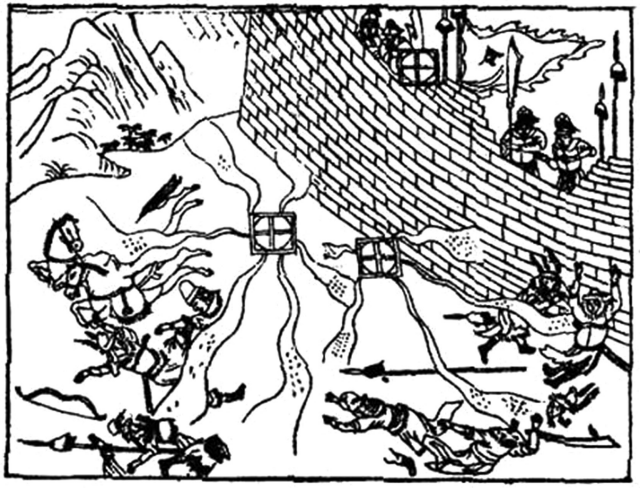

Figure 2.1 Illustration from thirteenth century China showing soft case grenades thrown from battlements to explode and release noxious fumes. (Reproduced with kind permission from Leong Kit Meng.)

Figure 2.2 Trench warfare, World War I. (Courtesy of Wikipedia, https://en.wikipedia.org/wiki/Trench_warfare#/media/File:Cheshire_Regiment_trench_Somme_1916.jpg.)

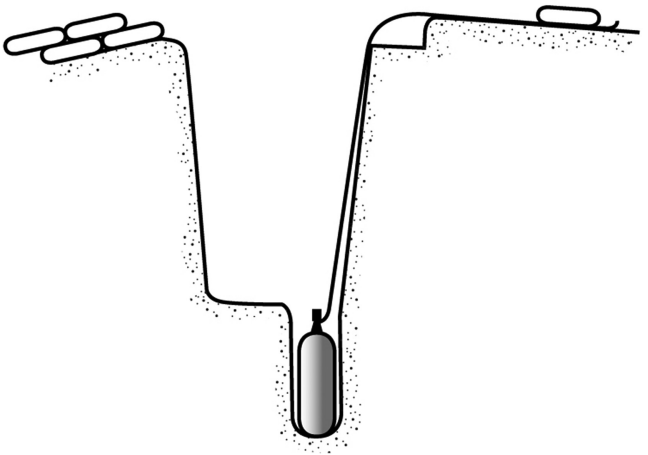

Figure 2.3 Typical German chemical cylinder setup ready for discharge. Thousands of cylinders were opened simultaneously, creating the gas cloud. (Courtesy of Army War College, *German Methods of Offense*, Volume 1, in: *Gas Warfare*, War Department, Washington, D.C., p. 14, 1918. With permission.)

Figure 2.4 Chlorine being released from canisters, World War I. (Courtesy of U.S. Army Medical Department Center and School, http://www.bordeninstitute.army.mil/published_volumes/chemBio/Ch2.pdf.)

Figure 2.5 Canadian soldier suffering from mustard gas burns sustained during World War I. (Courtesy of Wikipedia, http://en.wikipedia.org/wiki/File:Mustard_gas_burns.jpg.)

Figure 2.6 Fritz Haber is considered by many to be the *Father of Chemical Warfare*. (Courtesy of the Nobel Prize, http://nobelprize.org/nobel_prizes/chemistry/laureates/1918/index.html.)

Figure 2.7 Victims of Iraqi chemical weapons, early 1980s. (Courtesy of Wikipedia, http://en.wikipedia.org/wiki/File:Chemical_weapon2.jpg.)

