with it and mucin in 1 day, and 3 out of 3 mice in the saline group in 1, 2, and 3 days respectively. Also 2 out of 4 mice given 1:100 of the usual inoculum in saline died in 9 days. Blood cultures of the heart blood of the saline animals failed to reveal an infecting organism. A spreading type of growth covered the surface of plates receiving the inoculum from the mucin mice in this test, which was interpreted as a post mortem invasion or contamination.

Mucin alone or mucin and emulsified glycerinated normal dog cord has been inoculated into 16 mice, one of which died in 1 day. No paresis or paralysis developed in the other animals.

Seven attempts to establish serial infections in mice have been made. Three of these efforts resulted essentially in failure. However from the cords of mice dying in the 4th generation of series I, suggestive histological evidence for an inflammation of the spinal cord has been uncovered by Dr. Weil in a study of material from this work. A filtrate of the ground organs of these mice when injected intraperitoneally with mucin into 2 mice produced weakness in 6 days and death in 18 days in one mouse and weakness at 17 days but no death in the other.

Conclusion. Although the work presented does not prove conclusively that mice can be infected with poliomyelitis virus, the evidence, when considered together with the histological study of the material by Dr. Weil, appears to warrant further consideration of the mouse as an experimental animal for the study of this disease.

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A New Type of Centrifuge Tube for Preparation of Blood Serum for Accurate pH Work.

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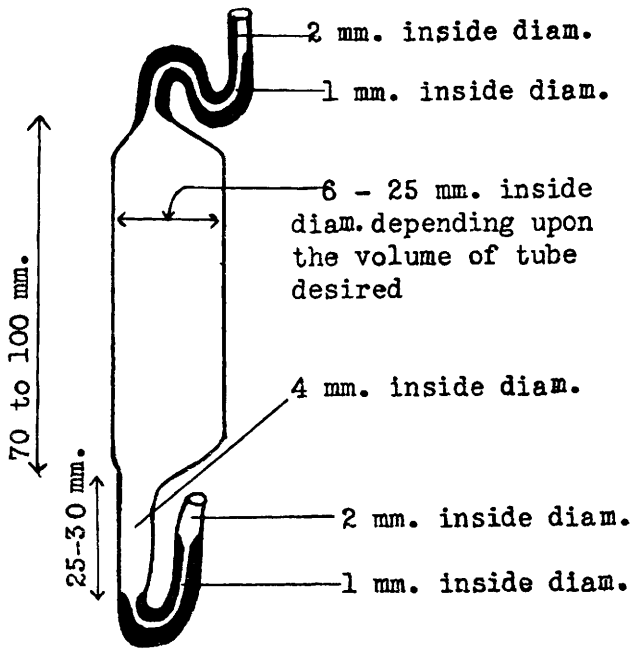
The conventional methods for the preparation of blood serum for pH determination involve the following steps:[1] the blood is drawn into centrifuge tubes under oil; the oil is displaced with wax or with a rubber stopper; after centrifuging, the wax or rubber stopper is again replaced with oil and the serum lying between the oil and the cells is withdrawn with a pipette which also contains some oil. Aside from being time-consuming this procedure has a

[1] Austin, Cullen, Hastings, McLean, Peters, and Van Slyke, *J. Biol. Chem.*, 1922, **54**, 121.

primary difficulty in that the contact of the serum with the oil brings about changes in the CO_2 tension and thus in the pH of the serum. This difficulty has been overcome in part by using oil having the same CO_2 tension as the blood. Often, however, the CO_2 tension of the blood is not known beforehand and this remedy is at best time-consuming and approximate.

A centrifuge tube is here described which enables one to prepare serum from blood without contact with anything except glass and



mercury. The accompanying sketch shows a tube with an S shaped capillary at the top and a U shaped capillary at the bottom. For filling the centrifuge tube with blood a T-tube with stopcock below the side-arm is attached to the upper capillary and the hypodermic needle is attached to the upper end of the T-tube, both through rubber connections. A rubber tube leading to a mercury leveling bulb is attached to the lower capillary through which the centrifuge tube is filled with mercury. Care must be taken to sweep all bubbles of air out of the S capillary. The mercury level is put a few millimeters above the side-arm of the T-tube and the stopcock below the side-arm is closed. The needle is now inserted into the blood vessel and about one cc. of blood is caused to flow through the side-arm of the T-tube above the stopcock, sweeping any air out ahead of it. The side-arm of the T-tube is then closed and with the mercury leveling bulb in a lower position, the stopcock is opened

and the blood thus caused to flow into the centrifuge tube. The rate of flow of the blood may be controlled by the height of the mercury leveling bulb and also by means of the stopcock.

Blood is drawn in until the mercury blood meniscus is in the lower part of the 4 mm. tube, that is, about 2 cm. above the bottom of the tube. Mercury is then run in through another side-arm in the T-tube at the top until the S capillary is filled with mercury. Any excess mercury admitted here escapes below without displacing any significant amount of blood. The stopcock is then closed, the leveling bulb tubing removed below, and then the rubber tubing removed above. The tubing above must not be removed before the leveling bulb below is removed or the pressure or suction of the mercury in the leveling bulb will remove blood from the tube.

The tube is in remarkably stable gravitational equilibrium, although it has only mercury seals above and below. The mercury in the open capillary arm of the U bend is about 1 cm. higher than the mercury in the other 4 mm. arm and this effectively balances the weight of the 10 cm. column of blood. The tubes may be centrifuged at high speed and the serum separates rapidly and effectively.

For transferring the serum, the centrifuge tube is clamped to a stand and a suitable delivery tube is attached above. A mercury leveling bulb with stopcock or clamp in the rubber tubing is attached to the U tube below and the serum is expelled above by mercury from below. By controlling the rate of inflow of the mercury by means of the stopcock in the leveling bulb line, the serum may be expelled very slowly and thus any stirring up of the cells is entirely avoided and a more quantitative transfer of serum can be made than is possible in any other kind of tube. Although the blood clots, the 4 mm. inside diameter is wide enough to allow the mercury to flow in freely while the serum is transferred.

The washing of these tubes is sometimes difficult since the clot cannot be removed directly through the capillary openings. If a vigorous stream of hot water is sucked through the tube within an hour after centrifuging, the clot frequently disintegrates and can be removed at once. When the clot remains we have found it best to fill the tube with normal NaOH and to set it in a warm place for several hours, later washing with a stream of hot water. Two such washings with NaOH have never failed to remove the clot.

These tubes have been used in sizes of 3 cc., 15 cc., and 40 cc. With the 15 and 40 cc. sizes the results on the pH's of triplicates drawn simultaneously agree to within 0.005 pH.