

intimate cutaneous contact with great quantities of powdered benzidine base for many years showed bladder tumors. On the other hand, it is well established that workers engaged in the production of this compound frequently contract vesical neoplasms. Engel (1937) listed 25 cases in a series of 190 as of benzidine origin and Evans listed 13 cases of a total of 83 as of this origin.

The carcinogenicity of aromatic nitro-compounds has been disputed by Engel, who contends that their mistaken incrimination is attributable to the fact that they are used for the production of the corresponding amino-compounds. A reinvestigation of this question appears to be indicated in view of the recent report of Schwartz, who noted the occurrence of bladder tumors among workers of an American chemical plant in which dinitrophenol was handled. Barkmeyer mentioned also an aniline tumor in a worker exposed to nitrobenzol. Naphthols appear to be harmless (Oppenheimer), as only a single case of bladder tumor has been observed so far in a worker of a naphthol factory (Posner).

A quite different explanation regarding the causation of bladder tumors was proposed by Bayet and Slosse, and Hamilton. They claimed that bladder tumors in dye workers were the result of a chronic arsenic poisoning. It may be either caused by the inhalation of hydrogen arsenide generated during the manufacture of aromatic amines, or introduced into the body by skin contact, or in the form of dust into the lung during the handling of these substances, or of the finished products containing arsenic as an impurity. The contention was based on the demonstration of arsenic in the urine of the dye workers and upon the known carcinogenic properties of arsenic.

The following description of the premonitory symptoms of chronic aniline poisoning in connection with bladder tumors is given by Bayet. The earliest, most characteristic symptom is profuse sweating of the hands, with swelling of the back of the hands. This is followed by an eczema with occasional loss of the deeper tissue. These lesions of pea-size are sharply outlined and are similar to those that occur on the arms of paraffin workers. In instances, this is followed by more acute cutaneous affections, such as general edema of the hand, face, ears and, especially, of the penis and scrotum. In some workers handling aniline, hyperkeratoses, which had the appearance of papillomas, were noticed. Because of this similarity of the cutaneous manifestations of chronic aniline poisoning with those seen in arsenic dermatitis, Bayet concluded that both conditions had the same etiology, namely, arsenic. This substance also was claimed to be responsible for the tumor formation caused by tar and related substances. Hamilton supported this contention and pointed out that the absence of bladder tumors among chemical workers in the United States was attributable to the fact that in the American dye factories the production of benzidine did not involve any risk of arsenic poisoning because manufacturing methods differed from methods in Germany and England. It is correct that arsenious acid was used formerly as an oxidative