lithotomy, I hope they will stick to the knife, which is the best and safest instrument; and, at the same time, give the long-beaked staff a trial. I am sure that they will gain confidence in the performance of an operation, which is often attended with some difficulty, and is always undertaken with some degree of anxiety by surgeons who have a due sense of their responsibility.

REMOVAL OF A CONSTRICTING IRON FROM THE PENIS.

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THE BRITISH MEDICAL JOURNAL of December 18th, 1880, contains editorial observations concerning the manner of removing tight rings from the fingers. I think the following rather peculiar case may, in some degree, serve to illustrate the subject, so far as it relates to the advantage to be gained by making peripheral compression, before attempting to withdraw the constricting agent.

Eighteen months ago, a man, aged 20, was admitted to the Mater Misericordiae Hospital, suffering from the pressure of an iron tube, which, on the previous day, he had removed from the handle of a plough, and had passed over his penis. It was difficult to obtain anything like a candid statement from the patient; but the account he gave amounted to this. He was "tricking" with the iron, and, having occasion to pass urine, it occurred to him to try if he could get his organ through the tube. His efforts proved successful; but then the organ, resenting the treatment to which it had been subjected, became swollen, and the youth found it impossible to rid himself of his encumbrance. In fear and distress, he sought the aid of a blacksmith, who managed, with chisel and hammer, to cut obliquely through the iron cylinder; but, on attempting to force the edges of his section apart, the upper margin of the divided iron wounded the penis, and so he was obliged to desist.

When the lad was placed under my care, I found his penis in an extraordinary and alarming condition. Close to the pubes, it was encased

by the tube figured in the annexed woodcuts. The upper edge of the divided tube seemed to be buried in the right side of the corpus cavernosum;

whilst the distal portion of the penis was enormously swollen, and, indeed, seemed to be upon the verge of becoming gangrenous.

The patient was at once brought under the influence of ether. Then, with a Syme's knife, I extensively punctured the congested and infiltrated tissues, so as to permit free drainage of blood and serum. Next, I obtained a narrow bandage of fine muslin, which I squeezed out of warm water, and applied, as tightly as was possible, from the extremity of the glans penis up to the lower border of the constricting iron. The thin damp muslin proved most useful; it allowed outward filtration of bloody serum, and, at the same time, it served to compress and empty the engorged tissues. As soon as the abnormal volume of the penis was reduced, I removed the compressing bandages; and, with considerable difficulty, succeeded in passing a flat hernia-director beneath the incurved edge of the divided iron. Two ordinary directors were also passed between the penis and the cylinder, so as to facilitate slipping forwards of the latter; then steady traction caused the iron to glide from its position, without producing any laceration of the soft parts. The young man was able to leave hospital three or four days after his admission, with an organ little the worse of having been iron-clad for thirty hours.

With regard to weight and dimensions: the tube weighed six ounces; its length was two inches and a quarter; its calibre nearly seven-eighths of an inch; and the iron was about one-sixth of an inch in thickness. Micturition was not very much interfered with during the period the penis suffered from compression.

ON THE BISMUTH TEST FOR SUGAR IN THE URINE.

By WALTER G. SMITH, M.D. Dubl.,
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In the clinical examination of urine little difficulty attaches to testing for albumen and bile, and the reagents employed (nitric acid, and tincture of iodine) are to be had everywhere, and keep well. But, in common with others who have had occasion to use the copper test for sugar in urine, I have sometimes felt the inconvenience of not being able to rely upon a copper solution which had lain aside for some time. It is well known that the solution of cupro-potassic tartrate is apt to gradually suffer a partial reduction even in the cold, especially when exposed to light, and that, when heated alone, it may afford a precipitate of cuprous oxide. The addition of a fresh excess of liquor potassæ at the time of making the experiment does not appear to be a satisfactory mode of getting over this difficulty, and, for clinical purposes, or for private practice, it is a desideratum to have a test-solution, which, while sufficiently delicate, will be convenient to use, and above all be permanent.

From time to time I have occasionally tried Böttcher's test (1857) (*Jahrb. für Pharm.*, Bd. xxii, 29; *Jahr. für Chemie*, Bd. lxx, 432; *Journ. de Pharm. et de Chim.*, 1857, Bd. xxxii, pp. 159, 371), i.e., subnitrate of bismuth and sodic carbonate, and in 1876 I made some experiments with a solution of potassio-bismuth iodide, recommended by E. Brücke (*Fresenius' Zeitschr. für Anal. Chem.*, 1876, p. 100). This reagent may be prepared by dissolving freshly precipitated subnitrate of bismuth in a hot concentrated solution of iodide of potassium, to which a little hydrochloric acid has been added. The solution thus obtained is a deep red liquid, and has been proposed as a precipitant for the alkaloids. The method of performing the test is as follows—Acidulate the urine, or other fluid, with a little hydrochloric acid; then add an excess of the reagent, which precipitates any albuminous substance or sulphide present in the urine; filter; to the filtrate add an excess of liquor potassæ, which throws down a white precipitate of the hydrate of bismuth, and boil. If the slightest trace of sugar be present, a black precipitate will be formed.

