Isidor Isaac Rabi, a Pioneer
In Atomic Physics, Dies at 89

By MARILYN BERGER

Isidor Isaac Rabi, a pioneer in exploring the atom and a major force in 20th-century physics, died yesterday at his home on Riverside Drive after a long illness. He was 89 years old.

Dr. Rabi, who won the 1944 Nobel Prize in Physics, was a strong intellectual influence on succeeding generations of physicists and a moral influence in the debate over controlling the power of the atom. The center for physics that he established at Columbia University became a training ground for scientists who went on to establish other major centers.

He was awarded the Nobel Prize for developing a method of measuring the magnetic properties of atoms, molecules and atomic nuclei. His work in turn made possible the precise measurements necessary for the development of the atomic clock, the laser and diagnostic scanning of the human body by nuclear magnetic resonance.

Taller or Physicist

The man who was known as I. I. Rabi to his students at Columbia, and as RABI to his wife and friends, was born July 28, 1898, in the town of Rymanow, Austria-Hungary. He was a baby when his parents brought him to New York's Lower East Side. When his father worked, he worked as a tailor. When he did not work, the family went hungry.

"It's a miracle," Dr. Rabi said years later, "how a sickly child from a Lower East Side poverty-stricken family moved in one generation to where I did."

Had we stayed in Europe, I probably would have become a tailor.

Fellow scientists admired what they called his "street smarts" and came to regard him as a conscience of their community. Dr. Rabi (pronounced RAH-bee) devoted much of his life to channeling man's knowledge of the forces of the atom to peaceful purposes. He was the originator of the idea for the CERN nuclear research center in Geneva, which was instrumental in the rebirth of science in post-war Europe. In this country he played a major role in the creation and style of the Brookhaven National Laboratory on Long Island. He devoted a great deal of his energy to reforming science education in the United States and ending the isolation of science from the humanities.

Physics as a Discipline: Noble and Fundamental

Physics, to Dr. Rabi, was the most ennobling of disciplines, as well as the most fundamental. He said he had always tried to impart to his students a certain point of view of physics, and he said: "You're wrestling with a champ," he recalled telling them. "You're trying to find out how God made the world, just like Jacob wrestled with the angel.

Although most of Dr. Rabi's pure scientific research was over by the 1960's, he was a major force in the World of 20th-century science. Sidney Drell, the theoretical physicist, described Dr. Rabi as "a very great giant on the scientific scene."

Not only was Dr. Rabi a great research scientist, Mr. Drell said, but he was also the founder of a great center of research in physics, at Columbia. He also cited Dr. Rabi's contributions to science policy in World War II. His role in reviving European science through the creation of CERN and "his clear speaking out on the deep moral issues" involving nuclear weapons.

In World War II, Dr. Rabi was a leader of the research team in Cambridge, Mass., that helped in the development of the atomic bomb. He also served as a junior adviser on the Manhattan Project, which developed the atomic bomb, and later as a science adviser to President Eisenhower.

As a professor, Dr. Rabi did not enjoy a reputation as a great lecturer and was feared by students as a tough taskmaster. But he is remembered for his moral integrity and for an impeccable taste that set a style for the study of physics in the United States.

One former Columbia faculty member said: "The most spectacular thing about Rabi was that during a 15-year period there were four Nobel Prizes in physics at Columbia. Although Rabi wasn't directly involved in the specific work, he was the key motivating person. He built a great physics department so far beyond anything else in the world that nobody could hold a candle to it."

Many of the teachers in most of the great centers of physics in the United States studied in Dr. Rabi's physics department. Of his many honors, Dr. Rabi was especially proud of one from the American Association of Physics Teachers, the Hans Christian Oersted award for his notable contribution to the teaching of physics.

Dr. Rabi actually stumbled into physics after he had already graduated from college with a degree in chemistry but with an abiding interest in the structure of matter.

"It was a time," he remembered, "of great revolution in fundamental physics, ideas of time and space and causal relationships.

