

# Two retired Oak Ridge National Laboratory employees recall stories about Eugene Wigner

(As published in The Oak Ridger's Historically Speaking column on August 22, 2016)

Carolyn Krause, who is connected with the History Room at Oak Ridge National Laboratory, learned from Dick Raridon, also with the History Room, that Lawrence Dresner, a retired ORNL physicist, had Eugene Wigner as a thesis adviser. So, she emailed Dresner and he responded with a detailed report. Carolyn also remembered from editing Joanne Gailar's oral history, which resulted from an interview conducted by Steve Stow at ORNL 10 years ago, that Gailar told stories about her encounters with Wigner during two different times in her life. Below is Carolyn's compilation of stories from both accounts.

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Eugene Wigner (1902-95), the first research director of what became Oak Ridge National Laboratory, was the doctoral thesis adviser of Larry Dresner at Princeton University. Dresner, who joined the ORNL staff in 1954, had met Wigner the previous year in the office of Alvin Weinberg, then the second research director of ORNL. After an "excruciating" discussion with Wigner, Dresner left with "a burning resolution" to learn all he could about nuclear physics that summer.

Weinberg asked Dresner to calculate the probabilities that atomic nuclei of uranium-238, the most abundant isotope of natural uranium, will absorb free neutrons emitted at different velocities by fission. Wigner and Ed Creutz worked out the theory of "resonance absorption" during the Manhattan Project and, after the war, published it in what Dresner called "a gem of a paper."

Dresner realized that many questions about resonance absorption were still unanswered, so he worked out answers and published many well-received papers on resonance absorption. After several years, he wrote to Wigner and asked him if the results published in these papers would "suffice for a dissertation." Wigner replied in his letter: "Dear Dresner, you have made a fine beginning." After considering Wigner's suggestions and pursuing his own initiatives, Dresner resubmitted his work in fall 1958, and Wigner accepted it.

After winning an extension for a month so he could be present at the birth of his son David, Dresner traveled to Princeton on Dec. 4, 1958, for his final oral exam. Wigner headed his dissertation committee, which included the famous theoretical physicist M. L. (Murph) Goldberger.

He asked Dresner to summarize his work. As he wrote equations on the blackboard, Dresner mentioned that he used Paul Dirac's neat little theorem. "Dresner, who is Dirac?" Goldberger asked. Dresner could have answered that Dirac was one of the 20th century's greatest theoretical physicists, but he guessed from Goldberger's twinkling eye that he wondered if Dresner would say what he answered, 'Dirac is Eugene's brother-in-law.'

"Wigner did not like to be upstaged," Dresner wrote. During his summary, he had mentioned a paper by Syd Dancoff and Mildred Ginsburg. "Dresner," Wigner asked, "who is Ginsburg?"

Dresner had learned earlier from Herb Pomerance in a discussion of Manhattan Project history that Mildred Ginsburg was a young math whiz who worked for Syd Dancoff and later married Murph Goldberger. "I believe," Dresner answered, "that Ginsburg is the present Mrs. Goldberger." The committee members smiled. When Dresner told his children this story many years later, he said that to get a Ph.D. in physics you need to know physics well. He added that it's a good idea to also know about the significant family connections of dissertation committee members.

In 1965 ORNL Director Weinberg invited Wigner to establish and head a Civil Defense research project to determine how best to guard against threats to the U.S. from chemical, biological and nuclear warfare. Dresner asked Weinberg if he "could be transferred to the Civil Defense project from the Chemistry Division, where I was helping with theoretical work on desalination with ion-exchange membranes. At first Alvin demurred, but I nagged him a bit, and being soft-hearted, as he was, he finally gave me permission. Eugene and I then became friends.

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"One of Wigner's major accomplishments in physics was the application of symmetry principles to quantum mechanics. He was keenly aware of the ubiquity of symmetry in all things." One day Wigner asked him directions to the south canteen in the main research building at ORNL. Dresner's initial explanation was unnecessarily involved, so he said:

"Now, to begin with, this building has two halves."

"Dresner, everything has two halves," Wigner said.

"Come with me. I'll take you, and we'll have lunch together."

Dresner wrote, "Eugene spoke flawless, though accented, English. He also spoke Hungarian (his mother tongue), German, and, I believe, Italian. He loved to express profound truths in the simplest, shortest words he could find. 'We must find out how big things are,' he once said to me as we worked at the blackboard.

"Eugene was well known for his unfailing courtesy. I never heard him disparage anyone's work. According to his friend and fellow teacher, Valentin Bargmann, Eugene used two words to describe the works of others: 'amusing' and 'interesting.' "

If he called your paper amusing, he liked it; the "interesting" label "was more or less a death knell," Dresner wrote. Wigner once wrote Dresner that the paper the latter was proud of was amusing. "Not knowing the code, I was mildly disappointed. But once I read Bargmann's remark, I felt a lot better."

The Dresners gave Wigner a birthday party when he turned 80 during a visit to Oak Ridge. They noticed "the first faint glimmerings of the devastating senile dementia that would slowly destroy one of the greatest minds of the 20th century."

