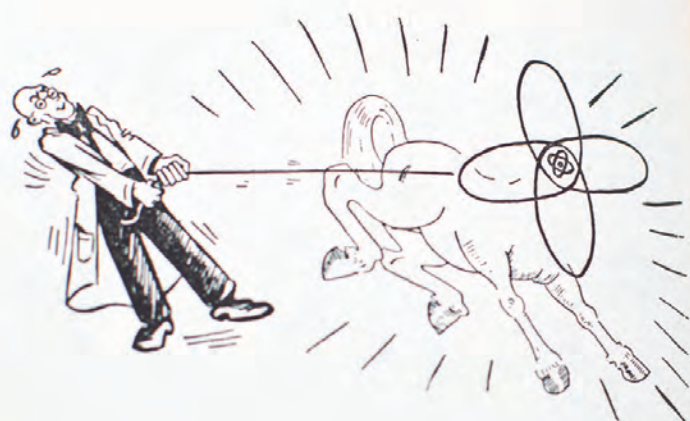




WHERE THE ATOMIC NUCLEI ARE:



CHAPTER TWENTY-TWO

Harnessing the Atom

Harnessing the Atom

A fascinating challenge . . .

ALTHOUGH THE United States has for many years been the largest harnesser of power in the world, the impact of the atom-bomb disclosure has had staggering effects on our imaginative dreams for the future. Newspaper headlines and magazine articles have told us what minute quantities of uranium 235 would be consumed in performing power tasks in the

Harnessing the atomic power

The uranium-carbon piles built this year are ordinary uranium in which the content of the reacting piles can be built for large-scale use of uranium or plutonium. Element number 92 to us in connection with chain-reacting piles is uranium 238 in that it will tend to capture a new atom. In this case the thorium 232 has the same property of splitting and releasing neutrons. Therefore, U233 may be used as material. Since thorium is more plentiful than uranium, future piles may operate with slight modification with uranium alone.

But as far as we know, uranium is all we can start a pile. The plutonium and secondary products that do not remain are the key to all practical developments we see at the present moment.

During the operation of a pile in the form of heat. In 1944, the first furnishing heat at the power plant was away by an air stream flowing through carbon piles at Hanford, Washington. Higher power rate in order to produce atomic bombs. Piles presently require the removal of heat at a rate of 1,500,000 kilowatts. In the case of the Columbia River, the heat is removed

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MAURICE SENDAK, PHYSICS ILLUSTRATOR

RYAN DAHN

The first credited work of the famed children's book author was a set of illustrations in a 1947 popular-science book about nuclear physics.

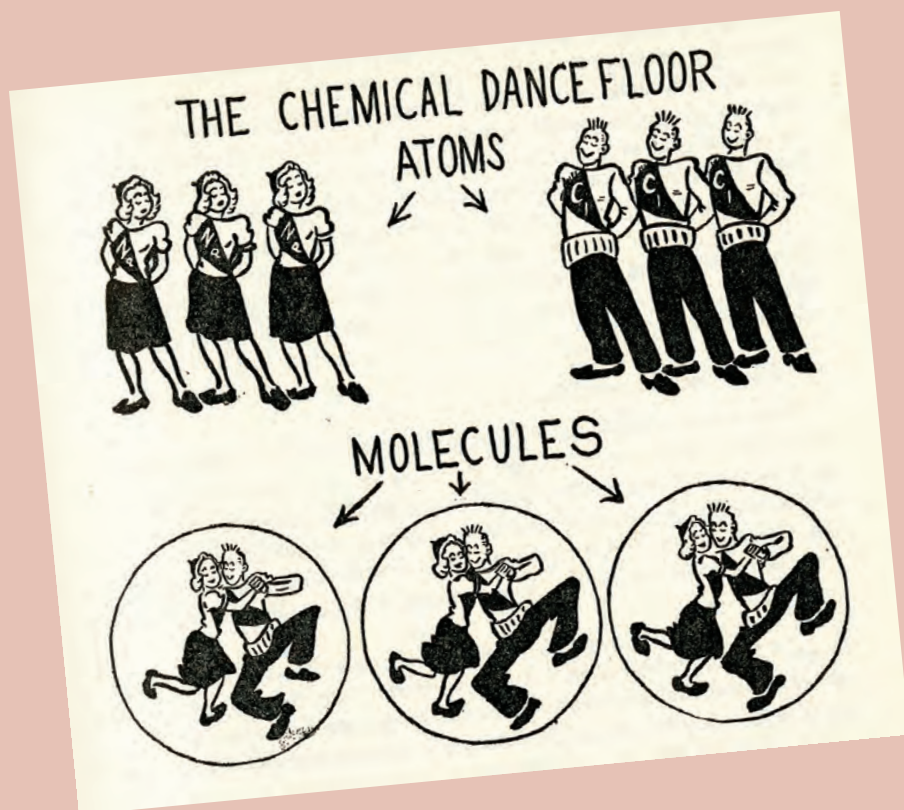
Well before Maurice Sendak became famous for *Where the Wild Things Are*, he was an 18-year-old high school senior in Brooklyn, New York, looking for his first paying art gig. Already known at his school as a talented artist, Sendak was asked in 1946 by his physics teacher, Hyman Ruchlis, to illustrate a popular-science book titled *Atomics for the Millions*. In the book, Ruchlis and coauthor Maxwell Leigh Eidinoff, a professor of chemistry at Queens College in New York City and veteran of the Manhattan Project, aimed to demystify nuclear science for laypeople in the wake of the Hiroshima and Nagasaki bombings.

