of the diphasic T wave usually measured 2 mm as a negative deflection and 3-5 mm as a positive deflection. In 2 of the adult dogs the positive phase of the diphasic T wave appeared first; in one, the negative phase was the first to appear and in the other dog there was a reversal of the initial deflection, being negative in the first 3 records showing diphasic T waves, positive in the next 4, and again negative in the last 3.

Conclusions. Bradycardia which was sometimes preceded by tachycardia developed in dogs poisoned with ethylene glycol. The cardiac arrhythmia of both immature and mature dogs were both regular and irregular in character. The regular alteration of rhythm was caused by an exaggerated sinus arrhythmia. The irregularity of cardiac rhythm of pups was caused by sino-auricular block, whereas, in adult dogs, it was caused not only by sino-auricular block but also by nodal and ventricular extra-systoles. A partial A-V block developed in only one of the 4 adult dogs and in this instance it did not occur until 2 hours before death. Atrio-ventricular block, therefore, appeared to be an exception rather than a rule in ethylene glycol poisoning. The deep S waves and the displacement and curvature of the S-T segment combined with a diphasic T wave were constant findings in the electrocardiograms of adult dogs after the developmeent of toxic symptoms of ethylene glycol poisoning. Similar S-T changes occurred in pups but much less extensively. The abnormal S-T complex (deep S wave, low take-off and convex curvature of S-T segment followed by a diphasic T wave) therefore appeared to be a characteristic alteration of the electrocardiograms of dogs poisoned with ethylene glycol. The electrocardiograms of dogs poisoned with "Prestone" were identical with those poisoned with c.p. ethylene glycol.

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Effects of Morphine Sulphate on Hypothalamus of the Cat.

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In 16 animals under light ether anesthesia, a needle electrode was inserted stereotaxically into the hypothalamus and observations were made as to the changes in the responses of this structure to faradic stimulation after the intra-hypothalamic or the intraperitoneal injec-

tion of a solution of morphine sulphate. Corresponding data were also obtained in 8 unanesthetized cats previously prepared under nembutal anesthesia by the insertion of separate needle electrodes into the hypothalamus and the opposite posterior cruciate gyrus.[1] The results of these experiments may be summarized as follows:

Acute Preparations. Stimulation of the anterior hypothalamus with from 2 to 8 volts of a 60 cycle current produced various degrees of piloerection, cyclodilatation with retraction of the nictitating membranes, salivation, forced urination, extrusion and fanning of the claws, champing and licking of the jaws, lashing of the tail, running and pawing movements of the fore-legs, and biphasic changes in the respiration and blood pressure. The injection directly into the hypothalamus of from 0.05 to 0.10 cc of Locke's solution containing from 1 to 10 mg of morphine sulphate or the intraperitoneal administration of from 30 to 180 mg of the drug produced no discernible effects in the anesthetized animal other than a slight myosis and a variable decrease in the rate of respiration; moreover, the responses of the hypothalamus to subsequent faradic stimulation were not consistently affected either in nature or degree.

Recovery Preparations. Electrical stimulation of the hypothalamus in an unanesthetized animal produced the same vegetative effects as in the acute preparation, and in addition, coördinated vocal and muscular activity suggestive of anxiety, fear and rage.[1] In contrast, stimulation of the cruciate cortex with weak currents (2 to 4 volts A.C.) produced only maintained flexion or extension of the legs, torsion of the body and occasionally slight piloerection or cyclodilatation, whereas stronger currents (4 to 12 volts) induced greater vegetative responses and muscular convulsions which progressed from the contralateral leg to involve the entire body. The intra-hypothalamic or intra-cortical injection of from 1 to 10 mg of morphine sulphate in 0.1 cc of Locke's solution again produced no evident effects, but the injection of from 30 to 180 mg of the drug intraperitoneally caused variable myosis, motor restlessness (3 of 8 animals) and finally, a stupor or coma which persisted for from 8 to 30 hours. However, the local or the intraperitoneal injection of morphine sulphate produced no consistent changes in the characteristic responses to elec-

[1] Detailed descriptions of the experimental methods employed in these studies and observations that were used as controls in the present work are included in previous reports from this laboratory (Masserman, J. H., *Arch. Neurol. and Psychiat.*, 1937, **37**, 617; *ibid.*, 1938, **39**, 1250; *ibid.*, 1939, **41**, 504; Masserman, J. H., and Haertig, E. W., *J. Neurophysiol.*, 1938, **1**, 350; Masserman, J. H., *J. Pharm. and Exp. Ther.*, 1938, **64**, 335). Thanks are due to Mr. John Austin for technical aid in the present study.

trical stimulation of either the hypothalamus or the cruciate cortex, other than that in the former case the animals which received more than 60 mg of morphine sulphate would cease their pseudo-affective behavior and relapse into stupor immediately after the cessation of the hypothalamic stimulus.

Conclusion. In the cat, the local injection of from 1 to 10 mg of morphine sulphate in Locke's solution or the intraperitoneal administration of from 30 to 100 mg of the drug does not affect the reactivity of either the cruciate cortex or the hypothalamus to faradic stimulation, except that in animals which receive more than 60 mg intraperitoneally the hypothalamic responses are limited to the duration of the stimulus.

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Effect of Sulfanilamide on the Isolated Frog Heart.

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A study was made of the effects of sulfanilamide on the isolated frog heart using the Straub-Fuehner method. The solutions of sulfanilamide used ranged from 0.05% to 0.50% and were made up in frog heart Ringer's. This solution was used between sulfanilamide perfusions to return the heart to normal.

All concentrations caused an increase in amplitude, more marked in the higher concentrations. In the weaker dilutions, the rate was only slightly increased, followed by depression, whereas the stronger solutions all caused a depression of rate. Further observations were made with stronger solutions of sulfanilamide, up to 0.8%, essentially with the same results. The heart always stopped in diastole. This was not due to the weight of the lever, since it also stopped in diastole when wholly disconnected from the lever.

In order to determine if any part of the action of sulfanilamide was caused by a change in pH, both the Ringer's solution and the 0.5% solution of sulfanilamide in Ringer's were tested. The sulfanilamide raised the pH very little so that the solution was still within the pH range permissible for frog heart Ringer's. Therefore, it was not a change in pH which affected the heart.

The effect of sulfanilamide on the isolated frog heart is stimulation