Early 19th-century scientists hypothesized an invisible, massless "ether" permeating all space, existing solely to transmit light waves. In 1887, physicists Albert A. Michelson and E. W. Morley devised an experiment using a specially designed interferometer to detect Earth's motion through this medium. Their apparatus split a monochromatic light beam into two paths, then recombined them, creating bright and dark "fringes" from constructive and destructive interference due to phase differences. These differences would stem from path variations and, critically, time differences caused by motion through the ether. It was predicted that rotating the apparatus 90 degrees would alter the fringe pattern as the phase difference changed. However, Michelson and Morley's experiments consistently found no observable change in the fringe pattern, thereby failing to detect the Earth's motion through the hypothesized ether.