

# SCIENCE

VOL. 98

FRIDAY, SEPTEMBER 17, 1943

No. 2542

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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL; WARE CATTELL, assistant editor. Published every Friday by

## THE SCIENCE PRESS

Lancaster, Pennsylvania

Annual Subscription, \$6.00      Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association of Science, edited by J. MCKEEN CATTELL; WARE CATTELL, assistant editor. Information regarding membership in the Association may be secured from the office of the permanent secretary in the Smithsonian Institution Building, Washington, D. C.

## ARISTOTLE, NEWTON, EINSTEIN<sup>1</sup>

By Professor E. T. WHITTAKER, F.R.S.

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It falls to us this year to commemorate the greatest of men of science, Isaac Newton, on the occasion of the three-hundredth anniversary of his birth. The centuries have not dimmed his fame, and the passage of time is unlikely ever to displace him from the supreme position. His discoveries, however—and this is part of their glory—have not persisted unchanged, but in the hands of his successors have been continually unfolding into fresh evolutions. During the eighteenth and nineteenth centuries there was an immense expansion of knowledge, springing directly from his work, and forming ultimately a vast superstructure based on the Newtonian concepts of space, mass, and force. Since 1900 the progress of science has continued, but the development of physics has

changed in character: it has become subversive and radical, questioning the traditional assumptions and uprooting the old foundations. In 1915 the Newtonian doctrine of gravitation was superseded by that of Einstein: the divergence between the results of the two theories, so far as concerns the calculation of the movements of the planets, is extremely slight, and indeed, in almost all cases, too small to be detected by observation; but on the question of the essential nature of gravitation, the two conceptions differ completely and are associated with opposite philosophies of the external world. The other great discovery of the present century is the quantum theory, which in its perfected form of quantum-mechanics appeared in 1925: this also is completely irreconcilable with the postulates of Newtonian science.

We have therefore come now to the end of an age—

<sup>1</sup> Address of the president of the Royal Society of Edinburgh, October 26, 1942.

# Science

**98 (2542)**

*Science* **98** (2542), 249-266.

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