FIG. 6.—Inversion procedure.

FIG. 7.—Constriction when too much wall is removed.

FIG. 8.—Insufficient removal of wall.

which is congenitally weak. If too much of the wall is removed a constriction occurs (Fig. 7), and if not enough, as illustrated in Fig. 8, a recurrence of the same pathological condition can be expected, since only a weakened wall of gut remains. In my operative procedure (Figs. 2 to 5) the important step is the excision of the congenitally weak portion of the ileum, followed by its repair and closure. This is accomplished so that

the wall of the ileum does not in any way interfere with the lumen. As shown in Fig. 3, a diamond-shaped incision is made after removal of the diverticulum and congenitally weakened area. The closure is made by suturing A to A₁, B to B₁, and C to C₁. By the employment of this method there can be no stenosis, nor any tendency by the weakened wall to form another diverticulum.

BENEDICT'S QUALITATIVE TEST

A FURTHER MODIFICATION SUITABLE FOR ESTIMATION OF URINE GLUCOSE IN WARD OR SIDE ROOM

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A modification of Benedict's test has been described¹ whereby a quantitative result could be obtained, with sufficient accuracy for clinical purposes, by filtering the boiled mixture of urine and Benedict's solution and comparing the filtrate with a set of graduated blue standard tubes. This modification has the disadvantage that, under the conditions described, the Benedict's solution is completely decolorized by 2 per cent. glucose. Hence, if the filtrate is devoid of a blue colour the estimation must be repeated with diluted urine. If the test is repeated with urine diluted twofold and the filtrate is again colourless more than 4 per cent. glucose is present, and a third estimation, with urine diluted fourfold, is required for a more exact result. With this last dilution up to 8 per cent. glucose can be estimated.

Nicholson² has employed the same principle of estimating glucose by the unreduced copper of the Benedict solution rather than by the precipitate; he did not filter, however, but allowed the heated mixture to stand several hours. He also increased the range of glucose detectable up to 4 per cent. by employing 0.25 c.cm. urine + 5 c.cm. Benedict's reagent in the test. This device reduces the sensitiveness of the test to half, and in any case does not obviate the necessity of repeating it with diluted urine when more than 4 per cent. glucose is present. To avoid a succession of tests the following two alternative procedures are proposed.

Method I

To two test tubes each containing 5 c.cm. of Benedict's qualitative solution add 0.5 c.cm. and 0.1 c.cm. of urine respectively; a blood pipette should be used for delivering 0.1 c.cm. The tubes are placed in a beaker of boiling water, and after heating for five minutes the first tube is filtered, using Whatman's filter paper No. 50 (which is even better than No. 44 first proposed). If the filtrate is bluish it is compared with the standards and the second tube is disregarded. If the filtrate is water-clear or yellowish the

second tube is also filtered. The second filtrate is compared with the standards, and the result obtained multiplied by five gives the approximate percentage of glucose. A more accurate result is obtained by referring to the following table, which compensates for the error arising from using 0.1 c.cm. urine only in the second tube.

No. of Standard Tube	...	...	...	1	2	3	4	5	6
Corresponding percentage of glucose	Using 0.5 c.cm. urine			0	0.4	0.8	1.2	1.6	2.0
	Using 0.1 c.cm. urine			0.14	2.6	4.4	6.3	8.1	10.0

Method II

This procedure is identical with the modification originally described, 0.5 c.cm. of urine being heated with 5 c.cm. of Benedict's solution for five minutes in the water-bath and the mixture filtered. Urines containing under 2 per cent. glucose yield bluish filtrates, which can be compared with the standards already described. Urines containing 2 per cent. glucose yield a water-clear filtrate, owing to complete, but just complete, precipitation of the copper. Urines containing over 2 per cent. glucose yield filtrates which are yellowish up to about 5 per cent. and gradually become brownish at higher values. The colour is due to caramelization of the glucose in excess of 2 per cent., a smell of burnt sugar becoming more and more noticeable when more than 2 per cent. is present.

The caramelized filtrate is then compared with a series of standards representing 3, 4, 5, 6, 8, and 10 per cent. glucose. These standards can be prepared by heating a series of mixtures each containing 5 c.cm. Benedict's reagent and 0.5 c.cm. of a standard glucose solution (from 3 to 10 per cent.) in a boiling-water bath for five minutes and filtering as in the test. The filtrates are sealed or stoppered in tubes and appear to keep well, though on this point observations do not go beyond a few months.

It is important that tubes should be removed from the water-bath at *exactly* five minutes, since caramelization progresses with further heating. Thus 5 per cent. glucose heated with Benedict's reagent for six minutes gave a result of 6 per cent.; when heated ten minutes it was 8 per cent., and with fifteen minutes' heating it was 9.5 per cent. When less than 2 per cent. glucose is present, however, the same result is obtained whether heating is for five or for fifteen minutes.

Preparation of Benedict's Solution

More careful tests showed that 2 per cent. glucose did not quite decolorize ordinary Benedict's solution, 7 per cent. of the copper remaining unreduced and imparting a slight bluish colour to the filtrate. Hence a slightly increased accuracy is to be obtained by using the following copper mixture, which is equivalent to 93 per cent. of Benedict's qualitative solution.

