

MAR06-2005-002366

Abstract for an Invited Paper  
for the MAR06 Meeting of  
the American Physical Society

**Low Temperature Physics at Yale in the late 30's through the early 50's**

ROBERT WHEELER, Yale University, Dept of Applied Physics

The low temperature program at Yale was initiated by C. T. Lane (1904-1991) in the fall of 1937 when he was appointed to the teaching staff as an instructor in the department of Physics. Following his doctorate from McGill in 1929 he investigated the magnetic susceptibilities of "soft" metals supported by the National Research Council of Canada, the Commissioners of the 1851 Exhibition and a Sterling Fellowship at Yale. Arranged by Louis McKeehan, with \$5000 from the new George Sheffield research fund, he started the construction of a Kapitza type helium liquefier. The machine was largely completed in the fall of 1939, yet liquid helium was not made until early December 1940 due to the need for extensive on line purification of the gas. Returning in 1945 from war research, Lane and Henry A. Fairbank (Ph.D 1944) continued the metals work along with new thrusts into Second Sound , properties of heliumthree impurities in liquid helium and starting in the 50's on rotating He II. In 1933 both Lane and Onsager were awarded Sterling Fellowships, which initiated a stimulating experimental- theoretical exchange continuing until they both retired. The best-known example was the rediscovery at Yale of the deHaas-van Alphen effect, previously observed only in bismuth, in zinc; where upon Onsager and his students provided new insights into our understanding of the Fermi surface of metals. With the development of new instrumentation one observed vast changes in experimental style during this period. The evolution of the production of liquid helium from Lane's device though the Collins machine to the commodity business of today now makes experiments of huge size and importance possible.