Alexander Williamson (1824–1904), himself a convinced atomist. In his presidential address of 1869 to the London Chemical Society, he said:

> It sometimes happens that chemists of high authority refer publicly to the atomic theory as something they would be glad to dispense with, and which they are ashamed of using. They seem to look upon it as something distinct from the general facts of chemistry, and something which the science would gain by throwing off entirely. . . . On the one hand, all chemists use the atomic theory, and . . . on the other hand, a considerable number view it with mistrust, some with positive dislike.[3]

On the whole, molecular reality met with less early resistance in physics than it did in chemistry. That is not surprising. Physicists could already *do* things with molecules and atoms at a time when chemists could, for most purposes, take them to be real or leave them as coding devices.

The insight that gases are composed of discrete particles dates back at least to the eighteenth century. Daniel Bernoulli (1700–1782) may have been the first to state that gas pressure is caused by the collisions of particles with the walls that contain them. The nineteenth-century masters of kinetic theory were atomists—by definition, one might say. In Rudolf Clausius' (1822–1888) paper of 1857, entitled "On the kind of motion we call heat," the distinction between solids, liquids, and gases is related to different types of molecular motion. Ludwig Boltzmann (1844–1906) was less emphatic, but he could hardly have developed his theory of the second law of thermodynamics had he not believed in the particulate structure of matter.

Long before these learned fin-de-siecle discourses took place, in fact long before the laws of thermodynamics were formulated, theoretical attempts had begun to estimate the dimensions of molecules. As early as 1816, Thomas Young (1773–1829) noted that "the diameter or distance of the particles of water is between the two thousand and the ten thousand millionth of an inch."[4] In 1873 James Clerk Maxwell stated that the diameter of a hydrogen molecule is about 6×10^{-8} cm.[5] That same year Johannes Diderik van der Waals (1837–1923) reported similar results in his doctoral thesis.[6] By 1890 the spread in these values, and those obtained by others, had narrowed considerably. A review of the results up to the late 1880s placed the radii of hydrogen and air molecules between 1 and 2×10^{-8} cm,[7] a remarkably sensible range.