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# Dublin Institute for Advanced Studies: School of Theoretical Physics.

The Dublin Institute for Advanced Studies was created by an Act of the Irish parliament signed by President Douglas Hyde on 19th. June 1940. The Act enabled the government to set up Constituent Schools in the Institute by Establishment Orders, and such Orders were immediately made to establish the School of Celtic Studies and the School of Theoretical Physics. The choice of these two schools reflected the personal interests in mathematics and the Irish language of Eamon de Valera, who was then Taoiseach (Prime Minister).

Erwin Schrödinger was appointed senior professor in the School of Theoretical Physics and he moved into his office at 65 Merrion Square in February 1941. In June of the same year he was joined by Walter Heitler, who had been appointed assistant professor. Schrödinger and Heitler immediately set about providing for the benefit of university staff members and senior students introductory courses on quantum mechanics, which at that time was little known in Ireland. They also conducted seminars on their own current researches. Initially Schrödinger's seminars were devoted largely to his attempts to construct within the framework of general relativity a theory which united gravitational and electromagnetic phenomena. Heitler spoke about his radiation damping theory and its application to the study of cosmic rays. These seminars of Heitler were responsible for the introduction of cosmic ray research to University College, Dublin, and to the inclusion of a cosmic ray section in the School of Cosmic Physics when it was established in 1947.

During the early years of the Institute communications with Great Britain and North America were difficult and communications with continental Europe were wellnigh impossible. Schrödinger made a major attempt to combat the isolation of the School by holding a colloquium which lasted from 16th. to 29th. July, 1942. The speakers from abroad were P.A.M. Dirac, who delivered five lectures on Quantum Electrodynamics, and A.S. Eddington, who gave the same number of lectures on Unification of Relativity Theory and Quantum Theory. These two sets of lectures were published as Numbers 1 and 2 of Communications of the Dublin Institute for Advanced Studies, Series A.

In the following year a colloquium on crystals was held, the chief speakers being Max Born, P.P. Ewald and Kathleen Lonsdale, and in 1945 a colloquium on topics ranging from quantum electrodynamics to the theory of solids was held with Dirac, Born and L.Jánossy as the main speakers. Thus already during World War II Irish scientists were able to establish personal contact with some of the leading figures of twentieth century physics. Then in March 1946 W. Pauli visited the School for two weeks and normal contacts were gradually resumed, but the summer colloquia were still frequently held.

In the Establishment Order of the School of theoretical Physics it is laid down that one or more public lectures on subjects or branches of knowledge in respect of which study or research is being carried on in the School shall be provided for delivery in alternate years at University College, Dublin, and Trinity College, Dublin. When this regulation was being drafted, A.W. Conway expressed the view that the preparation of a public lecture by a research scientist could be very time consuming. Fortunately Schrödinger and Heitler were not narrow specialists and so could draw on their reading to present in an intelligible form results of modern science.

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Of the statutory lectures given in the early 1940's those that made the greatest impression on the public was the series of four lectures delivered by Schrödinger at Trinity College, Dublin, in 1943 entitled "What is Life?" These dealt with the physical aspect of the living cell and especially with the bearing of the quantum theory on the structure of chromosomes and on the nature of mutation. The audience totalled nearly four hundred, and to accommodate them each lecture had to be repeated. The lectures were published and were subsequently translated into German, French, Swedish, Japanese, Italian and Russian. Some of the other lectures formed a basis for books published by Schrödinger and by Heitler on the relations between science, philosophy and humanism.

While the number of senior professors provided for in the establishment of the School was three, this number was not attained until 1948 with the appointment of J.L. Synge. Already in 1945 Heitler had been raised to the rank of senior professor. The advent of Synge imported a more mathematical orientation to the research of the School and a massive development of research in relativity theory.

Erwin Schrödinger  
Scientist and Philosopher

1887-1961

Erwin Schrödinger was a member of a cultured Viennese family. As a child he derived from his father an interest in botany, philosophy and painting and from his mother a proficiency in the English language, his maternal grandmother having been born at Leamington. His early formal education was chiefly in the ancient classics, and this helped him to become well acquainted with Greek philosophy. From 1906 to 1910 he studied at the University of Vienna, where he obtained an excellent training in the theoretical and experimental physics from Hasenöhr and Franz Exner.

Before coming to Dublin Schrödinger had held University posts at Vienna, Jena, Stuttgart, Breslau, Zürich, Berlin and Graz. During his stay in Zurich (1921-1927) he proposed what became known as the "Schrödinger equation", which provided a means of applying the quantum theory of Max Planck to physics, chemistry and biology. In spite of his immense influence in spreading the knowledge of quantum theory, Schrödinger appears to have remained at heart a classical, that is pre-quantum, physicist.