The only precautions to be taken in performing this test are to be sure that the liquid is boiled sufficiently, since, in the presence of a small amount of sugar, the reduction takes place with some difficulty; and secondly, to avoid the presence of too large an amount of the white hydrate of bismuth before boiling, since it might obscure the detection of a small amount of the black precipitate. Brücke considers that, applied as above, the bismuth test is fully as delicate and certain as the copper test for detecting the presence of small amounts of grape-sugar in the urine. The bismuth solution is not reduced by uric acid or creatinin. A practical inconvenience connected with the use of this test is the necessity of employing two reagents (hydrochloric acid and liquor potassæ) in addition to the bismuth solution; and hence it does not fully meet the needs of the busy practitioner who wants a single reliable test-solution that can be confidently appealed to at a moment's notice.

In 1877 a modification of the bismuth solution, which had been proposed by J. Loewe in 1871,* was brought under my notice by Dr. Emerson Reynolds, to whom I am indebted for the opportunity of carrying out many of the experiments in the laboratory of Trinity College. Loewe's formula is as follows:—Subnitrate of bismuth, 15 grammes, dissolve in glycerin (care should be taken that the glycerin is pure, and free from sugar, dextrin, or other body of reducing power) 30 grammes, and solution of sodium hydrate (specific gravity 1.34) 60—70 c.c., dilute with water, 150—16 c.c. Heat to 100° Cent. (212° Fahr.)

Should any reduction occur upon adding the subnitrate of bismuth to the liquid, digest at 100° Cent.; let stand and decant.

The test solution is best employed by adding a little of it to the urine, and then boiling. Should the solution be boiled first, it becomes liable to be reduced by substances other than sugar; e.g., urine rich in indigenous bodies.

If sugar be present the liquid first turns brownish, then the white precipitate of hydrate of bismuth becomes grey, and rapidly deepens in tint, until the reduction precipitate is perfectly black. The object of my paper is to invite attention to this test; and, from the experiments which have been made with it as occasion offered, I have come to the conclusion that the test is a good one, convenient to use, and adapted to the requirements of every-day practice.

One of the fallacies to which the bismuth test is liable, is the possible formation of a black precipitate of sulphide of bismuth in presence of sulphuretted organic compounds, such as mucus and albumen. But the following observations show that this does not necessarily happen. Some urine, albuminous to two-thirds, was tested with both the copper and the bismuth solutions. When boiled with the copper solution it assumed a deep brown colour, and with the bismuth solution a light brown, without yielding a trace of precipitate. Another specimen of albuminous urine, containing a little blood, turned light yellow with the bismuth solution (owing to the caustic soda in it), and when boiled for some time developed some iridescence on the interior of the test tube, but not a trace of black or even grey precipitate. When boiled for some moments with a solution of egg-albumen, the bismuth solution affords a greyish precipitate, while a sample of alkaline muco-purulent urine suffered no change upon boiling with the bismuth solution. Neither did a specimen of carboluric urine which exhibited in a marked degree the smoky brown colour from carboluric acid absorption.

With the view of testing the reliability of the bismuth reagent, I have experimented on a number of specimens of normal and pathological urines, and as yet the only case in which I have met with a result at all doubtful was one of enteric fever. The urine, which was loaded with lithates, was cleared by a gentle heat, and then boiled with the bismuth solution. After a few moments of ebullition, the precipitate assumed a decided steel grey tint. Unfortunately, the urine was not tested after removal of the lithates. No evidence of sugar was obtained with the copper test.

In regard to delicacy of action, the results of some qualitative comparisons between the copper and the bismuth tests lead me to believe that the bismuth test will not suffer by the comparison. Take for example the following.

(a) Ten c.c. of diabetic urine, rich in glucose, kindly sent to me by Dr. Finny, was diluted with water up to 100 c.c. The liquid gave copious precipitates with both the bismuth and the copper tests.

(b) Ten c.c. of this diluted urine, further diluted up to 100 c.c., still furnished abundant evidence of sugar with either test.

(c) Again diluted to c.c. of urine (b) up to 100 c.c. Upon testing it the next day with the bismuth solution a grey precipitate was obtained, and a slight lustrous film on the interior of the tube; with the copper solution, a trace of red precipitate on the sides of the tube. The bismuth solution is not adapted for quantitative estimation of sugar.

