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*Scientific American* has covered Einstein's theories—and the refinements and reactions to them—ever since scientists began to grasp the import of his landmark 1905 papers. Read on for a sampling of our reports, some by leading physicists of their times

**By Daniel C. Schlenoff**

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PORTRAIT of Albert Einstein was drawn by Ben Shahn to accompany the article that Einstein wrote for the April 1950 issue of *Scientific American*.

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# A CENTURY OF EINSTEIN

## It took several years for *Scientific American*, and mainstream physics

for that matter, to start mulling over the radical proposals Albert Einstein expounded in 1905. His repudiation of the intuitive understanding of the cosmos was hard to accept:

“In 1905, came a fundamental and (as the future historian will probably say) an epoch-making contribution in the shape of an unassuming and dry-looking dissertation, ‘Concerning the Electro-dynamics of Moving Bodies,’ by A. Einstein, a Swiss professor of physics. It appeared in the *Annalen der Physik*, the German counterpart of our *Philosophical Magazine*. It created no sensation at the time. It was hardly noticed. Yet, at the present time, you cannot open a journal devoted to physics without finding some fresh contribution to the ever-increasing literature on the subject: Einstein’s Principle of Relativity. —E. E. Fournier D’Albe”

*Scientific American Supplement*,  
November 11, 1911

“But is the ‘Principle of Relativity’ true? That is for experiment to decide. Its postulates have been and are now being pursued by the relentless logic of mathematics, and they must stand or fall as the deductions thus reached agree or conflict with experimental evidence. Just now,

however, the ‘Principle of Relativity’ seems to be irresistibly fascinating to mathematicians, but equally abhorrent to that host of physicists who can no more conceive of time as a function of velocity than they can imagine space to be curved or picture for themselves a fourth dimension.”

*Scientific American*,  
June 8, 1912

*Scientific American* kept track of Einstein’s efforts to extend the theory of relativity and of the reaction to his seminal 1916 paper:

“The principle of relativity in the strict sense has stood the test of experiment. If it long seemed doubtful, and is still so regarded by some physicists, this is because it appears irreconcilable with the electro-dynamical theories of Maxwell and Lorentz. In particular, the constancy of the velocity of light, which is deduced from those theories, seems difficult to admit. Now there is one domain of fundamental importance in which our empirical knowledge is far too small to supply, even in conjunction with the principle of relativity, a firm basis for a general theory, so that the



ISSUE of *Scientific American* dated June 8, 1912, covered an early debate on the special theory of relativity.

# Scientific American ran a contest to solicit a cogent explanation of Einstein's complex theory.

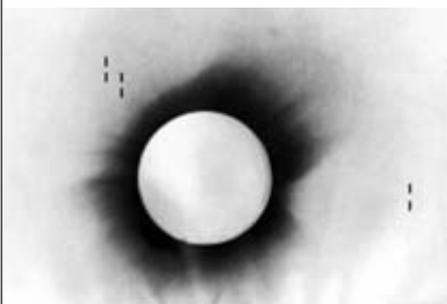
foundation must be completed by physical hypotheses. This domain is gravitation.”

*Scientific American Supplement*,  
September 19, 1914

“Whatever may be the nature of the aether, it is devoid of those material properties which could constitute it a framework of reference in space. We can perhaps best picture the aether as a four-dimensional fluid filling uniformly Minkowski's space-time continuum, not as a material three-dimensional fluid occupying space and time independently. The position we have now reached is known as the principle of relativity. In so far as it is a physical theory, it seems to be amply confirmed by numerous experiments (except in regard to gravitation). —A. S. Eddington”

*Scientific American Supplement*,  
July 6, 1918

The theory put forward in the 1916 paper lacked experimental proof. Several astronomers, including Arthur Stanley Eddington, in charge of the University of Cambridge Observatory, used a solar eclipse of May 29, 1919, as an opportunity to test one prediction: that light rays from a star would be bent as



