the shorter but more dangerous plan of attempting to pass a small metal instrument by the urethra is carried out, there is a preparation in the Norwich Museum of the bladder and urethra of a surgeon, who had suffered for some years from stricture and for whom a small metal instrument was passed by a well-known London surgeon fifteen years before the patient's death. For fifteen years he never voided his urine except by means of a catheter and after his death it was discovered that the reason for this state of affairs was that a false passage existed, which had left the urethra in front of the stricture and re-entered it in the middle of the prostate. Through this false passage all the urine had been drawn off with a catheter for fifteen years. Nothing probably has tended so much to the better treatment of urethral disease of recent years as the more general employment of rubber instruments in the treatment of small strictures, and it may certainly be laid down as an axiom that whenever a soft guide bougie will pass through a stricture it is capable of treatment by internal urethrotomy, whilst such an occurrence as the one just related will serve to show that however brilliant the passage of a metal instrument may seem to the bystander, the state of the patient afterwards may not be one to be exactly envied. Even if it be granted that success would follow on nine occasions out of ten the surgeon should rather content himself with the more tedious method than court occasional disaster for the sake of a brilliant temporary success.

It has long been recognised and it is now pretty generally admitted that penile strictures demand incision, whilst those more deeply situated are quite amenable to dilatation. It is certainly a curious fact that anterior strictures will not often yield to dilatation, and this is probably due to two facts: (1) The septum pectiniform of the penis is unusually firm and unyielding at its anterior portion; (2) the causes—such as syphilitic sores and very acute inflammations usually of gonorrhoeal origin, which tend to produce anterior strictures, are usually attended with a great deal of inflammation, and thus give rise to strictures of a very unyielding nature. Still the anterior strictures are interesting in other ways. Some of those which are situated within the first inch of the urethra are certainly capable of real cure. In the first place they are visible to the eye, so there can be no dispute about their existence; in the second they can be kept in view whilst they are being divided; and in the third place they can be kept dilated with very large instruments for any period that may be considered to be necessary. If cure be desired in such cases the stricture should be kept dilated for a few minutes daily with a short conical steel bougie for at least six months, after which time the dilatation should be carried on once or twice a week for four or five months more, at the end of which time there will be found to be in most cases (probably in all) but little tendency to recontraction. The accompanying engraving will show the character and shape of the

instrument. Surely if such a result can be obtained with such severe strictures, it should encourage us to hope for cure in those more deeply placed.

With regard to the strictures which are more deeply situated there will probably be much difference of opinion as to how they should best be handled. Many of the slighter ones are so readily amenable to occasional dilatation that few patients are disposed to submit to more prolonged treatment. With the more severe types whenever there is much thickening to be felt from the outside, if there is tendency to congestion, as is shown by their readiness to bleed, or by their admitting instruments of variable size within a short period, no plan has yielded in my hands such good results as electrolysis. I have on more than one occasion published an account of cases with their results several years afterwards, and further experience leads me to assert confidently that in suitable cases excellent results will with care be obtained.

If I were asked to formulate in a few words the most essential points in the treatment of stricture of the urethra I should be inclined to say: 1. Make certain you have a true stricture to deal with. 2. Take the greatest care to keep it dilated for a long time after it has been incised. 3. Where there is much thickening employ electrolysis.

Harley-street, W.

"THE ELECTRICAL RESISTANCE OF THE URINE AS AN AID IN DIAGNOSIS."

By DAWSON TURNER, B.A., M.D., F.R.C.P. EDIN., &c.,
PHYSICIAN TO THE LIVINGSTONE MEMORIAL DISPENSARY; LECTURER
ON MEDICAL ELECTRICITY AT SURGEONS' HALL.

A PRELIMINARY ACCOUNT of part of this research was given in the Proceedings of the Royal Society of Edinburgh on Dec. 21st, 1891, and a further account is being published in the author's "Practical Manual of Medical Electricity." I desire here to give a brief summary of the work and of its chief results. The object of the inquiry was to ascertain the electrical resistances of various kinds of urine, both in states of health and of disease. The measurements were made by means of a Wheatstone's bridge with alternating currents and a telephone according to Kohlrausch's method and at a temperature of 65° F. The engraving is a view of the electrolysis tube used.