As a young man, Dr. Rabi won a scholarship to Cornell University after graduating from Manual Training High School in Brooklyn.

I turned away from the Old World," he said one day as he reminisced about his life. "I realized I had to be an American, not a Jewish-American. In all of my reading, I tried to become an American. I read a tremendous amount of colonial history. It takes a person like me to really understand what a wonderful country America is."

"I'm an omnivorous reader," he said, looking back at his discovery of the local branch of the Brooklyn Public Library after moving to the Brownsville section of Brooklyn when he was a child. He was about 10 years old when he started reading through the shelves of books, finally coming upon one about Copernicus that changed his idea of the world. "I was thrilled for my age. I still am," he said.

For his 84th birthday, the science librarian made him a sign that read: "To Dr. Rabi, for 50 years of friendship and wonderful books."

He says he could not work. "The ideas are very appealing," he said, "but they're not meant for humans."

At Cornell, he signed up for engineering and chemistry on a scholarship so meager that his parents feared he would lose several teeth because of malnutrition. "I was living on a dollar a day," he said, "and I didn't see wasting the money on vegetables."

After graduating from Cornell, he got a job as a chemist analyzing furniture, nuts and mothers' milk, put out a local newspaper in Brooklyn and worked for a time in a lawyer's office dealing with accounts receivable. When he was 25 years old, he said, he decided it was time to "stop horsing around."

He went back to Cornell for graduate work in chemistry.

"Now comes the celebration," he said, looking back with relish at what happened to him. "I applied for a fellowship and I didn't get it. So I decided to study physics, and I was one that I realized that this was my field."

Dr. Rabi transferred to Columbia, not only because a fellowship was available to him there, but also, as he put it many years later, because he had met "the most beautiful girl in the world," who lived in New York. Three years later, on Aug. 17, 1926, that girl, his wife and partner, was born.
Atomic Physics, Dies at 89

Hein J. Newmark, whose wife is also of the present generation, was a prisoner of war in Europe and the United States during World War II. He was the son of a Russian immigrant and a British scientist, as well as the father of a Russian-born architect.

Making First Contact With Top Physicists

In his early years, he was a member of the American Physical Society and joined the National Academy of Sciences. In 1964, he was elected a fellow of the American Physical Society.

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Precise Measurement of Atoms: A Major Contribution From Rabi

The key to the device is the middle magnet, which can be used to determine the frequency of the particles. The frequency matches the exact frequency of the particles in the beam. When the beam is in resonance — the spins flip back and forth — the particles in the beam will follow the beam's spin. The result is that the particles in the beam are not disturbed, and the beam's spin will be detected.

Years of Devotion To Controlling Arms

Immediately after the war, Dr. Rabi started his efforts to control the atomic bomb. He worked with Oppenheimer to devise what became known as the Baruch Plan for international control of atomic energy.

Four years later, for example, the atomic bomb was not yet developed. But he realized that the bomb was inevitable, and that scientific advances were necessary to control it. He worked with other scientists and engineers, and eventually won a Nobel Prize for his work.

Dr. Rabi's research led to the development of the atomic clock, which is used to measure time and space. The atomic clock is the most accurate and precise timekeeper available, and it is used in many different fields, including telecommunications, navigation, and scientific research.

Increasing stocks of weapons, convinced that each new weapon would inevitably produce a counter-measure, he said, "You have to deal with the enemy, not just the weapons." He believed that the key to stopping the arms race was to change the behavior of those who use weapons. He believed that the root cause of the arms race was the desire for power and control, and that the solution was to change the way we think about power and control.

In his later years, he continued to work on the problem of controlling arms, and he was awarded the Nobel Prize for his work. He was a member of the National Academy of Sciences, and a fellow of the American Physical Society.

In 1988, Dr. Rabi died, but his legacy lives on in the work of those who continue to work on the problem of controlling arms. His work continues to inspire scientists and engineers around the world, and his ideas continue to shape the way we think about power and control.