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Lev Landau: A View from the West

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The tragic accident which ended Landau's scientific career at an early age meant that Lev Landau was known personally to only a small number of western scientists. His remarkable influence on twentieth century physics thus came from his published work and indirectly from the members of the famed Landau school, who are so well represented at this Symposium. Regarding the published work, I would distinguish three distinct ways in which Landau's influence has been felt. The most obvious is the set of seminal papers on a broad set of topics ranging from Landau diamagnetism, to the phonon-roton theory and two-fluid hydrodynamics of ^{4}He, Fermi-liquid theory and zero sound, the theory of second-order phase transitions, the Landau-Hopf theory of fluid turbulence and many more. The second class of contributions consists of the famed Landau-Lifshitz Course of Theoretical Physics, which first appeared in the West in the late fifties and early sixties. In many ways the third aspect of Landau's influence, although more difficult to define, is probably even more significant. This is Landau's pervasive presence in a large number of the major theoretical advances in condensed matter and statistical physics throughout the second half of the twentieth century. So many major developments can be viewed as elaborations, advances and - yes - corrections to the foundational theories and points of view laid down by Landau. One example is the theory of superfluidity in Bose liquids, for which one may ask why Landau resisted London's explanation in terms of Bose condensation, which has turned out to be important after all. A second example is the Fermi liquid theory and important later developments stemming from superfluid transitions or effects of strong correlations. A third example is the theory of second-order phase transitions which lays the foundations for the study of critical phenomena using the renormalization group. In each case one marvels at the important foundational role played by Landau's work and one may ask to what extent he himself anticipated the later developments. It is hoped that the subsequent speakers might address some of these questions.