

SCIENCE

VOL. LVII MARCH 9, 1923 No. 1471

<i>The Physical Basis of Life:</i> PROFESSOR EDMUND B. WILSON.....	277
<i>Darwin and Pasteur—an Essay in Comparative Biography:</i> THE LATE WILLIAM THOMPSON SEDGWICK	286
<i>Edward Emerson Barnard:</i> DR. OLIVER J. LEE	289
<i>Scientific Events:</i>	
<i>The Haber Process; International Scientific Cooperation; Research Service to the Industries of Michigan; Public Lectures of the Chicago Section of the American Chemical Society; Organization of Scientific Men in the Northwest; The Meeting of the American Chemical Society in New Haven</i>	291
<i>Scientific Notes and News</i>	295
<i>University and Educational Notes</i>	299
<i>Discussion and Correspondence:</i>	
<i>The Feeding Power of Plants:</i> DRS. A. R. DAVIS, D. R. HOAGLAND and C. B. LIPMAN.	
<i>The Personal Equation of the Astronomers:</i> PROFESSOR KNIGHT DUNLAP.....	299
<i>Quotations:</i>	
<i>Copernicus</i>	302
<i>Scientific Books:</i>	
<i>Howarth on the British Association for the Advancement of Science:</i> PROFESSOR BURTON E. LIVINGSTON.....	303
<i>Safranin and Methyl Green:</i> DR. H. J. CONN	304
<i>Special Articles:</i>	
<i>Furfural as a Biological Reagent:</i> DR. C. E. THARALDSEN.....	305

SCIENCE: A Weekly Journal devoted to the Advancement of Science, publishing the official notices and proceedings of the American Association for the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

100 Liberty St., Utica, N. Y. Garrison, N. Y.
New York City: Grand Central Terminal

Annual Subscription, \$6.00.

Single Copies, 15 Cts.

Entered as second-class matter January 21, 1922, at the Post Office at Utica, N. Y., Under the Act of March 3, 1879.

THE PHYSICAL BASIS OF LIFE¹

I HAVE been much honored by the invitation to speak on this occasion, but for me it has meant more; for the man in whose memory the Sedgwick Memorial Lectureship has been established was my life-long and cherished friend. My theme to-day is drawn from an infinitesimal but all-including world, bounded by the horizon of the compound microscope, a world that may seem far distant from Sedgwick's own broad domain of sanitary science and the public health. I am sure, however, that such would not have been his own view; for Sedgwick was one of the pioneer teachers of general biology in this country, and it was his life-long habit to think of the phenomena of life in terms of the activities of protoplasm.

I have a lively recollection of how he and I, in the days of our youth, when fellow students at Yale, fell under the spell of Huxley's Edinburgh address on the "Physical basis of life," at that time still a subject of widespread popular discussion. In this celebrated discourse, delivered in 1868, the eminent English biologist set forth certain general conclusions concerning protoplasm which had gradually taken shape through the work of such investigators as De Bary, Max Schultze, Kühne, Brücke and Lionel Beale. Huxley's presentation of the subject was a masterpiece, both of English style and of philosophical breadth of outlook. In part for this reason, still more because of its supposed materialistic implications, it aroused immediate and widespread public attention. Huxley himself warned that to accept his conclusions would be "to place one's foot on the first rung of a ladder which in most people's estimation is the reverse of Jacob's and leads to the antipodes of heaven"; nevertheless, he insisted that

¹ The first Sedgwick Memorial Lecture, delivered in Boston, December 29, 1922. It will hereafter be published in fuller form, with illustrations, under the auspices of the Department of Biology and Public Health, Massachusetts Institute of Technology.

Cornell University Medical College

First Avenue and Twenty-eighth St.
NEW YORK CITY

The first year of the course is also
offered at Ithaca, N. Y., subsequent
years at New York City only.

For Information Address
THE SECRETARY

Johns Hopkins University Medical School

The Medical School is an Integral Part of the University
and is in the Closest Affiliation with the Johns Hopkins
Hospital.

ADMISSION

Candidates for admission must be graduates of approved colleges or scientific schools with at least two years' instruction, including laboratory work in chemistry, and one year each in physics and biology, together with evidence of a reading knowledge of French and German.

Each class is limited to 75 students, men and women being admitted on the same terms. **Except in unusual circumstances, applications for admission will not be considered after July 1st.**

If vacancies occur, students from other institutions desiring advanced standing may be admitted to the second or third year provided they fulfill our requirements and present exceptional qualifications.

INSTRUCTION

The academic year begins the Tuesday nearest October 1, and closes the second Tuesday in June. The course of instruction occupies four years and especial emphasis is laid upon practical work in the laboratories, in the wards of the Hospital and in the dispensary.

TUITION

The charge for tuition is \$300 per annum, payable in three installments. There are no extra fees except for rental of microscope, certain expensive supplies, and laboratory breakage.

The annual announcement and application blanks may be obtained by addressing the

Dean of the Johns Hopkins Medical School,
Washington and Monument Sts., Baltimore, Md.

SUMMER WORK FOR GRADUATES IN MEDICINE

Beginning Monday, June 4th, and ending Saturday, July 14th, a course in medical diagnosis, including laboratory exercises in clinical pathology and demonstrations in pathological anatomy, will be offered. The course will be limited to **thirty** students, fee \$100. Applications should be made to the Dean's Office.

