Two recent trends are both causing more and more radioactive material to flow into municipal landfills. In late 1987 the federal Nuclear Regulatory Commission (NRC) re-classified large amounts of "low level" radioactive waste as "below regulatory concern" (in other words, too low to worry about). These wastes, from hospitals, laboratories, and nuclear power plants, used to be put into special (expensive) landfills, but now they can legally be sent to the town dump. At the same time, radioactive wastes are increasingly being incorporated into industrial and consumer products, which ultimately get thrown into the town dump—or are incinerated, then dumped. The safety implications of these trends must be questioned, particularly in light of new scientific evidence about the dangers of radioactivity to humans.

X-rays were first discovered in 1895 and came into widespread use for medical purposes soon thereafter. Many early radiation researchers died from cancer caused by the radiation used in their experiments. Likewise, early medical uses of radiation killed many patients. As recently as the 1950s, for example, many pregnant women were routinely given pelvic examinations by x-ray. Then in 1956, Dr. Alice Stewart published her landmark paper showing that pelvic irradiation increased the incidence of childhood cancer and leukemia by 50%. Today doctors take considerable pains to avoid fetal exposure to radiation, but the lesson was costly to learn.

Radiation regulations in the United States are constantly tightening. What used to seem sensible and safe is now recognized as foolishly and dangerously. Unfortunately, these regulations can only work in situations where exposure of individuals can be measured and controlled, such as medical exposures and exposures of workers in nuclear power plants. Radioactive wastes in municipal landfills are, by their nature, uncontrollable.

Despite the trend toward tightened regulations, there is a counter-trend putting more and more radioactive material into commercial products. Exposures from these sources are thus increasingly difficult to control. "Industrial and consumer devices incorporating radionuclides are proliferating as fast as inventors and entrepreneurs can dream them up," says Dr. John Gofman, Professor Emeritus at University of California at Berkeley.

Many people have heard of the unfortunate women who in the 1920s got cancer because they painted dials of wrist watches with radioactive radium-226. What is not so well-known is that selfilluminating radioactive watches are still being sold; radioactive tritium and radioactive promethium-147 have been substituted for radium. Exposures to the general public from this source are low, but the trend is clear: more and more radioactive material is being used in commercial products. In 1977—the most recent list we could find—the United Nations published a four-page list of consumer products containing radioactive materials. The list includes many radioluminescent products with the radionuclide embedded in paint or plastic: aircraft instruments, compasses, instrument dials and markers, thermostat dials and pointers, automobile lock illuminators, automobile shift quadrants, bell pulls, fishing lights and spirit levels. The radioactive elements involved are tritium, promethium-147 and radium-226.

Radioactive elements in sealed tubes are marketed in timepieces, ordinary compasses, marine, compass-classified marine navigational instruments, generators, markers, signs, indicators, exit signs, step markers, mooring lights and buoys, public telephone dials, light switch markers, bell pushes and miniature light sources. The radionuclides involved are tritium and krypton-85.

Electronic and electrical devices employing radionuclides include electronic tubes, glow discharge tubes, voltage discharge tubes, cold cathode tubes, fluorescent lamp starters, highpressure mercury-vapor lamps, vacuum tubes, glow lamps, spark-gap tubes, high-voltage protective devices and low-voltage fuses. The radionuclides involved are tritium, cesium-137, radium-226, thorium, nickel-63, cobalt-60, krypton-85 and promethium-147.

Gas and aerosol (smoke) detectors, now numbering in the millions, can contain Americium-241, radium-226, and plutonium238. (There are non-radioactive smoke detectors sold as well.)

Eyeglass lenses are on the market containing up to 30% by weight of radioactive uranium and thorium. Dental porcelain are marketed containing a combination of radioactive uranium and cerium, aimed at simulating the florescence of natural teeth in daylight and artificial light. Some ceramics (dinner plates) have been reported to contain as much as 10% uranium or thorium. The mantels of Coleman lanterns are made of radioactive thorium. The United Nations, in reporting this partial list of radioactive consumer products, concluded with these remarks: "It must be pointed out, however, that accurate information on the [radio]activities contained in the consumer products and on the number of products manufactured is sometimes difficult to obtain." Manufacturers are reluctant to discuss radioactivity in their products.

We must stress that the levels of radioactivity in these products are low. Still, as new evidence becomes available, radioactivity seems to be more dangerous to humans that previously realized.

In December, 1987, SCIENCE magazine (voice of the American Association for the Advancement of Science) described new studies showing that radiation of humans is two to seven times more cancer-causing than previously thought. Science pointed out that "most of what we know about the biological effects of radiation" comes from studies of people who lived in Hiroshima and Nagasaki at the time we A-bombed them, 45 years ago. Since that time, studies have been underway to estimate the radiation doses received by various individuals and the resulting medical effects. In 1965, calculations of the radiation dose were used throughout the world to set permissible radiation exposure levels. "It turns out, however, that those calculations were wrong," reports SCIENCE. The doses that A-bomb victims received were much lower than previously thought; thus the dangers of low exposures are far greater than previously realized. (An actual model of the Hisoshima bomb was constructed at the government's laboratory at Los Alamos, New Mexico, and was not exploded but was run as a controlled reactor while measurements were taken.)

Dr. Arthur Upton of New York University says new cancer mortality data from Japan "are causing total risk to appear much larger than it did a few years ago." The risk is greater among adults but greater still among children. Among children, radiation seems to be ten to 12 times more dangerous than formerly thought.

As the cancer risks from radiation rise, and as more and more radioactive material gets flows into municipal landfills, we must recognize that the town dump has become more dangerous than we used to think.


--Peter Montague

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