

URINE ANALYSIS.

ROUTINE WARD ROOM CHEMICAL TESTS.

By JOHN HATCHER.

Few Ward Test Rooms can boast the possession of a microscope and in general the testing of urine specimens must be limited to the routine chemical tests, such as for example those for albumin, sugar, bile, blood and so forth.

Physical Properties.

This includes not only such points as the colour, odour, volume and absence or presence of a deposit, but the specific gravity and reaction. The specific gravity is determined by means of a urinometer and it is important to see that the instrument floats freely in the specimen and is not held to the sides of the vessel by capillary attraction; accurate results can only be obtained if the reading is made at eye level. The reaction of the specimen is determined by means of litmus test papers; both red and blue papers should always be used, otherwise amphoteric or neutral reactions may be missed.

Albumin.

There are numerous tests for determining the presence of albumin in urine, but generally ward tests are made either by means of the boiling tests or by the salicyl-sulphonic-acid method. Both of these are qualitative methods; quantitative tests are almost invariably made by means of Esbach's method. The boiling test is very simple and properly carried out extremely accurate. There are however a number of pitfalls associated with this technique. Firstly, the urine must be acid; if the specimen is alkaline it must be acidified with 33 per cent. acetic acid. It is an excellent plan to afterwards retest with litmus to be sure that sufficient acid has been added. An excess of acid is undesirable. The actual test is carried out by three parts filling a test tube with urine and boiling the top part only in a flame, the unheated part being used as a control. If a white turbidity appears in the boiled part a drop of acetic acid is added and if on reboiling the turbidity persists the finding may be taken to indicate the presence of albumin. The test should be carried out in a good light, otherwise faint traces may be missed. In these days of blacked-out windows and reduced lighting this point of a good light is apt to be overlooked.

Salicyl-Sulphonic-Acid Method.

Approximately an inch of urine is placed in a test tube and half-a-dozen drops of 25 per cent. salicyl-sulphonic-acid added. A white precipitate indicates the presence of albumin. Doubtful traces may be compared with a test tube of untreated urine. It is important that the urine should be clear; if necessary it must be filtered.

Sugar.

The two principal tests for sugar are those of Benedict and Fehling, both of these methods are very similar and well known.

Benedict's method is a one-solution process and the test is carried out by placing about 5 c.c. (an inch) in a test tube and adding eight drops of urine. The mixture should then be boiled for two minutes and the presence of sugar is shown by the blue reagent changing to a green, brown or red, according to the amount of sugar present. It should be remembered that other substances besides glucose may reduce the copper and so bring about the colour changes.

Fehling's test requires two solutions, though in some hospitals it is the practice to supply them ready mixed. In this form they will, however, only keep a limited time. Two test tubes are used. In one is placed an inch of urine and in the other the same amount of Fehling; the two tubes

are then boiled and while boiling add the urine to the Fehling, allow to stand and sugar is shown in the same way as in Benedict's Test.

Acetone.

Rothra's test will detect both acetone and aceto-acetic-acid and is therefore by far the most useful method. It is carried out by half filling a test tube with urine, then adding about half an inch of the mixed crystals of ammonium sulphate and sodium nitroprusside. The later reagent should be in the proportion of one part to a hundred of the sulphate. About 3 c.c. of strong ammonia is then added and the test tube well shaken and put aside to stand for a few minutes. A positive reaction is shown by the appearance of a purple colour.

Blood.

The guaiacum reaction is usually employed and is carried out by boiling about 5 c.c. of urine in a test tube. This is then cooled and two drops of tincture of guaiacum added. The tube is shaken and a layer of ozonic ether added. Positive reactions are shown by the appearance of a blue ring.

Bile.

Both bile pigments and salts should always be tested for as one may well be absent in the presence of the other. Hay's test for bile salts is very simple and consists of sprinkling fine particles of flowers of sulphur on the surface of the urine. If bile salts are present the tiny particles fall to the bottom of the specimen. This test must of course be carried out in a good light. Gmelin's test for bile pigments is made by placing about 3 c.c. of strong nitric acid in a test tube and then carefully running down the side of the tube an equal amount volume of urine. The addition of the urine must be carried out very carefully so that the two fluids do not mix. The appearance of a green or blue ring indicates the presence of bile pigments.

TEACHING RAID VICTIMS HOW TO BE BLIND.

Some of the civilians who have lost their sight in air raids are to pass the early days of their blindness at Long Meadow, Goring-on-Thames, where experts of the National Institute for the Blind will teach them how to lessen the harshness of their disability.

As friend and adviser, these people will have with them Sir Beachcroft Towse, V.C., the blind owner of Long Meadow, who has put his lovely home at the disposal of the National Institute for training the newly blind. His generous offer followed a negative response to the Institute's recent appeal for the loan of country houses to serve as centres under its training scheme, the cost of which will be met partly by a gift of £10,000 from Lord Nuffield.

The presence of Sir Beachcroft at Long Meadow is regarded as an invaluable asset. His brave confidence and bearing, which affected Queen Victoria so deeply 40 years ago when he received his Cross, should be an inspiration to his guests at the beginning of their own dark journey. Though 76 years of age he is still a keen sportsman. He plays golf on a miniature course at Long Meadow, has a well-kept boathouse, and is a good amateur carpenter.

Experience gained at Long Meadow will be useful to the Institute at any further centres that may be required, but the staff of each will comprise specially trained blind men and women. These "homes of recovery" are intended for adults.

Little children will be trained at the Institute's Sunshine Homes for Blind Babies, and boys and girls of school age at existing schools of local blind societies, all of whom are co-operating with the Institute in the care of civilian war casualties. Arrangements for boys and girls of secondary school type are being made by Worcester College for Blind Boys and Chorleywood College for girls with little or no sight.

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