

# SCIENCE

VOL. 92

FRIDAY, NOVEMBER 15, 1940

No. 2394

*The Mathematical Way of Thinking*: DR. HERMANN WEYL ..... 437

**Scientific Events:**

*Animals and Air Raids; Earthquakes of 1940; Finances of the Massachusetts Institute of Technology; Acquirement by Harvard University of a Deposit of Fossils in Northern Florida; Equine Encephalomyelitis and Mosquitoes; The Rôle of Dentists in National Defense; Memorials* ..... 446

*Scientific Notes and News* ..... 449

**Discussion:**

*Coral-reefs and the Formation of Petroleum*: PROFESSOR WERNER BERGMANN and DAVID LESTER. *The Occurrence and Isolation of Azotobacter in Chinese Soils*: DR. H. ZANYIN GAW. *Production of Symptoms by Subcutaneous Injection of Histamine without Increase of the Blood Histamine*: DR. BRAM ROSE. *Agassiz and Liebig*: DR. A. B. BEAUMONT ..... 452

**The National Academy of Sciences:**

*Abstracts of Papers* ..... 455

**Reports:**

*A New Pan American Treaty*: HAROLD J. COOLIDGE, JR. .... 458

**Special Articles:**

*Uptake of Radioactive Phosphorus by Nuclei of Liver and Tumors*: DR. A. MARSHAK. *Mode of Action of Estrogens on the Mammary Gland*: DR. HAROLD SPEERT. *The Control of Protoplasmic Streaming*: NOBURÔ KAMIYA ..... 460

**Scientific Apparatus and Laboratory Methods:**

*A Simple Method of Mounting Small Exhibit Specimens of Mammals and Birds*: DR. CLYDE E. KEELER. *A Microphotographic Camera*: CHARLES GOOSMANN. *Automatic Mercury Valve*: HUGH B. MCGLADE ..... 463

*Science News* ..... 8

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.

## THE MATHEMATICAL WAY OF THINKING<sup>1</sup>

By Dr. HERMANN WEYL

THE INSTITUTE FOR ADVANCED STUDY, PRINCETON, N. J.

By the mathematical way of thinking I mean first that form of reasoning through which mathematics penetrates into the sciences of the external world—physics, chemistry, biology, economics, etc., and even into our everyday thoughts about human affairs, and secondly that form of reasoning which the mathematician, left to himself, applies in his own field. By the mental process of thinking we try to ascertain truth; it is our mind's effort to bring about its own enlightenment by evidence. Hence, just as truth itself and the experience of evidence, it is something fairly uniform and universal in character. Appealing to the light in our innermost self, it is neither reducible to a set of mechanically applicable rules, nor is it divided into watertight compartments like historic, philosoph-

ical, mathematical thinking, etc. We mathematicians are no Ku Klux Klan with a secret ritual of thinking. True, nearer the surface there are certain techniques and differences; for instance, the procedures of fact-finding in a courtroom and in a physical laboratory are conspicuously different. However, you should not expect me to describe the mathematical way of thinking much more clearly than one can describe, say, the democratic way of life.

A movement for the reform of the teaching of mathematics, which some decades ago made quite a stir in Germany under the leadership of the great mathematician Felix Klein, adopted the slogan "functional thinking." The important thing which the average educated man should have learned in his mathematics classes, so the reformers claimed, is thinking in terms of *variables and functions*. A function de-

<sup>1</sup> Address delivered at the Bicentennial Celebration Conference of the University of Pennsylvania, September 17, 1940.

# Science

**92 (2394)**

*Science* **92** (2394), 437-464.

**ARTICLE TOOLS**

<http://science.sciencemag.org/content/92/2394.citation>

**PERMISSIONS**

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 1940 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.