out. If any particles of dust are present, condensation takes place readily on these as nuclei—a fact familiar to all who have noted the heavy fogs in smoky atmospheres. Should no such dust particles be present, however, under proper conditions, *ions* act as nuclei for condensation. In this way, when the gas expands, if any ions are present, a small *visible* water drop forms around the *invisible* ion. By illuminating the gas immediately after expansion, and by taking an instantaneous photograph, pictures of the arrangements of ions as caused by different agencies have been obtained by Mr. Wilson.

This method has been used to visualize some of the facts of radioactivity. When an atom disintegrates in the manner noted above, the transformation is frequently accompanied by the emission of a rapidly moving electron (in this case generally called a β particle) and by a much heavier but more slowly moving positively charged α particle. (Incidentally it may be noted that the α particle has been identified with an atom of the rare gas, helium.) Now when a quickly moving charged particle moves through a gas it continually encounters ordinary neutral atoms, *from some of which it succeeds in extracting an electron.* In other words, as an α or β particle moves along, it ionizes the gas along its path. This has been shown in a beautiful manner by Mr. Wilson. By placing a small quantity of a radioactive substance within his expansion apparatus, he obtained photographs which show the actual paths of α and β particles by the trail of ions left behind them. In the case of an α particle, so many ions are produced that a continuous line is seen on the photographs. In figure 8 the radial lines represent the paths of numerous α particles shot off from the radioactive substance placed at *a*, while figure 9 shows a photograph of the trails of two single α particles. In the case of the lighter β particle, a much smaller number of ions are made and a discontinuous line is obtained. This is well shown in figure 10, a reproduction of a photograph of the trail of a single β particle. In this latter case it will be seen that the individual ions may be counted. Readers interested in modern physics will find a brief but attractive presentation of recent developments along lines discussed in this paper in a small book, "Beyond the Atom," by Prof. Cox.*

* "Beyond the Atom," Cox. Cambridge Univ. Press, 1913. 1s. net.

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