

for the concentration influence of the carbon monoxide-haemoglobin itself.) A few experiments were made with a type I antipneumococcus horse serum. In the first run, the heaviest globulin component observed was completely centrifuged out of the top compartment, as judged by optical observation. Analytical measurements according to the method of Heidelberger, Sia and Kendall⁴ showed that less than 1 per cent of the antibody originally present was left in the top compartment, whereas 92 per cent was found in the bottom. (We are indebted to Dr. E. A. Kabat for making these analyses.) Centrifuge runs of shorter duration, still leaving the fastest globulin boundary above the membrane, showed a corresponding increase in the analytically determined amount of antibody in the top layer. This indicates that the antibody function is mainly connected with this heavy globulin component, in agreement with earlier findings^{2,5}.

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² Heidelberger, M., Pedersen, K. O., and Tiselius, A., *NATURE*, **138**, 165 (1936).

³ Wyckoff, R. W. G., *Science*, **84**, 291 (1936).

⁴ Heidelberger, M., Sia, R. H. P., and Kendall, F. E., *J. Exp. Med.*, **52**, 477 (1930).

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Absorption of Tri-brom Ethanol through the Skin

In connexion with a study on absorption of various drugs and chemicals through the intact skin of different animals, an interesting observation was made in this laboratory. It was found that tri-brom ethanol readily penetrates the intact skin of such small animals as rats and mice and produces its characteristic narcotic effects.

A solution of tri-brom ethanol crystals (Winthrop's) was made in 95 per cent ethyl alcohol. When a sufficient amount of this solution was applied to the fur of white mice, it was rapidly absorbed and the animals were anaesthetized within 15-30 minutes. The anaesthesia lasted 2-3 hours, after which the animals recovered. When larger doses were applied, anaesthesia was followed by coma and death. The minimal quantity of a 10 per cent solution of tri-brom ethanol in 95 per cent ethyl alcohol required to anaesthetize a mouse weighing 24 grams was 0.85 c.c. In control experiments with ethyl alcohol alone, no narcotic effect was produced, nor was the anaesthesia described above due to absorption through the mouth.

Inasmuch as tri-brom ethanol intended for clinical use is combined with amylene hydrate, experiments were also made with a 10 per cent solution of tri-brom ethanol together with 5 per cent of amylene hydrate in 95 per cent ethyl alcohol. The minimal dose of this mixture required to produce general anaesthesia, when applied to the skin of mice averaging 24 grams in weight, was 0.75 c.c. The effectiveness of this dose, which is smaller than that required of tri-brom ethanol solution in alcohol alone, is obviously due to the synergism produced by combination of amylene hydrate with the drug.

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Production of Artificial Respiration by Rhythmic Stimulation of the Phrenic Nerves

IN a study of the effects of drugs on respiration, the various methods used for the production of artificial respiration were found to be unsatisfactory. In an attempt to work out a suitable method for the work, it was found that the phrenic nerves when stimulated rhythmically would carry on respiration for hours and at the same time keep the animal in exceptionally good condition.

The primary currents of two induction coils, in addition to being made and broken by their interrupter operated by the iron core, were closed and opened by a rotary contact. By means of an electric motor and rheostat, this contact was rotated slightly above the normal respiratory rate of the animal. Anaesthetized rabbits were used. The phrenic nerve on each side of the neck was isolated just above its point of entrance into the chest and placed in a small shielded electrode. Each electrode was connected with the secondary of one of the induction coils. By placing a sledge key in each of the primary circuits, the action of either the right or the left diaphragm could easily be demonstrated, while changes in the rate of the motor changed the respiratory rate.

The method was found especially useful in experiments where hyperventilation was desired. It obviates the changes in circulation which result when the increased tracheal pressure method of artificial respiration is used. As conductivity in nervous tissue is poor immediately following decapitation, it was found necessary in this preparation to use another method of artificial respiration until the phrenics had sufficiently recovered.

A further study of the method with the view of extending its applications and improving the technique is being carried out.

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A Coloured Intermediate on Reduction of Vitamin B₁

A VERY distinct green yellowish colour appears when vitamin B₁ (synthetic, I. G. Farben.), in a 0.5-1 per cent solution, is reduced with hydrosulphite in the manner described in a previous note¹. The intensity of the colour is highest at the beginning, declines with the declining rate of reaction and disappears at the end. The same transient green colour is observed when the vitamin is reduced with zinc dust in normal hydrochloric acid.

Similar coloured intermediates have been observed on reduction of cozymase² and of nicotinic acidamide methyl iodide³. These compounds are considered as half-reduced pyridines corresponding to the semi-quinones of Michaelis⁴. Therefore, it is suggestive to consider the coloured reduction product of vitamin B₁ as a half-reduced thiazole.⁵

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² Adler, Hellström and v. Euler, *Z. physiol. Chem.*, **242**, 225 (1936).

³ Karrer and Benz, *Helv. chim. Acta*, **19**, 1028 (1936).

⁴ Michaelis, *J. Biol. Chem.*, **92**, 211 (1931).

⁵ See also Erlenmeyer, Epprecht and v. Meyenburg, *Helv. chim. Acta*, **31**, 661 (1937).