

SCIENCE

VOL. 90

FRIDAY, AUGUST 18, 1939

No. 2329

<i>Food, Drink and Evolution</i> : PROFESSOR CHARLES T. BRUES	145
<i>Scientific Events:</i>	
<i>The First Hundred Years of Photography; Foreign Markets for Medicinal Products of the United States; The Rochester Athenaeum and Mechanics Institute; Biochemical Research at the University of Pittsburgh; The Third International Cancer Congress; The Bicentenary of the Royal Swedish Academy of Sciences; The Hundredth Anniversary of the Birth of Robert Henry Thurston; Recent Deaths and Memorials</i>	150
<i>Scientific Notes and News</i>	153
<i>Discussion:</i>	
<i>Compound Words</i> : PROFESSOR STERLING B. TALMAGE; R. H. BAUGH; DR. ORAN RABER; MARJORIE FULLER and JANE McMASTERS. <i>Value of Characters of the Undeveloped Shoot in Identifying Plants</i> : PROFESSOR H. D. HARRINGTON. <i>Cystine and Methionine Requirements for Growth and Lactation</i> : DR. J. R. HAAG and L. D. WRIGHT	155
<i>Scientific Books:</i>	
<i>The Theory of Numbers</i> : PROFESSOR GEORGE D. BIRKHOFF. <i>Principles of Insect Physiology</i> : R. E. SNODGRASS	158
<i>Societies and Meetings:</i>	
<i>The Royal Society of Canada</i>	159
<i>Special Articles:</i>	
<i>Copper and Vitamin C Effects upon the Excised Frog</i>	

<i>Heart</i> : DR. HUBERT B. PEUGNET. <i>Prolonged Therapeutic Effect of Subcutaneously Implanted Crystals of Ovarian Hormone in Women</i> : DR. UDALL J. SALMON, ROBERT I. WALTER and SAMUEL H. GEIST. <i>The Influence of 3-Indole-Acetic Acid on Pollen Germination</i> : PAUL F. SMITH. <i>The Vitamin C Content of Spring Greens</i> : PROFESSOR R. C. BURRELL and HELENA A. MILLER	162
<i>Scientific Apparatus and Laboratory Methods:</i>	
<i>A Thermal Method for the Separation of Gases and Isotopes</i> : DR. ARTHUR BRAMLEY and DR. A. KEITH BREWER	165
<i>Science News</i>	8

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal
Lancaster, Pa. Garrison, N. Y.
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, D. C.

FOOD, DRINK AND EVOLUTION¹

By Professor CHARLES T. BRUES

HARVARD UNIVERSITY

THE three primary animal instincts, to secure sustenance, to gain protection and to enjoy the opportunity of reproducing their kind, are related either individually or collectively to every biological problem, however narrow its scope. Although the impress of each of these necessities is to be found in the behavior and structure of every species, it is by no means evident to the same extent, nor alike at all periods of ontogeny. Reproduction is confined to a limited part of the life span even in the most primitive types of animals, and the period of reproductive activity is still more obviously restricted in the insects, where it becomes an attribute of only the final, unchanging imaginal stage. This stage must thus suddenly disclose all the adaptations of the sexually mature animal.

Protection from destructive agencies is on the other

hand a constant necessity, common to all periods of the life span. It is, however, in part passive, as it may depend to a great extent upon bodily characteristics, not necessarily associated with specialized behavior.

The instinct to secure food is equally a constant necessity during post-embryonic growth, for only by its gratification can growth and development take place. Even more than reproductive activity the taking of food by animals is rhythmic, cyclical or interrupted by periods of varying length. Furthermore, food requirements in insects are proportionally much greater during the preparatory stages, when large reserves of fat are produced and stored within the body. Feeding is thus by no means a uniform or continuous process, but its association with the several stages is far more extended than is reproduction. Also, it is a purely active, never a passive, process, and in consequence we find that it has modified struc-

¹ Annual public address of the Entomological Society of America at its meeting in Richmond, Va., December 29, 1938.

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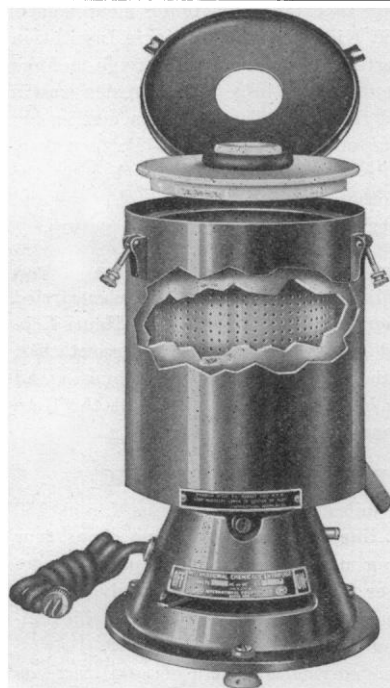
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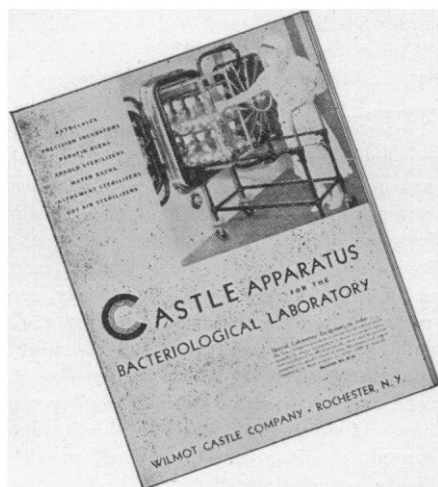
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