SCHOOL OF MEDICINE Western Reserve University of Cleveland, Ohio

HIGH STANDARD OF ADMISSION*

RESTRICTED CLASSES

THOROUGH INSTRUCTION

LARGE CLINICAL FACILITIES

HIGH STANDARD OF SCHOLARSHIP

**Admission confined to students
having academic degrees and to
Seniors in Absentia.*

For information address:

THE REGISTRAR

1353 East 9th St., Cleveland, O.

YALE UNIVERSITY SCHOOL OF MEDICINE

Affiliated with the New Haven Hospital
and New Haven Dispensary

111TH SESSION

Reorganized on a full-time basis

Entrance Requirements: A minimum of three years (or its equivalent) of college including general biology, physics, general and organic chemistry, qualitative analysis, physical chemistry or laboratory physics, and either French or German.

**ALL THE GENERAL FACILITIES
OF THE UNIVERSITY ARE AVAIL-
ABLE TO MEDICAL STUDENTS**

As the number admitted to each class is limited, applications must be made before July 1.

Dean, Yale University School of
Medicine

NEW HAVEN, CONN.

Northwestern University

MEDICAL SCHOOL

Situated in Chicago in close proximity to important Hospitals with an abundance of clinical material.

ADMISSION REQUIREMENTS—Two years of College credit including a satisfactory course in Physics, Chemistry, Biology or Zoology, and French or German.

COURSE OF STUDY—leading to the degree of Doctor of Medicine—Four years in the Medical School and a fifth year either as Interne in an approved hospital or devoted to research in some branch of Medical Science.

GRADUATE INSTRUCTION—in courses leading to the degree of Master of Arts or Doctor of Philosophy.

RESEARCH FOUNDATION—The James A. Patten Endowment for Research affords unusual opportunities for advanced students of Medical Science to pursue special investigations.

RESEARCH FELLOWSHIPS—Four fellowships of the value of \$500 each are awarded annually to promote scholarly research.

Tuition fees of the first and second years, \$190.00 a year. The third and fourth years, \$200.00 a year.

For information address

C. W. PATTERSON, Registrar

2421 South Dearborn Street, Chicago, Illinois

Paleontologist and stratigrapher (Doctor of Philosophy) desires change of location for 1923-1924. Five years' teaching and field experience. Excellent recommendations. Specialties: Devonian, Cretaceous, Eocene. Address K2, care of SCIENCE, Grand Central Terminal, New York City.

GEOLOGIST, with nineteen years' field experience in practically every line of geology in seven countries, with teaching experience in two colleges and three universities, broad academic training, considerable published work, experienced in managing large enterprises and satisfactory references desires situation in non-state university or college. Charles Laurence Baker, 10 Mosswood Road, Berkeley, California.

TEACHERS WANTED

College positions with desirable salaries offered teachers for all departments of the Sciences. Special terms. The Interstate Teachers' Agency, Macheca Building, New Orleans, La.

SCIENTIFIC PERIODICALS

Chemical, Medical and allied subjects. Complete files, volumes and copies; bought and sold. Please send us a list of your wants. B. LOGIN & SON, 29 East 21st Street, New York City.

Marine Biological Laboratory

Woods Hole, Mass.

INVESTIGATION Facilities for research in Zoology, Embryology, Physiology, and Botany. Eighty-four private laboratories \$100 each for not over three months. Thirty tables are available for beginners in research who desire to work under the direction of members of the staff. The fee for such a table is \$50.00.

Entire Year

INSTRUCTION Courses of laboratory instruction with lectures are offered in Invertebrate Zoology, Protozoology, Embryology, Physiology and Morphology and Taxonomy of the Algae. Each course requires the full time of the student. Fee, \$75.00.

July 3 to August 14, 1923

SUPPLY DEPARTMENT

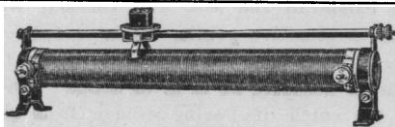
Open the Entire Year



Animals and plants, preserved, living, and in embryonic stages. Preserved material of all types of animals and of Algae, Fungi, Liverworts and Mosses furnished for classwork, or for the museum. Living material furnished in season as ordered. Microscopic slides in Zoology, Botany, Histology, Bacteriology. Catalogues of Zoological and Botanical material and Microscopic Slides sent on application. State which is desired. For catalogues and all information regarding material, address:

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

The annual announcement will be sent on application to The Director, Marine Biological Laboratory, Woods Hole, Mass.



JAGABI RHEOSTATS

meet a definite need in Educational, Research and Industrial Laboratories.

By means of sliding contacts the resistance values can be varied from zero to full rating, in exceedingly small steps

We find greatest demand for Rheostats with tubes 16" long, as illustrated above. Write for Descriptive Bulletin S 980.

JAMES G. BIDDLE, PHILADELPHIA
1211-13 ARCH STREET

ELECTRICAL MEASURING INSTRUMENTS

FOR PHYSICISTS AND PHYSICAL CHEMISTS

EQUIPMENTS SUITABLE FOR RESEARCH AND INDUSTRIAL LABORATORIES

We Solicit Inquiries

LEEDS & NORTHRUP CO.

4901 STENTON AVENUE PHILADELPHIA