

of tumors of the respiratory tract. Inhalation of fumes from inorganic acids and alkalies in chemical plants and laboratories are mentioned in this respect by Kikuth, who observed a pulmonary cancer in a chemist; while Hünemann reported a laryngeal carcinoma after such an exposure. Koelsch, in a study of 100 workers employed in plants manufacturing various acids (hydrochloric acid, sulfuric acid, and nitric acid), could not find a single case of lung cancer and made an identical observation among workers of the acid consuming (chemical, metallurgic, and graphic) industries. Betke recorded in 1933 three cases of lung cancer in workers exposed to fumes of sulfuric acid and hydrochloric acid after an exposure of 28, 31, and 42 years, respectively. The experimental production of lung tumors by the intrabronchial insufflation of hydrochloric acid into rabbits by Winternitz, Smith, and McNamara was unsuccessful, as only atypical, epithelial proliferations resulted.

A few cases have been reported in which organic, non-aromatic gases, and vapors have been incriminated in the production of tumors of the respiratory organs. The development of a laryngeal carcinoma, allegedly caused by the caustic action of benzine-petroleum vapors inhaled for a period of three years, was reported by Birkholz. The claim made by Stephens that the inhalation of carbon monoxide, contained in industrial waste gases and in the exhaust gases of automobiles, was responsible for the recent increase of lung cancers was investigated by Campbell, who exposed mice to the prolonged inhalation of carbon monoxide. This treatment did not cause any increase in the normal lung tumor incidence among the mice used, and it even retarded their growth.

The alleged carcinogenic action of war gas poisoning has played a conspicuous role among speculations as to the cause of the recent increase in respiratory malignancy. Gas poisoning by chlorine, phosgene, diposgene, dichlorethyl sulfide, and thioglycol chloride has been considered one of the possible major causes in this development by Kikuth; Brockbank; Goltz; Klotz; and Derischanoff. Residuals of warfare gassing were noted by Matz in 10 out of 138 cases of pulmonary cancer among American World War veterans. 4 out of 64 cases, recorded by Brockbank, were gassed badly during the war. Woelsch conceded that a few cases of lung carcinoma exhibited a doubtful etiological relation to war gas injuries, he did add that the existence of an individual predisposition must be assumed in these instances as the individuals affected were young, and that these carcinomas represented the result of an acute trauma. This last argument is fallacious, as war gas poisoning produces chronic, pathological, pulmonary lesions, such as obliterative bronchiolitis and epithelial, bronchiolar metaplasia, which are looked upon by some investigators as the precancerous residuals of gassing. The development of a laryngeal carcinoma on the basis of an ulcerative war gas injury was noted by Spamer, and a second similar case was placed on record by Tilley (cited by Denker).