

# SCIENCE

VOL. 100

FRIDAY, OCTOBER 20, 1944

No. 2599

<i>What Is Germ Plasm?</i> : PROFESSOR GEORGE T. HARGITT	343	<i>Relapsing Vivax Malaria</i> : DR. MICHAEL HEIDELBERGER and MANFRED M. MAYER. <i>Induction of Leukemia in Mice</i> : DR. ARTHUR KIRSCHBAUM and DR. HENRY S. KAPLAN. <i>The Neutralization in Vitro of Avian Pneumoencephalitis Virus by Newcastle Disease Immune Serum</i> : DR. J. R. BEACH. <i>The Isolation of the St. Louis Encephalitis Virus from Chicken Mites in Nature</i> : DR. MARGARET G. SMITH, RUSSELL J. BLATTNER and DR. FLORENCE M. HEYS	359
<i>Post-War Geology</i> : PROFESSOR BRADFORD WILLARD	348	<i>Scientific Apparatus and Laboratory Methods: An Easily Constructed Hepp Osmometer</i> : DR. WARREN S. REHM	364
<i>Obituary:</i>		<i>Science News</i>	10
<i>Recent Deaths</i>	350		
<i>Scientific Events:</i>			
<i>The Scottish Seaweed Research Association; The Alabama Academy of Science; Decorations of Russian Scientific Men by the Soviet Government</i>	351		
<i>Scientific Notes and News</i>	352		
<i>Discussion:</i>			
<i>The Utility of Major Foreign Languages in Phytopathology</i> : J. HARVEY McLAUGHLIN. <i>The Threat to Pure Science</i> : ALEXANDER W. STERN. <i>A Plea to Raman Spectroscopists</i> : DR. FORREST F. CLEVELAND. <i>Another Mastodon Found in Ohio</i> : DR. KARL VER STEEG	355		
<i>Scientific Books:</i>			
<i>Publications of the Mathematical Tables Project</i> : PROFESSOR R. C. ARCHIBALD. <i>Advances in Enzymology</i> : DR. A. E. MIRSKY	357		
<i>Special Articles:</i>			
<i>Normal Human Stromata as Antigens for Complement Fixation in the Sera of Patients with</i>			

SCIENCE: A Weekly Journal devoted to the Advancement of Science. Editorial communications should be sent to the editors of SCIENCE, Lancaster, Pa. Published every Friday by

## THE SCIENCE PRESS

Lancaster, Pennsylvania

Annual Subscription, \$6.00      Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary in the Smithsonian Institution Building, Washington 25, D. C.

## WHAT IS GERM PLASM?<sup>1</sup>

By Professor GEORGE T. HARGITT

DUKE UNIVERSITY

THE term germ plasm has become a common term. It is used by laymen as well as biologists with such diverse connotations that one can never be sure just what is meant. Weismann<sup>2</sup> developed a definite and specific meaning for germ plasm. As a result of his study of acquired characters and from his attempt to find an explanation of development and heredity which would be more satisfactory than the physiological units of Spencer or the gemmules of Darwin, he worked out an elaborate and logical hypothesis. Whether acceptable or not, his hypothesis merits high praise as an outstanding biological contribution which has stimulated observation, experiment and enormous discussion.

Weismann's germ plasm theory may be briefly out-

lined in the following points: Hereditary characters are produced by specific particles or substances called determinants, located in the chromosomes of the nucleus. Each independently variable character of an organism is due to a single kind of determinant, whether in a single cell or a group of similar cells. The germ cells alone contain all the determinants of a species needed at any and all periods of the life history of an organism, including complete or partial determinants of ancestors.

At the first cleavage of the egg two cells are produced, one of which is the primordial germ cell which takes no part in ontogeny, but remains unchanged to produce the germ cells of the individual at the appropriate time. This primordial germ cell is therefore a sample of the fertilized egg and its products will be exactly like it. The other cleavage cell is the starting point for the rest of the complex organism. During continued divisions the determinants are gradually

<sup>1</sup> Address of the vice-president and chairman of the Section on Zoology of the American Association for the Advancement of Science, Cleveland, September 13, 1944.

<sup>2</sup> A. Weismann, "The Germ Plasm." Translated. New York, 1893.

# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## AN EASILY CONSTRUCTED HEPP OSMOMETER

INTEREST in the use of gelatin as a blood substitute has emphasized the need for a rapid method for measuring colloidal osmotic pressures (C.O.P.). Hepp<sup>1</sup> has described a method in which the volume of fluid in the so-called outer chamber is exceedingly small, thereby insuring a relatively rapid attainment of equilibrium. The following is a description of a simplified form of this osmometer that is relatively easy to construct.

Fig. 1 represents a cross-section of the osmometer.

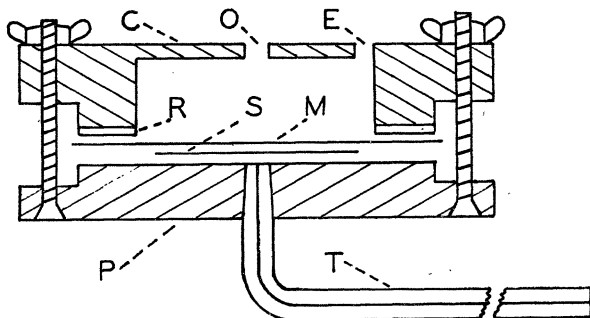


FIG. 1. A diagram of the osmometer showing relative positions of the membrane and silk cloth.

P is a circular platform made of lucite with an opening in the center into which a glass tube (T) can be inserted after warming the lucite in water. The end of tube (T) should be flush with the surface of the lucite. It is not necessary to taper that part of tube (T) that fits into platform (P). Leaks can be prevented by liberal application of DeKhotinsky cement to the base of this junction. The top part of the osmometer (C) is also made of lucite. The over-all diameter of the lucite pieces is 8 cm. The inside diameter of C is 4 cm and the width of the part of C in contact with the rubber gasket (R) is 1 cm. The diameter of the lumen of the glass tube (T) is 1 mm. A layer of ultrafiltrate or other appropriate fluid is placed on P, and a piece of silk cloth (S) and a membrane (M) previously soaked in the fluid are placed on top. Care must be taken to exclude air bubbles from under the membrane. The two pieces of lucite are fastened together by means of eight screws. The screws are threaded into P and act as guides in bringing C into contact with P. This procedure prevents the formation of wrinkles in the membrane. The rubber gasket (R) is necessary to prevent leaks between the lucite and the membrane. The experimental solution is placed in the chamber through opening (O). The fluid beneath the membrane is continuous with fluid in tube (T). The osmometer is placed on an appropriate platform in a constant tem-

perature box (variation of air temperature  $\pm 0.5^\circ \text{C.}$ ) with the tube (T) protruding to the outside through an opening in the box. Pressure (usually negative) is applied by means of a manometer (with large reservoirs to prevent uncontrolled changes in pressure) to tube (T), and the movement of the meniscus in tube (T) is observed with a microscope equipped with an ocular micrometer. A magnification of  $80\times$  is satisfactory. The pressure is adjusted until the meniscus moves slowly in a given direction and its rate of movement is determined. The pressure is changed (by about 20 mm of  $\text{H}_2\text{O}$ ) so that the meniscus moves in the opposite direction, and its rate is again determined. The equilibrium pressure is calculated by interpolation. Equilibrium pressure is determined at intervals until a constant value is reached (usually within 10 to 15 minutes with plasma or serum, but not until 2 to 3 hours with gelatin). The C.O.P. is the sum of the interpolated pressure and the hydrostatic and capillary pressures of the fluids in the manometer (determined by the usual methods). With this method a number of osmometers may be used with only one microscope and one manometer, the tubes (T) being clamped off in between readings. The osmometer can be emptied through opening (E). The openings (O and E) are partially covered during a determination to prevent evaporation. For further details the articles of Hepp<sup>1</sup> and Peters and Saslow<sup>2</sup> should be consulted.

Cellophane (300 gauge) and collodion membranes have been used in measuring the C.O.P. of gelatin solutions.<sup>3</sup> In the writer's experience the Cellophane membranes show less variation in permeability (determining rate of passage of saline through the membrane under a given hydrostatic pressure) than do collodion membranes prepared under carefully controlled environmental conditions. However, a completely satisfactory membrane for the measurement of the C.O.P. of gelatin has not been found.

WARREN S. REHM

DEPARTMENT OF PHYSIOLOGY,  
UNIVERSITY OF LOUISVILLE SCHOOL  
OF MEDICINE

<sup>2</sup> E. Peters and G. Saslow, *Jour. Gen. Physiol.*, 23: 177, 1939.

