

SCIENCE

Vol. 90

FRIDAY, OCTOBER 13, 1939

No. 2337

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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.

ADDRESSES AT THE OPENING ASSEMBLY OF THE INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS¹

THE following addresses were delivered at the official opening of the Seventh Triennial Assembly of the International Union of Geodesy and Geophysics in the Departmental Auditorium, Washington, D. C., on Wednesday evening, September 6, at 8:30.

In opening the assembly, Dr. Richard M. Field, president of the American Geophysical Union, stated that: "Through the courtesy of the Government of the United States of America, the American Geophysical Union, with the cooperation of its parent body, the National Research Council, has both the privilege and the honor of acting as host to one of the most significant international organizations in the promotion of science among the nations of the earth—the International Union of Geodesy and Geophysics.

¹ September 6, 1939, Washington, D. C.

In differentiating the work of this international body from that of national scientific societies, it is the peculiar province of this Union to devote itself to furthering the knowledge of the sciences of the earth in those particular fields where international cooperation is most necessary.

"The program of this seventh assembly now gathered in Washington includes those fundamental aspects of the sciences which deal with the problems of the earth's crust, its oceans and its atmosphere; problems that can not be solved without the cooperation of the many nations to whom are entrusted the various territories of our globe.

"We recognize that this assembly is called at a time of unusual stress, and the Executive Committee of this Union is therefore especially conscious of its

bilities of the various components in these sera are listed in Table 1; except for the absence in our photographs of the extra component with -2.1×10^{-5} cm² sec⁻¹ volts⁻¹ which had been identified as antibody, our measurements agree well with earlier ones.²

We have measured the areas under the globulin portion of the Longsworth photographs of sera before and after absorption with specific polysaccharides. This loss of area, limited to the γ -component, has paralleled the antibody content as determined by direct chemical⁵ analysis (the last column of Table 1).

TABLE 1

Serum	Type	Mobility				Decrease in globulin area on absorption	Antibody per cent. of total globulin	
		A	α	β	Antibody			
		$-\mu \times 10^5 \text{ cm}^2 \text{ sec}^{-1} \text{ volt}^{-1}$						
						%	%	
6639	I and II	5.3	4.0	3.0	—	1.0	37	32
8617	IV and VIII	5.1	3.7	3.0	—	0.8	32	33
Tiselius and Kabat		5.5	3.7	3.0	2.1	0.9		

We are not yet able to explain in satisfactory fashion the differences between our results and those of Tiselius and Kabat. Both sets of experiments were made at the same pH (7.7) and with similar buffers (0.15M NaCl, 0.02M total phosphates). All our accurate electrophoretic measurements have been made on sera diluted 1:4, but a few photographs of undiluted sera and of sera diluted 1:2 have given the same results. Though there is as yet only fragmentary evidence⁶ to support the hypothesis, it is possible that the antibodies in a horse become smaller under prolonged immunization. The sera available for the present experiments were all from horses which had been producing antibodies for many years, and their antibodies may be different from those in the sera examined by Tiselius and Kabat.

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THE PHYSIOLOGICAL CHANGES PRODUCED IN YEAST BY ULTRA-VIOLET LIGHT AND BY HEAT

As part of an extensive investigation in these laboratories¹ of the effects of salts and lethal agents on

¹ M. Heidelberger and F. E. Kendall, *Jour. Exp. Med.*, 61: 559, 1935.

² See for instance, E. A. Kabat, *Jour. Exp. Med.*, 69: 103, 1939.

³ B. M. Duggar and A. Hollaender, *Jour. Bacteriol.*, 37: 219-239, 241-256, 1934; A. Hollaender and B. M. Duggar, *Proc. Nat. Acad. Sci.*, 22: 19-24, 1936; A. Hollaender and W. D. Claus, *Jour. Gen. Physiol.*, 19: 753-765, 1936; A.

biological systems an occasion has recently been found to make a comparative study of the effects of ultra-violet light and of heat. A single cell isolation of a strain of *Saccharomyces cerevisiae* was used as the test organism. Of the physiological functions studied, the ability of the cells to divide, thus forming colonies on agar, was found to be the most sensitive to both agents. The aerobic respiration of the cells was quite sensitive to heat, but proved to be relatively unaffected by ultra-violet light, that is, $\lambda 2650$. Likewise, the resistance to staining with methylene blue is decreased by heat, but within comparable time limits is relatively unaffected by $\lambda 2650$.

One of the more striking observations is that irradiation with $\lambda 2650$ followed by heat treatment is two to five times as lethal as the treatment of the organisms in the reverse order. This is manifest in both the ability of the cells to form colonies and the resistance of the cells to staining.² Both functions are thus sensitized to heat by this wave-length. On the other hand, the rate of respiration is not sensitized, but is reduced by the same amount whether radiation is followed by heat treatment or *vice versa*.

The details of these experiments and the significance of the results in a general understanding of the nature of the lethal action of heat and ultra-violet light will be published shortly. In addition, the results give certain indications as to the mechanisms of the physiological processes studied and establish that certain of them are relatively independent of each other, *e.g.*, the ability of the cells to form colonies and their rate of respiration.