Sendak agreed to do the work for 1% of the royalties, of which he received an advance of \$100, about \$1600 today. He also negotiated a title-page credit as the book's illustrator—added to the contract in a handwritten addendum at the last minute—and, allegedly, a promise from Ruchlis that he'd receive a passing grade in his physics class. Published in 1947 by a McGraw-Hill imprint, *Atomics for the Millions* was Sendak's first credited work, and copies are now sought by collectors.

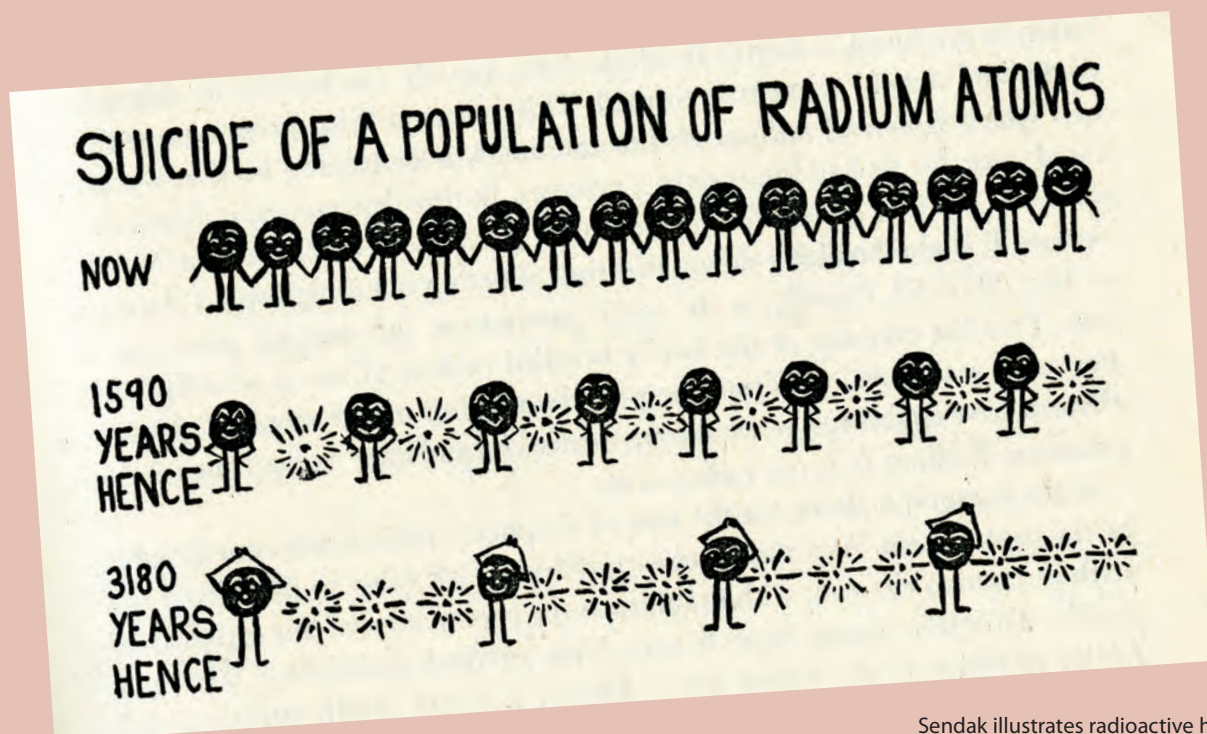
A perfectionist, Sendak apparently expressed disappointment later in life with his illustrations for the book. But one

can clearly see inklings of the artist's budding talent in the whimsical drawings, cartoons, and diagrams he created. Along with elucidating concepts from atomic physics, the art also supported the broader claim made by Ruchlis and Eidinoff in the book: With the atomic genie out of the bottle, humanity needed to choose between a peaceful future fueled by nuclear energy and a devastating nuclear war.

