

OCCUPATIONAL CARCINOGENESIS: THE TWO HUNDRED YEARS SINCE PERCIVALL POTT

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The worst sin towards our fellow creatures is not to hate them, but to be indifferent to them; that's the essence of inhumanity.

George Bernard Shaw

This year, we mark the 200th anniversary of the discovery of occupational carcinogenesis by Percivall Pott, who in 1775 reported scrotal cancer among London chimney sweeps. As children these chimney sweeps had been exposed to coal combustion by-products.¹ Today indeed is an occasion for sober reflection. For on this bicentennial, thousands of coke-oven workers in the steel industry of the United States alone are inhaling the very same class of substances that caused scrotal cancer in the chimney sweeps, and, as a result, are dying of lung cancer at a rate ten times that of other steel workers.²

In 1971, ninety years after miners in the Erz Mountains of Central Europe were observed to be dying of lung malignancy³ and thirty years after radioactivity within these mines was generally accepted to be the cause of these lung cancers,^{4, 5} thousands of American uranium miners were still working in radon daughter concentrations of such magnitude as to triple their prospects of dying from lung cancer. Indeed, in that same year MacMahon stated "the epidemic of lung cancer now in progress among American uranium miners could readily have been—and indeed was—predicted on the basis of past experience in other parts of the world."⁶

Today, 130 years after the observation of scrotal cancer in copper smelters exposed to inorganic arsenic,⁷ fully 1,500,000 workers in the United States are inhaling the very same substance,⁸ and many occupational groups exposed to inorganic arsenic are known to be dying of lung and lymphatic cancers at two to eight times the national average.⁹⁻¹²

In 1973, eighty years after the discovery that aromatic amines were causing bladder cancer in German dye workers,¹³ and decades after amines such as benzidine and β -naphthylamine were banned or withdrawn in the United Kingdom, Switzerland, Japan, Italy, and the USSR, thousands of American workers were still literally sloshing in them.¹⁴ As a result, these workers are now, and will continue to be, afflicted by bladder tumors at an epidemic rate. Indeed, as recently as 1973, 50% of former employees at one benzidine plant in the United States were reported to have developed bladder cancer.¹⁵

Seventy-five years after asbestos was known to cause fatal fibrosis of the lungs,¹⁶ and nearly a quarter of a century after it was known to be a potent cause of lung cancer,¹⁷ workers in dozens of asbestos factories and hundreds of asbestos-related trades in the United States were laboring in concentrations of asbestos dust of sufficient magnitude to obscure the light.¹⁸ As a result, of one million current and former American asbestos workers who still survive, fully three hundred thousand can be projected to die of cancer.¹⁹ Indeed one in five

of these men can be expected to develop cancer of the lung, one in ten cancer of the gastrointestinal tract, and another one in twenty of malignant mesothelioma, an always fatal tumor of the pleura or peritonium.¹⁹

Such are examples of the record in the field of occupational carcinogenesis during the two hundred years following the epic discovery of occupationally induced scrotal cancer among chimney sweeps by Percivall Pott.

The situation in which we find ourselves today is all the more tragic for the fact that over the past few years we have begun to document the extension of cancerous agents from the workplace into the general community.

We now know that the wives, children, and relatives of many asbestos workers have died of mesothelioma and that others will do so as a result of the previously unregulated practice of asbestos carried into the home on work clothes or in other manners.^{20, 21} We now know that people living in close proximity to asbestos factories have developed mesothelioma.²⁰⁻²² We now know that virtually 100% of all urban dwellers coming to autopsy show the presence of asbestos in lung tissue.²³

We now also know that individuals living in areas where arsenical insecticide spraying was common are dying of lung cancer at an increased rate.^{24, 25} We now know that children living near copper smelters have unusually elevated levels of arsenic in their urine and hair.¹⁰

We now also know that the aforementioned, and other, cancer-producing agents are present in much of our water as a result of uncontrolled waste disposal or other practices of industry.^{14, 26}

Perhaps the most striking example of the problem we face in the future arose one year ago, when it was learned that vinyl chloride, a petrochemical gas used for the past 35 years as an ingredient in the manufacture of many plastics, is also a potent cancer-producing agent of the liver and possibly of other organs as well.²⁷ It is estimated that as many as several hundred thousand workers in the United States may be exposed to this agent in the workplace alone. It is not known how many tens of thousands of people are exposed to vinyl chloride as a result of everyday living in near proximity to a facility where vinyl chloride or polyvinyl chloride are made. It is not known how many hundreds of thousands of people have been exposed to vinyl chloride as a result of using aerosol sprays that employed the chemical as a propellant and solvent. Equally unknown, of course, are the biological consequences of what these exposures will be.

Today, as we enter into the second two hundred years since Percivall Pott, the problems of occupational carcinogenesis are greater, more visible yet more subtle, and more pervasive than they were in the past. Indeed, the past director of the National Institutes of Health, Dr. Robert S. Stone, recently stated that "most known environmental carcinogens are a result of our increased agricultural and industrial technology."²⁸ Of even more worrisome dimensions are estimates that hundreds of new chemicals are being introduced into industry each year, most without any prior testing to evaluate the potential for carcinogenesis. Furthermore, it has been estimated by the World Health Organization that 75-85% of all cancers are related to our environment.²⁹

It seems only fitting at this point in time to suggest that society must take a new and dedicated commitment toward the war on cancer. Most assuredly the responsibility of health scientists and management and labor must extend beyond the scientific and economic issues to the moral and social issues. The scientific community must, in my opinion, not only investigate but inform, not only advise

but dissent when appropriate, and, most importantly, provide firm, prudent leadership in the formulation of public health policies. We must not allow the lay public, government, or management-labor to unwittingly remain complacent about the very long period of time necessary from the institution of controls to the eradication of occupationally related cancers, *all of which can and should be prevented*. Finally, as former United States Secretary of Labor Willard Wirtz so eloquently stated: "There is nothing more critically imperative today than this society's assertion of the absolute priority of the individual over institutional interests and of human over economic values."³⁰

If we do not undertake such a commitment on an urgent basis, it seems clear that society may soon be faced with a public health hazard of monumental and perhaps irreversible proportions. Indeed, if we do not undertake such a commitment now, and if our progress in occupational carcinogenesis continues to be as painful and slow in the future as it has been in the past, we must ask ourselves what line of introductory remarks will be in order at a similar conference one hundred years from now, on the 300th anniversary of the discovery of occupationally induced scrotal cancer in chimney sweeps by Percivall Pott.

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