Abstract.

Jecklin, L.: Bleistaub in der Luft. (Lead dust in the atmosphere.) Schweiz. med. Wochschr. 85:685-6, 1955.

Since 1947, Swiss gasolines contain ethyl fluid as an anti-knock agent, consisting of - given in weight % -: tetraethyl lead 63.3, ethylene bromide 25.8, ethylene chloride 8.7, and coloring matter 2.2. One L of gasoline contains 0.4 - 0.6 cc tetraethyl lead=425-640 mg of "pure" Pb, 0.6 being the maximum permissible concentration in both Swiss and German gasolines. Frequently, gasolines also contain ICA (o-tricresylphosphate) in order to reduce the deposition of lead oxide in the engine, and furthermore, 0.02-0.03 weight % of S. It is estimated that only 15-35% of the Pb contained in the gasoline is removed with the exhaust gases, but according to investigations carried out by the Shell Corporation, only 2-3% of the gasoline Pb is deposited in the engine. Supposing a car uses 10 L of gasoline per 100 km, the Pb deposit after driving it for 50,000 km would amount to 1625-2125 g, which seems to be rather high. The Pb content of the exhaust gases varies with the type of motor and is lowest during idling of the motor. Experimentally, an Austin A-30 car which had run 15,000 km was powered with Shell supergasoline, the Pb content of which was measured as 530 mg/L. The exhaust gases were collected in a funnel and passed through a cellulose filter, extracted with HNO_3 and distilled H_2O and then colorimetrically determined. The Pb content ranged from 274 to 404 mg, indicating that after burning 1,000 L of gasoline containing 500 mg/L, the Pb deposit in the engine of this car would amount to 96-226 g, rather than to 325-425 g, as demonstrated by the estimation mentioned above. Accordingly, in Switzerland, 135,000 kg of Pb in form of highly toxic Pb salts are yearly given off by car exhausts.

In order to determine how much of the Pb contained in the inhaled air is retained in the body, air samples of 100 L each were taken in the following three rooms of a printing establishment: melting room, type foundry and make-up room (used for sawing and planing of the lead). In addition, the exhaled air of persons working in these three rooms, also as 100 L samples, was collected in glass tubes and then passed through cellulose filters. It was measured with a gas meter and determined by the nephelometer method, i.e., measured as $PbCrO_4$ against buffered chromate solutions of known Pb content, the maximum probable error being 2μ. The following concentrations of Pb were found in the air of the three rooms, in the order stated above: 0.009, 0.02 snd 0.45 mg. No Pb could be detected in the samples containing the respiratory air. It was concluded that all of the Pb inhaled with the air is retained in the lungs of the exposed workers.

In the light of the constant increase of motor traffic, the latter fact is continually gaining importance. It is suggested that the use of lead-containing anti-knock agents represents a growing danger for the health of the exposed persons. It should be discontinued and could be substituted by lead-free agents, such as benzol in the German gasoline BV-Aral.