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<i>Digitalis and Some of Its Derivatives:</i> DR. HARRY GOLD	125
<i>Food and Nutrition as Related to the War:</i> DR. CHARLES GLEN KING	129
<i>Obituary:</i> <i>Max Harrison Demorest:</i> FRANÇOIS E. MATHES. <i>Recent Deaths</i>	131
<i>Scientific Events:</i> <i>The Inter-American Institute of Agricultural Sciences; du Pont Fellowships in Chemistry; The Detroit Meeting of the American Chemical Society; The Torrey Botanical Club; Wartime Training in Scientific and Technological Fields</i>	132
<i>Scientific Notes and News</i>	135
<i>Discussion:</i> <i>The Hardy-Weinberg Law:</i> PROFESSOR CURT STEEN. <i>The Shot-Put and the Earth's Rotation:</i> PROFESSOR PAUL KIRKPATRICK. <i>The Water Hyacinth in California:</i> PROFESSOR IRA L. WIGGINS. <i>Science, War and Football:</i> PROFESSOR S. C. BROOKS	137
<i>Special Correspondence:</i> <i>Reorganization of Conservation Work in Maryland:</i> PROFESSOR JULIAN D. CORNINGTON	140
<i>Scientific Books:</i> <i>Photography:</i> DR. HENRY C. STAEHLE. <i>Drugs and Cell Catalysts:</i> DR. M. H. SEEVERS	141
<i>Special Articles:</i> <i>The Lethal Effect of Triethylene Glycol Vapor on Air-Borne Bacteria and Influenza Virus:</i> DR. O. H. ROBERTSON and OTHERS. <i>Preventing the Bacterial Oxidation of Rubber:</i> DR. ALBERT E. DIMOND and DR. JAMES G. HORSFALL	142
<i>Scientific Apparatus and Laboratory Methods:</i> <i>A Simple Method for Converting a Line-Record into a Shadowgram:</i> DR. FREDERIC A. GIBBS. <i>A Method for the Study of Invertebrate Blood in Vitro:</i> DR. EMIL LIEBMANN	145
<i>Science News</i>	10

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DIGITALIS AND SOME OF ITS DERIVATIVES¹

By Dr. HARRY GOLD

DEPARTMENT OF PHARMACOLOGY, CORNELL UNIVERSITY MEDICAL COLLEGE

Ladies and Gentlemen: I WISH first to acknowledge the honor conferred upon me by the New England Heart Association through the invitation to address you this evening. The opportunity to discuss the subject of digitalis in the city of Boston, steeped in the traditions of cardiovascular research and rich in eminent leadership in cardiological practice, is indeed a great privilege. I feel doubly honored to have this opportunity on the occasion arranged as a tribute to the memory of one of New England's most distinguished physicians.

I have planned to present the results of experiments and to discuss briefly lines of evidence having to do with various phases of the nature of the action of

¹ Annual Jackson Lecture of the New England Heart Association, delivered at the Boston Medical Library, April 24, 1942.

digitalis and its glycosides. Some are based on experiments performed on animals, others directly on human subjects. The account is not intended to exhaust the subject. It represents for the most part explorations in this field carried out during the past few years by a group of collaborators in our laboratory and clinics.²

One of the popular formulations regarding the mechanism by which digitalis abolishes heart failure is based on the view that the essential action of digitalis is an action on the "tone" of the heart muscle. There is no general agreement as to the nature of the

² From the Department of Pharmacology of Cornell University Medical College and the Cardiac Services of the Beth Israel Hospital and the Hospital for Joint Diseases in New York City. Chief collaborators: Drs. McKeen Cattell, Nathaniel T. Kwit, Janet Travell, Harold Otto, Milton Kramer, Theodore Fox and William Zahm.

The speed of movement during exposure need not be absolutely constant, for changes in speed will merely produce longitudinal stripes. Some vertical banding will occur because of differences in the slope of the line. A little consideration will make it apparent that the line is widest, so far as the direction of movement is concerned, where the slope is steepest, the time of exposure is a function of the "width" of the line. Differences in slope are closely related to frequency and wave-form, however, and experience has shown that this type of banding is not ordinarily a serious source of error. It can be almost entirely eliminated if a high contrast print is made from the shadowgram.

