(As published in The Oak Ridger's Historically Speaking column the week of April 12, 2021)

"If at some time a heavenly angel should ask what the Laboratory in the hills of East Tennessee did to enlarge man's life and make it better, I daresay the production of radioisotopes for scientific research and medical treatment will surely rate as a candidate for first place." —Alvin Weinberg, Director, Oak Ridge National Laboratory, 1955-1973.

On Tuesday, April 20 (Alvin Weinberg's birth anniversary) at 7:00 p.m., a special TRIBUTE TO ALVIN WEINBERG will be held virtually on Zoom: You can participate in the tribute by using this link: <u>Tribute to</u> <u>Alvin Weinberg</u>

Preserving the Alvin Weinberg papers collection at the Children's Museum of Oak Ridge and providing online access are important to Oak Ridge and to the world really. Preserving Alvin's legacy as Oak Ridge's most revered scientist is what this tribute is about. We are nearing the end of over three years of effort to inventory, scan and publish online the collection Alvin left 35 years ago to the Children's Museum of Oak Ridge, and a celebration is certainly in order! Those involved have experienced much reward and want to share that with you.

Presentations will be given by speakers and through videos on his early history, his contributions to the development of nuclear reactors and power plants, and his influence on people and policies as a scientific leader and administrator. Weinberg is featured as a lecturer in one of the videos.

The speakers include Richard Weinberg, son of Alvin Weinberg; D. Ray Smith, historian for the city of Oak Ridge; Bonnie Carroll, founder and chief data officer of Information International Associates, who appears on video; Pat Postma, a friend of Weinberg and ORNL, who appears on video; Syd Ball, expert on molten salt reactors (which Weinberg promoted), and Carolyn Krause, former science writer for The Oak Ridger and former editor of the Oak Ridge National Laboratory Review research magazine (which was created by Weinberg). Gregg Marland, a geologist and climate expert who worked with Weinberg at IEA before taking a position at ORNL, appears on video in his faculty office at Appalachian State University in Boone, N.C.

Information on the new online archives of his scientific publications and other documents will be presented virtually to the public via Zoom at the tribute, which is co-sponsored by the Children's Museum of Oak Ridge and Friends of ORNL.

"The purpose of this public online event is to honor Alvin Weinberg's legacy and to celebrate the preservation and digitization of his papers," said Rhonda Bogard, who led the digitization of the papers, most of which were initially donated to the Children's Museum in 1986.

Weinberg was director of ORNL for 18 years from 1955 to 1973. After a year in Washington, D.C., he became the founder and director of the Institute for Energy Analysis, a think tank on climate and energy issues that he started in 1974 at Oak Ridge Associated Universities. He authored eight books and 541 scientific papers, and he wrote many letters and delivered numerous speeches.

The link to the online database of the Alvin Weinberg Papers is http://bit.ly/digitalweinberg

What follows is drawn from an article written by Carolyn Krause, which was published in the ORNL Review, Volume 40, Number 1, 2007, and which summarizes many of Alvin's accomplishments:

"Alvin M. Weinberg in many ways personified Oak Ridge National Laboratory. As the Laboratory's visionary director and the intellectual leader of an energy policy think tank he founded at Oak Ridge Associated Universities, he influenced U.S. government energy and science policy as well as research funding priorities—from reactor design and nuclear safety to renewable energy and the impact on climate of increased carbon dioxide emissions from coal-fired power plants.

"The son of Russian Jews who met on a ship while emigrating to the United States in 1905, Weinberg

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was born April 20, 1915, in Chicago. He died October 18, 2006, in Oak Ridge at the age of 91.

"The author of eight books, numerous speeches and 541 scientific papers, Weinberg was a nuclear energy pioneer and prophet. He advocated the peaceful use of nuclear energy for producing electricity and medical radioisotopes. He also made accurate long-term predictions about energy technologies. He was a brilliant scientist and innovative scientific administrator. He was a thought-provoking communicator, coiner of words and a man of conscience and social responsibility who cared intensely about the welfare of humankind.

"Weinberg was known on six continents. In Oak Ridge, this citizen of the world and Renaissance man was also a valued friend and neighbor. A lover of music and a musician, Weinberg played Bach preludes and fugues, as well as Christmas carols, on his Steinway grand piano and occasionally gave public concerts. Until his mid-80s he was a competitive tennis player with his backhand slice.

"Weinberg headed the nuclear design of the Graphite Reactor at Clinton Laboratories in Oak Ridge, where he and his family moved in 1945. The X-10 pile, the world's first continuously operating reactor, produced recoverable amounts of plutonium, paving the way for production of this fuel at Hanford to power the atomic bomb that ended World War II.

"In 1946-47, when his mentor Eugene Wigner was research director at Clinton Laboratories, Weinberg developed his administrative skills, first as the physics division director and then as ORNL's research director in 1948, replacing Wigner. Weinberg is credited with saving the Laboratory from shutdown, convincing the federal government that ORNL had reactor development capabilities vital to the nation. In 1955 he was named ORNL director.

"Of the books that Weinberg wrote, he was most proud of the work he coauthored with Wigner, entitled 'The Physical Theory of Nuclear Chain Reactors,' which was published in 1958. "That's probably my most important contribution to science," he once told the editor of the ORNL Review, which he founded in 1967.