In early dementia, Wigner continued to do physics well but his ability to form new memories was marred. Remembering his hotel room number was a challenge he overcame in his own way, Dresner noted. For example, if his room number was 210, Wigner would remember it by saying to himself, "It's the product of all prime numbers less than ten" ( $2 \times 3 \times 5 \times 7 = 210$ ).

In her oral history interview, Joanne Gailar described Wigner as "extremely courteous" who "thanked me profusely" after he visited her to discuss his son whom she taught in nursery school. Later when she was a Civil Defense project employee, they collaborated on papers on Soviet civil defense strategies. When her son had brain surgery in 1968, "Wigner was the most empathetic caring person. And, that was when I discovered he was superstitious," Gailar said, noting that when she told him her son was doing better, he left to search for wood to knock on.

Gailar received an audiotape of the 1995 memorial service for Wigner, sent her by his daughter. It indicates that Edward Teller, the "father of the hydrogen bomb," and his fellow Hungarian were good friends.

"The service was held at Princeton," Gailar said. "Teller, after mentioning Wigner's reputation as a warmonger, told this story about him. There was Wigner at the beach, where a bunch of ants were crawling on him. 'Eugene, aren't they biting you?' asked a friend. 'Yes,' said Wigner. 'Well, why don't you kill them?' 'Because I don't know which ones are biting me.'"

Then Teller said, 'That shows you what a warmonger he was.' "

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Thanks Carolyn!

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Lawrence Dresner in 1992

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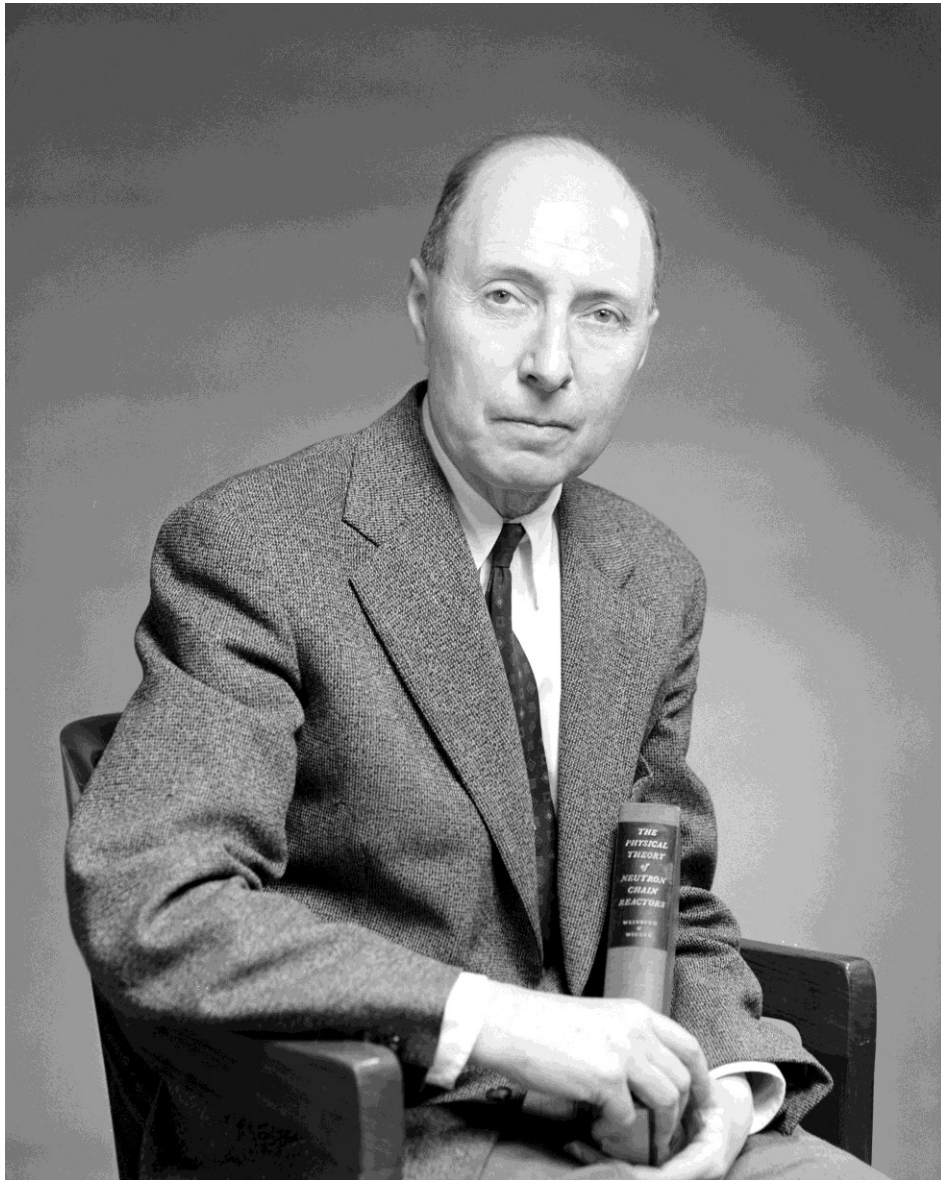
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Joanne Gailar in 1987

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Eugene Wigner in approximately 1958