The improvement in the animals following this change was striking. Even if this fluid was not given until within 2 to 3 hours before the time that death would have ordinarily occurred, the animals could be restored to a normal state within 4 to 5 hours after its administration. We have so far kept completely adrenalectomized animals in apparent health for 4 months on this mixture. No evidence of edema has appeared in these animals.

During severe insufficiency the animals were so weak that the salt mixture had to be given by pipette. Studies in progress suggest that other anions and cations should be included in the mixture, and possibly an increase in the amount of those ions already included. We have begun a comparative study using normal salt solution (.9% NaCl) as a treatment fluid. While our results are not as yet conclusive, it is our impression that these animals have not done as well as those on the salt mixture.

We do not feel certain that the action of adrenal hormone is primarily one of salt regulation, although this is quite probable. Further studies of the effect of starvation on the salt balance might elucidate this point. Such studies are now in progress. Our observations show that completely adrenalectomized animals may be kept in apparent normal health for long periods if sufficient salts are given.

7072 C

A New Form of Drop Recorder.

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Gibbs[1] classifies the drop recorders reported in the literature according to the essential mechanism as follows: (a) impulse, (b) weight, (c) expansion, (d) electrolytic, and (e) displacement. The simple and effective drop recorder here described depends upon a principle quite different from any described heretofore, and resulted because of our trial and abandonment of some of the most promising types, including that described by Gibbs.[2]

The essential part of our form of drop recorder consists of a short length of capillary tubing sealed to a bulb and T tube. A cur-

[1] Gibbs, O. S., *J. Lab. Clin. Med.*, 1927, **12**, 686.

[2] Gibbs, O. S., *Science*, 1931, **74**, 549.

rent of air from a pump or compressed air jet flows through the T tube and bulb and out of the capillary tube. The drops to be recorded as they fall from the drop inlet are blown through the capillary tube and momentarily hinder the passage of air sufficiently to create a slight increase of back-pressure that may be used to actuate a tambour or other recording device.

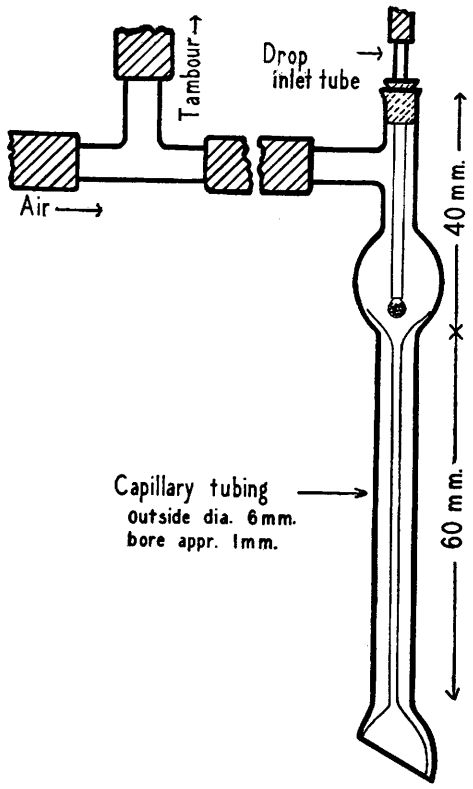

FIG. 1.
Drop recorder with approximate dimensions for convenient size.

The air pressure required is very slight, equivalent to a few centimeters of water, and requires no careful adjustment or maintenance of a constant pressure. The pressure required for the blowing out of the drops is so low that it is entirely compensated for by a few centimeters head of hydrostatic pressure in the drop inlet tube and ureteral or other cannula or catheter attached to the upper end of the drop inlet. If the size of the drops to be recorded is of importance, a change of the drop inlet tube, which may be a hypodermic needle of any gauge, a drawn-out glass tube, a suitable cannula, or a

small metal tube, may be made without trouble. Drops as small as 0.01 cc. or as large as 0.05 cc. have been used with entire success. The degree of viscosity (for example, 15% gum acacia solution) or the character of the fluid (electrolyte content) are also unessential for the satisfactory operation of this form of drop recorder, so long as discrete drops may be obtained.

In physiological or pharmacological experiments, the drop inlet tube is attached at its upper end by small rubber tubing directly to the cannula, the flow from which is to be recorded. The recorder should be kept in an approximately vertical position so that the drops fall directly into the capillary tube without spreading over the walls of the surmounting bulb. To obtain a sufficiently rapid response of the tambour, the rubber dam should be taut. Certain response and recording may be easily obtained with this apparatus with as many as 360 drops per minute, in other words, with drops that nearly merge into a stream.

(This drop recorder may be had from E. Machlett and Son, 220 East 23rd Street, New York City.)

7073 C

Influence of Mineral Oil on Assimilation of Vitamin A from Spinach.

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The inhibitory effect of mineral oil on the absorption and utilization of vitamin A has been discussed by several workers.[1, 2, 3] Rowntree[1] considers the phenomenon of little significance so long as abundance of vitamin is provided. Jackson[2] finds but slight effect upon vitamin absorption if the mineral oil is fed separately from the butter fat. In none of the investigations has special attention been given to the effect of mineral oil upon vitamin A from a vegetable source, nor to the quantity of vitamin actually diverted by the parallel use of mineral oil.

Would mineral oil effect the carotin of plant cells in the same manner that it did the true vitamin A from an animal source? This

[1] Rowntree, J. I., *J. Nut.*, 1931, **3**, 345.

[2] Jackson, R. W., *J. Nut.*, 1931, **4**, 171.

[3] Dutcher, R. A., Ely, J. O., and Honeywell, H. E., PROC. SOC. EXP. BIOL. AND MED., 1927, **24**, 953.