



Olga Kennard (1924–2023) and the Cambridge Crystallographic Data Centre

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Abstract

Olga Kennard (née Weisz, 1924–2023) was a true pioneer in crystallography. She left a lasting mark on scientific research with the establishment of the Cambridge Crystallographic Data Centre (CCDC).

Keywords Olga Kennard · Max Perutz · J. Desmond Bernal · MRC · Cambridge University · CCDC

Olga Kennard (née Weisz, Fig. 1) [1 and 2] was born in 1924 into a Jewish family in Budapest. Her brother, George Weisz, became a mechanical engineer, whose daughter, the famous British actress Rachel Weisz, still spells her name in the Hungarian way, Weisz with an “sz.” Olga and George’s father and uncle jointly ran a private bank. Their mother’s family had a long history of art dealership, and Olga learned a lot about ancient cultures from her. The family was prosperous, but the growing anti-Semitism in Hungary and the increasingly harsh anti-Jewish laws provided ample warning for the family to emigrate. They had the means for emigration and began a new life in England from August 1939. Most family members who remained in Hungary perished in the Holocaust.

The family arrived in their new home just before the start of the school year. Olga barely spoke English and when she started at a girls’ school in Hove, near Brighton, south of London, her teachers tested her English. She had to read a story and recite its content. Fortunately, she recognized the story from her Latin lessons in Budapest—it was the English translation of a Latin fable. As she showed good language skills, she was placed straight into the graduating class. Again, she was lucky in the exams, because she could answer questions about Shakespeare, although could not have asked for milk in the shop (there were no self-service shops then) because she did not know the every-day language. She then continued at a co-educational school in Evesham, south of Birmingham, where she was the only girl

in her class. As the completion of her high-school studies was approaching, she persuaded the headmaster to allow her to sit for the entrance exam for Cambridge University, even though no one from that school had ever gone to Cambridge before. She passed the exam and was admitted.

At Cambridge University, she had to decide what direction to take. Previously, she had been interested in history and related subjects, but the emigration experience had turned her towards the natural sciences. She found that in chemistry, physics, and mathematics, there was no difference between her Hungarian background and what she had studied in the English schools. These subjects were consistent, whereas the history she learned in England was very different from what she had studied in Hungary. She was at the women’s Newnham College and specialized in the natural sciences. At that time, women did not get degrees, only certificates, and they received their degrees fifty years later, in a belated ceremony. However, the lack of a formal diploma did not prevent her from obtaining higher qualifications and titles. She received her master’s degree in 1948 and her doctorate in 1973. She specialized in chemistry, physics, and crystallography.

Her first job was as a member of Max Perutz’s group at the world-famous Cavendish Laboratory in Cambridge, and she worked there from 1944 to 1948 [3]. Perutz was also a refugee, originally from Vienna. The Cavendish Laboratory had previously become an internationally leading research center in nuclear physics under the leadership of Ernest Rutherford. After Rutherford’s death, the new director, W. Lawrence Bragg, started a new direction in molecular biology. At the time, this could be considered risky, but it was generously supported by the British Medical Research Council (MRC) from 1947. Perutz was trying to determine protein

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Fig. 1 Olga Kennard, 2003, in Cambridge, England, during the 50th-anniversary celebrations of the discovery of the DNA double-helix structure (photograph by Magdolna Hargittai)

structures by X-ray crystallography. At first, this seemed almost hopeless, but in time, it proved a huge success, and Perutz and his first student John Kendrew were awarded the Nobel Prize in Chemistry in 1962 for their work on globular protein structures.

Olga Weisz did not stay long at the Cavendish Laboratory, for in 1948 she married and, following her researcher husband, took a job in London, from this time as Olga Kennard. She worked in the MRC's Vision Research Unit until 1951. Hamilton Hartridge, the head of the department, was researching the physiology of the eye and the mechanism of oxygen fixation in hemoglobin. He was a broad-minded and innovative scientist who welcomed Kennard but proposed an impossibly complex system for crystallographic analysis. When the project proved unfeasible, he encouraged Kennard to stay in research. In the meantime, the Kennards had two daughters, but the marriage broke up, and they were finally divorced in 1961. She raised the two girls alone. Both became successful in their chosen careers.

Kennard continued to work for another laboratory in London from 1951, and her task was to organize a research laboratory for crystallography, which she successfully completed. She returned to Cambridge in 1961 and remained in the Department of Chemistry at Cambridge University until her retirement. She reached a professorial rank only at the end of her active career. This was not a sign of not being sufficiently successful—the Nobel Prize-winning crystallographer Dorothy Hodgkin had similar difficulties at Oxford University.

Kennard's career was marked by duality. As a researcher, she studied the structure of systems important to physiology, for example, adenosine triphosphate (ATP), the energy carrier of living matter. In another line of work, she initiated the data collection and evaluation work that led in time to the development of the Cambridge Crystallographic Data Centre (CCDC). Today, no reputable journal publishes any crystallographic work on organic crystals that had not been verified by and included in the CCDC's holdings. Originally, J. Desmond Bernal's dream was to create a scientific information center where the processing of data could lead to new discoveries. Kennard and the CCDC realized Bernal's dream from 1965.

In the second half of the 1960s, we in Budapest took on some initial tasks at the Chemical Structure Research Laboratory of the Hungarian Academy of Sciences to help get the CCDC off the ground. We collected and provided data from electron diffraction structural studies. Eventually, there emerged another data center in West Germany (as it was then) for collecting and evaluating gas-phase structural data, under the leadership of Barbara Starck. Over the years, the CCDC has become an indispensable part of international structural research. Its main value lies in the increased reliability of structural information from laboratories around the world. Their data must meet certain quality requirements before they are accepted and made available to others. Each country benefits as a subscriber from the information accumulated in the CCDC, which now represents well over a million structures and is constantly growing. Each country's subscription fee is adapted to its financial means. The CCDC has grown into a successful business, but it does not seek to make a profit; it supports research, establishes scholarships, and has built its own headquarters, ideally suited to its function, which has won an architectural prize (Fig. 2). Olga Kennard was its director from 1965 to 1997.

Kennard remarried in 1994; her second husband, Sir Arnold Burgen (1922–2022), was a well-known pharmacologist professor who held important positions in the scientific hierarchy. He was one of the founders of the Academia Europaea (London), a scientific academy at the European level, covering all fields of scientific research. Olga Kennard became Lady Burgen but remained Olga Kennard in the academic world. The Burgens lived in Cambridge.



Fig. 2 The architectural-award-winning headquarters of the CCDC in Cambridge, England (photograph by Magdolna Hargittai)

In 1987, she was elected a Fellow of the Royal Society (FRS), and in 1988, she was made an Officer of the British Empire (OBE). In 1993, she was elected a Fellow of the Academia Europaea and in 2003 received an honorary doctorate in law from Cambridge University. In 2020, the International Union of Crystallography awarded her its highest honor, the Ewald Prize. Her portrait is in the collection of the National Portrait Gallery in London. She died three weeks before her 99th birthday. The CCDC remains her personal memorial.

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