were at their height on the eleventh day, when they showed marked elevation, reddened base, crater formation, and serous exudation. Curettings from one of the monkeys, at this stage, produced no results when inoculated cutaneously on three rabbits, two of which had proved refractory to similar inoculation with the original alastrim material from human cases. The monkeys had no generalized eruption or other symptoms.

Thirteen days after the monkeys were first inoculated with alastrim, one of them was reinoculated with one of the two strains (Jamaican) which had given a successful result, and the other, as well as a control monkey, was vaccinated with an active vaccine virus. The control monkey developed a typical primary vaccinia beginning on the fourth day and reaching its fastigium on the ninth day. The monkeys previously inoculated with alastrim showed nothing beyond a transient reaction of immunity, or of trauma, at the sites of inoculation with vaccine virus and of the second application of alastrim material, respectively.

This immunity to vaccinia is at least as high as that produced by the American strain of smallpox. Three monkeys, some months previous to the above series, were inoculated with vesicle contents from smallpox and developed local lesions similar to those above described. Twenty-four days later they were vaccinated, together with three controls, and showed a definite vaccinal "take," though more rapid and less severe than the previously uninoculated monkeys, *i.e.*, a vaccinoid or accelerated reaction.

126 (1708)

## Studies on the action of mercury.

By WILLIAM SALANT and NATHANIEL KLEITMAN.

[*From the Department of Physiology and Pharmacology, University of Georgia, Augusta, Georgia.*]

Observations on the pharmacology of mercury were made, with special reference to its influence on the circulation and respiration. Mercury in a concentration of 1:5000, in the form of the benzoate, succinate and acetate, was injected intravenously into dogs and cats under ether or ether-paraldehyde anesthesia.

Small doses of mercury frequently produced pronounced changes in the circulation as well as respiration. One and a half to two milligrams per kilo caused stimulation of respiration. Frequency and particularly depth of respiration were increased shortly after the administration of the salt was begun and the effect sometimes persisted for several minutes after the injection was discontinued. Larger doses, however, produced the opposite effect. Respiration was also depressed when the injection of a stimulating dose was repeated several times, thus indicating cumulation.

The effect on the circulation was more complicated. Small doses usually produced a temporary rise in blood pressure of about 8–10 mm. Hg, but in several experiments no change was observed. When small doses were repeated so that the total amount injected was 4–5 mg. of mercury per kilo, depression of the circulation was observed, thus showing cumulation as in the case of respiration. The changes produced usually consisted of a sudden drop in blood pressure and slowing or arrest of the heart which lasted in some experiments thirty seconds. This was followed by recovery, the blood pressure rising rapidly and attaining even a greater height than that before the injection. Very often the blood pressure remained at the new high level for some time and then descended again, but the descent was gradual. The sudden fall in blood pressure was a frequent occurrence, however, in a number of experiments, and in a few cases no recovery took place.

Attention may also be called in this connection to the long latent period which very often preceded the sudden fall in blood pressure, two to six minutes elapsing before this occurred.

The effects on blood pressure were different when the vagi were cut before the administration of mercury was begun. The lowering of blood pressure was much less abrupt and longer in duration. In one experiment it lasted for more than fifteen minutes. Marked changes in heart action were also observed. It might be added that stimulation of the peripheral end of the vagus failed to elicit the usual response after a sufficient amount of mercury was injected.