To sum up, it may be safely said that, whenever the bismuth solution gives with a liquid a black precipitate, after boiling for a few seconds, the presence of sugar is certainly indicated, care having been taken to exclude sulphide of bismuth. But no positive conclusion as to the presence of sugar should be drawn from the production of a grey or light-coloured precipitate, or of a scanty mirror-like deposit on the test-tube. In other words, while the bismuth test will not fail to detect the smallest quantities of sugar of any consequence for diagnostic purposes, the fact, that the solution requires to be maintained at the boiling temperature

for some little time before complete reduction takes place, suggests caution in allowing for the reducing influence of organic compounds other than sugar. In all cases of doubt it would be advisable, before adding the bismuth solution, to filter the urine (in order to get rid of mucus, lithates, etc.), and to remove albumen.

The special advantage of Loewe's solution over the copper test is its greater stability. The solution with which all the experiments were made was prepared in October 1877, was kept in a white glass bottle, and freely exposed to diffused daylight, and in July 1879, was clear and bright, ready for use, and did not appear to have undergone any material change.

AN IMPROVED METHOD OF AMPUTATING THE PENIS.

By S. J. MCGANN, L.R.C.P.ED.,
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IN cases in which it is necessary to amputate near the scrotum, Professor Humphry, in vol. v of Holmes's *System of Surgery*, describes his operation as follows. "I have, after making a straight cut through the penis in the ordinary manner, carried an incision through the raphe of the scrotum into the perinæum, exposing the corpus spongiosum. I then dissected that body from the corpus cavernosum as far as the crura penis, turned it down into the perinæum, and left it hanging out there half an inch beyond the level of the skin. The cut edges of the scrotum were united by a few points of suture in front of the urethral orifice. The patient recovered quickly, and experienced no difficulty in passing water through the perineal aperture."

Some time since, I had occasion to remove a cancerous penis, in which the disease extended up to the pubis, and followed the above directions in the performance of the operation. The results were quite satisfactory as far as the operation itself was concerned, and the patient left the hospital with the parts perfectly cicatrised, and with no difficulty in passing water through the opening in the perinæum. It appeared to me, however, that complete division of the scrotum was an unnecessarily severe procedure; and a great drawback was the length of time it took for the divided parts to unite, as, from the mobility of the testicles and contractility of the scrotal structures, sutures rapidly cut through, and strappings were less effective than elsewhere in keeping the parts in apposition, and permitting of union by granulation.

It occurred to me that if, instead of completely dividing the scrotum at the raphe, a bridge of skin were left (and the larger the bridge the better), it would obviate in a great measure this difficulty; and that this was not only practicable, but easier of performance than the other, I demonstrated to myself on the dead subject, and I carried it out as described in the following case.

Buswa, Hindu, aged 51, was admitted to hospital on November 13th, 1880, with cancer of the penis of, he stated, two years' standing. The man's general health appeared fairly good. The general outline of the organ was lost, and it was represented by a sessile pear-shaped fungating mass; and the inguinal glands on each side, especially those on the right, were enlarged and prominent. The man complained of great pain, which was much increased on passing urine, and begged for the removal of the mass.

On the 14th, he was placed on the table in the lithotomy position, and, chloroform having been given, an assistant, holding the scrotum in both hands, drew it forwards, keeping the raphe of the scrotum and perinæum in the same line. An incision of about two and a half or three inches in length was made in the median line, with its centre over the bulb; the corpus spongiosum having been completely exposed, the scrotum was allowed to drop and was drawn slightly backwards, and the penis was removed by a single sweep of the knife close under the pubis. An indurated portion of the scrotum at the right side was also removed. The scrotum having been again drawn forwards as before, the cut surface of the corpus cavernosum presented itself through the posterior incision; the bleeding vessels were then tied with fine silk, and the corpus spongiosum dissected from the corpus cavernosum, and turned down into the perinæum. All bleeding having ceased, the margins of the front incision were brought together by means of sutures and strapping, and the incision behind was also treated in like manner, and, finally, the corpus spongiosum was slit with a scissors to the extent of half an inch on its lower or posterior aspect, and the margins secured to the perineal skin on either side by two points of suture. This latter is better practice than leaving it simply protruding and undivided, as, in the latter case, when it retracts, as it always does, the introduction of a catheter into the bladder, should such be necessary, is more difficult. The subpubic wound gave abundant room for the examination of the inguinal glands, but, having found it impracticable to com-

* Fresenius' *Zeitschr. für Analyt. Chem.*, Band x, 1871, p. 452. Löwe merely suggests the solution, as a qualitative test, in a short communication, and he gives no details of its applications. He had previously proposed a solution of sodio-cupric glyceride in lieu of a copper solution for the testing and estimation of sugar; but of this I have no experience (*Zeitschr. für Anal. Chem.*, Band ix, 1870, pp. 20, 224; *Jahresh. für Chem.*, 1870, p. 1036).