rays are independent of the nature of the gas they traverse is, we would say, a clear indication the universality of the constitution of these rays. The value for *e/m* he obtained is a good one. Had he added one conjectural line to his paper, something like, "If we assume *e* to be the fundamental unit of charge identified in electrolysis, then cathode rays must be considered to be a new form of matter," he would have shared equal honors with Thomson for advances made in 1897. Perhaps the thought never struck him, perhaps it did but was rejected as too wild. Perhaps also the Berlin environment was not conducive to uttering speculations of this kind, as is evidenced by a recollection about the year 1897: "I heard John Zeleny say that he was in Berlin at that time, working in the laboratory of Warburg. When the discovery of the electron was announced, nobody in Berlin would believe in it."[19] It may not have been known at that time what went through Kaufmann's mind; it certainly is not known now.

It is fitting to conclude with a line from one of my favorite essays: "On History," by Thomas Carlyle[20]: "No hammer in the Horologe of Time peals through the universe when there is a change from Era to Era. Men understand not what is among their hands."

NOTES

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[4]T. Young, *Miscellaneous Works*, Vol. 9, (New York: Johnson Reprint, 1972), p. 461.
[5]J. C. Maxwell, *Collected Works*, Vol. 2, (New York: Dover, 1952), p. 361.
[6]J. D. van der Waals, (Ph.D. diss., Sythoff, Leiden 1873).
[7]A. W. Rucker, *J. Chem. Soc.* 53 (1888), 222.
[8]Maxwell, *Collected Works*, pp. 376–77.
[9]H. von Helmholtz, in *Selected Writings by Hermann von Helmholtz*, ed. R.Kahl (Wesleyan Univ. Press, 1971), p. 409.
[10]G. J. Stoney, *Phil. Mag.* 11 (1881), 381.
[11]———, *Trans. Roy. Dublin Soc.* 4 (1888–92), 563.
[12]E. Rutherford, *Radioactive Transformations* (London: Constable, 1906), pp. 1, 16.
[13]M. Faraday, *Philos. Trans. Roy. Soc.* 128 (1838), 125.
[14]E. Wiechert, *Schriften der Phys.-Okon. Ges. zu Konigsberg* 38 (1897), 3.
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[16]J. J. Thomson, *Phil. Mag.* 44 (1897), 310–12.
[17]———, *Phil. Mag.* 48 (1899), 547.
[18]Ibid., p. 565.
[19]G. Jaffe, *J. Chem. Educ.* 29 (1952), 230.
[20]T. Carlyle, "On History," in *The Varieties of History*, ed. F. Stern (New York: Vintage, 1973).