

# SCIENCE

VOL. LVII APRIL 20, 1923

No. 1477

<i>On the Formation of Organic Compounds from Inorganic by the Influence of Light:</i> DR. OSKAR BAUDISCH.....	451
<i>Dinosaurs and Coal in the Red Deer Country:</i> J. B. TYRRELL.....	457
<i>Explosive Eruptions of Kilauea:</i> DR. W. H. SHERZER .....	459
<i>Scientific Events:</i>	
<i>The Pi Mu Epsilon Mathematical Fraternity; The Arnold Arboretum of Harvard University; The Electron in Chemistry; The John Scott Medal Awards.....</i>	461
<i>Scientific Notes and News.....</i>	464
<i>University and Educational Notes.....</i>	469
<i>Discussion and Correspondence:</i>	
<i>Einstein Displacement on the Plates taken at the Australian Eclipse:</i> DR. C. A. CHANT. <i>Fundamental Classification of Galls:</i> DR. B. W. WELLS. <i>Athletics and the American Association for the Advancement of Science:</i> PROFESSOR H. M. PARSHLEY. <i>War Explosives mistaken for Minerals:</i> PROFESSOR F. N. GUILD. <i>Biological Institutes in Russia:</i> PROFESSOR H. J. MULLER .....	469
<i>Quotations:</i>	
<i>Free Museums and Art Galleries.....</i>	473
<i>Chemical Nomenclature.....</i>	474
<i>Fisheries Research.....</i>	474
<i>Special Articles:</i>	
<i>Critical Potentials of Thallium Vapor:</i> DRS. F. L. MOHLER, PAUL D. FOOTE, A. E. RUARK. <i>Cross-inoculation Studies with Cucurbit Mosaic:</i> S. P. DOOLITTLE AND M. N. WALKER. <i>Fresh-water Medusa:</i> PROFESSOR CHARLES W. HARGITT....	475
<i>Pacific Division of the American Association</i>	480

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.

## ON THE FORMATION OF ORGANIC COMPOUNDS FROM INORGANIC BY THE INFLUENCE OF LIGHT

THE incentive for my first photochemical research, which was begun in 1911, was received through reading Schimper's work on the relation between nitrate reduction in green leaves and exposure to light. According to Schimper, leaves in the shade are always much richer in nitrates than leaves which have been exposed to direct sunlight. Little or nothing was known at that time in regard to the chemical aspect of nitrate reduction under the influence of light. It was not until later that I became acquainted with the important work of E. Laurent in which the formation of oxygen gas and potassium nitrite by the action of sunlight on sterilized potassium nitrate was described.

My photochemical experiments, carried out in Zürich, between 1911 and 1914, were concerned with the reduction of nitrates by light energy, either alone or in the presence of organic substances. At that time I did not employ iron in my experiments. My attention was first called to the importance of iron in nitrate reduction by some bacteriological experiments which I carried out during the war. In my work with cholera bacilli I found that their iron absorption and assimilation must be in direct relation with their power of reducing nitrates to nitrites and ammonia. On searching the literature for similar observations, I found that Schimper describes an experiment in which iron free (chlorotic) leaves were unable to reduce any nitrate at all, even on exposure to intense light.

It is very striking to observe the great rapidity with which cholera bacilli, taken from the intestine of a cholera victim immediately after death, reduce nitrates to nitrites in a peptone culture. In the case of cholera bacteria the reduction proceeds just as rapidly in the dark as it does in the light. The reduction of ni-

## 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**

## Marine Biological Laboratory Woods Hole, Mass.

### INVESTIGATION

#### Entire Year

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.

### INSTRUCTION

**July 3 to August 14, 1923**

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.

### 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.

## SUMMER SCHOOL in BIOLOGY at CORNELL UNIVERSITY July 7—August 17, 1923

Courses in zoology, entomology, embryology, histology, botany, mycology, plant pathology, plant physiology, bacteriology, and genetics.

Graduate work leading to advanced degrees.

All the well-known facilities of the Cornell laboratories and libraries at the service of the students.

Rich collecting grounds easily accessible.

*Write for a catalogue to the*

**Secretary of Cornell University,  
Ithaca, N. Y.**

## SUMMER SESSION MASSACHUSETTS INSTITUTE OF TECHNOLOGY *Special Courses for Teachers Undergraduate Work Graduate Work Laboratory and Research*

The regular high standards of work and instruction are maintained.

Teachers and students working toward degrees will receive full credit for records obtained in the Summer Session.

For information and catalog, apply to the  
**Massachusetts Institute of Technology,  
Cambridge, 39, Mass.**

## The Microscope

By **SIMON H. GAGE** of Cornell University  
13th Edition, Published December, 1920

In this edition, special emphasis is put upon the Dark-Field Microscope. POSTPAID \$3.00.

**COMSTOCK PUBLISHING CO., Ithaca, N. Y.**