

years, 40 percent of all workers in a Griesheimer chemical plant (where chromium sulfate and other industrial chemicals were produced) had developed lung cancer. The author predicted that "every important chromate factory in Germany will have lung cancers among its workers."¹¹⁵

Arsenic inhalation was a much older concern. In 1822 John A. Paris, a fellow of the Royal Society of London and a senior physician at Westminster Hospital, had reported skin cancers among Welsh and Cornish workers exposed to arsenic fumes in copper smelters and tin foundries. Animals were also said to have been affected—horses and cows in the region were seen crawling on their knees in pain from tumors.¹¹⁶ People treated with potassium arsenite for psoriasis were found to have a higher-than-average risk of skin cancer in the 1870s, and communities where people drank arsenic-contaminated water were said to have above-average cancer rates.¹¹⁷

In the 1920s, concerns about poisoning arose when arsenic-based pesticides began to be sprayed onto vineyards to combat insect pests. Aerial spraying began shortly after the First World War, prompted not just by the wartime improvement of biplanes but also by growing recognition that some of the newer varieties of vines were especially vulnerable to pests. By 1929, Germany was producing 1,500 tons of arsenic, most of which was misted onto vineyards. German wine production grew by 60 percent from 1929 to 1938, the large part of which was attributed to the rising use of arsenic pesticides.¹¹⁸ Poisonings were also increasingly common. The pesticide showed up in both wine and grape juice, but also in the dusts churned up when treated fields were plowed.¹¹⁹

Chronic arsenic poisoning had been recognized as an occupational disease prior even to the First World War; the affliction—especially among glass- and steelworkers—was one of the first occupational ailments requiring official notification, along with poisoning by lead, mercury, and phosphorus.¹²⁰ Arsenic poisoning was recognized as an occupational disease in Germany's Occupational Disease Ordinance (*Berufskrankheitenverordnung*) of 1925, along with eight other classes of poisonings warranting governmental compensation (lead, phosphorus, mercury, benzene, aro-

matic nitro compounds, carbon disulfide, X-rays and radioactive substances, and carcinogens such as paraffin, tar, anthracene, and pitch that primarily affect the skin).¹²¹ Workers in the glass and steel industries were the best-known early sufferers from arsenic poisoning, but vineyard exposures were increasingly serious. Ernst W. Baader in 1929 called for the chemical industry to find a substitute for its use as a pesticide, and in 1937 argued that even in very low doses it could cause cancer (he also claimed that cancer was more common around factories releasing arsenic into the environment). Karl Reinhart in 1943 surveyed the situation, noting that by 1940 there were 589 verified cases of arsenic poisonings among vintners, including several cancers.¹²² The problem began to soften somewhat in 1940, when insecticides such as pyrethrum and chrysanthol were introduced, replacing arsenic (nicotine sprays were also encouraged).¹²³ The Nazi party Chancellery banned the use of arsenic pesticides in February of 1942, allowing vintners to use up their stocks by June 30, 1942.¹²⁴ Vintners had earlier been barred from applying compounds containing lead. Arsenic pesticides were still allowed on nongrape crops such as strawberries and tomatoes, but strict precautions specified when and how workers might spray, what they were to wear, and so forth.¹²⁵

German industrial hygienists generally recognized that while exposure to any dust was harmful, the worst in terms of the numbers of people affected was probably quartz or silica dust. Silicosis—the German is *Quarzstaublunge*, literally "quartz dust lung"—was regarded as the king of occupational lung disease, killing more, it was said (and perhaps rightly so) than all other dusts combined. Hundreds of scientific articles on the topic can be found in the German medical literature of the 1930s, describing everything from the maximally hazardous particle size to a possible cancer link.¹²⁶ Silicosis was a hazard wherever one inhaled quartz dust, but especially in iron foundry work (sand was used to make the molds for casting liquid pig iron), in work with quartz-based scouring powders (Comet Cleanser contains abrasive quartz), in porcelain or brick manufacture, in mining and sandblasting, and in other work involving exposure to sand or rock dust. The