
L'inversione di Walden: The Undergraduate Thesis of Primo Levi

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The Complete Works of Primo Levi in English (3 vol., 2910 p) published in 2015¹ did not include Levi's undergraduate thesis, *L'inversione di Walden* (1941). Levi, a student at the University of Turin, reviewed the literature of Walden inversion, the surprise that some molecules will turn themselves "inside-out" as if they had passed through a looking glass. The Italian race laws restricted Levi from the laboratory and consigned him to the library. Here, is an English translation of the thesis with some commentary on its relation to Levi's *oeuvre*. Levi's review stopped at 1933, just before mechanisms of nucleophilic substitution were sorted by Ingold and Hughes in the UK. Until then, the primary literature on the mechanism of Walden inversion was unsure, rendering it hard to summarize with the clarity that later would become a hallmark of Levi's genius. An up-to-date thesis was also thwarted by the disadvantaging race laws, and by the bombardment of Turin that made daily life difficult for all. Nevertheless, Levi searched in his sources for a quantitative mechanism, internal clocks, for predicting stereochemistry. Levi's two earliest poems, one before Levi's enslavement in the *Arbeitslager* and one immediately thereafter, show that, the thesis notwithstanding, Levi's gifts as a writer and sensibilities were innate, and they predated his most formidable experiences. Molecular chirality remained a lifelong curiosity as did mirrors and their manufacture. Some have extended Levi's study of enantiomers to the "opposite" world he encountered in the *Lager*. For Levi, mirrors and mirror image molecules were real, parts of nature, unlike Auschwitz for which there were few analogies and inadequate language. Precision forbade Levi from comparing enantiomers and mirrors to the *Arbeitslager* which did not invert the normal world but rather turned it upside down (*capovolto*), something mirrors never do.²

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- (1) Levi, P. *The Complete Works of Primo Levi*, 3 volumes. (Goldstein, A. ed.; Woolf, S.; McPhee, J.; Goldstein, A.; Shugaar, A.; Galassi, J.; Appel, A. M.; Moore, M. F.; Bastagli, A.; Bastagli, F.). WW Norton, New York, 2015.
 - (2) As published: Kahr, B.; Rossi, M. *L'inversione di Walden*, The Undergraduate Thesis of Primo Levi, Chemist, Writer, in *The Birth of the 3rd Dimension in Chemistry* (Greenberg, A.; Lewis, D. E. eds.), Springer, Nature, Switzerland, 2025.
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