arin into the circulation in amounts sufficient to prevent the formation of a blood clot prevents or reduces, in the majority of cases, the symptoms of anaphylactic shock in guinea pigs hypersensitive to horse serum.

[1] Kyes, Preston and Strauser, E. R., *J. Immunol.*, 1926, xii, 419-422.

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Further Evidences of the Non-Sympathomimetic Action of Ephedrine.

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In a previous report[1] it was shown that the most favorable functional state of the sympathetic nerves in blood vessels, *i. e.*, during sensitization by cocaine, failed to give responses to ephedrine, indicating that the cause of the pressor action of ephedrine was not sympathetic stimulation. Further evidence obtained recently along other lines confirms this result.

Three cats (4.5 to 7 cc. per kilo of Fledxt. Ergot, U. S. P.) and 1 dog (1 mgm. per Kg. ergotamine) were ergotized to the point of reversal of the original rises of blood pressure caused by epinephrine, to falls of pressure owing to paralysis of the constrictor sympathetic endings. In these same animals, the rises of blood pressure (before ergot) caused by different doses of ephedrine were invariably obtained when the vasomotor reversals to epinephrine were demonstrated. In other words, the pressor action of ephedrine still occurred after paralysis of the sympathetic constrictor endings, and

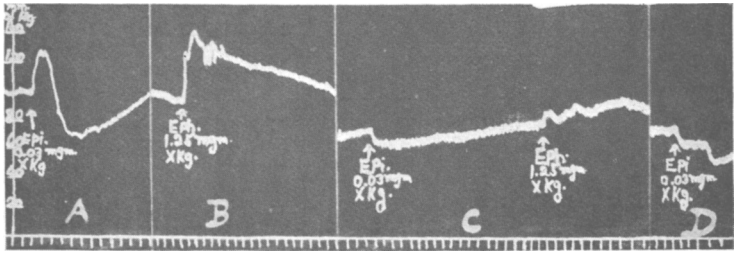

FIG. 1.

Control pressor actions of epinephrine and ephedrine (A and B), and reversal of epinephrine (C and D), but not with ephedrine (C) after ergot in a cat. "Epi" means epinephrine, and "Eph", ephedrine.

therefore, was due to muscular stimulation. Figures 1 and 2 illustrate typical results with different doses of ephedrine and epinephrine before and after ergot in a cat and a dog.

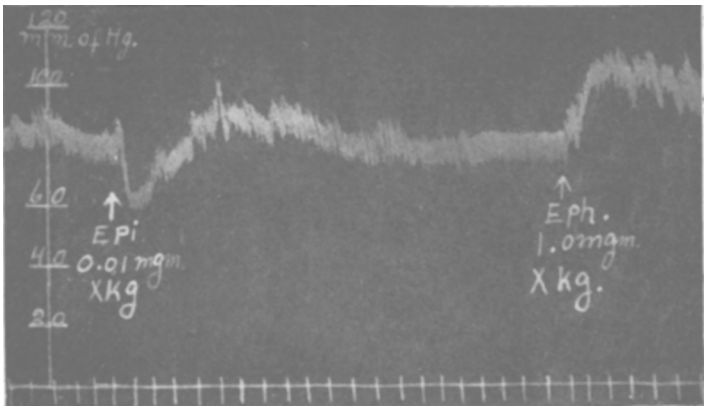

FIG. 2.
Pressor action of epinephrine reversed and pressor action of ephedrine preserved in an ergotinized dog; controls omitted, but were the same as usual.

Uteri responding by motor inhibition to treatment with epinephrine should respond similarly to ephedrine if the latter is sympathomimetic. However, this was not the case, for the same strips of excised uterus (in oxygenated Tyrode solution at 38°), which relaxed under epinephrine, were consistently contracted by the ephedrine. This biological test indicates that ephedrine stimulated the uterus through an action on the muscle. Figure 3 illustrates the contrast between epinephrine and ephedrine in their effects on excised guinea pig uterus. In a recent paper by Kreitmair,[2] appearing after this work was completed, the reported ephedrine stimulation of excised rabbit uterus, previously reversed with epinephrine with an ergot product, is consistent with our results. (See Fig. 3.)

Epinephrine had no action on the untreated bronchi of a decerebrated dog, previously atropinized and the vagus branches rendered non-responsive to electrical stimulation. But the bronchi were relaxed by ephedrine about as efficiently as by epinephrine when they were contracted by histamine and pilocarpine. This places ephedrine into the same category as epinephrie as a bronchodilator, the action not being sympathomimetic, but rather conditioned on the functional state of the bronchiolar musculature.

From all these results and the previous ones in cocainized animals, it is concluded that ephedrine* is not sympathomimetic in its actions on blood pressure, uterus and probably bronchi, the action

being muscular. This and the greater chemical stability of the alkaloid suggest why its actions are better sustained than those of epinephrine.

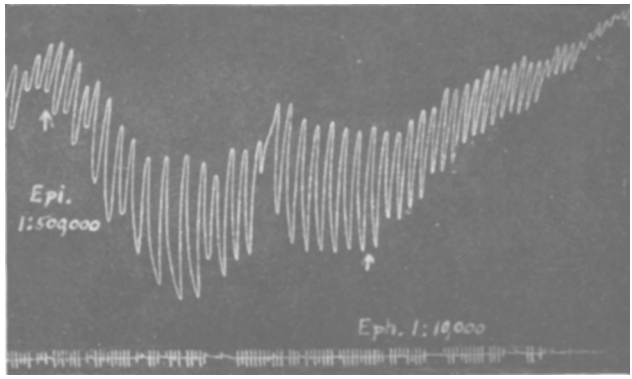

FIG. 3.
Strip of pregnant guinea pig uterus showing inhibitory response to epinephrine and augmentor response to ephedrine.

During the past two years different extracts and extractives (corresponding to alkaloid) of several specimens of *Ephedra nevadensis* obtained from Utah have been examined in this laboratory with negative results as to the presence of alkaloids and demonstrable physiological effects, except those which could be explained as due to the presence of tannin. Controls with extracts from Chinese ephedra and with ephedrine gave positive results.

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[1] De Eds, F., PROC. SOC. EXP. BIOL. AND MED., 1927, xxiv, 551.

[2] Kreitmair, H., *Arch. Exp. Path. Pharm.*, 1927, cxx, 189.

* The ephedrine used in this work came from two sources; a sample kindly supplied by Dr. Chen, and different samples marketed by the Abbott Laboratories.

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Studies in Tuberculosis. XI. Neutralization of Filterable Tubercle Toxin (T. F.) with Sheep Antiserum (Antitoxin).

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In continuation of the experiments reported previously,[1, 2, 3] Berkfeld filtrates from broth cultures of tubercle bacilli were used in the