

ELEMENTS OF INDUSTRIAL TOXICOLOGY

changes in the cornea to develop. There is no evidence of systemic injury associated with these eye injuries. Skin irritation and staining may be the result of skin contact.

See *Hygienic Guide*

Radioactive elements and compounds that are toxic are discussed in Chapter 42, "Ionizing Radiation."

Rotenone is the active constituent of the derris and cube plants, as well as of many other leguminous plants. It is highly toxic to insects but of relatively small hazard to mammals, and is therefore widely used as an insecticide. The powdered plant material is irritating to the skin and causes a dermatitis in a large proportion of the workmen handling it, and inhalation of large amounts of rotenone dust will produce a severe pulmonary irritation.

These hazards can be readily controlled by enclosure and exhausting of the equipment in which the material is handled and by careful personal hygiene.

Selenium compounds are uniformly highly toxic, although toxicity varies somewhat according to the solubility of the specific compound. The chronic effects of selenium were first noticed in "alkali disease" of cattle feeding on selenium-bearing forage. It is known that rats on a diet containing 350 μ of selenium per kg of body weight show definite symptoms of toxicity after a few weeks.

Symptoms are a garlicky odor of the breath, which may persist for a long time after the exposure is terminated, nervousness, gastrointestinal disturbances, loss of weight, and great pallor.

Although all the selenium compounds are toxic, exposures to hydrogen selenide and to selenium oxychloride are likely to be the most severe.

Selenium oxychloride produces extremely severe blisters and burns. A minute drop of the liquid on the skin will produce a third-degree burn. Immediate washing with plenty of water will reduce the severity and extent of the burn but will generally not prevent it.

See also Hydrogen selenide and *Hygienic Guide*

Silica is generally recognized as the most hazardous of the dusts which, when inhaled

in excessive amounts, can produce a fibrotic change in the lungs or silicosis.

Silica is found in industry in the forms of quartz or sand, quartzite, sandstone, flint, tripoli, diatomaceous earth, and as an important constituent in chert, granite, and other kinds of minerals. Whatever the form and manner of use, exposure to free silica should be kept as low as possible by dust suppression methods. There is no method known for removing fibrotic tissue from the lungs, consequently, silicosis is incurable.

For a discussion of the mechanism and symptoms of silicosis, see Chapter 39, "Industrial Hygiene." Also note the method of calculating threshold limit values for mineral dusts given in Table 40-B in this chapter.

Also see Industrial Data Sheet 531 and *Hygienic Guide*.

Sodium chlorate is a solid oxidizing agent which, with reducing agents such as sugar, coal dust, shellac, sawdust, or other organic materials, can form explosive mixtures that may be detonated by friction or shock. Sodium chlorate is generally shipped in boxes or kegs lined with heavy brown paper. After the material is removed from the container, both the lining and the box or keg should be burned immediately.

Chlorate solutions are widely used for the destruction of weeds and other noxious plants. The clothing of workmen on these jobs, if saturated with the solution, can be ignited either through friction or through smoking. Combustion in such cases is practically explosive, and the injuries are likely to be fatal.

Walking on chlorate spilled on the floor can also cause serious burns. The material should be handled over smooth, impervious floors, and spillage should be cleaned up immediately. Impervious clothing should be worn while chlorate solutions are being handled. Clothing should be thoroughly washed at the end of the shift to remove spilled material, and should be rinsed during the shift whenever material is spilled on it.

Large quantities of chlorates should be stored in an isolated fire-resistant building, conspicuously marked with the nature and hazards of the contents. Such buildings should not be used for any other purpose, no other chemicals should be stored there.