

SCIENCE

VOL. LXVIII

DECEMBER 21, 1928

No. 1773

TWENTY-FIVE YEARS OF BIOCHEMISTRY¹

CONTENTS

<i>Twenty-five Years of Biochemistry: PROFESSOR HANS PRINGSHEIM</i>	603
<i>The Thirteenth International Physiological Congress</i>	608
<i>Thomas Chrowder Chamberlin—Teacher, Administrator, Geologist, Philosopher: PROFESSOR H. L. FAIRCHILD</i>	610
<i>Scientific Events:</i>	
<i>The Fifth International Botanical Congress; The Gorgas Memorial Institute of Tropical and Preventive Medicine; The Biological Laboratory at Cold Spring Harbor; The American Nature Study Society; The New York Meeting of the American Association</i>	612
<i>Scientific Notes and News</i>	615
<i>University and Educational Notes</i>	618
<i>Discussion and Correspondence:</i>	
<i>The Meaning of Vitamin A: PROFESSOR HENRY C. SHERMAN. The Sieve of Eratosthenes: PROFESSOR FLORIAN CAJORI. The Probable Usefulness of Blood-Grouping Tests in Establishing Non-Paternity: DR. SANFORD B. HOOKER and DR. WILLIAM C. BOYD. Pressure Phenomena in the Dividing Cell: DR. WILLIAM FIRTH WELLS. Hairy Mammoth Skeleton in Utah: GEO. H. HANSEN</i>	619
<i>Quotations:</i>	
<i>International Congresses</i>	621
<i>Scientific Books:</i>	
<i>Metcalf and Flint on Destructive and Useful Insects: DR. L. O. HOWARD</i>	623
<i>Reports:</i>	
<i>The Smithsonian Institution</i>	624
<i>Special Articles:</i>	
<i>The Shape of Cork Cells: PROFESSOR FREDERIC T. LEWIS</i>	625
<i>The National Academy of Sciences</i>	626
<i>Science News</i>	xiv

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.

TWENTY-FIVE years ago I gave my last lecture in America as an instructor in chemistry in Harvard University, after two years of industrial and two years of academic work in this country. I did not then expect ever again to address an American audience, and even less did I anticipate the honor of being allowed to report in this great university about the special work to which I have devoted all my interest and energy during the last two and a half decades. I wish therefore first of all to express my sincere thanks to Professor Dennis and Cornell University for the invitation which affords me this opportunity.

As an introduction, it would seem best to attempt a short historical review of the branch of science that is generally termed "biochemistry." Because of the limited scope of this lecture I will define biochemistry in a somewhat arbitrary manner, as the chemistry of physiologically important organic substances which are essential to the living organism of animals or plants.

Biochemistry as a special branch of study or as a particular field of instruction is of quite recent origin, and a history of biochemistry has not yet been written. In the brief time at my disposal this evening it would be quite impossible adequately to review the progress in this branch during the last quarter of a century, and I will therefore attempt merely to outline the chief developments in this field. Detailed discussions of the progress may be found in the writings of that important contributor to biochemical literature, Oppenheimer.

In earlier times when experimental chemistry was exclusively in the hands of physicians and pharmacists, who by the nature of their work should especially have been interested in biochemistry, very little progress was made. The reason for this lies in the fact that important biochemical substances were very complex, a characteristic which renders their investigation difficult. Before entering upon the study of such substances it was necessary that precise knowledge of inorganic substances and reactions should first be gained, and the successful investigation of these bodies naturally had to be preceded by adequate

¹ Introductory public lecture by Professor Hans Pringsheim, of the University of Berlin, non-resident lecturer in chemistry at Cornell University.

CARNEGIE INSTITUTION OF WASHINGTON

ECOLOGY

By **FREDERIC E. CLEMENTS**
and Collaborators

No. 242. Clements, Frederic E. *Plant Succession: An Analysis of the Development of Vegetation.* Published 1916.

No. 290. Clements, Frederic E. *Plant Indicators: The Relation of Plant Communities to Processes and Practice.* Published 1920.

