more or less malignant than spontaneous ones. This is a killing disease, only 20 per cent of all cases having survived more than 10 years from the first recognition of the disease.

In 1935, certain alterations in plant and technic were made and these have reduced the risk just significantly, but another 243 cases (over and above the 262 traced cases in a population of 4622 men) may be expected among British workers engaged in the manufacture of chemicals during the next few years. In 1945 and 1950, more drastic plant alterations were made and we can expect these to bear fruit in about 1965.

Meanwhile, we need to be ever vigilant in recognizing as occupational tumors any that may occur in other industries in which the dyestuff intermediates are in use. Case and Hosker (1954)[9] have recently demonstrated an occupational bladder-tumor risk in the rubber industry in England and Wales. Attention was drawn to this by the finding of a high incidence of bladder tumors in the hospital records of a County Borough which is an important center of the rubber industry. It is probable that the risk was introduced into the industry in 1928, when a certain antioxidant began to be used. The latter was known to have caused bladder tumors among the men in the chemical industry who manufactured it, and it contained about 2.5 per cent of free naphthylamine, both alpha and beta isomers. The treatment of the rubber "mix" containing the antioxidant volatilized quantities of naphthylamines. It needed a most laborious and careful search of records of many kinds to establish this risk on a sound statistical basis and it is satisfactory to report that the manufacturers of the antioxidant immediately ceased its manufacture and the users discontinued its use and destroyed old stocks.

Of great interest to the experimental worker is the search for the reasons for the localization of the tumors in the urinary tract, or perhaps the wider conception of localization along the routes of excretion would be preferable. If 2-naphthylamine is administered by feeding to dogs, all the animals will eventually develop tumors of the bladder, though the number and location will vary in individuals (Hueper and Wolfe, 1937;[10] Bonser and her co-workers, 1951[1]). If 2-naphthylamine is fed to mice, hepatomas or benign cholangiomas will occur. If fed to rats or rabbits, occasional benign papillomas of the bladder will be seen. If benzidine is fed to dogs, bladder tumors occur after many years (Spitz, personal communication), but if injected into rats, hepatomas and acoustic gland tumors will be found (Spitz, Maguigan and Dobriner, 1950);[23] if injected into mice, hepatomas only will occur (Bonser and her associates, unpublished observation) (Table 3). Such localization of tumors suggests that 3 important factors must be at work: (a) species variations in biologic response; (b) excretion of the original chemical or its metabolites along a specific pathway; and (c) concentration of these substances in certain sites.

A study[4] of the metabolism of 2-naphthylamine in various species showed that a conversion of the amine to 2-amino-1-naphthol conjugates occurred and that the capacity to form tumors was roughly proportional to the concentration of these substances in the urine. In the dog, the ratio of urinary to serum content of