

ing with the potential carcinogenic action of certain well-defined, abnormal, atmospheric ingredients are of greater scientific significance and have produced more reliable and definite information.

II. CHEMICAL AGENTS OF DEFINED TYPE

The exposure to the inhalation of chemically well-defined substances is to a large extent restricted to industrial hazards. The industrial exposures consist of contact of the respiratory organs with abnormal atmospheric ingredients present in the form of dust, fumes, vapors, and gases of the most varied types. Non-occupational contact with atmospheric contaminants is limited to the inhalation of coal dust, soot, carbon monoxide, sulfur dioxide, and, in some mining regions, arsenicals [smelting of arsenic containing ores (copper, iron, and silver)].

Silicosis

Silicosis, which is second only to anthracosis the most frequent type of industrial pneumoconiosis, has been incriminated by Fine and Jaso; Dible; and Charr as direct or indirect cause of pulmonary cancer. There are approximately 40 to 50 verified cases on record in which these two pulmonary conditions coexisted (Dible; Fine and Jaso; Klotz and Simpson; Klotz; Maxwell; Sladden; Middleton; Sweany; Porsche and Douglass; Vorwald and Karr; Allen; Sokoloff; Pancoast and Pendergrass; Simons; Schnurer; and Charr), when combinations of asbestosis and lung cancer are excluded from this list. Silica belongs to the biologically active types of dust (in contrast to the inert types, such as carbon), which are capable of exciting a characteristic tissue response of fibrotic nature in the lung (Gardner) by causing foci of chronic inflammatory irritation. Silicotic pneumoconiosis fulfills all the requirements which may be asked from a nonspecific carcinogenic agent acting on the basis of the chronic irritation theory of carcinogenesis.

A recent analysis of the pulmonary cancer incidence in 50 cases of silicosis observed from 1925 to 1936 by Klotz led this author to believe, that the liability to pulmonary malignancy was excessive in silicotics compared with that of the general population. There were four cases of lung cancer in this group, whereas 53 lung tumors were found among 4,500 necropsies performed during the same period. Only one of the silicotic cases with lung cancer was employed as a miner, while the others belonged to different occupational groups, such as metal workers, laborers, and gas company employees. A marked pulmonary fibrosis was present in only one case; this condition was of minimal or slight degree in the rest of the cases. The type of evidence, advanced in support of the conclusion drawn, cannot be admitted as adequate. In view of the great practical and scientific importance of this potential interrelation, it is fortunate that a number of very comprehensive, reliable, and thorough clinico-statistical studies have been made and have led to a definite decision concerning this question.