

Comment&Letters

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St Patrick's Day exodus

Madam, - It's not the exodus of so many of our politicians for St Patrick's Day that concerns me; it's their return that I find so objectionable. - Yours, etc.,
PETER MURRAY,
Abbeydorney,
Co Kerry.

Location of the Abbey Theatre

Madam, - With due respect to the eminent persons who desire to have the Abbey Theatre remain in Abbey Street, I believe yet another location might be considered. My proposal is that the theatre should be housed in the GPO.

What a worthy tribute to the memory of the 1916 leaders this would provide - not to mention the benefits which would accrue to our capital street. It would also be an appropriate long-term use for this fine building if the "Abbey GPO National Theatre" became a reality. - Yours, etc.,
SEÁN TIERNAN
Malahide,
Co Dublin.

Comparing tax rates

Madam, - Your edition of March 10th reports on the OECD survey of tax and social insurance, showing that Irish workers pay much lower rates of deductions than workers elsewhere. It seems to me that surveys such as this are extremely misleading. To take an example: as far as I can see, the figures for Germany include pension contributions ("Rentenversicherung") and also health insurance ("Krankenversicherung"). The Irish figures do not include these substantial payments, apart from PRSI, of course. A case of apples and oranges, I'm afraid. - Yours, etc.,
NORMAN STEWART,
Seapark,
Malahide,
Co Dublin.

An Irishman's Diary

The year 2005 has been declared World Year of Physics (or Einstein Year) to commemorate the extraordinary achievements of a young Albert Einstein in the year 1905. Although Einstein is a household name synonymous with intellectual power and scientific originality, many people are vague about the exact importance of his work.

Albert Einstein was born in Ulm, Germany in 1879. After schooling in Germany, Italy and Switzerland, he graduated from the Zurich Polytechnic (ETH) with a diploma in mathematics and physics in 1901. Unable to find a teaching post, he accepted a position as technical assistant in the Swiss patent office. There, he devoted his spare time to the study of fundamental problems in the science of the day.

A highly original and unorthodox thinker, his musings resulted in the publication in 1905 of three separate works that form the foundation of much of modern science.

Einstein's first success was the conjecture that the motion of pollen grains in liquid (Brownian motion) could offer long-sought evidence for the existence of atoms. His careful statistical study of the effect led directly to the first experimental proof that all matter is indeed made up of tiny atoms. This discovery forms the basis of almost all of modern science, from atomic physics to chemical bonding, from microbiology to the structure of DNA.

A second paper in 1905 proposed that light could behave like a stream of tiny mass-less particles. The idea was a radical departure from the traditional wave theory of light and was firmly rejected for many years. Later, the proposal became a cornerstone of quantum theory, which revolutionised 20th-century science and technology.

While Einstein later received the Nobel Prize for his contribution to quantum theory, it was a third paper, also published in 1905, that quickly established him as a scientist of note. This was the Special Theory of Relativity. In a startling departure from traditional ideas, Einstein proposed that quantities such as time, distance and mass are not absolute, but depend on motion. The theory predicted that

Cormac Ó Raifeartaigh

observers moving at high speed relative to one another would see each other's time as running slowly, and each others distances shortened. The dependence of mass on motion implied that the mass of a body

