The data from these experiments show also that half an hour after the exercise, when the oxygen utilization of the children approached within 3-5% of its basal level, the pulse rate remained higher than basal and the pulse pressure, though variable, was usually lower than basal. The possibility of these phenomena being correlated with disturbances in the acid-base balance is suggested by the fact that the pulmonary ventilation is often above normal at this time and will be the subject of a later report.

Summary. 1. During recovery from exercise the relaxed arterial tree constricts. 2. The pulse pressure, and even the product of the pulse rate and pulse pressure, are not always decreasing in the first moments of recovery. 3. The basal circulatory equilibrium is not re-established as quickly as is the basal rate of oxygen consumption.

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Resistance of Bacteria and Embryonic Tissue to Germicidal Substances. VI. Iodine Trichloride.

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Iodine trichloride (ICl_3) was first introduced as a germicide by von Langenbach.[1] It was described as a powerful disinfectant and recommended for the sterilization of hands, instruments and other surgical uses.

According to Hailer[2] the chemical is stable in concentrated solutions. In less concentrated solutions the iodine trichloride decomposes into iodine mono-chloride, iodic acid and hydrochloric acid, according to the equation, $2\ ICl_3 + 3\ H_2O \rightarrow HIO_3 + ICl + 5\ HCl$. In more dilute solutions the iodine monochloride decomposes to form iodic acid, free iodine and hydrochloric acid, $10\ ICl + 6\ H_2O \rightarrow 2\ HIO_3 + 8\ I + 10\ HCl$. The effectiveness of the compound is due probably to the amount of free iodine liberated.

In the first paper of this series[3] methods were described for comparing the resistance of bacteria and embryonic chick heart tissue

[1] Rideal, Samuel, and Rideal, Eric K., Chemical Disinfection and Sterilization, London, Edward Arnold and Co., 1921.

[2] Hailer, E., *Weyls Handbuch der Hygiene,* 1922, **8**, 861.

[3] Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 665.

to germicidal compounds. A *Staphylococcus aureus* phenol coefficient and a toxicity index were determined for each germicide tested.

The highest dilution of phenol required to kill *Staphylococcus aureus* in 10 minutes but not in 5 minutes was 1:65. For iodine trichloride it was 1:6,000. This gave iodine trichloride a *Staphylococcus aureus* phenol coefficient of 92 by the method of Reddish.

Rideal and Rideal[1] reported that a concentration of 50 parts per million was required to destroy typhoid bacilli in 30 minutes. A saturated aqueous solution showed a phenol coefficient of 94. The activity of the compound was found to be only slightly impaired by the addition of albumin or salts. Behring[4] stated that iodine trichloride was a powerful disinfectant. He found that a 0.1% solution killed vegetative cells in one minute and a 1% solution destroyed spores within a few minutes.

The tissue culture results are summarized in Table I.

TABLE I.

Germicide	Highest Dilution Showing No Tissue Growth = A	Highest Dilution Showing No Growth of *Staph. aureus* = B	Toxicity Index = A/B	*Staphylococcus aureus* Phenol Coefficient
Phenol	1:840	1:65	12.9	
Iodine Trichloride	1:2,400	1:6,000	0.4	92

The results show that iodine trichloride, in addition to being a powerful germicide, is relatively very non-toxic to embryonic chick heart tissue. With the exception of iodine it showed the smallest toxicity index of any of the germicides so far studied when tested by the tissue culture technique. The compound showed more than twice the toxicity to *Staphylococcus aureus* than to embryonic chick heart tissue. Combining these results with those obtained in previous tests on other germicides,[3, 5–8] the chemicals may now be arranged in the following order on the basis of their toxicity indices: iodine = 0.09; iodine trichloride = 0.4; Hexylresorcinol = 3.0; Metaphene = 12.7; phenol = 12.9; Merthiolate = 35.3; and Mercurochrome = 262.0.

4 Behring, *Zeit. f. Hyg.*, 1890, **9**, 395.

5 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 937.

6 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1057.

7 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1119.

8 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., in press.