



Science News-Letter

The Weekly Summary of Current Science

Reg. U. S. Pat. Off.



A Science Service Publication

Edited by **Watson Davis**
Vol. XI No. 310



10¢ a copy \$5 a year
March 19, 1927

GENERAL SCIENCE

Scientists Honor Memory of Sir Isaac Newton

Why Newton is Remembered

By PAUL R. HEYL

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The 20th of March of this year is the 200th anniversary of the death of one of the greatest scientific men of all time—Sir Isaac Newton. His long life of 85 years comprised many different activities. As a young man he practised alchemy. He wrote many theological treatises; he was a professor at Cambridge University, and for the last 30 years of his life he was the Master of the British Mint. But upon none of these does his fame rest. Hundreds of men have equaled or exceeded Newton in such respects, and all have been swept by relentless time into the limbo of mediocrities.

Why is Newton remembered? Not primarily for his experimental work in optics, important as this is, for a dozen others have done as well. Not because he "discovered gravitation"; that had been known since the days of Aristotle. Not because he formulated the exact law according to which gravitation acts, for that appears to have suggested itself to at least three of his contemporaries. Not that he was the first to conceive the idea that the earth's gravitative attraction might reach as far as the moon; that had been imagined before him, though no demonstration of it had been given.

Newton stood head and shoulders above his contemporaries because he had vision, a broad mental grasp, a good sense of perspective. Scientific knowledge before his day consisted chiefly of isolated facts of observation, with little or no correlation, and no satisfactory assigned causes. But Newton was able to visualize all the moving bodies in the universe from comets to falling apples, and to



SIR ISAAC NEWTON

demonstrate that they all obeyed a single law—universal gravitation. He brought order out of chaos; he had constructive talent; he was a builder, not only a collector of building materials. It was nearly 200 years after the publication of the "Principia" before the scientific world saw its like, until Darwin, with the "Origin of Species" did for biological science what Newton had done for physical science two centuries earlier. Such men are rare, but scientific progress would be impossible without them.

How thoroughly Newton accomplished this task is evidenced by the change in scientific thought since his day. The "Principia" is taken for granted; the picture of the universe set forth in it is part of our common heritage, almost innate. Newton succeeded in endowing all scientific posterity with a measure of that vision and perspective which he

alone possessed in his day. He said modestly of himself: "If I saw farther, 'twas because I stood on giant shoulders." But by the hands of Newton we have been lifted and placed upon a peak which he himself could not reach, from which, like Moses of old, we may look over the Promised Land, though it may be reserved for those who follow us to enter.

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Newton and Gravitation

Say "Newton" and the response is "gravitation" just as to say "Einstein" brings to mind "relativity." Although Sir Isaac Newton will always be known and honored by science for his researches upon the binomial theorem, the method of tangents, the differential and integral calculus, and theory of colors, he will probably be most widely known for his work on the law of gravitation.

Legend has it that Newton's attention was forcibly called to gravitation by the fall of an apple upon his head as he rested beneath an apple tree. Voltaire is the authority for this anecdote and he is said to have obtained his information from Newton's favorite niece. But whether the apple legend is true or untrue, it is a fact that Newton's thoughts and researches upon gravitation have changed our conceptions of the universe. He began his researches when a lad of but 24 years; in fact, of 1665 and 1666 when the plague had driven him and all other students from Cambridge, Newton said: "I was in the prime of my age for invention, and minded Mathematics and Philosophy more than at any time since."

The great Galileo died the year Newton was born and it was his

(Just turn the page)

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Sir Isaac Newton

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invention of the telescope and his planetary observations that prepared the way for Newton's discovery. John Kepler, follower of the master astronomer, Tycho Brahe, had reduced to simple laws the movements of the planets, most important of which was the fact that they moved in elliptical orbits around the sun at one of the two foci. Why should a planet swing a closed orbit around the sun instead of shooting off in a straight path? The mathematical genius of Newton proved that if there existed an attracting force between the sun and the earth that varied inversely proportional to the square of the distance between the two bodies, the earth would sweep the identical orbit around the sun that Kepler had observed. Experience with falling bodies and the weight of things suggested that the earth attracts bodies far from it just as it attracts a falling stone. Again Newton's calculations proved his theory right and the moon was shown to be but an immense stone ever falling toward earth and so kept in its orbit. The earthly force of gravity became a heavenly force as well.

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As Newton Saw Truth

"I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."—*Sir Isaac Newton as given in Brewster's Memoirs.*

Science News-Letter, March 19, 1927

It is estimated that an automobile engine wastes 97 per cent. of the energy of gasoline.

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SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. Patent Office.

Subscription rate—\$5.00 a year postpaid. 10 cents a copy. Ten or more copies to same address, 6 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Advertising rates furnished on application.

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