

the nasal passages with nine fatalities. This fact was confirmed by a brief statement issued by E. H. Cooper, the physician of the Mond Nickel Company in 1933. During the same year, Stephens reported that these tumors occurred among workers handling the Bessemer matte. The condition started, according to this investigator, with an irritation of the nasal passages followed by an inflammatory condition. Turbidity of the antrum and the ethmoid cells were early signs of a preneoplastic or neoplastic involvement of these tissues. Papillomas or polyps were formed, often originating from the ethmoid cells. These proliferative reactions became malignant ultimately, and tended to invade the orbit and the frontal sinus. Of a series of sixteen cases, thirteen were polymorphous-cell carcinomas and three were squamous-cell carcinomas (Baader). The exposure time of the workers was, on the average, twenty-two years.

In spite of extensive and marked improvements directed toward the suppression of dust and fumes, made in the plant during recent years, a considerable number of additional cases of respiratory malignancy occurred among the workers. Between 1932 and 1936 there were 20 new cases of cancer of the nasal passages, 19 of which proved fatal, and 19 carcinomas of the lung, 17 of which terminated in death (Bridge). These cases could be traced to two nickel refineries in South Wales. An analysis of the death certificates issued in South Wales showed that 36 cases or 34.2 per cent of the 105 cases of cancer of the respiratory organs, which occurred between 1907 and 1934 among the population of the district in which the nickel refineries were located, were copper-nickel refinery workers.

The etiological agent and the causative mechanism responsible for the production of these tumors have remained a matter of speculation. The inhalation of nickel carbonyl might be involved in the etiology of these occupational neoplasms. From our present knowledge of chemical carcinogens it does not appear probable that this compound possesses primary carcinogenic properties. If nickel carbonyl can be incriminated at all in this connection, it seems more likely that its biological action on the various component parts of the tissue in contact with it produces substances which may display such qualities. Reference may be made to a reaction of nickel carbonyl with aromatic hydrocarbons (benzene). Nickel carbonyl changes benzene into anthracene derivatives in the presence of aluminium chloride at a temperature of 100°C. It is not known if nickel carbonyl may perform similar changes with the benzol group of compounds in the living organism. Finally, nickel compounds apparently form combinations with proteins, which are evidently the cause of the chemo-allergies observed in nickel workers.

Various Noxious Gases and Fumes

A great number of noxious fumes, vapors, and gases of non-aromatic character have been incriminated, during more recent years, in the production