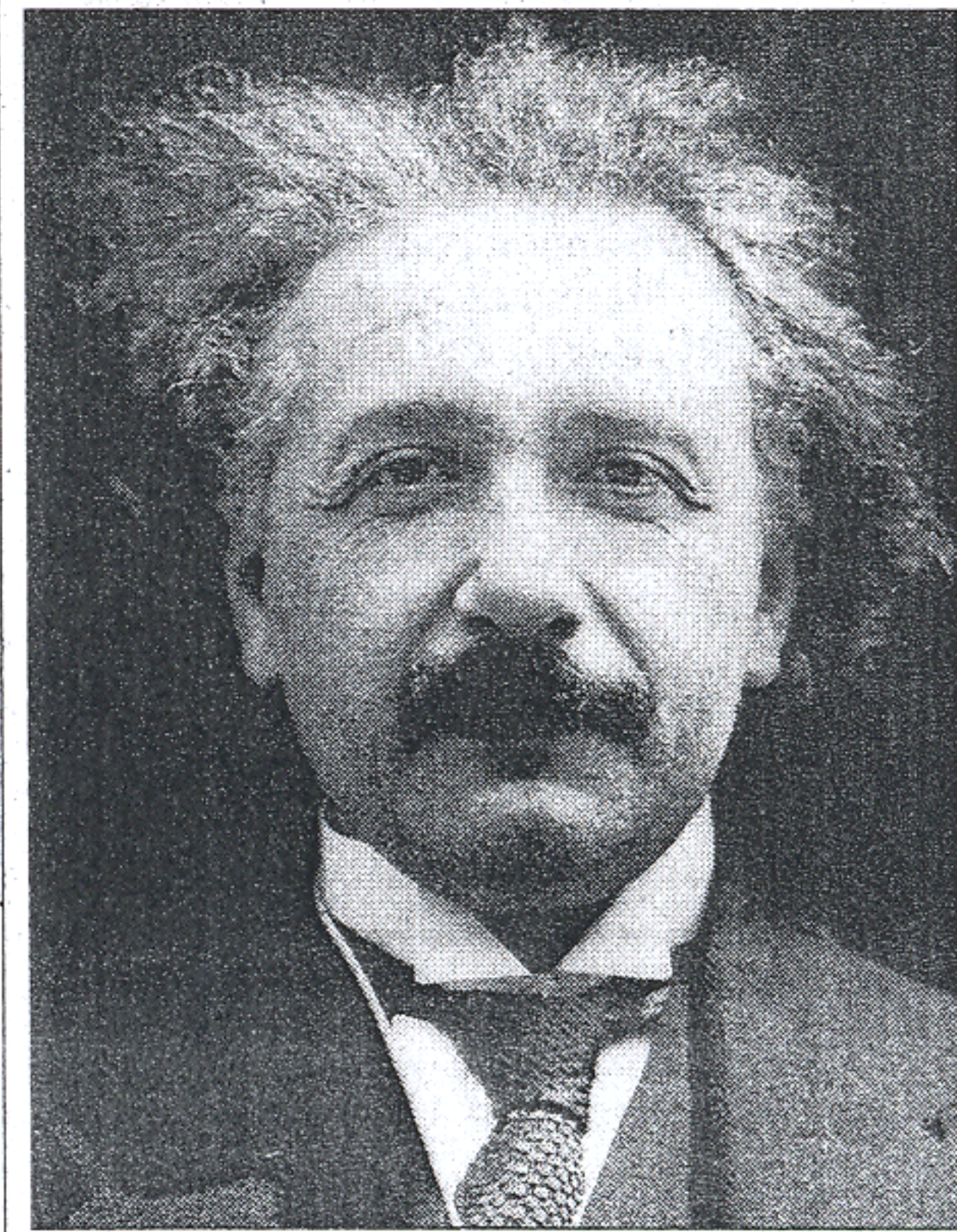
General Relativity, firmly establishing Einstein as the world's leading scientist.

With the rise of the Nazi regime in the 1930s, Jewish Einstein fled his native Germany with his family, taking up a position at the Institute for Advanced Study in Princeton in the US. From then until his

death in 1955, his research was concerned mainly with an unsuccessful attempt to unite his theory of gravity with that of other forces.

How does Einstein's oeuvre stand up today? It has occasionally been suggested that relativity is mistaken (or that it was written by his first wife!) In reality, Einstein's work has stood the test of time remarkably well.

The Special Theory of Relativity has survived rigorous testing in modern particle accelerators (the first such test was



Albert Einstein: his work underpins much of modern science and technology

is simply a form of energy ($E = mc^2$), a discovery that represented a revolutionary advance in science.

Direct experimental support for Special Relativity was not immediately forthcoming. However, scientists were highly impressed by the insights it offered in diverse areas - from an explanation for radioactivity to the first understanding of the energy source of the sun. By 1909, the young patent clerk had been appointed associate professor at the University of Zurich, an appointment that was followed by professorships at the University of Prague, Zurich ETH and the University of Berlin.

Einstein did not rest on his laurels: by 1915, he had completed his General Theory of Relativity, a complex theory that extended the ideas of relativity to the study of forces. The new theory gave the world an entirely new view of the force of gravity (as a curvature of space-time) and is considered to be Einstein's greatest achievement. In 1919, measurements of the bending of light during a solar eclipse offered dramatic support for

performed by the Irish scientist Ernest Walton) and forms the basis of the nuclear power industry. General Relativity has so far passed all astronomical tests and underpins our view of the universe, from Big Bang theory to the notion of black holes. Quantum Theory, which Einstein helped to create but felt was incomplete, forms the backbone of much of modern technology - from the silicon chip to the advent of the laser.

Einstein might be a little sad to discover that many of today's physicists are engaged in a struggle that mirrors his own final project. The epic search for a Final Theory that can provide a unified description of the fundamental forces of nature is a descendant of Einstein's unsuccessful final opus - and highlights the enormity of the task the world's greatest scientist set himself during his last years on earth.

● Dr Cormac Ó Raifeartaigh lectures in physics at Waterford Institute of Technology. A list of activities celebrating World Year of Physics can be found at www.einsteinyear.org/about/ireland