

thought that the adsorption of small amounts of a chromium compound through the skin, lung, or gastro-intestinal tract over a prolonged period leads to dysfunctional phenomena, caused by a sensitization of the organism to chromate-protein complexes.

*Lung Carcinoma in Chromate Workers: Incidence.* A carcinogenic action of chromates has been denied for many years (Lehmann). Constant irritation exerted by chromium compounds on the skin and mucous membranes of the mouth and nose has never started an epithelioma in spite of the production of chronic ulcerations and the active destruction of tissues (Legge). The irritative action of chromium compounds seemed to lack, in the opinion of White, some specific qualities as they do not exert any proliferation stimulating action. On the basis of these observations White advanced the conception that malignancy was not merely the result of an irritation of some non-specific acute or chronic inflammation, even if the irritation was often repeated or continued. In support of this conception Legge reported in 1922 that there were 175 cases of chrome ulceration on record in the English industry (93 in the manufacture of chromates; 69 in dyeing operations; and 7 in chromate tanning), but none of them gave any suggestion of epithelioma. This optimistic outlook was destroyed definitely in recent years by the demonstration of an excessive incidence of pulmonary malignancy among workers of several German chromate factories.

This development had been foreshadowed many years before by the occurrence of a few isolated cases of malignancy of the respiratory tract in chromate workers. The suspicion as to an occupational origin of these neoplasms expressed at that time was not given any credence. The first instance of a carcinoma of the respiratory tract in a chromate worker was recorded by Newman in 1890 (Scotland). This investigator found a large adenocarcinoma originating from the nares of a man, 47 years old, who had been employed for 20 years in a chromate plant and who had, as the result of his occupation, the characteristic perforation of the nasal septum. More than twenty years later (1911 and 1912) Pfeil observed two additional cases of malignancy in chromate workers, this time located in the lungs. These workers were employed in a German plant, in a chromate operation, in which alkaline chromates were produced or used in the manufacture of quinones. These two cases of pulmonary carcinoma in chromate workers remained unique for many years. When in 1932 Lehmann commented upon their occurrence in connection with a discussion on occupational pulmonary malignancy, he was still convinced that no etiological connections existed with an occupational exposure to chromates, as no additional cases of pulmonary carcinoma had been noted since 1912. There was no reason for any undue alarm at that time, in his opinion.

Any doubts which had existed in this respect were removed definitely only three years later by the communications of Pfeil (1935); Alwens, Bauke