comb-growth response of capons to male hormone requires less time, many factors are involved such as light and accurate measurement that render its routine application rather difficult. It is also easier and much less expensive to maintain a sparrow colony in the average laboratory.

The results of this study, therefore, suggest the use of the bill color of the sparrow capon for the standardization of extracts of male hormone. More extensive experiments are planned to test its practicability.

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A Functional Study of the Nodose Ganglion of the Vagus with Degeneration Methods.*

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In 11 adult cats, the vagus (5 on the left, 6 on the right) was cut at its exit from the jugular foramen above the nodose ganglion. In 5 experiments, the superior cervical sympathetic ganglion was also removed. Approximately 15 days' degeneration was allowed. The animals were anesthetized with urethane or ether, the carotid (in some cases the femoral) artery was cannulated and prepared for blood pressure tracings. In some experiments, movements of the thorax were also recorded as an index for the rate of respiration. The nerves were stimulated with rapid faradic stimuli delivered through platinum electrodes which were connected to a Harvard inductorium (approximately 2 amperes were delivered to the primary coil). Both the vagus and the cervical sympathetic trunk were sectioned and then stimulated distal to the section. The saphenous nerve was also stimulated in order to elicit pressor responses.

With adequate stimuli (from 10 to 6 cm. coil separation), we have never seen any indication of the normal vagus inhibitory effect on the heart with slowing in rate and decrease in blood pressure. When the sympathetic trunk was stimulated 2 to 3 cm. below the superior cervical ganglion, no change in blood pressure was observed in 3 experiments with a coil separation of 6 cm. In the

* This study was conducted with the aid of the Rockefeller Foundation Grant for Fluid Research in the Medical Sciences at Stanford University.

remaining experiments, a rise in blood pressure (1 to 7 mm.) was seen when the sympathetic trunk was stimulated in this position. The latent period was relatively long (2 to 3 sec.). The heart and respiratory rate changed but little and then with slight increases. This effect was present after removal of the superior cervical ganglion at the time of the original operation and thus was not due to descending conduction over axones arising in that ganglion. A similar response was seen only once when the right vagus was stimulated in a similar position and consisted of a 9 mm. rise in blood pressure, an increase of 12 beats per minute in the heart rate and an increase from 37 to 45 respirations per minute. When the electrodes were moved down to about 2 cm. above the middle cervical sympathetic ganglion, the effect could be much exaggerated. Inasmuch as this effect could also be obtained from the vagus with strong stimulation (6 cm. coil separation) at a corresponding level and it resembled the pressor effect obtained from the saphenous nerve, the conclusion was reached that we were dealing with a pressor response elicited probably by the stimulation of sensory fibers either at the point of stimulation or by a spread to ones in the distribution of the middle cervical sympathetic ganglion or possibly in the carotid plexus. The slight increase in blood pressure obtained in some experiments when the sympathetic trunk was stimulated more rostrally may have been due to the occasional presence of a very few visceral afferent fibers which have passed up the cervical sympathetic trunk beyond the middle cervical ganglion. Cleveland's[1] anatomical observations suggest such a possibility. An atypical distribution of visceral afferent fibers probably explains the response which was obtained from the vagus in one instance. This response was present after atropinization (1.2 mg. atropine sulphate intravenously) and disappeared after a dose of fluid extract of ergot which abolished the pressor response from the saphenous nerve. It was also present on stimulation of the peripheral end of the cut normal vago-sympathetic trunk following atropinization.

The effect on respiration as shown by our method of recording was slight and might be attributed as a component of the pressor response. While our observations were not directed especially to the gastrointestinal tract and took place late in the progress of the experiments, no changes in gastrointestinal motility were seen.

Anatomical controls were made by careful autopsy and microscopic sections of the nodose ganglia showed no pathologic abnor-

[1] Cleveland, D. A., *J. Comp. Neurol.*, 1932, **54**, 35.

malities with the exception of some neuronophagia at the rostral pole of one ganglion.

Recently Morgan and Goland[2] have presented evidence that tends to show that there are postganglionic parasympathetic fibers which arise in the nodose ganglion of the dog to pass to the heart. Heinbecker and O'Leary[3] failed to show any decrease in heart rate but normal results were obtained from the fibers responsible for certain motor effects in the lungs and duodenum of the cat. Ranson, Foley and Alpert[4] report observations which show no histological evidence that the nodose ganglion contains synapses between pre- and postganglionic parasympathetic neurons in the cat. Our observations in the cat give no support to the presence of postganglionic parasympathetic neurons situated in the nodose ganglion which control the heart. Final conclusions as to the presence of such neurons which may exert an effect on the respiratory and gastrointestinal tracts can not be reached from our observations.

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Acetylation Studies.

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In an earlier paper[1] experiments were recorded as evidence for the belief that acetylation studies might prove of value in elucidating phases of intermediary metabolism. In this communication we record further experiments dealing with acetylation.

p-Aminobenzoic acid is partially acetylated by the rabbit forming *p*-acetyl-aminobenzoic acid, a substance which can be recovered from the urine. (Qualitative tests make it quite evident that some of the *p*-aminobenzoic acid is also eliminated in the form of its glycuronate salt; but this will be the subject of another communication.) Since carbohydrates—and possibly fats—are probably the

[2] Morgan, L. O., and Goland, P. P., *Am. J. Physiol.*, 1932, **101**, 274.

[3] Heinbecker, P., and O'Leary, J., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 506.

[4] Ranson, S. W., Foley, J. O., and Alpert, C. D., *Anat. Rec.*, 1933, **55** (suppl.), 33.

[1] Harrow, Power and Sherwin, PROC. SOC. EXP. BIOL. AND MED., 1927, **24**, 422.