

SCIENCE

VOL. 87

FRIDAY, MARCH 25, 1938

No. 2256

<i>The American Association for the Advancement of Science:</i>	
<i>Taxonomy as a Field for Research:</i> DR. J. M. GREENMAN	265
<i>Americans and the Royal Society:</i> DR. R. HEATH-COTE HEINDEL	267
<i>Scientific Events:</i>	
<i>Liverpool Cancer Commission of Inquiry; Investigation of the Pilchard Fishery; The Floods in Southern California; The Seventh Hancock Pacific Expedition. Recent Deaths</i>	272
<i>Scientific Notes and News</i>	275
<i>Discussion:</i>	
<i>Science at the University of Chicago:</i> PROFESSOR CARL R. MOORE. <i>Effects of Freezes in Southern California on Shade and Ornamental Trees:</i> S. A. SKINNER. "Idest": G. R. L. POTTER. <i>The Manufacture of Kraft Pulp and Paper:</i> DR. CHAS. H. HERTY	278
<i>Reports:</i>	
<i>Progress of the New York Zoological Society:</i> FAIRFIELD OSBORN	280

Special Articles:

<i>The X Particle:</i> DR. ARTHUR BRAMLEY. <i>Administration of Oestrone to Young Alligators:</i> DR. THOMAS R. FORBES. <i>The Flagellation of Bacteria:</i> DR. H. J. CONN and GLADYS E. WOLFE. <i>The Molecular Weight of Crystalline Catalase:</i> PROFESSOR JAMES B. SUMNER and DR. NILS GRALÉN	281
---	-----

<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.

TAXONOMY AS A FIELD FOR RESEARCH¹

By Dr. J. M. GREENMAN

MISSOURI BOTANICAL GARDEN

It has been customary for the retiring vice-president of Section G of the American Association for the Advancement of Science to present at the expiration of his term of office a retiring address. I shall adhere to that established custom. However, realizing that we have a very full program ahead of us, and that an important symposium is to follow this address, I shall be very brief. Knowing also, that it would be expected of me to deal with some phase of taxonomy, I have chosen for my subject "Taxonomy as a Field for Research." I have done this with some degree of hesitation, but with the profound conviction that taxonomy furnishes a fertile field for the apt student, that it has much to contribute to related sciences and

therefore merits a place along with other botanical subjects in the domain of pure research.

That taxonomy has made marked advances during the past three or four decades, I think few would be inclined to question. Interest in this subject in recent years has been stimulated in many ways, particularly by numerous scientific expeditions, which have been concerned either wholly with botany or in which botany has taken an important place. The results of these expeditions to various and little known parts of the world have greatly added to our knowledge of the world's flora. Extensive collections of plants from hitherto little-known regions have furnished material for floristic studies on which new floras have been based, and they have also furnished material for monographic research.

New methods of attack have been brought to bear

¹ Address of the vice-president and chairman of the section on the Botanical Sciences, American Association for the Advancement of Science, Indianapolis, December 28, 1937.

organisms without realizing that type of flagellation may occur which is essentially peritrichic, although some cultures are monotrichic. True polar flagellation includes lophotrichic and definitely monotrichic organisms. True peritrichic flagellation is best shown by forms that possess four or more flagella. A degenerate type of peritrichic flagellation, on the other hand, may show one to four flagella and, if only one, the attachment may be either polar or lateral.

It is felt that much greater progress can be made in the classification of bacteria if organisms with only one flagellum are not separated from those which have three or four peritrichic flagella. A more satisfactory plan seems to be to group them on the basis of a correlation of characters. A considerable number of organisms have been observed (*e.g.*, the violet bacteria, the legume nodule organisms, *Bacterium radiobacter*, *Alcaligenes fecalis* and numerous still unidentified soil non-spore-formers) which either show this type of flagellation or else lack all flagella. These organisms resemble each other in their physiological characteristics. Such a classification as that here suggested, therefore, does not run counter to the prevailing systems of grouping bacteria, in which much weight is laid on fermentation reactions and similar characters, as well as on morphology.

H. J. CONN
GLADYS E. WOLFE

NEW YORK AGRICULTURAL
EXPERIMENT STATION
GENEVA

THE MOLECULAR WEIGHT OF CRYSTALLINE CATALASE¹

THE apparent relationship of the enzyme catalase and methemoglobin, as suggested by comparison of the absorption spectra and hematin side-chains of these two substances, makes the determination of the molecular weight of catalase of considerable interest. Recently Stern and Wyckoff² concentrated horse catalase of a purity of 4,000 to 9,000 *Kat.f.* by sedimentation in an air-driven high-speed centrifuge and obtained a product with a *Kat.f.* of from 8,500 to 33,400. The sedimentation constant of this material they found to be 11×10^{-13} , indicating a molecular weight of 250,000 to 300,000. They obtained a sedimentation constant of 12×10^{-13} for a nearly pure catalase preparation from beef liver, but do not tell how this catalase was prepared.

