

Martin Whitaker: ORNL's first director was a radiation victim

(As published in The Oak Ridger's Historically Speaking column on April 11, 2016)

Carolyn Krause has now written in *Historically Speaking* about several of the Oak Ridge National Laboratory Directors, such as, Alvin Weinberg, Herman Postma, Alvin Trivelpiece, Bill Madia, Jeff Wadsworth and Thom Mason. She now brings us insight into the lab's very first director and even shows us a very important early lesson he learned. Remember, the world was changing radically and the requirements for dealing with radiation safely was just beginning to be understood!

Enjoy Carolyn's look back at Martin Whitaker:

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The first director of Clinton Laboratories (X-10), which morphed into Oak Ridge National Laboratory in March, 1948, was Martin D. Whitaker. He was the director from 1943 through 1945 during World War II and the Manhattan Project days in Oak Ridge.

The Clinton Labs' initial mission was to demonstrate the reactor production of usable amounts of radioactive plutonium from radioactive uranium in support of the development of the second atomic bomb, which triggered the end of the war. As it turned out, in 1944, Whitaker and his guests were victims of one of the largest radiation exposures during the war. However, this incident led to positive benefits.

Martin Dewey Whitaker was born on June 29, 1902, in North Carolina, and died on August 31, 1960, at the age of 58. At the time of death from lung cancer, he was president of Lehigh University in Bethlehem, Pa.

During his tenure at Lehigh, the university's assets tripled, its endowment more than doubled and the number of professors increased by 75 percent. Six years after he died, the Whitaker Laboratory was named in his honor.

Whitaker graduated with a bachelor of arts (A.B.) degree from Wake Forest College in 1927 and worked as an instructor at the University of North Carolina from 1928 to 1930, while earning a master of science degree in physics. A fellow graduate student was Karl Z. Morgan, who later became one of the nation's first health physicists. Morgan gladly accepted Whitaker's invitation 13 years later to join Clinton Labs as a health physicist. (Morgan later became director of ORNL's Health Physics Division.)

Whitaker then attended New York University, where he earned his Ph.D. degree in physics in 1935. The topic of his doctoral thesis was the absorption and scattering of neutrons. He was acting chairman of NYU's department of physics until 1942 when he was asked to join the Manhattan Project's Metallurgical Laboratory at the University of Chicago.

The director of the Met Lab was Arthur Compton, an Ohio native who won the Nobel Prize in 1927 for demonstrating that electromagnetic radiation has a particle, as well as a wave, nature. The Met Lab was responsible for building nuclear reactors (in Oak Ridge and Hanford, Wash.) to produce plutonium from uranium, identifying ways to separate plutonium from uranium and designing an atomic bomb.

In September 1942, Compton asked Whitaker to form a nucleus of an operating staff for the X-10 Graphite Reactor, which was built from February through October in 1943 and started up November 4, 1943. The pilot plant (or "semi-works" as it was called then) enabled researchers in Oak Ridge to prove that plutonium could be produced in significant amounts in a natural uranium reactor and separated from the spent uranium. While Whitaker was lab director, the University of Chicago operated Clinton Labs for the Army Corps of Engineers.

The first permanent operating staff arrived at X-10 from the Met Lab in April 1943. Du Pont, the X-10 reactor construction contractor, started transferring some of its employees to the site. Some 100 technicians in uniform from the Manhattan District's Special Engineer Detachment joined them. By March 1944, some 1,500 people were working at X-10.

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Whitaker and his research director Richard Doan organized Clinton Labs under the Met Lab's direction. They set up a medical division (which included health physics and biology sections), and divisions devoted to chemistry, separations development, analytical work, engineering development and physics.

According to the 1993 issue of the ORNL Review, "The major concern of Clinton Laboratories during the war was the potential effect of radiation on health. The Oak Ridge facility hired health physicists who monitored radiation throughout the X-10 area, introduced measures for personnel safety and conducted research on radiation and its effects. Caged rodents were placed near the reactor to detect the effects of any escaping radiation. Despite these precautions, the rush to meet deadlines and aid the war effort sometimes led to radiation overexposures."

