

markedly dependent on minor variations in the daily trichloroethylene exposure. Furthermore, the excretion of trichloroacetic acid went on for weeks after trichloroethylene exposure, which made it less important that the sample be taken within a certain definite time. Finally, as the taking of each sample did not call for a personal examination but only for an analysis of the urine, which might be performed at the laboratory several days after the sample had been taken, this method seemed to combine the necessary advantages for use in field-work.

After a single dose of trichloroethylene the renal excretion of trichloroacetic acid does not commence until two to four hours have elapsed, and it attains its maximum after 20 to 50 hours (Forssman and Ahlmark.⁹) Thus a short inhalation of trichloroethylene on one day does not give maximum excretion until the following day and possibly later. Because of this slow excretion, the acid accumulates in the organism, and one thus obtains, on repeated daily administration of small amounts, relatively high concentrations of trichloroacetic acid in the urine.

TABLE 1.—*Renal Excretion of Trichloroacetic Acid During Two to Three Consecutive Days in Seven Workers Exposed to Trichloroethylene **

Subjects	A-n	B-n	G-n	H-g	J-n	L-t	S-g
First day							
8.00.....	....	....	2.2	....	....	11.0	...
12.00.....	21.6†	10.1	2.5	22.4	10.7	....	7.4
15.30.....	17.0	10.7	...	19.8	16.6	5.3	8.6
Second day							
8.00.....	7.1	....	4.8	....	....	5.9	5.8
12.00.....	10.1	10.2	6.1	17.5	14.1	11.6	7.7
15.30.....	24.6	14.9	7.8	18.0	13.4	....	8.7
Third day							
8.00.....	4.1	....	6.7	....	....	7.0	11.0
12.00.....	18.6	....	6.9	....	....	8.7	9.4
15.30.....	17.1	....	...	....	....	11.0	8.9

* The values represent milligrams per liter of urine.

† This sample was collected at 10.30.

In order to supplement our knowledge of the conditions of excretion, we examined urine from a number of workers who had been relatively severely exposed to trichloroethylene, after their exposure had been discontinued. As appears from chart 1, which shows some representative examples, the urinary concentration of trichloroacetic acid diminishes relatively rapidly at first and then slowly. In cases of high initial concentration it may be several weeks before the excretion of acid comes to an end.

In view of the above conditions of excretion it is important, in the estimation of single urine values, to know the variations that may arise in the course of 24 hours and from day to day in workers exposed to trichloroethylene in their work. For this reason analyses of urine were carried out for a score of workers with relatively constant trichloroethylene exposure. In table 1 are given some representative examples of these examinations. It emerges from the results that as a rule

9. Ahlmark, A., and Forssman, S.: (a) Theoretical Background of the Quantitative Pyridine Alkali Test for Trichloroethylene Poisoning, Proceedings of the Ninth International Congress of Industrial Medicine, London, England, Sept. 13-17, 1948, London, Simpkin Marshall Ltd., 1949, p. 551; (b) footnote 7.