The method of Sumner and Dounce³ for preparing crystalline catalase from beef liver has made it easy to

obtain this enzyme in what is apparently pure condition. We have prepared the enzyme in this laboratory and have determined the sedimentation constant of the recrystallized material by centrifuging an approximately 1 per cent. solution at 65,000 r.p.m. The value obtained over a pH range of 6.3 to 9.6 was 12.0×10^{-13} . A complete description of the method employed will be given in a later publication. Here, it suffices to note that the catalase was found to be a homogeneous substance, very slightly contaminated by impurity. Qualitative tests after centrifuging in a separation cell⁴ showed that there was no enzymatic activity found in the solution removed from the upper portion of the cell and that the activity followed the high-molecular colored substance. Determination of the diffusion constant gave a value of 4.1×10^{-7} , while the partial specific volume was found to be 0.73. From these data the molecular weight of beef liver catalase is calculated to be 263,000. This value is almost exactly 4-fold the molecular weight of horse hemoglobin.⁵ Now the percentage of iron in catalase is one fourth of that of hemoglobin, and accordingly the number of iron atoms per molecule must be four in catalase as well as in hemoglobin.

In conclusion, we wish to express our thanks to Professor The Svedberg for the use of his laboratory and to the Guggenheim Foundation for generous financial assistance.

JAMES B. SUMNER
NILS GRALÉN

⁴ A. Tiselius, K. O. Pedersen and T. Svedberg, *Nature*, 140: 848, 1937.

⁵ T. Svedberg, *Nature*, 139: 1051, 1937.

BOOKS RECEIVED

- BECK, CONRAD. *The Microscope, Theory and Practice*. Pp. 264. 217 figures. R. and J. Beck, London. 7s 6d.
- CARPENTER, J. RICHARD. *An Ecological Glossary*. Pp. viii + 306. University of Oklahoma Press. \$4.00.
- EINSTEIN, ALBERT, and LEOPOLD INFELD. *The Evolution of Physics*. Pp. x + 319. Illustrated. Simon and Schuster. \$2.50.
- HOPKINS, ANDREW D. *Bioclimatics; A Science of Life and Climate Relations*. Miscellaneous Publication No. 280 of the U. S. Department of Agriculture, January, 1938. Pp. iv + 188. Government Printing Office, Washington.
- NORMAN, J. R. and F. C. FRASER. *Giant Fishes, Whales and Dolphins*. Pp. xvii + 361. 97 figures. Norton. \$4.00.
- RUZICKA, L. and W. STEPP. *Ergebnisse der Vitamin-Und Hormonforschung. Band 1*. Pp. xvi + 470. 44 figures. Akademische Verlagsgesellschaft M.B.H., Leipzig.
- Science Reports of the Tôhoku Imperial University*. Fourth Series, (Biology) Vol. XII, No. 3. January, 1938. Pp. 323-482. 60 figures. 39 plates. Maruzen, Tokyo.
- Symposium on Cancer*. Given at an Institute on Cancer Conducted by the Medical School of the University of Wisconsin, 1938. Pp. x + 202. 17 figures. University of Wisconsin Press. \$3.00.
- PERKINS, HARRY A. *College Physics*. Pp. ix + 820. Illustrated. Prentice-Hall. \$3.75.

¹ From the Institute of Physical Chemistry University, Upsala, Sweden.

² K. G. Stern and R. W. G. Wyckoff, *SCIENCE*, 87: 18, 1938.

³ J. B. Sumner and A. L. Dounce, *Jour. Biol. Chem.*, 121: 417, 1937.

NEW WILEY BOOKS

Spectroscopy in Science and Industry

Edited by GEORGE R. HARRISON, *Professor of Physics, Massachusetts Institute of Technology.*

This book offers, in slightly abbreviated form, twenty-nine papers from the 1937 summer conference on spectroscopy and its applications held at the Massachusetts Institute of Technology. The scope of the papers presented covers almost every part of the field which has thus far been developed. The list of authors of the various articles includes most of the leading American workers in applied spectroscopy.

134 pages; 60 illustrations; 7½ by 10; \$3.00

Essentials of Human Embryology, Second Edition

By GIDEON S. DODDS, *Professor of Histology and Embryology, School of Medicine, West Virginia University.*

This textbook of human embryology has been written primarily for medical students and secondarily for those who are preparing for the study of medicine in schools where embryology is a prerequisite subject. It presupposes a knowledge of the gross and microscopic structure of the human body and is designed especially to interpret and clarify such knowledge. In this edition the original plan of the book has been retained; the changes introduced have been mainly for the purpose of incorporating important new knowledge on numerous phases of development.

316 pages; 182 illustrations; 6 by 9; \$4.00

Season of Birth—Its Relation to Human Abilities

By ELLSWORTH HUNTINGTON, PH.D., *Research Associate in Geography, Yale University.*

Biologists have long suspected that man, like other animals, has a definite season of reproduction. Dr. Huntington shows not only that such a rhythm undoubtedly exists, but that it is intimately dependent on the weather and has a potent effect upon our lives. He believes that a knowledge of season of birth and its climatic conditions may have a profound effect in altering our habits, adding strength to future generations and causing a shift of population from one climate to another. For the student of sociology and population problems.

473 pages; 104 illustrations; 5½ by 8½; \$3.50

Manual of Psychiatry and Mental Hygiene, 7th Edition

By AARON J. ROSANOFF, M.D., *Lecturer in Psychiatry, University of Southern California.*

A working manual presenting a description of the material of the psychiatric clinic, and methods of dealing with it—techniques of diagnosis, prevention and treatment. The book represents an attempt to give a comprehensive view of the entire field of psychiatry and mental hygiene. Important researches and views of other workers have been abundantly presented, as far as possible in their own wording. The case method of teaching has been freely resorted to.

1091 pages; 87 illustrations; 6 by 9; \$7.50

JOHN WILEY & SONS, 440--4th Ave., New York