sulphate solution. It is also significant that the only experiment in which we have failed to produce fibrillation was in a dog which showed spontaneous fibrillation when the chest wall was removed, and in which the fibrillation had been stopped by a large dose of quinidine before stimulation was attempted.

In our experiments, whenever the stimuli have been applied to rapidly beating hearts, either during stimulation of the accelerators, after atropinization, or after small doses of epinephrine, the resulting fibrillation has never lasted more than a few seconds, whereas we have usually obtained fibrillation lasting from half a minute to 2 hours when the stimuli have been applied to hearts whose vagi were being stimulated either electrically, with pilocarpine or with large doses of epinephrine.

Further studies upon the influence of these factors, as well as upon variations in acid-base equilibria, effects of ions, etc., are in progress.

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Effects of Epinephrine Injections upon Deep and Superficial Blood Vessels of Frog's Tongue.

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Investigations by Cannon and his collaborators[1, 2, 3, 4] have shown that while intravenous injections of epinephrine cause the whole limb to decrease in volume, an increase in volume may be recorded if the skin of the limb has been removed. In other words, epinephrine causes vasoconstriction in the vessels of the skin but not in those of the muscle. We have observed a similar phenomenon in the arterioles of the frog's tongue. If the frog's tongue is observed under the microscope, the superficial capillaries supplying the mucous membrane can be seen as loops closely resembling the familiar capillary loops in the human skin, while the deeper vessels supplying the muscles of the tongue run a much less tortuous course. After the injection of 1.5 cc. of 1:100,000 epinephrine solution into the dorsal or ventral lymph sac, most of the super-

[1] Cannon, W. B., and Lyman, H., *Am. J. Physiol.*, 1913, xxxi, 376.

[2] Gruber, C. M., *Am. J. Physiol.*, 1918, xlv, 302.

[3] Hartman, F. A., and Kilborn, L. G., *Am. J. Physiol.*, 1918, xlv, 111.

[4] Hartman, F. A., Kilborn, L. G., and Fraser, L., *Am. J. Physiol.*, 1918, xlvi, 168.

ficial capillaries become perfectly bloodless, while in others, the flow of blood corpuscles is greatly retarded. No such contraction or retardation can be noted, however, in the deeper capillaries and arterioles supplying the muscles of the tongue.

These observations show that the same contrast between the effects of epinephrine on the superficial vessels and in the deeper vessels takes place in the frog as has been observed in mammals.

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Inhibiting Effects of Lipoids upon Actions of Antiseptics.

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Although many experiments have been performed which have shown that the antiseptics have a weaker action in blood serum and tissue juice than in water salt solution or bouillon, this diminution of action has always been ascribed to the presence of the proteins. However, since these fluids also contain lipoids, and since, as has been shown by Cruikshank,[1] Loewe[2] and others, the lipoids may play a decided rôle in altering the distribution coefficient of the antiseptic dyes, we have studied the effects of the mere presence of lipoids upon the action of various antiseptics. In the experiments which we have performed, we have found that when cultures of *Staphylococcus aureus* and *Bacillus coli* are exposed to the action of various antiseptics (acriflavine, pyridium, phenol, bichloride of mercury) in suspensions of 0.5% lecithin or kephalin, or of .05% cholesterol, the antiseptic activity was greatly weakened; and this decrease of effectiveness is of about a degree similar to that which is brought about by the presence of an equal concentration of protein, though usually somewhat less marked. Since blood plasma contains .25% lecithin and .18% cholesterol, suspensions which we have used are quite comparable to blood plasma.

The table below gives the greatest dilution in Clark's buffer solutions ($Na_2HPO_4+KH_2PO_4$ at pH 7.4) of the antiseptics which inhibited the growth of transplants to agar after the bacteria have been exposed to the action of the antiseptic for 3 hours. The experiments with pyridium were done in Locke's solution as the antiseptic is precipitated by the phosphate buffer at pH 7.4.

[1] Cruickshank, J., *J. Path. and Bact.*, 1920, xxiii, 230.

[2] Loewe, S., *Biochem. Z.*, 1922, cxxvii, 231.