an additional role of acid as a nervous integrator. Enlargement of motor end plates in respiratory muscles might readily increase the amount of electrotonic current generated by the plates. A differential effect on the response of respiratory and non-respiratory muscles to the electrotonic current generated at the motor end plate is another possibility.

The differential effects of a common increase in cH may be of biological significance in preventing excessive use of locomotor muscles and assuring an adequate pulmonary ventilation for the needs of the body as a whole.

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Effect of Various Digitalis Glycosides upon the Cardioinhibitory Action of Acetylcholine.

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We have previously reported that in the dog 10% of the lethal dose of a certain tincture of digitalis abolished the cardiac inhibition produced by acetylcholine.[1] A preliminary investigation to determine whether this was due to some one or other of the known glycosides in digitalis purpurea has not been conclusive, but indicates that the glycosides do not behave identically in respect to their modification of the response to acetylcholine. To test this question further, the 3 glycosides of digitalis lanata, Lanatoside A, Lanatoside B, and Lanatoside C were employed.*

Anesthetized dogs were used. The minimal dose of acetylcholine bromide required to produce cardiac inhibition after injection into the femoral vein was determined. This varied in different animals from 0.1 to 1.0 mg. As the variation in an individual normal animal when tested at various intervals of time was occasionally as much as 50%, provision was made for such variation by using twice the minimal effective dose of acetylcholine. The cardio-inhibitory action of acetylcholine was determined from the carotid blood pressure tracing and by electrocardiograph tracings. An estimated 1/12th of the lethal dose of a glycoside was injected via the femoral vein, and similar doses were injected at 10-minute intervals until the animal died. Five minutes after each injection the test dose of acetylcholine (*i. e.* twice the original minimal cardio-inhibitory dose) was injected and observations made as to whether this did or did not cause cardiac inhibition. The results in 10 animals with each glycoside are shown in Table I.

Lanatoside C invariably abolished the cardiac inhibition produced by acetylcholine and did this when an average of 62% of the lethal dose was given. Lanatoside A produced such an effect in only 2 out of 10 experiments and Lanatoside B in but 5 out of 10 experiments. A statistical comparison of the frequency with which the various glycosides abolished the cardio-inhibitory action of acetylcholine shows that the probability that the differences between Lanatosides A and C could be due to chance alone is 1 in 2800; between B and C is 1 in 61; and between A and B is 1 in 6.

These results have a bearing upon the question of the similarity of cardiac effect produced by various cardiac glycosides. It is well known that these agents vary as to their absolute potency, absorbability from the gastrointestinal tract and duration of action. However, it is generally assumed that their cardiac actions are qualitatively identical. In the present experiments a progressively increasing cardiac action from initial to lethal effect was produced in each case.

[1] Wells, J. A., Dragstedt, C. A., Rall, J. E., and Ruge, D. A., *Fed. Proc.*, 1943, **2**, 93.

* The glycosides used in the present study were furnished to us through the courtesy of Sandoz Chemical Works, Inc.

TABLE I.
Effect of Lanatosides A, B, and C on the Cardio-inhibition Produced by Acetylcholine in Anesthetized Dogs.

	Lanatoside A			Lanatoside B			Lanatoside C		
	I	II	III	I	II	III	I	II	III
	.25	(—)	57	.82	(—)	100	.14	84	84
	.36	(—)	67	.25	80	80	.24	83	75
	.27	(—)	77	1.17	(—)	90	.54	85	85
	.34	(—)	93	.10	(—)	100	.24	55	55
	.66	58	33	.13	(—)	67	.22	50	50
	.33	60	70	.21	(—)	76	.17	43	43
	.49	(—)	86	.22	63	54	.26	50	50
	.40	(—)	62	.25	58	58	.23	67	67
	.43	(—)	38	.22	67	55	.30	45	45
	.65	(—)	35	.29	84	38	.23	56	56
Avg	0.42		62	.37		73	.26	62	62

I Lethal dose in mg per kilo. II. % of lethal dose which abolished the cardio-inhibitory effect of acetylcholine. III. % of lethal dose which produced gross cardiac irregularities. (—) Cardio-inhibitory effect of acetylcholine not abolished at any time.

If the cardiac effects of the various glycosides are qualitatively identical there should be a similar sequence of evolution of the characteristic phenomena in each case and the phenomena produced by a certain per cent of the lethal dose of one glycoside should be produced by the same per cent of the lethal dose of another. The results indicate that such is not the case and therefore an actual qualitative dissimilarity in cardiac action appears to exist.

No explanation for this apparent qualitative dissimilarity between the glycosides is offered, and it is not clear why each glycoside did not prevent the cardio-inhibitory action of acetylcholine when evidences of idioventricular rhythms appeared. Electrocardiograms show that the dose of acetylcholine used produces auriculo-ventricular block. While digitalis principles also depress auriculo-ventricular conduction, we have seen no evidence of an enhanced response to acetylcholine in the digitalized animals.

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Activity of Penicillin Against *Hemophilus ducreyi in vitro.*

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The activity of penicillin on *Hemophilus ducreyi* was studied *in vitro* by the serial dilution method.

Both a crude filtrate of a culture of *Penicillium notatum* and a standardized penicillin* were tested against this organism. The test cultures were 5 strains of *Hemophilus ducreyi*, three JS, LB, and BF, recently isolated in our laboratory from patients with chancroid, and two, JB and S, stock cultures. All strains were morphologically typical of *H. ducreyi* and were pathogenic for rabbits

* This penicillin was obtained from Dr. G. L. Hobby of the Department of Medicine, College of Physicians and Surgeons, Columbia University. It was prepared in the laboratory of that Department under permit of the War Production Board and had been standardized against penicillin received from Dr. R. Coghill of the Northern Regional Research Laboratories, Peoria, Illinois.