"Weinberg was the first to publish and promote to key Navy officers the concept of the pressurized water reactor. The energy source for U.S. nuclear submarines became the dominant reactor design in commercial nuclear power plants, which today provide 10 percent of the world's electricity.

"Freeman Dyson, renowned physicist with the Institute for Advanced Studies at Princeton University, writes in a 2006 letter that, in 1956, Weinberg taught him and others at General Atomic Company the particulars of nuclear reactor function and design. Dyson continues: 'Weinberg made ORNL the best place in the world for designing and building nuclear reactors. Oak Ridge developed the basic technology for scientific research reactors, electric power reactors and Navy submarine propulsion reactors. He was the only nuclear pioneer who supported the wide universe of reactor designs, going beyond the conventional solid-fueled reactors. He built liquid-fueled reactors with highly original designs.'

"Of Weinberg's broader influence at the Laboratory, Dyson writes: 'His vision for Oak Ridge went far beyond nuclear reactors. He made ORNL become an outstanding international center for research in pure physics, chemistry and biology, as well as ecology and environmental science. He was interested in all kinds of energy technology and the effects of technology on the environment. Long before the subject of global warming became fashionable, he set up a research program in Oak Ridge to study the effects of carbon dioxide emissions on climate. This program trained many people who became leaders in climate studies at other institutions'

"Alex Zucker, former acting director of ORNL, says Weinberg's leadership sprang from his interest in knowing ORNL researchers and understanding their work. 'His trademark was sitting in the front row at information meetings and asking penetrating, and sometimes embarrassing, questions,' Zucker notes. 'If he approved—euphoria.'

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"Weinberg was a member of the President's Science Advisory Commission. In 1961 he chaired the Kennedy Administration's Panel of Science Information, which issued the report 'Science, Government and Information.' Also known as the Weinberg Report, it emphasized the need to communicate meaningful scientific information to technical and lay audiences.

"A popular speaker and bold thinker, Weinberg coined new words to explain his groundbreaking ideas about energy and science to lay audiences. Examples are 'burning the sea' (fusion), 'burning the rocks' (fission), 'nuclear-powered agro-industrial complex,' 'nuclear priesthood,' 'technological fix,' 'Big Science' (mega-projects like the moon mission), and the 'Faustian bargain' for nuclear power (the nuclear waste issue). Weinberg started the annual 'State of the Laboratory' address for informing the Oak Ridge community about ORNL research.

"Weinberg left ORNL in 1973 and started Oak Ridge Associated Universities' Institute for Energy Analysis, which he directed from 1974 to 1985. IEA was the first organization to receive significant funding from the Department of Energy for climate studies. In 1974, he worked in Washington, D.C., as director of the U.S. Office of Energy Research and Development to help address the energy crisis. One of his office's recommendations, to establish a solar energy research institute, resulted in the creation of a DOE national lab in Colorado, now called the National Renewable Energy Laboratory.

"Weinberg told the Review in a 1995 interview that his most important and original contribution was to develop criteria for measuring the value of competing scientific ventures. The National Science Foundation uses many of these criteria to guide funding decisions.

"Weinberg was elected to the National Academy of Sciences, National Academy of Engineering, American Philosophical Society and American Academy of Arts and Sciences. He received dozens of honorary degrees. He won the Atoms for Peace Prize, Enrico Fermi Award, E. O. Lawrence Award, Hertz Prize and even the 1950 Young Man of the Year Award from the U.S. Junior Chamber of Commerce. Weinberg promoted peace and the end of the nuclear arms race.

"He led the International Friendship Bell project in which two bronze bells manufactured by Japanese artists were placed in Oak Ridge and Hiroshima, target of the first atomic bomb that used enriched uranium from Oak Ridge. He advocated the 'sanctification of Hiroshima' to make the Japanese city a permanent shrine against nuclear war and for the tradition of non-use of nuclear weapons. The American Nuclear Society, which he helped establish, awards a Weinberg Medal 'for contributions to the understanding of the social implications of nuclear technology.'

"Weinberg's biggest disappointment was that he did not live long enough to witness the 'second nuclear era' with inherently safe nuclear power reactors that would replace fossil fuel plants and curb global warming. ORNL—the multidisciplinary laboratory he rescued, built and personified—continues the effort to realize his dream."

That concludes segments of Carolyn's excellent article in memory of Alvin Weinberg. Please join us on Tuesday, April 20 at 7:00 p.m. on Zoom to participate in the TRIBUTE TO ALVIN WEINBERG: <u>Tribute to</u> <u>Alvin Weinberg</u>

JOIN US ON ZOOM

tinyurl.com/weinberg202

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# Tribute to ALVIN WEINBERG

### SPEAKERS

SYD BALL BONNIE CARROLL CAROLYN KRAUSE GREGG MARLAND PAT POSTMA RAY SMITH RICHARD WEINBERG

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AND

#### THE ALVIN WEINBERG ARCHIVE COLLECTION

Tuesday, April 20

7–8pm

In 1986, **Dr. Alvin Martin Weinberg**, a nuclear science luminary and long-time director of Oak Ridge National Laboratory, donated his personal papers to the Children's Museum of Oak Ridge. Join us on April 20, Weinberg's birth anniversary, to honor his legacy and celebrate the preservation and digitization of his papers! The Alvin Weinberg Archive Database provides a means of searching this large digitized Collection. <u>Search the Archives</u>

This presentation is jointly sponsored by

Friends of ORNL

A Tribute to Alvin Weinberg to be held April 20, 2021