

## MEMORIAL RESOLUTION CONYERS HERRING

(1914-2009)

William Conyers Herring, Emeritus Professor of Applied Physics, passed away at his home in Palo Alto, California on July 23, 2009 at the age of 94. For over five decades he made insightful contributions in materials science and solid state physics that were appreciated by colleagues world wide and were given the highest awards in those fields by the American Physical Society and the Materials Research Society. He was a one-person practioner of interdisciplinary research. In 1959, he was awarded the Oliver E. Buckley Award of the American Physical Society for contributions to electronic band theory and its applications. In 1980, he received the Von Hippel Award of the Materials Research Society for discovering and explaining the remarkable mechanical properties of single-crystal microfibers. He wrote comprehensive scholarly reviews, still well-cited today, of thermodynamic and magnetic phenomena whose worth has been recognized by the National Academy of Sciences with the James Murray Luck Award.

When Conyers started school as a five year old in the small town of Parsons, Kansas, he had already taught himself how to read so well that he was placed in the 5<sup>th</sup> grade. He told his wife that the bullying he received by some older classmates made him aware how important it is to treat people respectfully. His father's death when he was thirteen left the family impoverished, but the following year he was awarded a four-year scholarship at the University of Kansas. He graduated with a major in astronomy and was recruited by Cal Tech where he received special attention because he was the only registered student in Oppenheimer's quantum theory course. However, he found the course requirements at Cal Tech at that time were too restrictive, so he transferred to Princeton, which allowed more freedom for independent study. There Eugene Wigner's group, consisting of John Bardeen, Frederick Seitz, Conyers led by Ed Condon, met weekly and created the modern band theory of solids. He received his degree in 1937 and spent the following two years as a National Research Council fellow at MIT. He invented the orthogonalized plane wave [OPW] method, the first workable scheme for calculating electronic energy bands in solids, and for which much later he received the prestigious Wolf Prize in physics.

Of interest to us at Stanford, he met and mentored Marvin Chodorow, then a graduate student at M.I.T. Marvin frequently expressed his debt to Conyers for teaching him how to construct the "Chodorow potential" and proceed with his thesis calculation of the band structure of elemental copper. Much later, of course, they renewed their friendship as members of the Applied Physics Department.

Conyers served in the Division of War Research at Columbia during the Second World War. In 1946, after a short time in the Applied Mathematics Department at the University of Texas, he took a position as member of staff at the Bell Telephone Laboratories, at Murray Hill, New Jersey. In that same year he married Louise Preusch who

had just graduated from Barnard in math and physics. They made their home in nearby Summit, where their four children, Lois, Alan, Brian, and Gordon were born and raised.

Conyers' creation of the theoretical physics department from the strong group already existing was a major factor in Bell Labs becoming preeminent in solid state physics. For a considerable period Bell was a major source of faculty for research universities that were expanding what is now called condensed matter. Stanford was able to start its semiconductor research program in Electrical Engineering with the appointment of Gerald Pearson. Subsequently, four Nobel Prize winners- Arthur Schawlow, Robert Laughlin, Steven Chu, Douglas Osheroff, and many others including Calvin Quate and myself, were recruited from Bell.

Conyers kept himself and many others informed of significant advances throughout the world by reading the latest journals in order to keep current with the leading contributions of the Russian theorists during the Cold War, and not wanting to wait for problematic translations, Conyers simply learned to read Russian. He organized the information on three-by-five note cards that he kept in a well-traveled suitcase. He served others as a one-man Google, actually a more useful one because he had already filtered out the extraneous. Robert Laughlin has undertaken the well worth while but arduous task of preserving the information, which eventually grew to about 15,000 cards, by initiating a project to digitize it.

Conyers retired from Bell and moved to Stanford University as a Professor of Applied Physics in 1978. He and Louise became active members in the campus community. The profound questions he raised during seminars were appreciated by students and faculty. He continued his celebrated weekly journal club where he solicited qualified colleagues to present short presentations on forefront research that he uncovered in recent publications or correspondence. A 2600<sup>th</sup> (more or less) journal club was held at Stanford in honor of Conyer's 80<sup>th</sup> birthday. There is room to present only one of the many tributes. P.W. Anderson said, "I can best describe the massive impact you have had on solid state physics by visualizing a tree structure of the scientific literature of solid state physics. I colored red all the branches which originate in papers which were either yours or had [or should have had] an acknowledgement of your invaluable help. My conclusion is that the whole tree would have ended up being bright red."

Near the end of his career Conyers was engaged in preparing one final review, "The Evolution of Solid State Physics." As part of Applied Physics' contribution to Stanford's centennial celebrations, he started to give, but due to the infirmities of old age, was unable to complete, a series of lectures. It is left for some historian to use the careful notes he had compiled to complete the task. It is sad that Conyers could not do this himself, but it is wonderful that he never gave up, even after seven decades.

Conyers had many outside interests in addition to his science and his devotion to his family. He was an avid competitive and moderately skilled tennis player. He enjoyed social events frequently would produce a clever and appropriate limerick. He had a deep, non-judgmental faith in Christ. In a science-and-religion lecture series at Stanford in 1985, he

said, “my scientific experiences give me no reason to believe that there is any ‘clockwork’ model of the universe that is ultimately and finally the correct one. Scientific theories will always work with such models and they will always be capable of greater and greater refinement, but I feel sure they will always prove imperfect. It is safer, I think, to have faith in the living force that makes this improvement always possible.”

One thing seems certain—his contributions to physics will live. Those who knew him cherish memories of this remarkable man.

Mr. Chairman, I, Theodore H. Geballe, Emeritus Professor of Applied Physics, have the honor to place before the Senate of the Academic Council a Resolution in the memory of the late W. Conyers Herring, Professor of Applied Physics, Stanford University.

Committee:

Theodore H. Geballe, (Chair)  
Walter H. Harrison