Schrödinger's publications include sixteen books and about one hundred and sixty papers, many of which were translated into foreign languages. The range of his scientific publications embraces quantum theory, statistical mechanics, Brownian motion, dielectric theory, general relativity, optics. He wrote on interdisciplinary topics; in particular he investigated how physics and chemistry might be applied to biological problems. He was also very much concerned with the cultural value of the natural sciences.

Erwin and Annemarie Schrödinger became Irish citizens in 1948. Schrödinger left Ireland in 1956 to take up a personal chair in the University of Vienna.

## SCHRÖDINGER - Boxed Information

Born: Vienna, 12 August 1887.  
Died: Vienna, 4 January 1961.  
Married: Annemarie Bertel 1920.

Addresses:

1940-1956 26 Kincora Road, Clontarf, Dublin.  
1956- Pasteurgasse 4, Wien 9.

Distinctions:

1. Membership of the following scientific academies:  
Vienna (1928), Prussian (1929), Royal Irish (1931),  
Madrid (1935), Pontifical (1936), USSR (1940),  
Lima (1944), Lincei (1947), Royal Society of London (1949).
2. Honorary doctorates of University of Gent (1939), Dublin University,  
(1940), National University of Ireland (1940).
3. Medals: Medaglia Matteucci (1929), Nobel prize for Physics (1933),  
Max Planck Medal (1937).

Walter Heitler  
Theoretical Physicist and Chemist

1904-1981

Walter Heitler son of Adolf and Ottilie (née Rudolf) Heitler, was born in Karlsruhe, Baden, Germany, of a Bohemian-Jewish family, nearly all of whom later perished in the Nazi holocaust. His early education was classical but at about the age of eleven he began to develop a personal interest in the natural sciences. He studied at universities in Karlsruhe, Berlin and Munich, where he took his Ph.D degree under the supervision of Herzfeld. After a brief stay in Copenhagen he arrived at Zürich just a few months before Schrödinger left for Berlin in 1927. Having mastered Schrödinger's papers on quantum mechanics he set about applying them to calculate the Van der Waals interaction between two atoms. He collaborated with another research worker Fritz London and the result was the Heitler-London theory of chemical bond.

In 1927 Heitler went to Göttingen as assistant to Max Born. When Hitler came to power in 1933, Heitler left Germany for Bristol where he remained until he transferred to Dublin in 1941. In the meantime he had been recognized as the world's leading authority on the quantum theory of radiation. In Dublin he devoted his energies to the theory of the newly discovered particle whose mass was about two hundred times that of electron - now called the muon. He gathered about himself an active group that included J. Hamilton, N. Hu, S.T. Ma, H.W. Peng, S.C. Power and P. Walsh. Though Schrödinger and Heitler were together in Zürich and Dublin, their research interests at any time did not coincide. Heitler became an Irish citizen in 1946 and retained Irish citizenship when he left for Zürich in 1949.

One of Heitler's regrets in his latter years was that he had chosen to specialize in physics rather than in biology or philosophy. Of his seven books four deal with philosophy and religion, and he died a member of the Swiss Reformed Church. The number of his scientific papers exceeds eighty. It was a matter of surprise to his contemporaries that Heitler was not awarded the Nobel Prize.

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HEITLER - Boxed information

Born: Karlsruhe, 2 January 1904  
Died: Zürich, 15 November 1981  
Married: Kathleen Nicholson 1942  
Children: One son, Eric

Addresses

1941 - 1949 21 Seapark Road, Clontarf, Dublin  
1949 - 1958 Drusbergstrasse 59, Zürich  
1958 - Am Guggenberg 5, 8053 Zürich

Distinctions

1. Memberships of the following scientific academies:  
Royal Irish (1943), Royal Society of London (1948),  
Leopoldina in Halle (1968), Mainz (1970), Norwegian (1974).
2. Honorary doctorates of National University of Ireland (1954),  
University of Göttingen, University of Uppsala.
3. Medals: Max Planck Medal (1968), Marcel Benoist Prize (1970),  
Literaturpreis der Stiftung für Abendlandisch Besinnung (1977),  
Gold Medal of Humboldt Gesellschaft (1979).

7.

Further reading:

Institute for Advanced Studies Act, 1940. Dublin: Stationery Office.

Institute for Advanced Studies (School of Theoretical Physics)  
Establishment Order, 1940. Dublin: Stationery Office.

J. Mc Connell, Erwin Schrodinger (1887 - 1961) Austro-Irish Nobel  
Laureate, Occasional papers in Irish Science and  
Technology, No. 5, Royal Dublin Society, 1988.

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