the blood within 40 to 50 seconds after collection. In a series of determinations made upon dogs, we have obtained consistent and readily reproducible results.

A small glass vessel, illustrated in the figure, was made, having two side arms. This vessel may be attached to the standard Beckman glass electrode by winding firmly with thin rubber dam and fastening with rubber cement. After a little practice an air-tight connection can readily be made. If the Beckman electrode with the ground glass collar is available, the

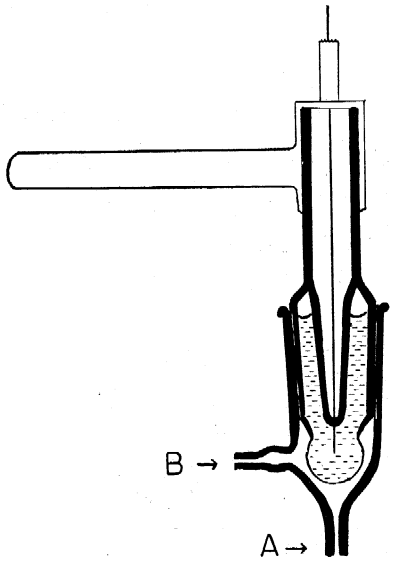

FIG. 1

vessel may be ground to fit this collar. The ground glass connection permits of more rapid adjustment and is more convenient for washing, but we have found the rubber connection to be perfectly satisfactory. The side arm, A, is attached by the shortest possible length of rubber tubing to a syringe adapter. If desired, this side arm may be made of a syringe tip, sealed into the cup, thus making a direct connection for the needle.[1] A ten-inch length of 3 mm rubber tubing attached to a mouthpiece is fastened to side arm, B, to be used in filling the vessel. The total capacity of such a chamber is 0.3–0.4 cc.

The procedure for performing a blood pH determination is as follows: Saturated KCl solution is warmed to 40° C. and placed in a small wide-mouthed vessel of about 50 cc capacity. This is supported so that the calomel half-cell dips into it and a thermometer is immersed in the solution, which serves as a bath and a salt bridge. Sufficient 1 per cent. neutral oxalate (pH 7.0) at 38° C. is drawn through A into the electrode vessel and a small clamp placed on the rubber tubing near the mouthpiece. A venipuncture is made with a hypodermic needle and when a constant flow of blood is obtained, the chamber is attached to the needle and the blood drawn into the vessel by opening the clamp and exerting suction on the mouthpiece. From 0.5–0.7 cc of blood is drawn into the vessel and tubing to insure complete replacement of the oxalate. It is essential that the chamber remain free from air bubbles. The electrode is disengaged from the needle, plunged immediately into the bath and the connection made rapidly. The temperature of the bath will usually have fallen to 38° C. and can be checked with the thermometer and adjusted, if necessary, by adding warmer or colder KCl solution. A steady E. M. F. is obtainable within 30 to 40 seconds after the electrode is attached to the pH meter.

As soon as the reading is obtained the electrode is removed and the vessel washed free of blood by drawing in warm distilled water. It is then rinsed and refilled with oxalate in preparation for the duplicate determination. During the interval necessary for the pH reading and the washing of the vessel a syringe may be attached to the needle and a blood sample taken for analysis. This total procedure can be done in from 2 to 4 minutes. When stasis is avoided, duplicate determinations check within the error of the instrument (± 0.01 pH). If this agreement is not obtained, a third determination should be done. Before each determination, we find it advisable to calibrate the electrode with standard buffers in the pH range of blood at 38° C., using the procedure as outlined for blood.

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[1] Both types of vessel were made for us by Mr. J. D. Graham, at the University of Pennsylvania.

BOOKS RECEIVED

BRODE, WALLACE R. *Chemical Spectroscopy.* Pp xi + 494. Illustrated. Wiley. $5.00; professional edition, $6.00.

CAMPBELL, NEIL. *Qualitative Organic Chemistry.* Pp. ix + 213. 13 figures. Van Nostrand. $2.60.

Contributions from the Biological Laboratory of the Science Society of China; Vol. X, Botanical Series, No. 3, April, 1938. Pp. 207–308. 7 figures. The Society, Nanking.

DA ROCHA-LIMA, HENRIQUE, JOSÉ REIS, KARL SILBERSCHMIDT. *Methoden der Virusforschung.* Pp. viii + 384. 54 figures. Urban and Schwarzenberg, Berlin.

MOY-THOMAS, J. A. *Palaeozoic Fishes.* Pp. ix + 149 + 8. 33 figures. Chemical Publishing Co. $2.00.

OPPENHEIMER, CARL and KURT G. STERN. *Biological Oxidation.* Pp. ix + 317. 16 figures. W. Junk, The Hague. 15 fl.

VICKERY, HUBERT B., GEORGE W. PUCHER, ALFRED J. WAKEMAN and CHARLES S. LEAVENWORTH. *Chemical Investigation of the Rhubarb Plant; Bulletin 424, May, 1939.* Pp. 157. 38 figures. Connecticut Agricultural Experiment Station, New Haven.

WILSON, A. H. *Semi-conductors and Metals.* Pp. viii + 120. 39 figures. Cambridge University Press, Macmillan. $2.00.