

The frequency of aniline tumors (morbidity statistics) in the working population of different factories evidently varies to a certain extent, depending on the types of chemicals used and produced and, especially, on manufacturing processes employed and precautionary measures taken. In addition to these factors which influence the incidence of bladder tumors in different plants, countries and periods, the methods by which statistical data on this subject are obtained are of outstanding importance.

Curschmann in 1920 pointed out that the percentage of aniline tumors among German chemical workers was very low. He found only 177 cases among an estimated 80,000 to 100,000 chemical workers. Scheele, in 1926, attempted to discredit any occupational significance on the causation of bladder tumors in aniline workers by referring to the percentages of such tumors in the surgical patient population of the university clinics of Rostock (1.24), Frankfurt (1.81), Vienna (3.59) and Basel (1.66). He pointed out that these figures did not show any relation to the industrial chemical activities in these cities. He argued, therefore, that in Frankfurt bladder tumors were attributed incorrectly to occupational chemical hazards simply because an appreciable part of the city population was employed in the chemical industry. In support of this contention he quoted the marked variations existing between the proportions of the different occupational groups contributing to the total number of cases of bladder tumor in the various localities (Fuchs, 25 per cent in intellectual workers; Stenius, 38 per cent among agricultural laborers).

The fallacy in this statistical argument is readily evident. It is unessential how high the percentages of the various occupational groups are in regard to the total number of diseased persons in a certain occupational group. Rehn in 1904 estimated that bladder tumors had been observed in between 0.2 and 0.4 per cent of the workers employed at different factories where these conditions occurred. Gehrman stated that in 532 cystoscopically examined dye workers, engaged in more or less hazardous operations, 25 cases of aniline tumor were detected or 4.5 per cent. Di Maio (1936), on the other hand, found 11 cases among 54 workers (20.3 per cent).

Such figures, however, do not give any reliable information as to the incidence of such tumors in that small group of workers who are engaged in operations in which they receive a more or less continuous and relatively massive exposure (Engel, 1937). The frequency of bladder neoplasms among members of these small groups of operators runs higher (from 80 to 90 per cent), especially when technical and sanitary measures are inadequate. As the number of workers in these particular groups, even in large chemical factories is relatively low, the exceptionally high incidence of bladder tumors among them is not reflected in the frequency rate of neoplasms calculated for the general population of a larger territory in which the plants are located (Mueller (1936) for Basel; Scheele for Vienna).

In more recent years figures of incidence lower than those just quoted have