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Dreams of a Final System: Origins of the Quest for an Absolute Standard

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The first attempts to find unchanging phenomena that could be used to evaluate the accuracy of standards and recreate them if lost predated the metric system. As early as the seventeenth century, members of the French Academy and British Royal Society sought to use the seconds pendulum and the Earth's meridian as tethers for length standards. These efforts ultimately failed. The vision of an absolute standard was revived in the 1870s, when C. S. Peirce was the first to experimentally tie a unit, the meter, to a natural standard, the wavelength of a spectral line, using a diffraction grating. This work inspired A. Michelson and E. Morley, in the 1880s, to apply the interferometer with which they were attempting to detect ether drift to this purpose. Michelson further pursued this work at the BIPM in 1892, which set the stage for the later redefinition, in 1960, of the meter in terms of the wavelength of a spectral line.