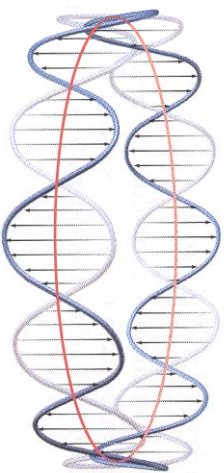
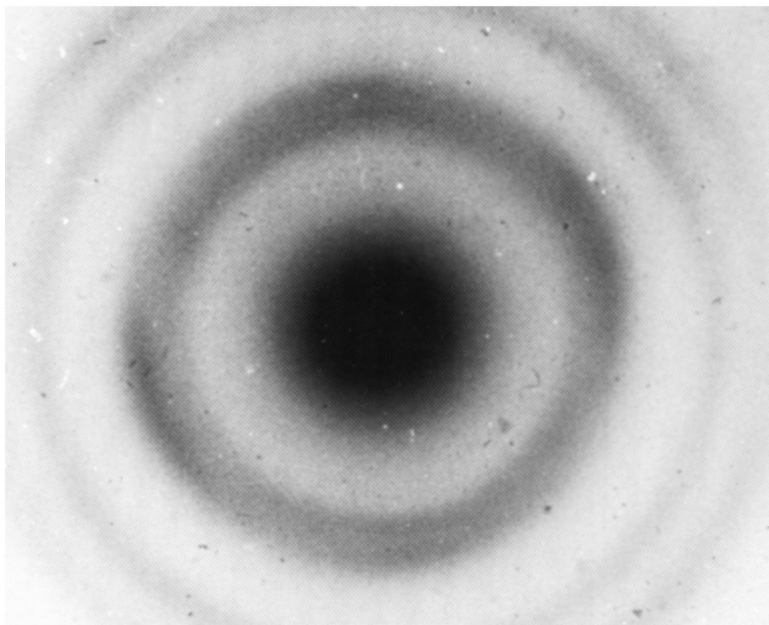


**figure 19-15** Standing waves as the superposition of left- and right-going waves; 1 and 2 are the components, 3 the resultant.

David Halliday and Robert Resnick, *Physics*, 3rd ed., Wiley: New York, 1978.

**FIGURE 4.18** A circular standing wave on a closed loop. The state shown has  $n = 7$ , with seven full wavelengths around the circle.



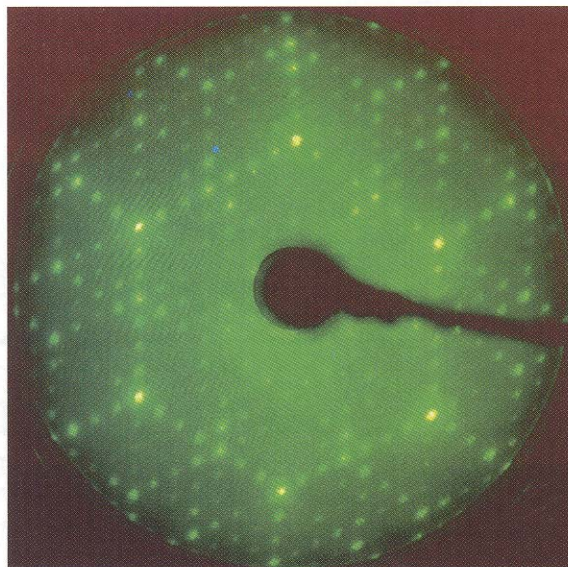


**FIGURE 1.21** Davisson and Germer showed that electrons produce a diffraction pattern when reflected from a crystal. G. P. Thomson, working in Aberdeen, Scotland, showed that they also produce a diffraction pattern when they pass through a very thin gold foil. The latter is shown here. G. P. Thomson was the son of J. J. Thomson, who identified the electron (Section B). Both received Nobel prizes: J. J. for showing that the electron is a particle and G. P. for showing that it is a wave.

Peter Atkins and Loretta Jones, *Chemical Principles*, 4th ed.,  
W. H. Freeman: New York, 2008.

**FIGURE 4.22** Low-energy electron diffraction pattern of the same silicon surface imaged by scanning tunneling microscopy in the figure opposite page 1 of this book.

(Courtesy of Dr. Gerard Parkinsen and Mr. William Gerace,  
OMICRON Vakuumphysik GMBH, Tanusstein, Germany)



Oxtoby, Gillis, and Campion, *Principles of Modern Chemistry*, 6th ed.,  
Thomson Brooks/Cole: Belmont, CA, 2008.