Science, Art, and the Discovery of Nuclear Fission

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On December 2, 1942, the first self-sustained nuclear reaction was initiated at the University of Chicago by a group of physicists led by Enrico Fermi. The experiment took place in an old squash court and became one of the landmarks of the nuclear era. Today the site is commemorated by a sculpture called Nuclear Energy, commissioned by the University of Chicago from a British sculptor, Henry Moore. Fermi and Moore were widely influential in science and the arts of their times, respectively.

Enrico Fermi (1901–1954) was born in Rome and was awarded a doctorate at the University of Pisa. He then worked in Gottingen in Germany, in Leyden in Holland, and for 2 years at the University of Florence. He eventually became Professor of Theoretical Physics at the University of Rome. In 1938 he received the Nobel Prize in Physics “for his demonstrations of the existence of new radioactive elements produced by neutron irradiation, and for his related discovery of nuclear reactions brought about by slow neutrons” (1, 2). Fermi also postulated the presence of the neutrino, a particle that was detected in 1956.

After receiving the Nobel Prize, at a time when so-called Racial Laws were being introduced in Mussolini’s Italy, Fermi immigrated to the US. He initially worked at Columbia University in New York and later became one of the leaders of the Manhattan Project, which led to the development of the atomic bomb. After the war, he served on the General Advisory Committee, advising the Atomic Energy Commission.

The 1930s were an immensely exciting period in physics (3). The progress in elucidation of nuclear phenomena was the work of an international community of scientists. In 1935, Frédéric Joliot and Irène Joliot-Curie, the son-in-law and daughter of Pierre and Marie Curie, were awarded the Nobel Prize for “the synthesis of new radioactive elements” (4). In 1938, Otto Hahn (1879–1968), collaborating with Fritz Strassmann in Germany and Lise Meitner (who escaped to the US in 1938), discovered nuclear fission, producing barium after bombarding uranium with neutrons. Hahn received his Nobel Prize in 1944 “for his discovery of the fission of heavy nuclei” (5, 6), and after the war became a strong opponent of the military use of atomic energy. Perhaps only retrospectively can we realize the enormous potential threat that was present at the point when the Nazis were taking over in Germany, with substantial parts of cutting-edge nuclear physics research being accomplished there (7).

Moore’s Nuclear Energy piece, shown in Fig. 1, was unveiled in December 1967, exactly 25 years after the Chicago reactor went live (8).

Henry Moore (1898–1986) did for sculpture of his time what Fermi had done earlier for nuclear physics. He became one of the most influential sculptors of the 20th century. His art reflected his fascination with nature and organic shapes. He was also inspired by the early sculptures from the Aegean, and also those of Africa and Oceania (9, 10). Interestingly, although for most of his career he was not keen on classical art, he became inspired by it later in life (11). His forms emphasized volumes and interspersed them with voids and internal spaces. His recurring themes were “mother and child” and “reclining figure,” the latter being influenced by his experience of the London Underground during World War II; he was appointed a war artist and made a series of drawings of the stations filled with people sheltering there from air raids. There are more references to his wartime experience in the sculpture series entitled Helmet Heads, such as the Helmet Head No. 1 from 1950, currently in the Tate Gallery in Britain (12). His Nuclear Energy piece is a comment on both the destructive and the constructive potential of atomic energy; its upper part is shaped as a helmet-cum-mushroom-cloud, while the lower part suggests a colonnaded cathedral (13).

Moore’s public sculpture was phenomenally successful. To give just a few examples, his Reclining Figure (1957–1958) was sited in front of the UNESCO headquarters in Paris; another Reclining Figure (1963–1965) is at the Lincoln Center for the Performing Arts in New York. The Two-Piece Reclining Figure No. 9 (1968) is in Canberra, in front of the National Library of Australia. His estate at Perry Green in Hertfordshire became a place for art exhibitions of his and other artists’ work—the current one is entitled Body and Void: Echoes of Moore in Contemporary Art (14).

The Nuclear Energy piece places the name of an artist close to fundamental science. There is another point in this story that crosses the art–science divide: a commen-

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orative plaque dedicated to Enrico Fermi has been placed in the Basilica Santa Croce in Florence, where there are monuments to the great Italians, including Leon Battista Alberti, Dante, and Michelangelo.

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References


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