Both of the above books are out of print. However, Dr. Clements has succeeded in combining the greater part of both into a new volume entitled:

Plant Succession and Indicators. A Definitive Edition of Plant Succession and Plant Indicators. Octavo, xvi+453 pp., 44 pls., 24 figs. (1928).

This new volume contains all of the chapters of the first that deal with the principles and methods employed in the study of climaxes and succession in present-day vegetation, and all the chapters of the second except the one concerned with the climax formations of North America. This volume is not for sale by the Institution, but copies may be purchased from H. W. Wilson Co., 958 University Avenue, New York City, at the price of \$8.50.

Other volumes by Dr. Clements and his collaborators, for sale by the Institution, are:

No. 315. Clements, Frederic E. *Aeration and Air-Content: The Rôle of Oxygen in Root Activity.* Octavo, 183 pp. \$2.00

No. 355. Clements, Frederic E., and John E. Weaver. *Experimental Vegetation: The Relation of Climaxes to Climates.* Octavo, vii+172 pp., 15 pls., 41 figs. \$2.50

No. 356. Clements, Frederic E., and G. W. Goldsmith. *The Phytometer Method in Ecology: The Plant and Community as Instruments.* Octavo, 112 pp., 11 pls., 45 figs. \$1.75

No. 326. Hall, H. M., and Frederic E. Clements. *The Phylogenetic Method in Taxonomy. A Monograph of the North American Species of Artemisia, Chrysothamnus, and Atriplex.* Quarto, iv+355 pp., 58 pls., 47 figs. \$6.75

No. 389. Douglass, A. E. *Climatic Cycles and Tree-Growth: A Study of the Annual Rings of Trees in Relation to Climatic and Solar Activity.* Octavo. Vol. 1 is out of print. Vol. 2 \$2.75

CARNEGIE INSTITUTION OF WASHINGTON
WASHINGTON, D. C.

New FALL BOOKS from Cambridge University Press

Common Principles in Psychology and Physiology

By **John T. MacCurdy**

This book is an attempt to bridge the gap between body and mind, between structure and function. \$6.00

The Suasoriae of Seneca the Elder

Introduction and Notes by **W. A. Edward**

The first time this work of Seneca has been edited and annotated in English. \$4.00

The Development of the Human Eye

By **Ida C. Mann**

This is the first comprehensive monograph in English devoted to the embryology of the human eye. \$12.00

Bibliography of the Writings of William Harvey

By **Geoffrey Keynes**

A strictly limited edition which will be of great value to libraries and research workers in medical history. \$7.00

Astronomy and Cosmogony

By **J. H. Jeans**

This new book attempts to describe the present position of Cosmogony and of various closely associated problems of Astronomy, such as the physical state of astronomical matter, the structure of the stars, the origin of their radiation, and their evolution. \$10.00

The Place-Names of the North Riding of Yorkshire

By **A. H. Smith**

In this volume the English Place-name Survey makes its first excursion into Scandinavian England. Many interesting discoveries have been made with regard to the relative part played by Danes and Norsemen in the Viking settlement in this country. \$6.50

Beyond the Electron

By **Sir J. J. Thomson**

A lecture given by the Master of Trinity College, Cambridge, which will be of great interest to all scientists and students of philosophy. \$.80

For sale in the United States by

THE MACMILLAN COMPANY
60 Fifth Avenue New York City

Princeton University Press, Princeton

THE FUEL OF LIFE. John J. R. Macleod. pp. ix + 147. \$2.50.

This volume, by the codiscoverer of insulin, reviews evidence of importance favoring the view that carbohydrate can be produced from fatty acids in animals, as it is in plants. An attempt has been made to present the subject as simply as possible.

J. B. Lippincott Company, Philadelphia

TAKING THE DOCTOR'S PULSE. J. F. Montague. 103 pp. \$1.00.

Constructive criticism of the present-day practice of medicine in an effort to influence future practice along lines which the author believes will be of benefit to humanity.

Houghton Mifflin Company, Boston

INTELLIGENCE TESTS. Walter F. Dearborn. pp. ix + 336.

