. The resulting product may be obtained in the solid form by a method identical with that described under piperidine urate. The solubility of this salt, determined at the following temperatures, is at 17° C. or 62° F. 0.7 per cent., at 36° C. or 98° F. 3.3 per cent. A solution of this salt in water has a slightly acid reaction to litmus.

For the purposes of comparison we thought it would be interesting to give the solubilities of the following known urates:

¹ Piperazine urate at 17° C. is soluble to the extent of 2.0 per cent.

Lithium urate at 20° C. " " " 0.3 "

" " " 39° C. " " " 0.9 "

Potassium urate (acid salt) at 20° C. " " " 0.7-0.8 "

The physical conditions obtaining in the blood and other physiological and pathological fluids differ sufficiently from those in distilled water to render a separate research necessary before any suggestion can be made with regard to the probability of the above bases being of use in the treatment of lithæmia in the human subject. This matter we are at present investigating.

REFERENCE.

¹ Beilstein: *Handbuch der organischen Chemie*, B. I, 1334. We have been unable to confirm the high solubility ascribed to piperazine urate.

SEVERE CASE OF TYPHOID FEVER IN WHICH ANTITOXIN WAS SUCCESSFULLY EMPLOYED.

By P. R. COOPER, M.B. LOND., F.R.C.S. ENG.,
Bowdon, Cheshire.

As a supplement to the four cases recorded by Dr. Pope in the *BRITISH MEDICAL JOURNAL* of January 30th, the following brief report may prove of interest:

J. B., aged 29, a labourer, formerly a soldier, of strong physique (but rather alcoholic habits), had never been abroad, and his only previous illness had been an attack of "rheumatic fever" whilst in the army. He presented no cardiac lesion. On December 13th, 1896, he complained of severe pain and aching in the head, back, and limbs, shivering, general *malaise*, complete loss of appetite, and vomiting of everything taken by the mouth. He had also sore throat, enlarged glands in the neck, hoarseness, cough with thick

muco-purulent expectoration. The temperature was 103.2°, the pulse 96, and the respirations 30, the tongue was furred,