CuSO ₄ .5H ₂ O ...	...	16.1 grams	} contained in 1 litre.
Sodium citrate ...	...	161.0 "	
Anhydrous sodium carbonate	93.0 "	"	

This weaker solution should be used both for the tests and for the blue standards.

I am indebted to Dr. G. A. Harrison for facilities to carry out the above investigation in his laboratory.

REFERENCES

¹ Fine: *British Medical Journal*, 1934, ii, 167.

² Nicholson: Personal communication, and textbook on *Laboratory Medicine*.

Clinical Memoranda**Unusual Misadventure with a Urethral
Whip Bougie**

Recently, while dilating a urethral stricture of many years' standing, I passed, as often before in the same patient, a black gum-elastic whip bougie, size 3-5 English scale.

As usual, the slender distal portion coiled up in the bladder to allow the thicker basal part to pass through the stricture. On proceeding to withdraw the instrument I experienced a slight sense of resistance. This increased till, finally, the instrument became fixed at the seat of the stricture, and extraction was only accomplished by a forcible pull. I then found that the end of the instrument had become knotted, and that the knot had caught

on the vesical face of the stricture and brought away some of the urethral mucosa. The accompanying drawing shows the appearance of the whip as it came out.

What had happened was that the portion coiling up in the bladder had become entangled in itself to form a simple "thumb-knot," which, during the extraction of the bougie, was drawn taut close to the tip of the instrument. This, to judge from my experience of whip bougies, must be a very unusual occurrence. I may add that on the next occasion (some two weeks later) on which I used a whip bougie on the patient there was no repetition of the misadventure.

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Agranulocytic Angina

As the number of reported cases of agranulocytic anaemia in this country is still small, and as it is not yet clear whether the disease is a rare one, or whether cases are missed because of the difficulty of recognition of the prodromal symptoms, it is well that every accredited case should be reported with as full notes as possible on the symptoms and treatment. The following one proved fatal, though pentose nucleotide had been given freely during the last five days of the illness.

CASE REPORT

A woman, aged 32, married, no children, had had pulmonary tuberculosis for the past four years, during which time artificial pneumothorax had been performed once a month. She reported ill to one of us (R. A. M.) with sore throat. Her temperature was 103° F., and the fauces, uvula, and

soft palate were swollen, red, and oedematous. The following day the condition suggested an acute follicular tonsillitis; the temperature was still high. Local and general treatment was instituted, but the patient showed little response. The temperature gradually became higher and the pulse more rapid, though the patient maintained that she did not feel ill. On the eighth day the breath became malodorous, and the left tonsil was covered with a membrane; the nose was completely obstructed. Diphtheria antitoxin was given without benefit, and a throat swab was negative for diphtheria. The condition of euphoria remained.

The patient was seen on the following day by W. S. T. N. in consultation. The temperature was then 105° F. and the pulse 118. The tonsils were necrotic, and covered by a thick, yellowish membrane, which was strictly limited to the tonsils; the nasal septum was covered with a membrane. On removal of the membrane there was free bleeding. Both sides of the neck looked full, due to slight enlargement of the cervical glands. Swabs were taken from the nose and throat. There was no evidence of diphtheria, but streptococci and staphylococci were present in abundance. The blood examination by one of us (S. M.) showed a complete absence of polymorphonuclear cells, which confirmed the diagnosis of agranulocytic anaemia. Details of this and subsequent examinations are as follows.

Chart of Blood Counts and Pentnucleotide

Day	Pent-nucleotide (c.cm.)	Haemoglobin per cent.	Red Cells in Millions per c.mm.	White Cells per c.mm.	Differential Count		
					Granulo-cytes	Lympho-cytes	Mono-cytes
1	20	65	4.0	2,400	0	84	16
2	30						
3	30	65	3.6	4,200	0	87	13
4	30						
5	30	55	3.6	2,400	4	82	14

As soon as the diagnosis was confirmed 10 c.cm. of pentose nucleotide in normal saline was given intravenously and the same amount intramuscularly. Subsequently three intramuscular injections, each 10 c.cm. of pentose nucleotide, were given daily without effect. The patient succumbed on the sixth day from the commencement of the pentose nucleotide injections without having shown the least response to treatment.

The case illustrates the difficulty of early diagnosis owing to the resemblance to a streptococcal infection in the early stage and later to a diphtheritic or Vincent's infection. It also conforms to the more grave type of the disease in showing no response to pentose nucleotide. The question of blood transfusion was discussed, and the possibility of x-ray radiation of the long bones, but neither of these subsidiary methods of treatment was tried as the patient gave no evidence of improvement.

The early recognition of the disease is of the greatest importance because of the urgent necessity for appropriate and energetic treatment at the earliest moment. In pentose nucleotide we have perhaps the most hopeful remedy for this deadly condition, but recourse to blood transfusions and x-ray irradiation of the long bones may be necessary. The characteristic features of agranulocytic anaemia are necrotic ulcers of mucous membranes, usually in the mouth, associated with marked and characteristic changes in the white cells of the blood. The salient clinical features in order of their occurrence are: discomfort or malaise, rigors, fever, sore throat, ulceration, prostration often associated with dysphagia, and lymphadenitis. Associated with this syndrome there is often the feeling of well-being of the patient in complete contradiction to the clinical condition.

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