Born identity revealed in newly-opened archive

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A Nobel Prize Medal, a postcard from Einstein and a Hitler-stamped letter of expulsion are among a fascinating archive of documents and other material belonging to Max Born – one of the fathers of quantum mechanics – being opened by Cambridge University's Churchill Archives Centre.

The Centre, nestled in the grounds of Churchill College, already houses some of the most important political, military and scientific papers of the 20th century, including those of Winston Churchill, Margaret Thatcher, John Cockcroft and James Chadwick.

But the story contained within Born's archive, who fled Nazi Germany in 1933, opposed the dawn of atomic weapons and corresponded with all the major physicists of his age, draws a compelling portrait of the man who helped formulate quantum mechanics with his assistant Werner Heisenberg and who is renowned for his many major contributions to 20th century physics.

Not only was Born, who came to Cambridge University after fleeing Germany, a close and lifelong friend of Einstein, he also taught nine Nobel-winning physicists including Heisenberg, during a period often referred to as the 'golden age of physics'.

Others that received their Ph.D. degrees under Born at Göttingen University, before Hitler ordered the expulsion of Jews from universities in 1933, included J. Robert Oppenheimer, father of the atomic bomb,

Max Delbrück, Walter Elsasser, Friedrich Hund, Pascual Jordan and Maria Goeppert-Mayer.

Lynsey Robertson, who has worked on the collection, said: “Born’s story is an incredible one. Although a pacifist, he was the teacher of the inventors of the atomic bomb. He was forced to flee Nazi Germany and was a friend of Einstein’s for 40 years. He provided the first self-consistent mathematical formulation of quantum mechanics and developed the concept that, at the atomic level, physical processes are determined by probabilities, a completely different perspective from that of classical physics.”

Allen Packwood, Director of the Churchill Archives Centre, said: “The archive provides a wonderful window on the personal development and private life of one of the twentieth century’s greatest scientists. It is appropriate that his papers should sit alongside those of many of his contemporaries, including John Cockcroft, James Chadwick and Lise Meitner who, like Born, fled Nazi persecution.”

Included in the archive, which amounts to some 84 boxes of material, is original correspondence that illuminates Born’s complex relationship with 1932 Nobel Prize winner Heisenberg, who worked on Germany’s nuclear weapons research during the Second World War.

They met again after the war and in correspondence with his son, Gustav, in 1947, Born said Heisenberg had become ‘somewhat infected by Nazi ideas…but in spite of all that we liked him immensely’.

Many, including Heisenberg himself, felt that Born should have shared the 1932 Nobel Prize. That he did not was a passing sadness to Born but he did not complain about it. Many years later, in a 1952 letter from Born to his son, he remarks that many of his discoveries had been wrongly attributed to Heisenberg.

However, Born did finally receive the Nobel Prize for Physics in 1954 for his work on the interpretation of Schrodinger's wave function.

Also included in the archive are letters from Born to his wife and children recording his views on contemporary scientific work, his colleagues and international affairs -including the dropping of the atomic bomb and what he saw as man's failings on the nuclear issue. He went on to become one of the founding members of Pugwash – the movement opposing such armed conflict – alongside Bertrand Russell.

Of particular note to those with an interest in the history of science, the archive also holds Born's handwritten notes, including lectures to the Kapitza Club, as well as a volume of the young Born's notes of the famous mathematician David Hilbert's lectures.

Cambridge University's Professor Malcolm Longair, who has studied the original Born scientific papers for a new book entitled Quantum Concepts in Physics, said: "Max Born was a brilliant mathematical physicist who made some of the most important technical advances which led to the first fully self-consistent theory of quantum mechanics.

"Born was also remarkably modest about his achievements, claiming he lacked the intuition of people like Niels Bohr and Heisenberg, but he had the mathematical and technical knowledge to convert Heisenberg's revolutionary concepts into the first complete theory of non-relativistic quantum mechanics."

Born, who lived from 1882-1970, was born into a Jewish family in Breslau (then Germany, now Poland) but converted to the Lutheran faith following his marriage to Hedwig Ehrenberg, a practicing Lutheran. He was educated and taught at some of the best German universities.

He went on to study at the University of Breslau, Heidelberg University,

the University of Zurich, University of Göttingen and, during 1908-1909, he studied at Gonville and Caius College, Cambridge.

He became a lecturer at Gottingen in 1909 and married Hedwig Ehrenberg in 1913, having three children together. It was in 1915, while Born was Professor of Theoretical Physics at the University of Berlin, that he met Albert Einstein.Returning to Gottingen in 1921, following a stint in Frankfurt, Born created its School of Theoretical Physics, making Gottingen one of the most important international centres of the new 'quantum mechanics', which he named in 1924.

In 1925, he recognised the key concept of non-commutativity in quantum mechanics which had appeared in Heisenberg's revolutionary paper of 1925 and which caused Heisenberg great concern. Born showed that this phenomenon can be naturally described in terms of matrix calculus and this led to the formulation of matrix mechanics which he worked out with his assistants, Heisenberg and Pascual Jordan.

In 1926, Schrodinger showed how quantum mechanics could be formulated more transparently using wave functions and Born went on to demonstrate how this could be interpreted in terms of probabilities, the work for which he was belatedly awarded the Nobel prize in 1954.

Although a convert to Lutheranism, he was condemned as Jewish according to Nazi Germany's anti-Semitic laws. Fleeing from Germany in 1933, Born accepted the position of Stokes Lecturer of Applied Mathematics at Cambridge before moving to Bangalore for a period of six months. In 1936 he accepted the post of Tait Professor of Natural Philosophy at the University of Edinburgh where he remained until his retirement in 1953.

Following his retirement he returned to Germany where he lived until his death on January 5, 1970.

The archive has been deposited by Max Born's son, Professor Gustav Born FRS (etc), an eminent medical scientist, assisted by members of his family. His daughter, Max Born's grand-daughter, Georgina Born, was responsible for initiating the connection with Churchill College when she was Professor of Sociology, Anthropology and Music at Cambridge University (2006-10).

Other grandchildren include Sebastian Born, Associate Director of the National Theatre in London and Grammy-Award winning singer and actress Olivia Newton-John.

Provided by University of Cambridge