It would appear from the observations—some 500 in number—that the specific resistance of a normal urine amount on the average to about 45 ohms, and that it varies as a rule more or less inversely with the specific gravity. When the specific gravity is high and when the urine holds in solution much salts, its electrical resistance is low, and *vice-versa* where the specific gravity is low, the resistance is high. The amount of urea has but little to do with the resistance in ordinary urines. A number of experiments were made with artificial urines (see tables), and from these it is clearly apparent that the electrical resistance depends almost wholly upon the salts, and that it is only when these are quite absent, or very much diminished that the influence of the

Tables of Electrical Resistances of Artificial Urines.

[illegible]

SODIUM CHLORIDE.

Strength. per cent.	SODIUM CHLORIDE.								Specific resistance.
2	..	..	..	..	..	..	..	..	29·25
1	..	..	..	..	..	..	..	..	59·5
0·75	..	..	..	..	..	..	..	..	79·9
0·5	..	..	..	..	..	..	..	..	110·5

UREA AND SODIUM CHLORIDE.

Urea.				NaCl.					Specific resistance.
3 per cent	..	..	..	1 per cent.	..	..	..	..	55.25
2 "	..	..	..	1 "	..	..	..	..	57.8
1 "	..	..	..	1 "	..	..	..	..	57.8

GRAPE SUGAR AND SODIUM CHLORIDE.

NaCl.		Sugar.		Specific resistance.	
1	per cent.		10 per cent.		68
2	"		20 "		51
2	"		30 "		63 75

urea makes itself felt. The resistance is a measure of the chemically active substances in the urine—of the salts, particularly of the chloride of sodium. This gives us a simple and rapid method of estimating the constitution of a urine as regards its salts, while the specific gravity, in the absence of sugar, is a guide to its urea. Some interesting and useful results come from the employment of this method. There are in certain diseased conditions exceptions to the rule laid down that “the resistance varies inversely with the specific gravity”; amongst these are croupous pneumonia and diabetes mellitus. The increased resistance in the former is due to the diminution in the chlorides, and in the latter to the great relative diminution in all the salts, while the specific gravity is raised above the normal by the sugar; but the very presence also of the sugar, if in large quantities, tends by its viscosity, perhaps, to slightly raise the resistance.

In acute and chronic Bright's disease, in certain respiratory affections, in pernicious and other anæmias, &c., the resistance is high; in neurotic individuals of active mental capacity, and in certain other conditions, the resistance is low. The method may be used in both diagnosis and prognosis, and has appeared to me to be an excellent barometer not merely of the efficiency of a patient's kidneys, but also of his general condition. The lower the electrical resistance the healthier, *cæteris paribus*, will be the condition of the kidneys; and where a patient is improving the resistance will diminish from day to day and *vice-versâ*. The tables appended illus-

Electrical Resistance of J. B.'s Urine (Subacute Bright's Disease).

Date.	Sp. gr.	Urea grs. per oz.	Albumen &c.	Specific resistance.
Dec. 8	1011	4	blood	114.75
" 11	1012	4.68	"	106.25
Jan. 9	1013	4.68	albumen	89.2
" 20	1011	3.6	blood	93.5
" 30	1015	3.74	"	76.5
Feb. 11	1010	3.04	" (less)	73.1
" 15	1014	4	"	61.2
" 23	1015	4.68	"	59.5
March 5	1016	5.6	"	61.2
" 12	1017	4.68	"	74.8
" 24	1.20	9	albumen	63.75
May 23	1024	8.19	" (less)	42.5

Case of I. (Pernicious Anæmia).