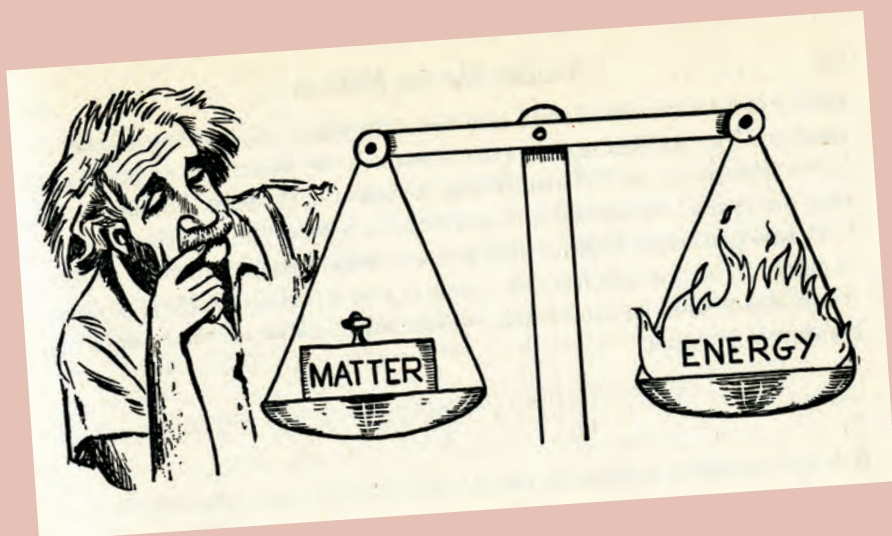
The following pages present an annotated selection of Sendak's illustrations from *Atomics for the Millions*. The decorative motifs are also taken from the book.



In many of his drawings, Sendak anthropomorphizes atoms, molecules, and subatomic particles to convey the otherwise esoteric details of nuclear science. Here, he shows sodium atoms, taking the form of young women reminiscent of 1940s bobby-soxers, and chlorine atoms, represented by strapping young men, meeting on the “chemical dance floor” and forming sodium chloride molecules.



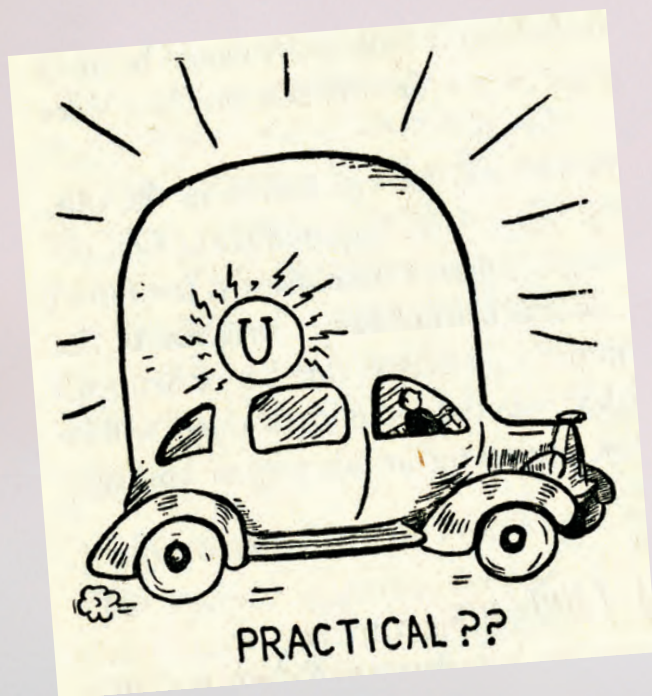
Sendak illustrates radioactive half-life by using radium. He shows the element’s atoms holding hands in the top row. After its half-life of 1590 years has passed, half the radium atoms remain, on average; after 3180 years, only a quarter of the atoms are intact. Sendak’s use of the word “suicide” in his caption is striking: The artist struggled with depression throughout his life and was open about having had suicidal thoughts.



No popular-science book about 20th-century physics would be complete without a discussion of Albert Einstein and $E = mc^2$. In their “Modern Alchemy” chapter, the authors explain the process of nuclear transmutation, the transformation of one element into another through radioactive decay or other nuclear reactions, by analogizing it to alchemy in the Middle Ages. Sendak’s illustration shows Einstein, deep in thought, pondering a balance—an alchemist’s tool—whose two arms are equally loaded with matter and energy.



