

the published reports concerning the German and Swiss experiences, and the technical and medical measures taken, remained either unknown or were disregarded in the initial construction of the dye works in the countries with post-World War chemical industrial development.

#### *A. Factory Measures*

a. Technical methods were devised to eliminate or restrict to a large extent the free escape of fumes as well as the production of dust of aromatic amines which were connected unavoidably with the use of open containers in the manufacture of synthetic dyes. This task was accomplished successfully by the introduction of the closed system of production, in which compressed air is used to convey the chemicals from one container into the next through fume-tight pipe lines. Modifications were made also in the technique employed for the routine analysis and identification of the chemical qualities of the carcinogenic products, thus obviating any direct contact of the chemist with the substances examined.

b. These measures were supplemented by the installation of an elaborate and adequate exhaust ventilation system, wherever necessary, in places where the danger of leaks in pipe lines existed, where the escape of fumes and the production of dust could not be excluded entirely, and where apparatus had to be cleaned and repaired at regular intervals.

c. High stacks (200 feet) were erected and equipped with neutralizing apparatus through which exhaust fumes were released into the higher strata of the air. From here they could not be blown easily into nearby buildings. By reducing the amount of carcinogenic substances which were allowed heretofore to contaminate the air of the plant district, the possible danger of cancer production in persons working or living in the fume zone of the factories, was diminished markedly or removed entirely.

d. Special regulations were issued controlling the procedure of repair work on apparatus used for the production of carcinogenic aromatic amines. This work is done in some plants only in the presence of and under the supervision of a specially trained member of the safety department, who is independent of the department manager. The workers engaged in such tasks are obliged to wear special protective clothing (rubberized) and masks. Nassauer advised the removal of all workers not used directly for the repair work from the room, especially when the repair involves pipe lines and boilers. Repairs on boilers and stills should be done only after these containers are cooled.

e. Attention may be called also to the fact that a floor covering which absorbs aromatic amines, such as asphalt, is unsuitable for use in rooms in which these substances are produced or handled. The same consideration may be applied to ordinary porous brick and wood in the construction of buildings to be used for this purpose, as these building materials take up considerable quantities of aromatic amines from the fumes and dust produced. In the con-