greater H_2O_2 toxicity. Santesson[6] observed that at a concentration of 0.15%, neoarsphenamine faintly speeded catalase action, and below this concentration the arsenical exerted practically no effect. As the concentrations found in the blood stream after injection of chemotherapeutic doses of neoarsphenamine are of the order 0.001-0.01%, the catalase of the host and parasite should function normally to protect the parasites from the H_2O_2 formed in their metabolism or during the auto-oxidation of the arsenical. Santesson[7] proposed that tissue H_2O_2 assists in converting neoarsphenamine into "Arsenoxide".

Conclusion. Hydrogen peroxide is toxic to trypanosomes. The formation of traces of H_2O_2 under conditions where the catalase content of the system is low cannot be excluded. Such concentrations, although not detectable, might be sufficient to exert some damaging action on trypanosomes. While this factor is probably negligible *in vivo,* it still might be involved with the rate of the —AsO formation and thus concerned indirectly with the chemotherapeutic activity of arsenicals (Santesson).

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Effect of Adenine and Caffeine Injections on Behavior of Rats in a Circular Maze.

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Albino rats were trained in a large circular maze until they were able to run from the periphery to the center in the shortest time possible and without making an error. Such trained animals were then given different doses of caffeine and adenine separately and also in combination; the running time, the number of errors, and the general behavior of the rats were noted at various intervals thereafter. Thirty young adult rats, weighing from 100 to 200 gm., were used in these experiments. The dosages varied from 1 to 5 mg. per hundred gm. weight of the animals; the drugs were administered by intraperitoneal injection. In other experiments, the different drugs were given to large rats through a stomach tube; and in

[6] Santesson, S. K., *Arch. f. Physiol.,* 1915, **32**, 405.

[7] Santesson, S. K., *Arch. f. Physiol.,* 1923, **43**, 55.

such cases as much as 10 mg. of these were administered at one time. The number of experiments performed on trained animals with the drugs was 124. Both caffeine and adenine were administered in the form of a weak aqueous solution of the bases (0.2 to 0.4%). As a rule, each rat was given the drug not more than once or, at most, twice a week. An effort was made to determine the effects of adenine and caffeine separately and in combination on each individual animal. The results obtained were as follows:

Caffeine was administered to rats in 51 experiments. In 36 experiments (71%), excitement was produced; in 3 experiments (6%), no effect was observed; and in 12 cases (24%), a depression was noted after administration of the drug. Adenine was given in 40 experiments. A slight excitement was noted in 21%, no effect was observed in 28%, and a distinct depression was produced in 52%. When adenine and caffeine were administered simultaneously in equal doses of from 1 to 3 mg. per 100 gm. weight, the following results were obtained. The total number of experiments was 33; depression was noted in 61%, no effect in 24%, and excitement appearing in 15%.

When adenine and caffeine are administered in combination the effect is an antidynamic one and cannot be explained by a mere summation of the pharmacodynamic action of the 2 components. The excitation produced by caffeine was in most cases weakened or inhibited by the adenine. Tea and coffee affect many individuals in different ways, coffee usually producing greater excitation of the nervous system, as indicated by insomnia, etc. The difference cannot be explained by the difference in quantity of caffeine. Tea differs from coffee especially in containing a large amount of adenine. It is possible that the adenine in tea counteracts the pharmacological action of its caffeine content. This holds good for certain other pharmacological reactions (Macht and Schroeder[1]). The experiments are of further interest in indicating that caffeine, although producing excitation in 70% of the cases, has a depressant instead of a stimulating effect on other animals. This agrees well with the clinical observation that, in some persons, coffee, instead of acting as a stimulant, has a sedative effect and even promotes sleep.

[1] Macht and Schroeder, *Klin. Wochensch.*, 1930, **9**, 2429.