

Teutschlaender, when taken as a group; up to 100 per cent, according to Sladden, after being exposed for more than 40 years). The workers employed on the mixers, heaters, and presses (mixers, heatermen, pressmen) are less exposed, because most of these operations are carried out in closed systems, mainly permitting only contact with pitch fumes and steam. They show, therefore, a minor liability to pitch cancer. An appreciable degree of exposure is present, on the other hand, for the individuals (fuel stowers, rope runners, hostlers, coal tippers, and other laborers working in the yards of briquette plants) who handle the finished briquettes. This pertains especially to the loaders of the brick briquettes (the egg briquettes are loaded with a mechanical conveyer), as the bricks contain approximately 7 per cent pitch. A similar exposure exists for the men handling the patent fuel during its consumption, such as stokers and firemen of railroad engines and ship's boilers.

In modern briquette plants in which either the Fohr-Kleinschmidt or a similar method of production is used, the dust hazard is almost completely eliminated (Grempe; Teutschlaender; Heller). The first installation of this method was made in Germany in 1912-1913 (Teutschlaender) at Engelsburg near Bochum. The technical advantage of this method is the use of liquid pitch which permits a more efficient, uniform, and economical mixture of the powdered coal (brown coal or anthracite) with the binder. The freshly-produced hot pitch is loaded into special tank cars at the place of production (usually coke oven plants), and is brought in this hot, liquid state directly to the patent fuel plant, where it is pumped from the tank car and sprayed into the mixing drum filled with coal dust. Since the entire operation is automatic and takes place in a closed system a distinct saving of labor is obtained, and simultaneously, altho originally unintended, a marked diminution of the occupational exposure to pitch dust ensues. Plants working on this or a similar system have been erected later in many parts of Germany as well as in the United States (Teutschlaender; Wood). Not a single case of pitch cancer has been observed among the workers employed in a German plant operating on this system since 1914 (Teutschlaender). Similar observations were reported by Wood concerning the occurrence of pitch cancer among American patent fuel workers. The binder used in the manufacture of American briquettes is not coal tar pitch usually, as is used in Europe, but petroleum asphalt (Heller), a substance of lower carcinogenic potency.

Cancers in briquette plant workers have been placed on record by Leymann; Bering and Zitzke; Teutschlaender; Fuss; Leclercq and Cordonnier; Jaqué and Sluys; Müller; de Vries; Sladden; Bridge and Henry; O'Donovan; Eisner; Manouvriez; Legge; Wignall; Downing; Kranenburg. Teutschlaender and Leymann mentioned the occurrence of pitch cancer among railroad stokers who handle brick briquettes.

The incidence rate of pitch cancer among patent fuel workers can be appre-