The theory on which the procedure is based is exceedingly simple. When a point of light is moved on a photographic film, it forms a line. When a line is moved, it forms an area. When the image of a wavy line is moved at right angles to its long axis, it will widen, and, if moved far enough, it will become so wide that half the line can be disregarded and its characteristics will be correctly represented by its margin.

FREDERIC A. GIBBS

A METHOD FOR THE STUDY OF INVERTEBRATE BLOOD IN VITRO

THE blood elements of many invertebrates disintegrate very rapidly when exposed to air and their study in the hanging drop is extremely difficult. This is particularly the case with the various types of trephocytes, but the amebocytes of some species present similar obstacles.

The following method was found suitable for this kind of observation. A capillary about 3 to 4 cm long and not over 0.25 mm thick is drawn out from a glass tube of 3 to 4 mm external diameter. About 5 cm of the glass tube are left for handling and a

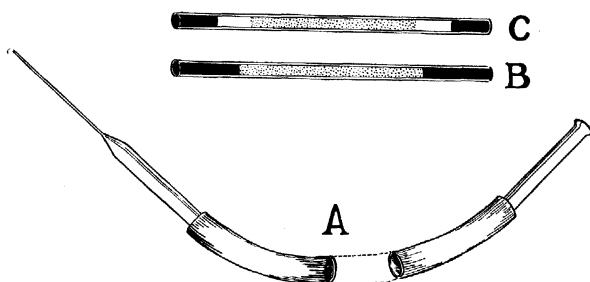


FIG. 1.

rubber tube attached to it (Fig. 1A) through which suction is applied when necessary.

When used, first the end of the capillary is dipped into pure mineral oil till a column of a few millimeters is drawn up by capillary attraction. The oil adhering to the outer surface of the capillary is wiped off and

the latter carefully inserted into the body cavity or blood vessel like a syringe needle. Capillarity will draw the body fluid up whilst pushing the paraffin column ahead; if this for some reason is insufficient, suction is applied through the rubber tube.

After a column of 1 to 2 cm of blood has been drawn up, the capillary is removed from the body and is instantly dipped again into mineral oil drawing up another 2 to 3 mm of it. Thus the capillary contains a column of body fluid enclosed between two columns of mineral oil (Fig. 1B).

Now the capillary is broken off just above the liquid, placed in a drop of mineral oil on a slide, and covered. For observation with immersion it is advisable to use mineral oil instead of cedar oil.

If necessary, the method can be applied without exclusion of air either by omitting the use of mineral oil or by drawing in small columns of air before and after drawing the blood. In the last case the blood column is separated on both ends by air from the mineral oil (Fig. 1C).

This method has some other advantages over that of the hanging drop. The corpuscles adhering all around the capillary wall are seen from above, below and in profile. By slightly moving the cover glass the capillary is made to turn, thus enabling observation of a single element from various angles. The method is also useful for the study of blood in very small forms, where its quantity is so minute as to make the preparation of a hanging drop rather difficult.

EMIL LIEBMANN,

Dazian Foundation Fellow

DIVISION OF MICROSCOPIC ANATOMY,
TULANE UNIVERSITY,
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BLANCHARD, FRANK NELSON. *The Ring-Neck Snakes, Genus Diadophis*. Illustrated. Pp. 144. Bulletin, Chicago Academy of Sciences.
BLY, MERWYN. *A Guide to Cathode Ray Patterns*. Illustrated. Pp. vii + 39. John Wiley & Sons.
CALDWELL, WILLIAM T. *Organic Chemistry*. Illustrated. Pp. x + 763. Houghton Mifflin Company. \$4.25.
CUSHING, BURTON L. *Fundamentals of Machines*. Illustrated. Pp. 436. Ginn and Company. \$1.24.
DORF, ERLING. *Upper Cretaceous Floras of the Rocky Mountain Region*. Pp. 168. Carnegie Institution of Washington Publication 508. Paper cover, \$2.50. Cloth binding, \$3.00.
FROST, S. W. *General Entomology*. Illustrated. Pp. x + 524. McGraw-Hill.
GILMAN, HENRY. *Organic Chemistry*. Two volumes. Illustrated. Pp. ix + 1983. John Wiley.
HASKILL, DANIEL C. *The United States Exploring Expedition, 1838-1842 and Its Publications 1844-1874*. Illustrated. Pp. xii + 188. New York Public Library.
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