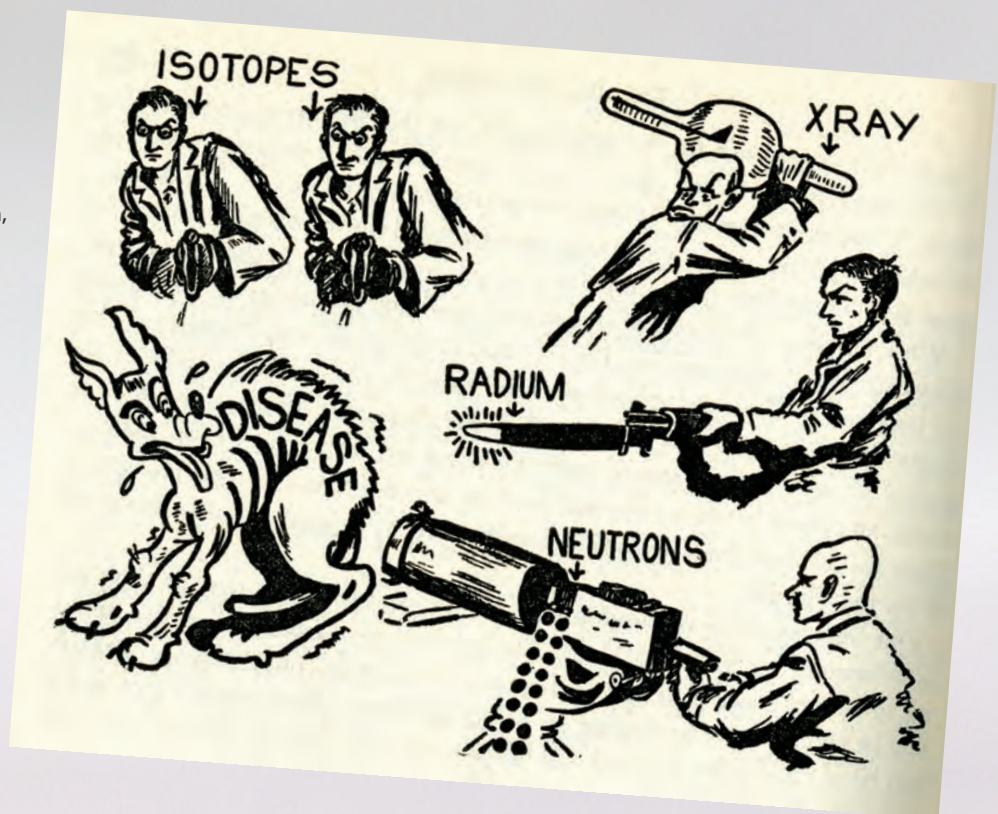
Long before the days of email, chain letters asking recipients to pass along a message to several others arrived in one’s physical mailbox. The authors use that common experience to explain chain reactions in nuclear reactors. In Sendak’s image, a chain letter begins multiplying and quickly buries a harried postal worker under a deluge of mail.