THOMAS F. ANDERSON
B. M. DUGGAR

UNIVERSITY OF WISCONSIN

Hollaender and B. M. Duggar, *Jour. Bacteriol.*, 36: 17-37, 1938.

² W. T. Bovie and G. A. Daland (*Amer. Jour. Physiol.*, 66: 55-66, 1923) have reported a similar sensitization of *Paramecium caudatum* to the lethal action of heat by irradiation with the short ultra-violet rays transmitted by fluorite ($\lambda < 2000\text{\AA}$). The relation between our work and that of various investigators on the (small) temperature coefficient of the lethal action of ultra-violet light is probably rather remote.

BOOKS RECEIVED

- JELLINEK, KARL. *Kurzes Lehrbuch der Physikalischen Chemie*. Heft II. Pp. xii + 292. Illustrated. A. E. Kluwer, Deventer, Holland.
- MANGHAM, SYDNEY. *Earth's Green Mantle; Plant Science for the General Reader*. Pp. 322. Macmillan. \$3.50.
- MULLER, H. J. *Bibliography on the Genetics of Drosophila*. Pp. 130. Oliver and Boyd, Edinburgh.
- Recent Marine Sediments. A symposium. Pp. 736. Illustrated. American Petroleum Geologists, Tulsa, Oklahoma.
- SHRADER, JAMES H. *Food Control; Its Public-Health Aspects*. Pp. ix + 513. Wiley. \$4.00.
- ZAHL, PAUL A. *To the Lost World*. Pp. x + 268. Illustrated. Knopf. \$2.75.

Six Noteworthy New Books

Propagation of Horticultural Plants

By GUY W. ADRIANCE and FRED R. BRISON, Texas A. & M. College. *McGraw-Hill Publications in the Agricultural Sciences*. 314 pages, 6 x 9. \$3.00

In this book the reproduction of plants, for commercial or home planting, is considered from two viewpoints: (1) production of seeds and growing and handling of seedlings; and (2) the various methods of asexual propagation, involving the use of plant parts. Forcing structures and other equipment necessary in the growing of plants are illustrated and described. The most recent practices relative to the propagation of specific plants are included.

The Management of Farm Woodlands

By CEDRIC H. GUISE, Cornell University. *American Forestry Series*. 352 pages, 6 x 9. \$3.00

This book provides the technical information required in the solution of the problems of woodland management and in stimulating good silvicultural and utilization practices. The material is applicable to farm woods of several acres as well as to the larger woodlands not sufficiently extensive to be included in commercially operated forests. Although the book has been prepared with the eastern United States especially in mind, the principles as outlined in the text will apply throughout the entire country.

History of Chemistry. *New third edition*

By the late F. J. MOORE. Revised by WILLIAM T. HALL, Massachusetts Institute of Technology. *International Chemical Series*. 447 pages, 5½ x 8. \$3.00

As before, this book gives a treatment of the historical development of the important theories of chemistry which covers the origin of the fundamental ideas of the science, their philosophical basis, the critical periods in their development, and the personalities of the great men who have contributed to that development. In the new edition equal emphasis has been given to all phases of chemistry; more attention is paid to the work of American chemists; and greater stress is placed upon recent progress in the field.

Principles of Metallography.

New fourth edition

By ROBERT S. WILLIAMS and VICTOR O. HOMERBERG, Massachusetts Institute of Technology. *International Chemical Series*. 339 pages, 5½ x 8. \$3.50

In the new fourth edition of this widely-used textbook the authors retain the dominant purpose of previous editions: to meet the needs of those students of general science or engineering who do not intend to specialize in metallography, but who expect to use it in connection with their professional work. There is an important new chapter on plastic deformation and annealing of metals, and the section on aluminum alloys has been completely revised and brought up to date.

Laboratory Studies in Zoology.

New second edition

By the late H. D. REED, and B. P. YOUNG, Cornell University. *McGraw-Hill Publications in the Zoological Sciences*. 207 pages, 6 x 9. \$1.50. Outline plates to accompany the manual, 75¢.

Intended to give the student a knowledge of all the fundamental biological principles, this manual introduces the study of the frog as a means of inculcating the principles of bodily organization; the services rendered by bodily components; the nature of protoplasm; the importance of the cell as a vital unit; and the organism as a totality and superior entity. Directions for most of the studies have been entirely rewritten and enlarged. The series of outline plates has been revised and several new plates have been added.

Engineering Materials

By ALFRED H. WHITE, University of Michigan. 547 pages, 6 x 9. \$4.50

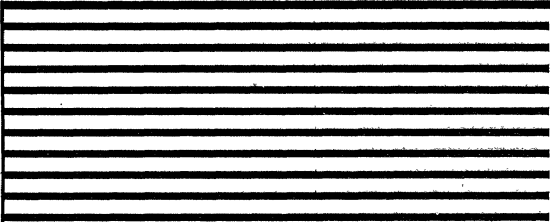
Approaching the subject from the modern theoretical standpoint, this new book discusses plastics, protective coatings, corrosion, fuel, combustion, water softening, and the newer alloys, as well as the older types of ferrous and non-ferrous metals, clay products, cement, and concrete. The treatment stresses the relationship of properties of materials to their atomic and crystalline structure.

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Published July, 1939

JOHN WILEY & SON, INC.
440 FOURTH AVE., NEW YORK

