

the thyrotropic factor. This protective action of ascorbic acid against thyroid hypertrophy can be correlated with earlier work^{7, 8} on (a) the production of a transient Graves' disease-like syndrome in rabbits and cats by sufficient but sublethal injury of the suprarenals; (b) with the sharp increase in the heat production of infants beginning on the 8th day after birth and associated with involution of the suprarenal cortex⁹; (c) with the beneficial effects of suprarenal cortex emulsion in the treatment of Graves' disease¹⁰; (d) with the metabolism lowering effect of fresh glycerol emulsions of suprarenal cortex emulsions in rabbits; and (e) with the association of Graves' disease with prolonged deep X-ray therapy to the suprarenal region in man.¹¹

7355 P

Susceptibility of Heart to Electric Shock in Different Phases of the Cardiac Cycle.

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In connection with an extended series of experiments on the effects of electric shock, the fact has been brought to light that shocks whose duration is a small fraction of the cardiac cycle have a marked difference in their tendency to cause ventricular fibrillation, depending upon the phase of the cycle in which they occur. The shocks were tripped off by amplified cardiac currents after a controlled delay from a reference point in the electrocardiac cycle. The electrocardiogram together with the shock current and voltage were photographically recorded in time relation on a continuously moving film, which enabled checks to be made on the placement of the shocks in the cardiac cycle. Nearly 800 shocks with 60-cycle current of .03 and .1 second durations were administered to 92 anesthetized sheep in different parts of the cardiac cycle, with currents ranging from 1 to 17 amperes, through the pathway between

⁷ Marine, D., and Baumann, E. J., *Am. J. Physiol.*, 1921, **57**, 135.

⁸ Scott, W. J. M., *J. Exp. Med.*, 1922, **36**, 199.

⁹ Marine, D., Lowe, B., and Cipra, A., *J. Metabol. Res.*, 1922, **2**, 329.

¹⁰ Shapiro, S., and Marine, D., *Endocrinology*, 1921, **5**, 699.

¹¹ Marine, D., *Am. J. Med. Sci.*, 1930, **180**, 767.

the right fore-leg and the left hind-leg. A large proportion of the shocks which were given near the end of ventricular systole, as determined by their coincidence with the T-wave of the electrocardiogram, caused ventricular fibrillation and death, while but one shock (0.1 second duration) distinctly outside the T-wave resulted in fibrillation.

It seems probable that the difference in the susceptibility of the heart to fibrillation from shocks in different phases of its cycle is related to the known variation of its excitability. Further investigation is being carried forward.

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Estimation of Small Traces of Alkaloids.

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The need to measure the amount of cocaine penetrating to the aqueous humor of an experimental animal after instillation of a cocaine solution into the conjunctival sac led to the following analytical procedure, which we find applicable to the quantitation of traces of many alkaloids in aqueous solution, and of certain alkaloids, particularly cocaine and strychnine, in body fluids. The method, which is accurate within the limits of colorimetric observations, is strikingly simple, and we believe will be of interest to workers in pharmacology, toxicology and experimental medicine.

A. *Procedure for aqueous solutions.* To a measured amount of solution containing from .5 to .05 mg. of the alkaloid is added 1 cc. of a 1% solution of phosphomolybdic acid in normal sulphuric acid. This is best done in a small test tube of about 5 cc. capacity. After mixing and standing for 15 minutes, the mixture in the test tube is centrifuged and the supernatant fluid decanted. The residue is resuspended in water, again centrifuged and the supernatant discarded. To the washed precipitate is now added 1 cc. of fifth normal sulphuric acid, 1 cc. of 2% aqueous solution of hydroquinone, and after shaking, 1 cc. of the carbonate-sulphite solution used in the Bell and Doisy¹ method for phosphate determination (15% so-

¹ Bell and Doisy, *J. Biol. Chem.*, 1920, **44**, 55.