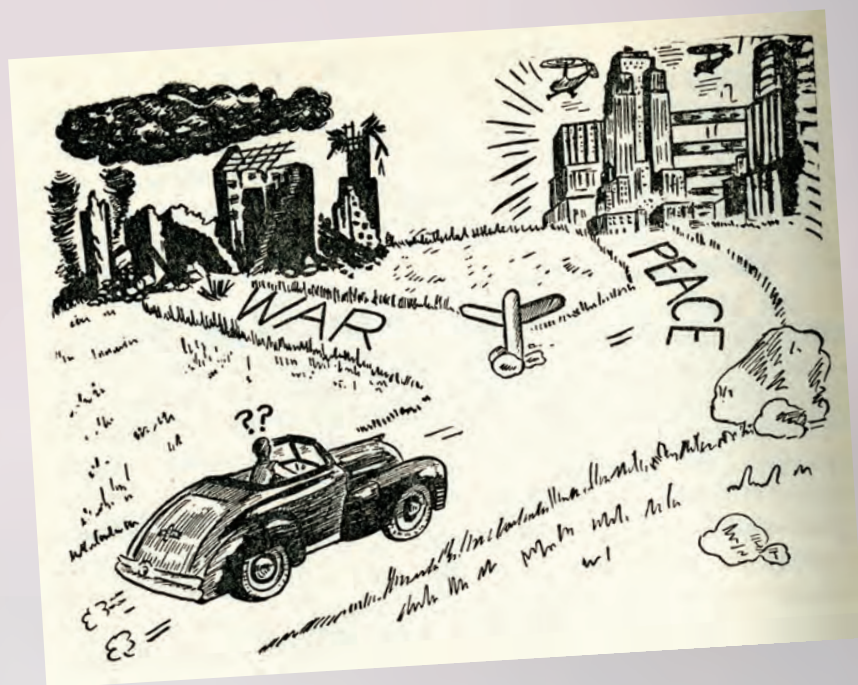


During the early atomic age, nuclear utopianism met US automobile culture in the form of the hypothetical nuclear-powered car: a vehicle that one could drive thousands of miles without refueling. Authors Ruchlis and Eidinoff pour cold water on that idea by arguing that reactors would never be small enough to power a personal vehicle. Sendak's illustration captures the absurdity of the concept.

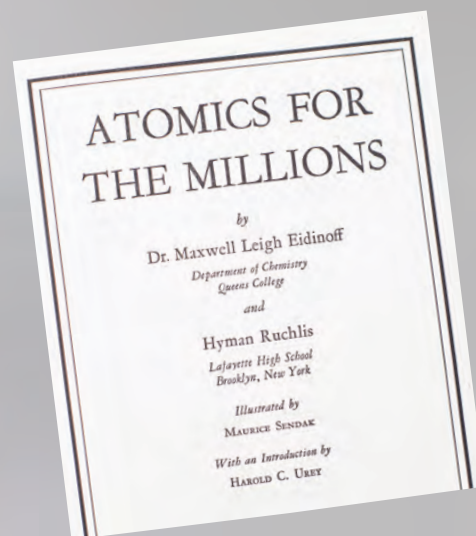
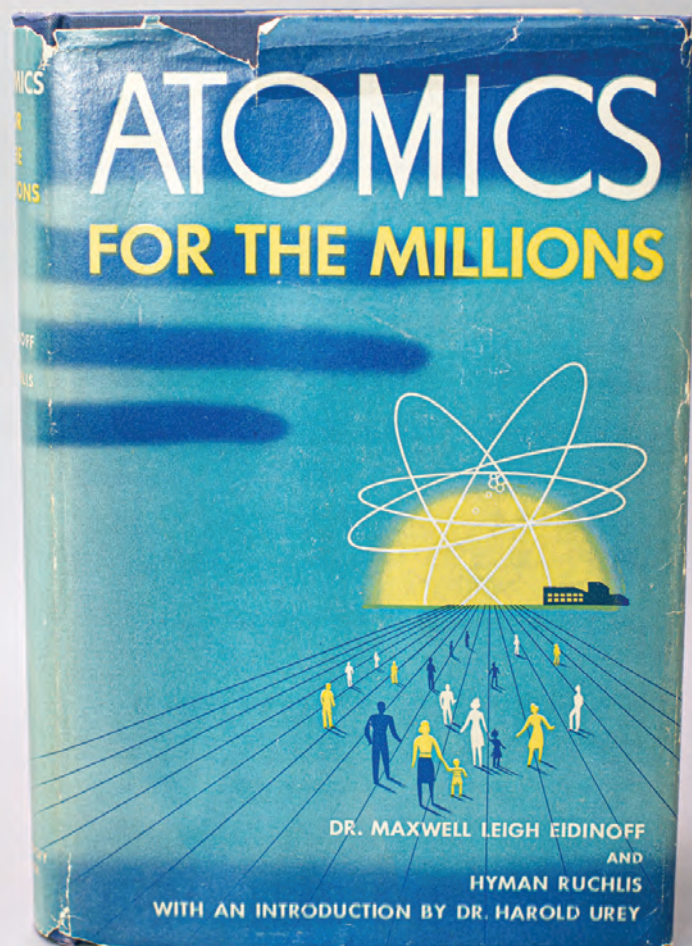


Sendak's drawing for a chapter dedicated to the medical applications of synthetic isotopes echoes World War II-era military imagery. Medical practitioners attack a mangy dog labeled "disease" with what appear to be a neutron machine gun, a radium-tipped bayonet, an x-ray bludgeon, and isotope tommy guns.





Sendak's final illustration in the book makes vividly apparent the binary choice between nuclear utopia and nuclear oblivion that the authors believed humanity was facing. Some might argue that the drawing lacks nuance, but one could say the same of the authors' characterization of the future of the atomic era.



The book's dust jacket shows families and individuals walking toward what appears to be an idyllic atomic-powered future. This copy of *Atomics for the Millions*, which the illustrations were scanned from, is held at the Niels Bohr Library & Archives in College Park, Maryland. The library is part of the American Institute of Physics, which publishes *PHYSICS TODAY*. PT