of the cardiac cycle at which to expose roentgenograms in order that the unsharpness due to cardiac action may be minimized. Such study is in progress and involves the simultaneous recording of electrocardiogram and roentgenokymogram by a method similar to that used by us for the study of heart sounds.[4]

7705 P

Clinical Identification and Measurement of Urinary Sugars.

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In the routine urinalysis of the Prudential Laboratory all copper-reducing urines have for some years been measured by our modification[1] of Sumner's[2] di-nitro-salicylic acid method. Because of its speed, accuracy and independence of personal equations of technicians we use the Photo-Electric Scopometer,[3] but the method also works well with Junior Scopometer,[4] colorimeter or even permanent test tube standards.*

After Lasker and Enklewitz[5] drew attention to the fact that urines containing keto-pentose reduce Benedict's qualitative copper reagent at room temperature, we observed that ketose-containing urines also reduced our di-nitro-salicylic acid reagent at room temperature, perhaps more perceptibly than they do copper. When the reductions of di-nitro-salicylic acid by keto-pentose at room temperature were measured and the tests then boiled and the total reductions measured in our usual way, the results proved very consistent. We therefore began placing all di-nitro-salicylic acid tests in a water bath at 30° for 5 minutes and measuring whatever reduction might occur before going on in our usual way to boil the tests and measure the total reduction.

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[4] Hirsch and Schwarzchild, *Acta Radiologica*, 1934, **15**, 2, 84, 100.

[1] Rose, A. R., Schattner, F., and Exton, W. G., *Tr. Assn. Life Insurance Med. Directors of America*, 1929, **16**, 178.

[2] Sumner, J. B., *J. Biol. Chem.*, 1925, **63**, 393.

[3] Exton, Wm. G., *Am. J. Clin. Path.*, 1932, **2**, 411.

[4] Exton, Wm. G., *J. Am. Med. Assn.*, 1929, **92**, 708.

* Procurable from the Standard Reagents Co., 1709 Colonial St. (W. Oaklane), Philadelphia, Pa.

[5] Lasker, Margaret, and Enklewitz, Morris, *J. Biol. Chem.*, 1933, **101**, 289.

One result of this new step was the discovery of more pentose-containing urines than were hitherto seen. Another result was the finding of a constant proportionality between the ketose reduced at the lower temperature and the total ketose reduced by boiling: a relationship which seems to hold regardless of the concentration of ketose in the specimen.

This information, coupled with observations made in the course of previous experiments with other sugars and reagents, led us to inquire how urinary sugars other than ketose would behave under the same or similar conditions such as picric acid reductions, etc. The results of some of these studies are shown in Fig. 1, and similar results may, of course, be had with temperature constant and time variable.

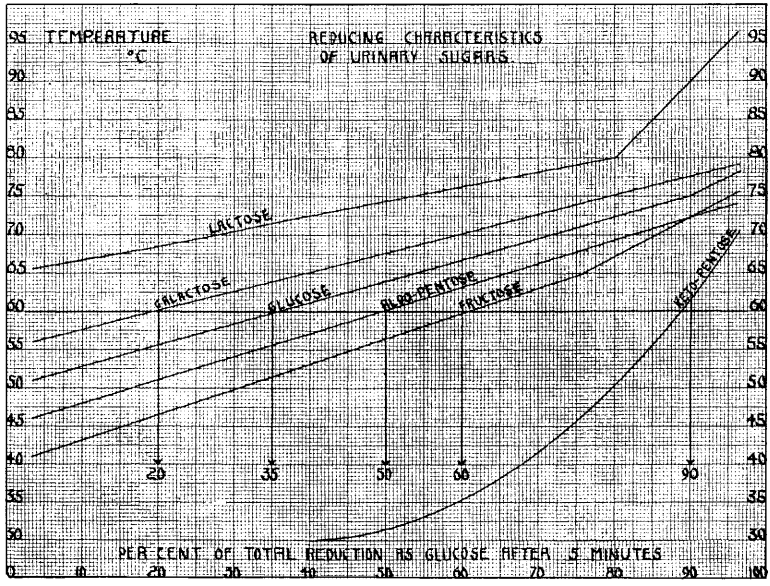

FIG. 1.

Working with a sensitive method that is accurate to 1%, and with temperatures thermostatically controlled within a degree, it is apparent from the data that the differences between the reductions of the various sugars at the higher and lower temperatures are great enough to enable the identification of any one of them. In fact, it is practicable to identify more than one sugar by additional observation and calculation.

In our routine urinalysis we therefore now measure the reductions

of all indicated specimens at a lower as well as at the higher temperature and carry out the procedure as follows:

We apply our di-nitro-salicylic acid method to all urines. This step eliminates the non-reducing urines which are reported sugar-negative and also provides the total reduction value of whatever reducing substances a specimen may happen to contain.

To all the reducing urines we then apply an improved (unpublished) phenyl-hydrazine test. This step eliminates all the non-sugar-reducing urines, which are also reported negative for sugar.

If phenyl-osazone crystals are present, another di-nitro-salicylic acid test is run at the lower temperature on a sample which has been adjusted so that concentrations of sugar are always 0.4%. This adjustment is readily accomplished by increasing the amount of or diluting the urine, as may be indicated by the known total reduction value of the sample. A simple calculation then gives the desired qualitative and quantitative information.

It will be observed that this simple addition to routine technics need be applied only to those specimens which are definitely known to contain some kind of sugar. It may also be noted that the actual manipulations of the new step take about 2 minutes, exclusive of time in the water bath, and that the complete procedure requires less than 2 cc. of urine.

7706

Absence of Dietary Anti-Anemia Substance in the Diet Causative of Canine Black Tongue.

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Goldberger[1] showed that autoclaved yeast possessed the power of preventing black tongue in dogs, and later that the liver fraction of Cohn and Minot,[2] which was therapeutically effective in pernicious anemia, was also prophylactic against black tongue. Autoclaved yeast was found by Strauss and Castle[3] to be capable of effecting remissions in pernicious anemia after it had been incubated with normal human gastric juice. The therapeutic similarity between

[1] Goldberger, J., and Sebrell, W. H., *Pub. Health Rep.*, 1930, **45**, 3064.

[2] Cohn, E. S., McMeekin, T. L., and Minot, G. R., *J. Biol. Chem.*, 1930, **87**, 49.

[3] Strauss, M. B., and Castle, W. B., *New England J. Med.*, 1932, **207**, 55.