

to beta-naphthylamine and considering that most of their lesions were relatively early, some support can be given to Engel from this source:

It has been asserted that bladder tumors, having their genesis in exposure to aromatic amines, appear in an earlier period of life than those of unknown cause. Schär stated that aniline tumors are especially frequent in men between 30 and 40 years of age. Büttner found that the average age of the afflicted workmen was 48, the youngest being 38 and the oldest 54. Oppenheimer (1927), on the other hand, noted that malignant tumors are not frequent in men between 30 and 40 years of age. The fifth decade was, according to him, the period during which the majority of aniline tumors were seen. The 94 instances collected from the European literature by Hueper (1934) were distributed in the various age periods as follows:

| Years                | 20-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | Total |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hueper's series of   |       |       |       |       |       |       |       |       |
| European cases       | 3     | 21    | 40    | 52    | 11    |       |       | 127   |
| Evans' series of     |       |       |       |       |       |       |       |       |
| American cases       | 5     | 19    | 23    | 29    | 6     | 1     |       | 83    |
| Joseph's series of   |       |       |       |       |       |       |       |       |
| cases of unknown     |       |       |       |       |       |       |       |       |
| origin               |       | 13    | 32    | 46    | 41    | 21    | 4     | 157   |
| Wilinski's series of |       |       |       |       |       |       |       |       |
| cases of unknown     |       |       |       |       |       |       |       |       |
| origin               | 2     | 8     | 27    | 39    | 22    | 4     |       | 102   |

The combined aniline tumor series show 52.4 per cent of the cases before the fiftieth year, while the two cryptogenetic series have only 28.6 per cent in the same age range. The evident shift toward the younger age groups contradicts the statement of Engel that the aniline tumors are rarely seen before the fiftieth year. He concedes, however, that they may occur at an earlier age provided the individual is exposed to very active carcinogenic substances, such as beta-naphthylamine. The American series, with its high proportion of cases exposed to this compound mentioned, apparently confirms this part of Engel's contention, as it shows the most marked shift toward the younger decades of life. A definite decision in this matter depends upon a proper consideration of the average age at which the occupational exposure starts for the dye worker in Europe and in the United States. In view of the fact that many of the workers in dye factories entered employment at a rather early age, the foregoing observations present important support for the conception that not the age but the duration of exposure is the determining factor in the development of aniline tumors (Curschmann; International Labour Office; Kennaway).

On the other hand, age, inasmuch as it goes parallel with duration of exposure, may have some relation to the biologic character of the aniline tumors observed. It appears that with increase in age there is a corresponding