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On fundamental changes in the action of some alkaloids upon frogs after cardiectomy or ligation of one aorta.By **S. J. MELTZER.**

[From the Department of Physiology and Pharmacology of the Rockefeller Institute for Medical Research.]

At the last meeting of the American Physiological Society I reported that in cardiectomized frogs an injection of adrenalin will still cause dilatation of the pupil and an injection of strychnine will cause a tetanus. At the February meeting of this society I reported on the action of morphin on cardiectomized frogs. An injection of 10 or 15 mgr. of morphin in living, normal, medium-sized frogs causes at first no perceptible effect; after a few days a tetanus may set in, while there is at no time a depression. In cardiectomized frogs, however, an injection of 6 or 8 mgr. of morphin causes the appearance of tetanic symptoms in less than an hour. When 10 to 20 mgr. are injected the tetanus is preceded by a paretic state. After an injection of 25 to 30 mgr. the animal becomes paralyzed very early, to be interrupted later by only short weak tetanic movements.

I have since found that also after the ligation of one aorta, especially of the right one, a tetanus will very frequently develop two or three hours after an injection of 10 or 15 mgr. of morphin; in some cases the tetanus may persist as long as twenty hours. In some cases two or three hours after the development of the spasmodic state the tetanus became temporarily interrupted by paralysis which lasted only 30 to 60 minutes.

Since the beginning of April it often became difficult to obtain in cardiectomized frogs a tetanus; even with small doses of morphin the effect was in many cases complete paralysis, which set in very early after the injection. The same was true also of frogs with one aorta ligated. Here the heart might be seen beating forcefully for hours while the animal is completely paralyzed. The fact reminds one of the behavior of nerve and muscle irritability in spring frogs.

Finally in a small percentage of cardiectomized frogs curare

(curarin) was found to produce tetanic symptoms. It was found further that when the right aorta has been ligated and the tissues of one leg or of both were firmly contracted, under the exclusion of the sciatic nerves (Claude Bernard), curarin produced in most cases a stage of definitely increased reflexes and even of short tetanic attacks.

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**On the convulsant action of acid fuchsin (Abel and Barbour)
in cardiectomized frogs.**

By **DON R. JOSEPH** and **S. J. MELTZER.**

[*From the Department of Physiology and Pharmacology of the Rockefeller Institute for Medical Research.*]

In experiments carried out in this laboratory it was shown that in the absence of the cardiovascular mechanism alkaloidal solutions are well distributed through the body; that, for instance, injections of adrenalin cause dilatation of the pupil and injections of strychnine cause the development of spasms. It was further found that the action of some substances may be even greatly accelerated and more effective in cardiectomized than in normal frogs. Morphine, for instance, may cause a tetanus in 40 to 50 minutes.

In a recent communication of Abel and Barbour it was reported that an injection of a comparatively large dose (one mgr. and more per grm. body-weight) of acid fuchsin into a frog may cause after many hours (even as much as 20) the appearance of a series of convulsions. These investigators discovered further that in frogs in which the anterior third of the cerebral lobes was removed, such convulsions may appear very soon, 13 minutes and less, after an injection of only a small dose of the fuchsin, *e. g.*, 0.35 mgr. per grm. body-weight. With the consent of Professor Abel we investigated the behavior of fuchsin in cardiectomized frogs in which the brain remained intact. The following is a brief preliminary report of the results.

Observations were made so far on about forty frogs. In all cases in which fuchsin was injected into the dorsal lymph sac of cardiectomized frogs, convulsions never failed to appear and the time of appearance was never longer than half an hour after the