1154-11-1256 **Michael J. Mossinghoff*** (mossinghoff@alumni.stanford.edu), Center for Communications Research, 805 Bunn Dr., Princeton, NJ 08540, and **Timothy S. Trudgian** (t.trudgian@adfa.edu.au), School of Science, UNSW Canberra at ADFA, Northcott Dr., Campbell, ACT 2610, Australia. *A Tale of Two Omegas.*

On average, would you expect there to be more positive integers $n \leq x$ with an even number of prime divisors, counting multiplicities, or with an odd number? What if instead one counted the number of *distinct* prime divisors of each integer? We investigate the two functions $L(x) = \sum_{n \leq x} (-1)^{\Omega(n)}$ and $H(x) = \sum_{n \leq x} (-1)^{\omega(n)}$, where $\Omega(n)$ counts the total number of prime divisors of n, including multiplicity, and $\omega(n)$ counts the number of distinct prime divisors of n. Studies of $L(x)$ date to work of Pólya from a century ago; the behavior of its oscillations is connected to the Riemann Hypothesis and related problems. The function $H(x)$ is less well studied. We describe some experimental investigations of these functions, and some surprising ways in which $H(x)$ and $L(x)$ qualitatively differ. In particular, we describe a method involving substantial computation that produces lower bounds on the oscillations exhibited by $L(x)$ and $H(x)$, as well as some other functions arising in number theory. (Received September 14, 2019)