on pages 12 and 13) that, "The smallness of m/e may be due to the smallness of m or the largeness of e, or to a combination of these two." He went on to argue in favor of the smallness of m, "Thus on this view we have in the cathode rays matter in a new state, a state in which the subdivision of matter is carried very much further than in the ordinary gaseous state: a state in which all matter . . . is of one and the same kind; this matter being the substance from which all the chemical elements are built up."

As I see it, Thomson's finest hour as an experimentalist came in 1899 when he applied the methods just described to photoelectrically produced particles and concluded—he was the first to do so!—that these particles were electrons: "The value of m/e in the case of ultraviolet light . . . is the same as for cathode rays."[17] In the same paper he announced his experimental results for the value of e, obtained by a method recently discovered by his student C. T. R. Wilson, who had found that charged particles can form nuclei around which supersaturated water vapor condenses. Thomson's measurement of e is one of the earliest applications of this cloud-chamber technique. He determined the number of charged particles by droplet counting, and their overall charge by electrometric methods, arriving at $e \sim 6.8\times10^{-10}$ esu, a very respectable result in view of the novelty of the method. And that is why Thomson is the discoverer of the electron.

When Thomson addressed a joint meeting of British and French scientists in Dover in 1899, most doubts had been resolved. He quoted a mass of 3×10^{-26} g for the electron, the right order of magnitude. The atom had been split. "Electrification essentially involves the splitting up of the atom, a part of the mass of the atom getting free and becoming detached from the original atom."[18]

ENVOI

TO DEFINE the "birth of an era" is perhaps best left for parlor games. Let me write of the birth of particle physics nevertheless, define it to take place in 1897, and appoint Wiechert, Kaufmann and Thomson as keepers at the gate. Their respective experimental arrangements are of comparable quality, their experimental results equally good. Kaufmann's observation that certain properties of cathode