Röntgen’s great discovery of the “new kind of rays” that could reveal the structure of opaque objects swept the world in 1896. By 1949 it was widely recognized that the short wavelength should open microscopy far beyond that achieved with visible light. For crystals, imaging molecular structure at atomic resolution was developed quite rapidly. Beyond crystals it took over 100 years for X-ray microscopy to mature. We shall trace this long road, and the rapidly accelerating progress in the field.