

SCIENCE

VOL. LVIII NOVEMBER 23, 1923 No. 1508

CONTENTS

<i>The Contributions of Astronomy to Civilization:</i>	
PROFESSOR E. P. LEWIS.....	405
Robert Wiedersheim: H. H. W.	412
Hermann M. Biggs	413
<i>Scientific Events:</i>	
<i>Experiment Stations in Finland; The Rothamsted Experimental Station; Symposium on Heat Transfer; The Seismological Society of America; A Study of Engineering Education; The Rollin D. Salisbury Memorial</i>	415
<i>Scientific Notes and News.....</i>	417
<i>University and Educational Notes.....</i>	419
<i>Discussion and Correspondence:</i>	
<i>Climatic Changes: DR. ERNST ANTEVS. Color Hearing: MARY DANA HICKS PRANG. Sex Determination in Pigeons: PROFESSOR F. E. CHIDESTER. Zoological Nomenclature: DR. C. W. STILES.....</i>	420
<i>Quotations:</i>	
<i>Recognition of Scientific Work.....</i>	422
<i>Scientific Books:</i>	
<i>Bouvier's The Psychic Life of Insects: DR. VERNON KELLOGG</i>	423
<i>Special Articles:</i>	
<i>The Protozoan Fauna of a Sewage "Filter": PROFESSOR W. J. CROZIER. Longevity in Spores of Aspergillus oryzae and Rhizopus nigricans: ADELIA MCCREA</i>	424
<i>The National Academy of Sciences.....</i>	427
<i>The American Chemical Society:</i>	
<i>Division of Chemistry of Medicinal Products: E. H. VOLWILER. Section of the History of Chemistry: DR. LYMAN C. NEWELL.....</i>	427
<i>Science News</i>	x

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

Lancaster, Pa. Garrison, N. Y.
New York City: Grand Central Terminal.

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.

Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.

THE CONTRIBUTIONS OF ASTRONOMY TO CIVILIZATION

THE principal duty imposed upon the president of the Pacific Division is the delivery of an address at the annual meeting. In some respects this duty is an embarrassing one for the present incumbent. This is preeminently an astronomical occasion, and your president is not an astronomer. With no original message of his own, he can perhaps best fulfill his obligations by reminding those who are gathered here of some of the great contributions which astronomy has made to civilization.

If the earth were alone in the universe human life could not exist. With the sun to give essential warmth and light, life would be possible; but imagine if you can how the progress of mankind would have been retarded if there were no stars, or if the pioneers of astronomy had failed to discover how to use their apparently uniform rotation as a measure of the flow of time and the axis of this rotation as a standard of direction. The north star was a faithful guide to the traveler, and without it Columbus might well have hesitated to embark on his perilous journey in search of a new world. The first astronomers, without instruments, must first have noticed the rotation of the fixed stars about the axis passing through Polaris, then the orderly annual precession due to the motion of the earth in its orbit. The seemingly erratic motions of the planets must have puzzled them, but in time the orderly sequence of their motions with respect to the earth was recognized and correctly described in Ptolemy's theory of epicycles. As time went on, accumulated observations and deductions therefrom gradually made clear our relations to the solar system. Copernicus revived the bold guess made by others centuries before, that the earth and planets revolve about the sun. Galileo, with the enlarged field of vision due to the telescope, found reasons to support that guess, and Kepler formulated the laws which almost exactly describe the motions of the planets in elliptic orbits around the sun. Newton proved that the same force which causes bodies to fall to the earth, causes the moon to revolve about the earth and the earth about the sun. This discovery made celestial mechanics an exact science.