SOLAR ECLIPSE in 1919 bolstered Einstein's theory. As he predicted, the sun's mass caused light from distant stars (marked by vertical bars) to be deflected at the earth—by a few hundredths of a millimeter.

they passed close by the gravitational field of the sun. When the prediction appeared to be proved accurate, Einstein was hailed by the science community and achieved almost an apotheosis in the public mind:

“The results obtained at the total solar eclipse of May 29 last were reported at a joint meeting of the Royal Society and the Royal Astronomical Society, held on November 6. The results with the 4-inch lens stationed at Sobral, North Brazil, were most satisfactory. The star-images are well defined, and their character is the same on the eclipse and check plates. The resulting shift at the limb is 1.98”, with a probable error of 0.12”. It will be seen that this result agrees very closely with Einstein's predicted value of 1.75”. It was generally acknowledged at the meeting that this agreement, combined with the explanation of the motion of the perihelion of Mercury, went far to establish his theory as an objective reality. Sir J. J. Thomson, who presided, spoke of the verification as epoch-making. —A.C.D. Crommelin”

*Scientific American Supplement*,  
December 6, 1919

But how was the public to understand such a complex theory? *Scientific American* ran a contest to solicit a cogent, concise explanation, offering as a first prize the hefty sum of \$5,000 (worth more than \$50,000 in today's money). Einstein is reported to have said, “I am the only one in my entire circle of friends who is not entering.... I don't believe I could do it.” Interest was keen:

“We have with us a freshly-risen scientific topic of transcendent importance—one which has occupied a place in the public prints and the public mind such as has never be-

fore been granted to any matter of abstruse scientific doctrine. It gives us the greatest pleasure to state that Mr. Eugene Higgins, an American resident of Paris and for many years a close friend of this paper, offers through the *Scientific American* a prize of Five Thousand Dollars for the best essay on the Einstein postulates.”

*Scientific American*,  
July 10, 1920

“Numerous prospective competitors for the five-thousand dollar prize have written us, asking more or less baldly where they may inform themselves upon the subject of the Einstein theories. We have no serious expectations that Mr. Higgins' money is going to be won by anybody whose knowledge of and interest in the doctrines of relativity is of such recent growth that he has to ask this question.”

*Scientific American*,  
August 28, 1920

“Mr. L. Bolton, author of the winning essay [see top illustration on opposite page], we suppose may fairly be called unknown in a strictly scientific sense, though he is a professional man of distinction in his field. He is on the staff of the British Patent Office. It will be recalled that Einstein himself was in the Swiss Patent Office for some years.”

*Scientific American*,  
February 5, 1921

And yet, while relativity became a popular topic, the science community continued its lively debate on all its aspects:

“Whether or not the general reading public is to believe that Professor Dayton C. Miller, the physicist who during several years past has been re-performing at Cleveland and Mount

# Relativity

The Winning Essay for the Eugene Higgins Five Thousand Dollar Prize

By "Zodiaque" (L. Bolton, London, England)

probably acquainted with the principle of specifying positions in space by their mutually perpendicular sides of a flat-land is in fact in counting relations between or diagrams. These are called, together for measuring, most otherwise the events

**I**N their work of gradual elimination of those essays which were not the best, the Einstein judges found that by all means the most effective test to apply was that which arises from the fact that when a man writes about the Einstein theories in 3,000 words, the most momentous problem confronting him is what to leave out. Examination of the essays brought to light without much difficulty about twenty that stood out well above the others in this regard. Mr. Bolton's winning essay is the example par excellence of this merit of advantageous selection. Everybody will of course agree that he says admirably what he has to say; but the real reason why his essay was ultimately chosen over the other candidates was the extraordinary fine judgment which

Taking into account of lengths and principle of relative physical laws. All unaccelerated equivalent for the equal laws of physics statement is called stricted, Principle it is restricted in reference. Natural state mechanics definition, since the alternate length

Wilson the famous Michelson-Morley ether-drift experiment and obtaining with uniform consistency indications of an actual ether-drift and hence the existence of an ether, is out to 'get' the Einstein theory of relativity, which dispenses with an ether, seems to depend upon what it reads. Let a world of blind admirers and enraged detesters of a theory beat the air with super-heated syllables, Einstein serenely smokes his pipe and says 'If Professor Miller's research is confirmed, my theory falls, that's all.' And Miller, standing before his assembled peers in science, is almost apologetic about his findings, but indicates that there they are."