Date.	Sp. gr.	Urea grs. per oz.	Albumen, &c.	Specific resistance.
Jan. 16	1017	9·36	0	68
Feb. 11	1015	6·31	0	78·2
„ 16 (before) transfusion) {	1014	7·7	0	115·6
Feb. 16 (after) transfusion) {	1014	6·5	blood	115·6
Feb. 17	1012	6·08	0	114·75
March 1	1020	7·02	0	51
„ 12	1019	7	0	44·2

trate this in a striking manner. Remembering that the normal specific resistance is about 45 ohms, it will be noticed that in the case of J. B. (subacute Bright's disease) it stood at first

at 114.75 ohms, and at once, on suitable treatment being adopted, began to fall, eventually reaching 42.5 ohms. The patient was kept on milk diet until March 15th. He considered himself at that time perfectly well. The second table exhibits the steady increase of the resistance in a case of pernicious anæmia, as the patient grew worse, followed after transfusion on Feb. 16th by a rapid improvement, so that before a month had elapsed the resistance was down to the normal.

I have to thank Dr. J. O. Affleck, physician to the Royal Infirmary, very heartily, not only for many of the specimens of urine obtained from patients under his care, but also for the encouragement he has continually extended to me in prosecuting this inquiry. My thanks are also due to Dr. Milne Murray for advice in regard to some of the electrical details.

Edinburgh.

Clinical Notes :

MEDICAL, SURGICAL, OBSTETRICAL AND
THERAPEUTICAL.

GASTRIC ULCER WITH HÆMORRHAGE, TERMINATING
FATALLY FROM THROMBOSIS OF PULMONARY
ARTERY.

BY JOHN H. DEWHURST, M.B., B.C. CANTAB.

M. F—, aged twenty-five, was admitted to hospital under Dr. Johnson on Oct. 6th, 1891, with the following history. Two years previously she had gastric ulcer with slight hæmatemesis. She soon recovered and had been in fair health until ten days ago, when she began to feel some uneasiness after food, followed in a few days by vomiting whenever she tried to take anything solid; vomit occasionally blood-stained. Seven days ago she had profuse hæmatemesis, followed by several attacks of fainting on the slightest exertion. On admission the patient was extremely anæmic and complained chiefly of great thirst and faintness. She had not vomited since the hæmorrhage. Pulse 160, very weak; temperature 100°. There was a faint systolic murmur at the apex of the heart and over the pulmonary artery. The urine had distinct traces of albumen. The tip of the nose was discoloured (capillary stasis). On the night of admission the left foot suddenly became painful and swollen. She took nourishment well—nutrient suppositories, peptonised milk, strong beef-tea with desiccated blood &c.—Oct. 7th: Left big toe discoloured. Rather delirious towards evening.—8th: Tip of index-finger of right hand somewhat discoloured. Pulse 120. Towards evening the patient became more restless, with some dyspnœa; several times tried to get out of bed. I was called about midnight, when the breathing was very shallow and hurried; heart acting very strongly, but irregularly. She died within a few minutes, her face remaining quite pallid to the end.

Post-mortem examination thirty hours after death.—On the upper margin of the anterior wall of the stomach, midway between the cardiac and pyloric ends, was a small punched-out ulcer about the size of a sixpenny-piece ; just above was a small patch of submucous hæmorrhage. About three-quarters of an inch below was a small puckered scar (probably the seat of the ulcer two years ago). The lungs were very anæmic, but freely crepitant all over. Heart : The left ventricle was practically empty ; the right ventricle contained a small quantity of red clot, which easily broke down. Starting from the base of one of the columnæ carneæ and firmly attached to it was a piece of clot about the thickness of a goosequill, greyish-white in colour and of singularly firm consistence. This extended along the pulmonary artery, divided into right and left and gave off shoots down the main branches. On pulling firmly the cardiac end a large piece about five inches came away, showing plainly the division of the artery into main and secondary branches. The clot was very elastic and stood a good strain, returning to its original shape much like a piece of indiarubber.

Remarks.—I think there can be no doubt this patient died from thrombosis of the pulmonary artery—certainly not a