The author examines present-day intelligence tests, together with the various misconceptions that have arisen regarding them. He points out their value and shows how in many respects they are in need of revision. He lays stress on the part which learning plays in determining intelligence.

American Photographic Publishing Company, Boston

THE AMERICAN ANNUAL OF PHOTOGRAPHY, 1929. Edited by: Frank R. Fraprie and E. J. Wall. pp. 67 + 240. Illustrated.

This book will doubtless prove of value to the many scientific men who find photography a useful tool in connection with their work in the fields of astronomy, medicine, exploration, engineering and nature study. The book treats of various photographic processes and has 208 illustrations.

Ask For

No.	Subject
10	Capacitance, Inductance and Magnetic Measurements
20	Galvanometers
30	Keys and Switches
40	Resistances, etc
48	Electrolytic Conductivity Measurements
75	H-Ion Equipment
726	White Potentiometer
755	Type K Potentiometer
765	Students Potentiometer

We Publish 45 Catalogs and Bulletins
Write for Complete List


Catalogs and Bulletins on

Electrical

Measuring Instruments

are sent on request
Correspondence invited on electrometric problems

LEEDS & NORTHRUP CO.
4901 STENTON AVE.
PHILADELPHIA, PA.



THE SCIENCE PRESS PRINTING COMPANY

PRINTERS OF

SCIENTIFIC AND EDUCATIONAL
JOURNALS, MONOGRAPHS
AND BOOKS

Correspondence Invited

LANCASTER, PENNSYLVANIA

Marine Biological Laboratory

Woods Hole, Mass.

SUPPLY DEPARTMENT

Open the Entire
Year

Biological Supplies

For the classroom, museum or collector. Look for the sign of the Limulus. As the Limulus represents the test of time, we feel from the business growth that our supplies have also stood the test of years.

Send for Catalogue

No. I. Zoological and Embryological material. Life Histories and Habitat Groups.
No. II. Botanical material.
No. III. Microscopic Slides.

Address all correspondence regarding material and catalogue to:
Supply Department

GEO. M. GRAY, Curator,
Woods Hole, Mass.



THE MICROSCOPE

By SIMON H. GAGE, of Cornell University

Revised, Dark-field Edition (1927) now Available.
The Old and the New in Microscopy, with a special chapter on Dark-Field Methods and their Application.

Postpaid, \$3.50


COMSTOCK PUBLISHING CO., ITHACA, N. Y.

HEALTHY WHITE RATS AND GUINEA PIGS.

Temporary overproduction. Will sacrifice 2000 rats, 500 pigs, 50 cents each for all or part. Express extra.

RUSCH FOX BREEDING ESTATES,

1001 15th Street, N. W., Washington, D. C.



Hy-Speed Mixers

Clamp to any tank, operate from light circuit, mix all kinds of liquids. Also used for even temperature baths. Thousands in use.

Write for circular.

ALSO ENGINEERING CO.
47 W. 63rd St., New York

All Sizes from 1/10 H. P. \$37.50 up

"A Glass in the Pocket is worth two at home."

BUY GOOD BINOCULARS

The new 7-Power Mirakel weighs only 6 oz. Can be carried in vest pocket. Needs no re-adjustment—20 ft. or 20 miles. A wonderful high-grade Prism \$35

Binocular for every use \$35
Hensoldt New "Dialyt"—6x30—13 oz. \$58
Zeiss Wide-Angle "Deltrentis"—8x30. \$66
Prismiris Pocket Binocular, 6 Power, 12 oz. prism. Good glass; priced low. \$16

Compass—Engineer's and Sportsman's Floating Dial. \$3.50
Mahogany Wall Barometer, for house \$5.00
Hygrometer, for home health \$3.50
Fiala Sleeping Bag—Scientifically Correct— Warm, Light Weight—Sanitary. Best for Outdoor Sleeping. The "SPECIAL LLAMA" bag can be washed, sunned and dried. With cover complete weighs 5 lbs. 12 oz.: rolled bulk 17" x 7". Price \$35
Xmas Gifts for Sportsmen. Write for Catalog "A"



