

mones. With insulin no marked success has yet been attained. With pituitrin, on the contrary, the oxytoxic activity could be ascribed to a simultaneous action of several substances<sup>2</sup> which, taken separately, showed little action on the uterus. Finally, by the use of sodium picrate in a very concentrated solution, pepsin could be divided into inactive ferment (propepsin) and the kinase. Detailed reports will be published.

---

<sup>1</sup> Jansen and Donath, *Gen. Tijdschr. v. Ned-Indie*, 1926, lxxvi, 6.

<sup>2</sup> Reported at the Intern. Congress of Physiol., Stockholm, 1926. Comp. Report of Oliver Kamm at the meeting of Amer. Chem. Soc. in Detroit, 1927.

### 3734

#### Determination of Blood pH Without Transferring the Sample.

IRVINE MC QUARRIE.

*From the Department of Pediatrics, University of Rochester Medical School.*

The simple procedure described here has been devised to obviate the necessity of transferring the blood and of using mineral oil, both of which tend to complicate the technique for determining the pH colorimetrically. The only special apparatus\* required for this consists of a sampling tube identical in shape and size (10x1.5 cm.) with the tubes used to contain the standard solutions. It is provided with a double-holed, hollow, glass stopper, which is ground-in and which has sealed to it a small, two-way stop-cock with two holes. (Fig. 1.) The apparatus is made of clear Pyrex or Nonsol glass and connections are made with special rubber tubing, which will not cause excessive film formation on the mercury. Before use all apparatus, including the mercury, is cleaned and tested for neutrality in a manner similar to that outlined by Austin, Cullen, *et al.*<sup>1</sup>

The general method followed is essentially that of Cullen<sup>2</sup> as modified by Hastings and Sendroy.<sup>3</sup> Whole blood is used instead of plasma in accordance with the method of Hawkins.<sup>4</sup> The necessary correction factor for converting the colorimetric readings to the true pH value is found by the method proposed by Austin, Stadie and Robinson.<sup>5</sup>

When a determination is to be made, the apparatus is assembled as shown in the accompanying figure. Mercury is run from the

---

\* May be obtained from Technical Glass Apparatus Co., 42 Galusha Street, Rochester, New York.

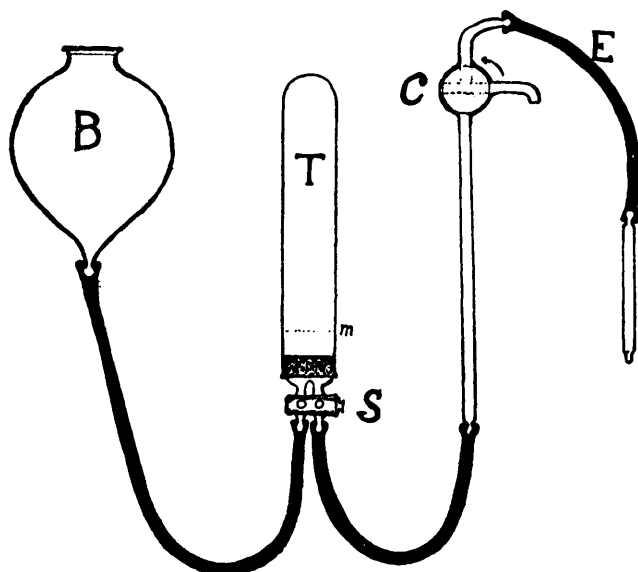


FIG. 1.  
Apparatus as Assembled for Taking Blood Sample.

bulb B into the sampling tube and connecting tubes until these are completely filled to the three-way inlet stop-cock C, thereby excluding all air. The sampling tube held by a clamp attached to the stop-cock S is then inverted. With the stop-cocks S and C open to make direct communication between T and E, the latter is immersed in a small flask of indicator-saline solution, which has been adjusted previously to a pH of approximately 7.40, and the air in E is displaced with mercury by elevating B. The latter is then lowered until the necessary amount of diluting fluid has been drawn into T. In order to make the required 20-fold dilution of the plasma, the amount of blood drawn into the sampling tube must be such that its plasma volume is  $1/20$  (or slightly less) of the capacity of the tube. In preparation for taking the blood, therefore, a volume of mercury equal to that of the sample to be taken must be left in the inverted sampling tube under the diluting fluid (level m).

With the sampling tube still in place, the color of its contents through an additional tube filled with distilled water is compared with the 7.40 bicolorimetric standard. If these do not match, the fluid is run back into the flask and 0.01 N NaOH or HCl, as indicated, is added until the match is satisfactory. The connecting tube is refilled with mercury as far as stop-cock C by elevating bulb B, after which C is closed.

With the diluting fluid thus properly adjusted, vena puncture is made under aseptic conditions. After all air and fluid have been forced out of E by the blood, the mercury bulb is lowered and C is opened long enough to allow the mercury in the sampling tube to be replaced by blood. The stop-cock S is then closed and T is inverted to mix its contents. With the rubber connecting tubes detached, the sampling tube is centrifuged until its supernatant fluid is entirely clear. This is then placed with the standard tubes in a water bath at 38.5° C. for 10 minutes before it is matched with these in the comparator block.

---

<sup>1</sup> Austin, J. H., Cullen, G. E., Hastings, A. B., McLean, F. C., Peters, J. P., and Van Slyke, D. D., *J. Biol. Chem.*, 1922, liv, 121.

<sup>2</sup> Cullen, G. E., *J. Biol. Chem.*, 1922, lii, 501.

<sup>3</sup> Hastings, A. B., and Sendroy, J., Jr., *J. Biol. Chem.*, 1924, lxi, 695.

<sup>4</sup> Hawkins, J. A., *J. Biol. Chem.*, 1923, lvii, 493.

<sup>5</sup> Austin, J. H., Stadie, W. C., and Robinson, H. W., *J. Biol. Chem.*, 1925, lxvi, 505.

### 3735

#### Relation of Calcium and Phosphorus in Blood of Parathyroid-ectomized Dogs.

C. I. REED, ROBERT W. LACKEY AND J. I. PAYTE.

*From the Department of Physiology, Baylor University Medical School, Dallas, Texas.*

Changes in the blood calcium and phosphorus in dogs were investigated, both before and after complete thyro-parathyroidectomy. While it was found that tetany occurred at varying levels of calcium concentration, there was always a definite mathematical relation between the concentrations of the two elements when symptoms first appeared. In normal animals the Ca:P ratio ranged between 1.5 and 2.0. After operation there was progressive reduction in this ratio until the first attack of tetany, when it was always approximately 1.0. Occasionally, there was an increase after spontaneous recovery from an attack, but usually there was a progressive decrease with each successive attack until death occurred. Treatment by any of the established methods restored the ratio, but symptoms always disappeared long before there was any extensive readjustment of the ratio. The following table illustrates the relationship: