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THE NATIONAL ACADEMY OF SCIENCES¹

PRESENTATION OF THE COMSTOCK PRIZE

As Dr. Millikan, chairman of the Committee of Award of the Comstock Prize, is unable to be present, it has become my pleasant privilege to tell you the grounds on which the committee recommended to the academy that the prize be awarded to Dr. Ernest Orlando Lawrence.

Prior to 1919, we had no definite information concerning the interior of the nucleus of the atom. We knew that it had a positive charge equal to the sum of those of its extra-nuclear electrons. In addition to this, it was clear that the nuclei of the various chemical elements were all constructed from the same building blocks. But nothing was known about the nature of these blocks nor of the forces holding them together. The constitution of the nucleus was, then, one of the most fundamental problems that had ever presented itself to physical science.

It was Lord Rutherford who opened the door to this rich storehouse of scientific knowledge. By shooting

¹ Meeting at Rochester, N. Y., October 25, 26 and 27, 1937.

alpha particles into nitrogen he was able to disintegrate the nitrogen nucleus with the formation of protons and an oxygen isotope. His classical experiment was followed by the bombardment of other elements with natural alpha particles and, in this way, the nuclei of nearly all the lighter elements up to calcium were transformed. With one exception, however, all attempts to transform the nuclei of the heavier elements had failed. Thus arose the urge to produce, artificially, particles having a higher energy content than those projected spontaneously from the radioactive elements. It was clear that, given sufficiently high voltages, such particles could be produced, provided suitable tubes could be developed to withstand these difficulties and seemingly serious limitations.

Dr. Lawrence envisioned a radically different course—one which did not have those difficulties attendant upon the use of potential differences of millions of volts. At the start, however, it presented other difficulties and many uncertainties, and it is interesting to speculate on whether an older man, having had the same vision, would have ever attained its actual em-

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