Whitaker was exposed to radiation when he was leading some dignitaries from Washington, D.C., on an inspection of the Graphite Reactor. On one side was a large opening through a six-foot-thick concrete shield to the graphite-uranium pile. Materials such as shielding samples were placed in the opening to test their ability to stop radiation. When testing was not under way, water containing neutron-absorbing boron was pumped into a tank in the opening to serve as shielding against neutron and gamma radiation.

In his 1999 book, *The Angry Genie: One Man's Walk through the Nuclear Age*, Karl Morgan wrote: "Due to some special experiments that were under way, the tank was empty. As Whitaker and his guests entered the pile building, they ignored the Health Physics Department's yellow ribbons bearing 'Danger' warnings and 'No Admittance' signs placed conspicuously in the area near the empty water tank. They went on to tour the reactor area.

"Our director thereby exposed himself and his guests to a life-threatening direct beam from the operating pile. Horrified to see them in the prohibited area, we rushed them out. We were never able to determine the dose they received because Whitaker and his guests had also ignored laboratory rules by not wearing film badges.

"Fortunately, they spent only seconds in this very dangerous zone. Had they tarried there much longer, they surely would have received a fatal dose. We estimated that each received a dose equivalent to approximately 50 roentgens.

"In some respects this accident proved fortunate, since thereafter the laboratory director strongly supported all health physics rules. Everyone who might conceivably enter a radiation zone now wore a film badge and risked being fired if he or she ignored the yellow ribbons and warning signs."

The debacle turned out to be a blessing in disguise, perhaps Whitaker's best contribution to the lab. Scientists are no longer careless and scornful of radiation protection measures. Safety remains the number one priority at ORNL today.

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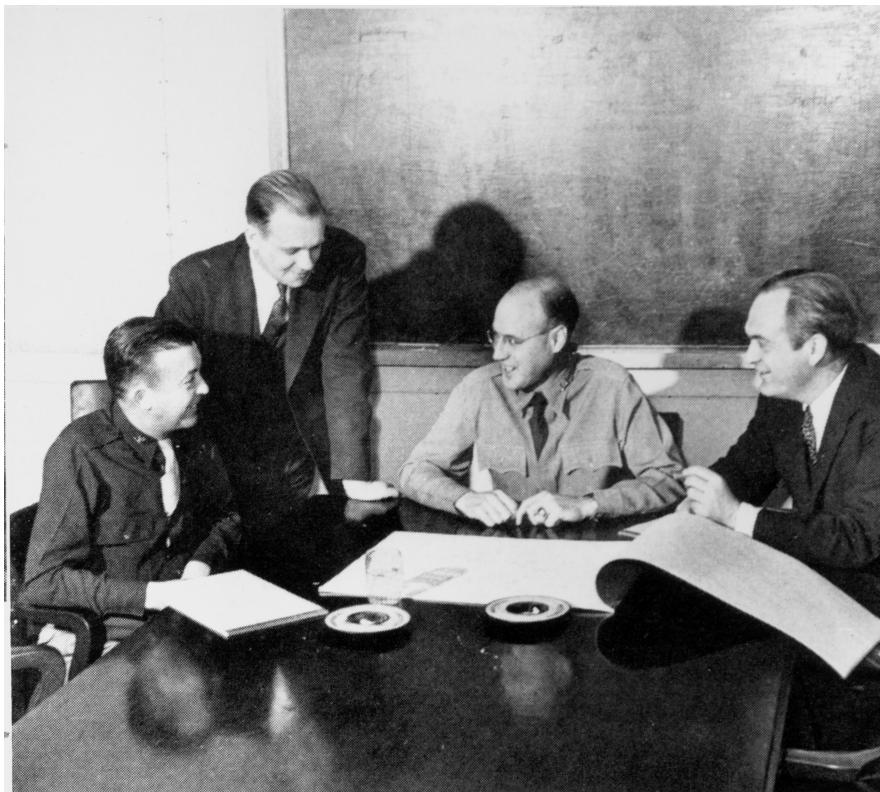
Another excellently researched and written history of an important individual in our history. Thanks, Carolyn...and readers, look for more interesting articles as Carolyn continues to document the directors of ORNL over the years!

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Martin D. Whitaker, first Director of Clinton Laboratories



Martin Whitaker (right), director of Clinton Laboratories, discusses wartime administration problems with, from left, Colonel J.S. Hodgson, Robert Thumser, and Colonel K.D. Nichols