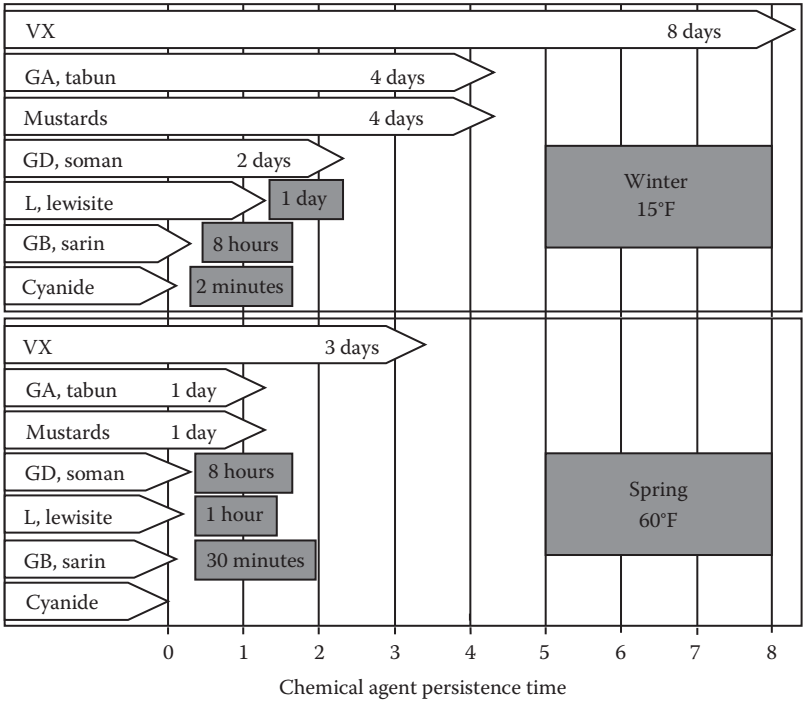

Figure 2.8 Graphical representation of the persistence of various types of chemical weapons agents during two times of year. (Courtesy of Swedish Defence Research Agency. With permission.)

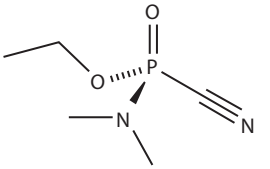

Figure 2.9 Structure of tabun.

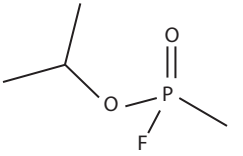

Figure 2.10 Structure of sarin.

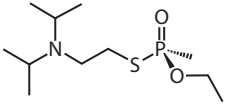

Figure 2.11 Structure of VX.

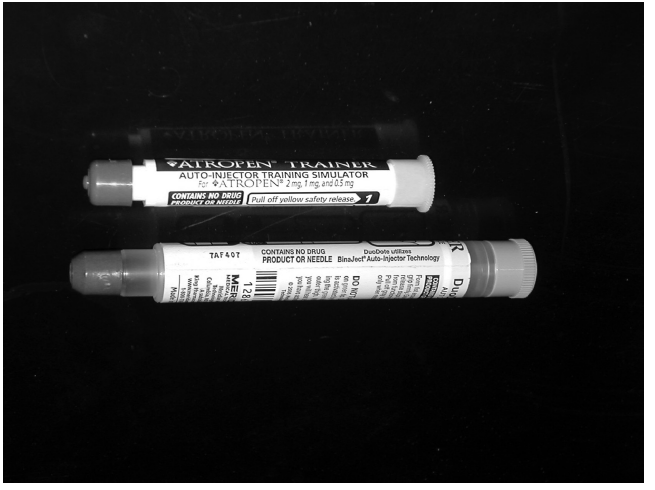

Figure 2.12 Atropine autoinjectors.

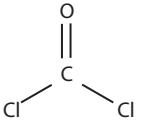

Figure 2.13 Structure of phosgene.

002x013.eps

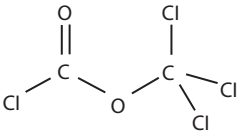

Figure 2.14 Structure of diphosgene.

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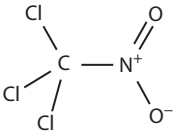

Figure 2.15 Structure of chloropicrin.

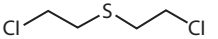

Figure 2.16 Structure of sulfur mustard.

002x016.eps

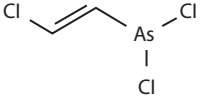

Figure 2.17 Structure of lewisite.