Mathematical astronomy has made it possible to establish standards of time and to make exact surveys of the earth, and enables the navigator to find his position and determine his direction at sea. When his observations are made impossible by cloud or

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

Marine Biological Laboratory Woods Hole, Mass. Biological Material



1. ZOOLOGY. Preserved material of all types of animals for class work and for the museum.
2. EMBRYOLOGY. Stages of some invertebrates, fishes (including Acanthias, Amia and Lepidosteus), Amphibia, and some mammals.
3. BOTANY. Preserved material of Algae, Fungi, Liverworts, Mosses, Ferns and Seed Plants.
4. MICROSCOPE SLIDES in Bacteriology, Botany and Zoology.
5. LIFE HISTORIES, Germination Studies, and Natural History Groups.

Catalogues furnished on application to

GEORGE M. GRAY, Curator
WOODS HOLE MASSACHUSETTS

SCIENTIFIC PERIODICALS

Chemical, Medical and allied subjects. Complete files, volumes and copies, bought and sold. Kindly send us a list of your wants.

B. LOGIN & SON

29 East 21st Street

New York, N. Y.

Turttox Products for BIOLOGY



Ascaris megalocephala occurs in the small intestine of horses. This worm possesses certain cell structures which make it one of the most interesting forms known to biologists. Beginning with the work of Van Beneden and Boveri (1880-1890), *Ascaris megalocephala* became a classical object for the study of the phenomena of fertilization, maturation, and cleavage of the cell.

The preparation of *Ascaris* material for slides, requires care, skill and patience. For reasons not readily determinable, one lot of material may yield beautiful results, while a second lot prepared in what would appear to be identical fashion proves worthless.

We can supply from stock, *Ascaris* slides as follows:—

- (A) Fertilization slide; showing penetration of the spermatozoan.
- (B) Maturation slide; tetrads, diads, polar bodies and fusion of pro-nuclei.
- (C) Cleavage slide; (Two to four cells) shows spindles, centrosomes and chromosomes grouped in various mitotic figures.
- (D) Later cleavage; many cells and small figures.

Price per slide\$1.50
Set of four slides\$5.00

Descriptive Booklet: We are preparing a booklet on *Ascaris megalocephala*. This pamphlet will give habit notes, historical references, histological significance, etc. A number of illustrations, made from photomicrographs of our own slides will be included. These illustrations will be carefully labelled and will be described in the text. The pamphlet can therefore be used as a reference or key book in the use of the slides. This booklet will be given free with every order for *Ascaris* slides providing the order amounts to five dollars or more. The booklet may also be purchased separately.

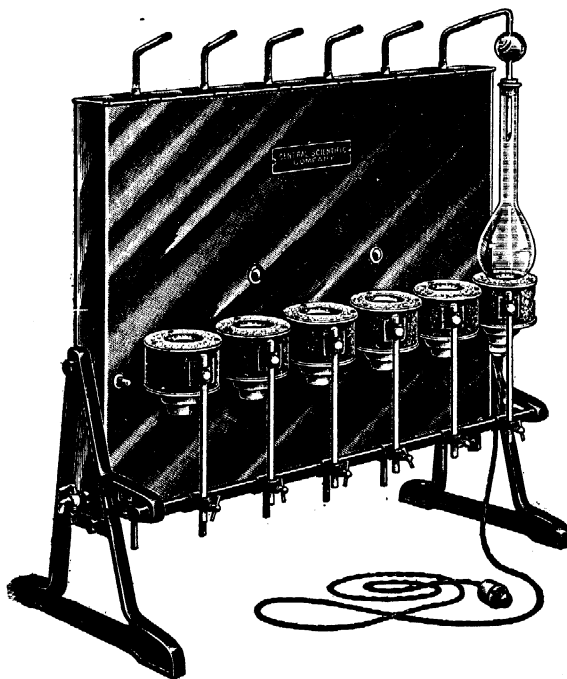
General Biological Supply House

1177 EAST 55TH STREET,

CHICAGO, ILL.