*Scientific American,*  
March 1930

There was, and is, an ongoing discussion as to how great Einstein truly was:

"Not that Einstein 'needs the publicity'; but because the editors from time to time receive communications from persons who either request confirmation of his high standing in science or, as sometimes occurs, wish to have their private opinion confirmed that he is a 'faker' (as one rather excitable anti-Einsteinian repeatedly put it), attention is called to the recent tribute of the Riverside Church in New York which has chosen to include a carved figure of Einstein with those of the world's very greatest on the tympanum of the doorway of its new edifice. Einstein is the only living person thus to be honored. Another naïve question sometimes is asked: 'Is Einstein really Jewish?' Einstein is a Jew."

*Scientific American,*  
December 1930

"Albert Einstein, whose 70th birthday this month is being noted throughout the civilized world, occupies a position unique among scientists. He has become a legend in his own lifetime. The importance of Einstein's scientific ideas does not reside merely in their great success. Equally powerful has been their psychological effect. At a crucial epoch in the history of science Einstein demonstrated that long-accepted ideas were not in any way sacred. —Banesh Hoffman"

*Scientific American,*  
March 1949

In 1950 Einstein wrote an article for *Scientific American* on his attempts at further extensions to the theory of relativity [see "Forces of the World, Unite!" by George Musser, on page 106]:

"As for my latest theoretical work, I do not feel justified in giving a detailed account of it before a wide group of readers interested in science. That should be done only with theories which have been adequately confirmed by experience. Experience alone can decide on truth. —Albert Einstein"

*Scientific American,*  
April 1950

Einstein died on April 18, 1955. The leading lights of science acknowledged with gratitude their debt to him:

"With the death of Albert Einstein, a life in the service of science and humanity which was as rich and fruitful as any in the whole history of our culture has come to an end. To the whole of mankind Albert Einstein's death is a great loss, and to those of

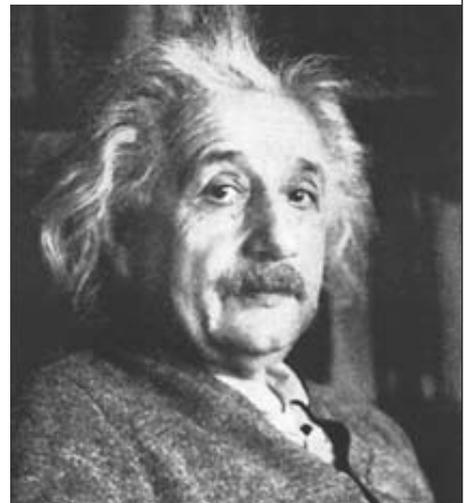
WINNING ESSAY in the Einstein contest appeared in *Scientific American*, February 5, 1921. [The full version is available at [www.sciam.com/ontheweb](http://www.sciam.com/ontheweb)]

us who had the good fortune to enjoy his warm friendship it is a grief that we shall never more be able to see his gentle smile and listen to him. —Niels Bohr"

*Scientific American,*  
June 1955

And a final word about Einstein's history, according to Einstein:

"Two weeks before the death of Albert Einstein, I sat and talked with him about the history of scientific thought. Einstein said most emphatically that he thought the worst person to document any ideas about how discoveries are made is the discoverer. Many people, he went on,



PROFESSOR EINSTEIN was photographed at home in his study for our June 1939 edition.

had asked him how he had come to think of this or how he had come to think of that. Einstein believed that the historian is likely to have a better insight into the thought processes of a scientist than the scientist himself. —I. Bernard Cohen"

*Scientific American,*  
July 1955

*Daniel C. Schlenoff edits the 50, 100 & 150 Years Ago column.*