

The oil obtained from condensation is of interest in two aspects as far as occupational medicine is concerned. First, the oil contains small amounts of physically dissolved gas of approximately the same composition as the noncondensable gas; this gas is emitted during the continued purification of the oil. Second, it contains up to 30 per cent of gasoline, i. e., the volatile part of the shale oil.

The toxicity of the gasoline vapor has been the object of repeated investigations. In general, the conclusion has been—experimentally and practically—that the danger of poisoning due to gasoline vapor in refining and distillation is slight. Lasarew³ (1929) found the toxicity of gasoline lower the higher the content of paraffin, but the difference of toxicity between olefins and paraffins does not seem to be great. Drinker, Yaglou and Warren⁴ (1943) stated that an air concentration of 0.1 per cent is unimportant but that concentrations of more than 2 per cent are rapidly fatal to most experimental animals and in man result in dizziness after 10 to 12 breaths. Maximum Allowable Concentration Values for 1947 state 0.05 per cent as being the highest allowable concentration for work over a long period. These figures are probably not exceeded in the shale oil industry except

TABLE 2.—*A Comparison Between the Toxic Effects of Gasoline and Hydrogen Sulfide (From Henderson and Haggard²)*

	Per Cent in Air	
	Gasoline	H ₂ S
Maximum concentration allowable for prolonged exposure.....	0.15	0.002
Concentration producing slight symptoms after exposure of several hours..	0.25	0.015
Maximum concentration tolerable for 1 hour.....	0.70	0.030
Concentration dangerous for short exposure.....	1.00	0.060

for short periods in the refinery, where there have not been acute intoxications that cannot be explained in other ways (discussed below).

The symptoms of acute gasoline intoxication are those of narcotic poisoning—fulness of the head, headache, blurred vision, dizziness, unsteady gait, nausea and a typical “hang-over.” Some workers become euphoric (“gasoline jag”); some, very irritable and quarrelsome. Machle⁵ (1941), who has had some 2,300 refinery workers under observation for 10 to 12 years, believes that chronic gasoline poisoning is very rare; he has found neurasthenic symptoms, possibly caused by gasoline, only among the barrel fillers, who are more heavily exposed.

The content of benzene in shale oil does not exceed 1 per cent; the risk of acute benzene poisoning can therefore be considered as practically excluded.

The content of hydrogen sulfide, as is shown in table 1, amounts to no less than 25 per cent in the noncondensable gas and thus occurs in concentrations equivalent to those of the comparatively atoxic hydrocarbons (table 2). In view of the very high toxicity of this gas and of the fact that all acute poisonings have occurred in departments where the content of hydrogen sulfide in the transported gas has been high (*A* to *E* in chart 1) or within plants where hydrogen sulfide has occurred

3. Lasarew, N. W.: Arch. f. Hyg. **102**:227, 1929.

4. Drinker, P.; Yaglou, C. P., and Warren, M. F.: J. Indust. Hyg. & Toxicol. **25**:225, 1943.

5. Machle, W.: Gasoline Intoxication, J. A. M. A. **117**:1965 (Dec. 6) 1941.