<sup>3</sup> Lawson, Hampden and W. S. Rehm, *Am. Jour. Physiol.*, 140: 431, 1943.

## BOOKS RECEIVED

KORSTIAN, CLARENCE F. *Forestry on Private Lands in the United States*. Illustrated. Pp. xiii + 234. Duke University School of Forestry. 1944.

SCHEINFELD, AMRAM. *Women and Men*. Illustrated. Pp. xx + 453. Harcourt, Brace and Company. \$3.50. 1944.

WATSON, G. N. *A Treatise on the Theory of Bessel Functions*. Illustrated. Pp. vi + 804. The Macmillan Company. \$15.00. 1944.

<sup>1</sup> O. Hepp, *Z. ges. exper. med.*, 99: 709, 1936.

---

## New Books . . . McGraw-Hill

---

### **THEORY AND APPLICATIONS OF ELECTRON TUBES.** *New second edition*

By HERBERT J. REICH, University of Illinois. 694 pages, \$5.00

Assembles and coordinates present knowledge of the theory and application of electron tubes. The basic principles are applicable to radio engineering problems, as well as to industrial electronics, power control, electrical measurements, and other fields of use.

### **HISTORICAL GEOLOGY. The Geologic History of North America**

By RUSSELL C. HUSSEY, University of Michigan. 491 pages, \$3.50

A lucid and well organized introductory text that presents the geologic history of North America and its inhabitants throughout two billion years. A special attempt has been made to cover broad panoramas of important events rather than a mass of details.

### **GENERAL CHEMISTRY**

By JOHN ARREND TIMM, Simmons College. *International Chemical Series.* 691 pages, \$3.75

Presents general chemistry clearly and graphically in a vivid style that will capture and hold the interest of the student. The Lowry-Brønsted acid-base definitions are used consistently, yet the older definitions are carefully pointed out. An outstanding feature of the text is the sound modern approach to the fundamental theory.

### **LABORATORY MANUAL FOR GENERAL ZOOLOGY**

By TRACY I. STORER, University of California at Davis. *McGraw-Hill Publications in the Zoological Sciences.* 150 pages, \$1.25

Designed to accompany the author's well known *General Zoology*. Includes detailed exercises on the structure and physiology of the frog and other common representatives of the principal groups of animals.

### **SUGGESTIONS FOR LABORATORY INSTRUCTORS**

By TRACY I. STORER. (Supplied gratis to users of the *Laboratory Manual*)

Offers suggestions regarding the laboratory demonstrations and procedures, to aid the instructor in conducting his classes. A feature of the booklet is the inclusion of 32 useful formulas.

### **THE ELEMENTS OF ASTRONOMY.** *New fourth edition*

By EDWARD ARTHUR FATH, Carleton College. *McGraw-Hill Astronomical Series.* 382 pages, \$3.00

A widely used standard text, revised and brought up to date. The discussion of the galaxies has been entirely rewritten. As before, the treatment is nonmathematical, and is designed especially for the beginning student.

### **METEOROLOGY. A Practical Course in Weather**

Edited by GEORGE J. BRANDS, Chief Meteorologist, Pan American Airways System. 225 pages, \$2.50

Meets the requirements of those who need a special knowledge of meteorology in its application to their work, for safety, economy, and efficiency. Each lesson, consisting of text and examination, covers a particular topic in concise form.

### **CLIMATOLOGY**

By BERNHARD HAURWITZ and JAMES M. AUSTIN, Massachusetts Institute of Technology. 410 pages, \$4.50

Intended primarily as an introduction to climatology for the meteorologist, this book stresses the physical causes of the climates and of the variations of the climatic elements in space and time. The descriptions of the various climates are given in meteorological language.

### **ADSORPTION**

By C. L. MANTELL, Consulting Chemical Engineer. *Chemical Engineering Series.* In press—ready in November.

Practice, rather than theory, is the keynote of this new approach to the subject of adsorption written from the viewpoint of industrial procedure, the designing engineer, and the operator of equipment.

*Send for copies on approval*

---

## McGRAW-HILL BOOK COMPANY, INC.

330 West 42nd Street, New York 18, N. Y.

Aldwych House, London, W.C.2.