ANTHONY FIALA, 25 Warren St., New York

The Wistar Institute Bibliographic Service

is of invaluable assistance to

Librarians—Investigators—Teachers

It brings to them, in AUTHORS' ABSTRACT form, a brief review of all original papers on Biological Subjects which appear in the following journals:

Journal of Morphology and Physiology
The Journal of Comparative Neurology
The American Journal of Anatomy
The Anatomical Record
The Journal of Experimental Zoology
American Journal of Physical Anthropology
The American Anatomical Memoirs
The Biological Bulletin (M. B. L., Woods Hole, Mass.)
Folia Anatomica Japonica (Tokio, Japan)
The Journal of Parasitology (Urbana, Ill.)
The Australian Journal of Experimental Biology
and Medical Science (Adelaide, South Australia)
Stain Technology (Geneva, N. Y.)
Physiological Zoology (Chicago, Ill.)

Advance Abstract Sheets

issued every few days, bearing Authors' Abstracts without bibliographic references, offer a practical means of making research immediately available in abstract form and of purchasing articles of special interest in reprint form without the necessity of subscribing to all the journals. Subscription, \$3.00 per year.

Bibliographic Service Cards

with complete bibliographic references, printed on Standard Library-catalogue cards, are of value and assistance to Librarians and Investigators. Subscription, \$5.00 per year.

Abstracts in Book Form

referred to above, are brought together periodically, with Authors' and Analytical Subject Indices. Price \$5.00 per volume.

*Subscriptions to the Bibliographic Service
and orders for reprints should be sent to*

The Wistar Institute of Anatomy and Biology
Thirty-sixth St. and Woodland Ave. Philadelphia, Pa.

LIFE OF INLAND WATERS

AN ELEMENTARY TEXT-BOOK OF FRESH-WATER BIOLOGY

By James G. Needham, Prof. of Limnology
and Entomology, Cornell University. (Co-
author, John T. Loyd, Ph.D.)

1928 Revised Edition. \$3.00

GUIDE TO THE STUDY OF FRESH- WATER BIOLOGY—Needham.

An indispensable collection of illustrations,
keys, and tables. \$1.00

GENERAL BIOLOGY—Needham.

A comprehensive study of the principles of
biology. A text-book fully illustrated, \$2.50.

THE NATURAL HISTORY OF THE FARM—Needham.

An analysis of the sources of agriculture.
Fully illustrated. \$1.50

THE AMERICAN VIEWPOINT SOCIETY

Incorporated

17 Astor Place

New York City

THE MONIST

January, 1929

Contents

The Goal of Human Life EUGENIO RIGNANO
Empirical Idealism in Outline H. W. WRIGHT
The Philosophy of Worship HENRY N. WIEMAN
The Search for the Concrete

GEORGE A. WILSON
Sensible Appearances, Sense-Data, and Sensa-
tions HELEN M. SMITH

The Rôle of Mathematics in Modern Physical
Theory ALEXANDER WILLIAM STERN

A Set of Postulates for the Logical Structure of
Music SUSANNE K. LANGER

Relativity and Its Precursors
ROBERT P. RICHARDSON

Discussion:

Aristotelian Logic and the Logic of Classes
A. P. UCHENKO

A Reply, Emphasizing the Existential Import
of Propositions F. S. C. NORTHPROP

85c an issue: yearly \$3.00

The Open Court Publishing Company

339 East Chicago Avenue
Chicago, Illinois

Ready January 1

BIOLOGICAL REVIEWS

AND BIOLOGICAL PROCEEDINGS OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY

Edited by H. MUNRO FOX

Biological Reviews appears quarterly and em-
bodies critical summaries of recent work in
special branches of biological science, addressed to
biological readers.

Vol. IV. No. 1. January, 1929. \$3.00

CONTENTS

DER ISOELEKTRISCHE PUNKT VON ZELLEN
UND GEWEBEN. VON HANS PFEIFFER.
THE DERMATOPHYTES OR RINGWORM FUNGI.
BY P. TATE.
THE STRUCTURE OF PROTOPLASM. BY
WILLIAM SEIFRIZ.

CAMBRIDGE UNIVERSITY PRESS
Fetter Lane, London, E.C.4, England