CENCO ELECTRIC NITROGEN DISTILLING APPARATUS

Another one of the numerous applications of electricity, for the convenience of the laboratory worker, which have become associated with the name Cenco



No. 9482 Table Form

Saves Time

Avoids Breakage

Conserves Energy

Minimizes Fire Hazard

Preserves Your Temper

9481. KJELDAHL DISTILLING APPARATUS Electrically Heated

Wall Form without supports but with hooks for hanging on the wall

No.	A	B
For volts	110	220
Each	\$103.00	\$108.00

9482. KJELDAHL DISTILLING APPARATUS Electrically Heated

Table Form (as shown above) without glassware.

No.	A	B
For volts	110	220
Each	\$105.00	\$110.00

For Complete Description Send for Bulletin No. 93-S

CENTRAL SCIENTIFIC COMPANY

LABORATORY SUPPLIES
Apparatus Chemicals

460 E. Ohio St.,

Chicago, U.S.A.

U.S.A.



THE SCIENCE PRESS PRINTING COMPANY

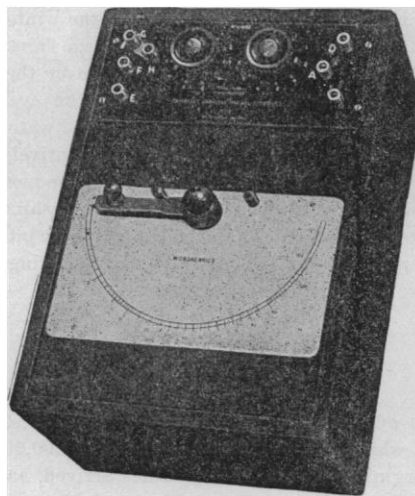
The Science Press Printing Company has been incorporated by the State of Pennsylvania for the printing of scientific and educational journals, monographs and books. The object of the directors is to establish on a permanent basis a press especially equipped for printing scientific literature in the best way, with compositors, pressmen and proof-readers trained for technical work. It is a business corporation; but it has been founded to provide facilities essential for the advancement of science. J. McKeen Cattell is president; A. E. Urban is general manager.

The corporation owns its building at Lancaster, Pennsylvania, over 14,000 square feet of floor space lighted on all sides, with space for printing a hundred scientific journals. It has the best obtainable presses, composing machinery and binding equipment and these will be increased as needed. What is more important, it has the most competent pressmen and compositors in a city which since "Science" was first printed there in 1894 has become a center for fine scientific printing. The costs are only about three fourths as much as in the large cities.

The capacity of the office is shown by the circumstance that "Science," "School and Society," "The Scientific Monthly" and "The American Naturalist" were transferred to it on July 1 without the least delay or difficulty. The typography and presswork of these journals will bear comparison with any weekly or monthly publication in the United States or elsewhere. Those authors who have read proofs will know the correctness of the composition. A distinguished scientific man writes to the editor of "Science": "I corrected my first proof a year before you were born and the one I returned yesterday was the first one in my long experience that needed no correction."

Only a limited number of publications can be accepted at present as the business of the office will not be enlarged beyond its ability to do the best work with promptness. All correspondence should be addressed to the general manager, A. E. Urban, The Science Press Printing Company, Lancaster, Pa.

CAMBRIDGE INSTRUMENTS



Campbell Variable Mutual Inductance Standard

This instrument, used in conjunction with its auxiliary apparatus, provides one of the most accurate and direct means of measuring inductance and capacity. The range of the instrument is wide, the moving coil extending from minus 3 to 104 microhenries, whilst the two dials give 1,000 and 10,000 microhenries respectively.

For high frequency measuring instruments send for Descriptive List No. 162A.

Also manufacturers of all types of Physical and Electrical Instruments.

The Cambridge and Paul
INSTRUMENT CO. OF AMERICA (INC.)

MAIN OFFICE AND FACTORY
OSSINING-ON-HUDSON
NEW YORK

INCORPORATING
CHAS. F. HINDLE

SALES OFFICE & SHOWROOM
GRAND CENTRAL TERMINAL
NEW YORK CITY