

# SCIENCE

VOL. 94

FRIDAY, JULY 11, 1941

No. 2428

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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.

## MATHEMATICS AND THE SCIENCES<sup>1</sup>

By Professor C. V. NEWSOM

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A CLOSE inspection of the history of mathematics and that of physical science reveals the mutual dependence of the two fields of thought. At times mathematical development has been definitely stimulated by the needs of science; at other times scientific progress has been extremely rapid because of the availability of the necessary mathematical devices. It is interesting to observe, however, that serious reflection upon the actual relation of mathematics to the sciences has awaited the twentieth century. Such consideration, stimulated by a better understanding of the nature of mathematics, needs greater publicity, for it is the immediate cause of the mathematizing of parts of science previously untouched by mathematical treatment. This paper,

then, will briefly review some of the factors which are of importance in any attempt to understand the relation of mathematics to the sciences. Implicit in the discussion is a broad definition of mathematics; my only apology for such a point of view is that it is the modern one.

Certainly it is true that a natural science originates with inductive procedures. The inspection of many similar situations in an effort to perceive those constant principles to be designated as laws must always remain fundamental. However, a time comes in the life history of a science when such methods are no longer adequate. Lapicque<sup>1</sup> has expressed the thought in the following words:

<sup>1</sup>L. Lapicque, "L'orientation actuelle de la Physiologie," in *L'orientation actuelle des sciences* (Paris, 1930). The translation employed here was given by C. N. Moore in SCIENCE, v. 81: p. 31, 1935.

<sup>1</sup>Address of the retiring president of the Southwestern Division of the American Association for the Advancement of Science, Lubbock, Texas, April 30, 1941.

# Science

**94 (2428)**

*Science* **94** (2428), 27-50.

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