2.8: The Risks of No Risks

There are limits to the reduction in risk beyond which efforts to do so become counterproductive. As in other areas of endeavor, there are circumstances in which there is no choice but to work with hazardous substances. Some things that are inherently dangerous are rendered safe by rigorous training, constant attention to potential hazards, and understanding of hazards and the best way to deal with them. Consider the analogy of commercial flight. When a large passenger aircraft lands, typically 100 tons of aluminum, steel, flammable fuel, and fragile human flesh traveling at a speed of twice the legal interstate speed limits for automobiles come into sudden contact through air-filled rubber tires with an unforgiving concrete runway. That procedure is inherently dangerous! But it is carried out millions of times per year throughout the world with but few injuries and fatalities, a tribute to the generally superb design, construction, and maintenance of aircraft and the excellent skills and training of aircrew. The same principles that make commercial air flight generally safe also apply to the handling of hazardous chemicals by properly trained personnel under carefully controlled conditions.

So, although much of this book is about risk reduction as it relates to chemistry, we must always be mindful of the risks of not taking risks. If we become so timid in all of our enterprises that we refuse to take risks, scientific and economic progress will stagnate. The U.S. space program is an example of an area in which progress has been made only by a willingness to take risks. However, progress has probably been slowed because of risk aversion resulting from previous accidents, especially the 1987 Challenger space shuttle tragedy. If we get to the point that no chemical can be made if its synthesis involves the use of a potentially toxic or otherwise hazardous substance, the progress of chemical science and the development of such beneficial products as new life-saving drugs or innovative chemicals for treating water pollutants may be held back. It may be argued that thermonuclear fusion entails significant risks as an energy source and that research on controlled thermonuclear fusion must therefore be stopped. But when that potential risk is balanced against the virtually certain risk of continuing to use fossil fuels that produce greenhouse gases that cause global climate warming, it seems sensible to at least continue research on controlled thermonuclear fusion energy sources. Another example is the use of thermal processes for treating hazardous wastes, somewhat risky because of the potential for the release of toxic substances or air pollutants, but still the best way to convert many kinds of hazardous wastes to innocuous materials.