

must be regarded as less conclusive than those of the pigeon-tests. Macht's results were obtained with cats, but he gives no data.

Conclusions. The emetic and fatal doses of digitalis in significant numbers of pigeons were found to be 40 and 22% less, respectively, at an altitude of 10,000 feet than at sea-level. A similar tendency was shown by the extremes in fatal doses for cats, but the results were inconclusive, due probably to greater variations in cats and smaller numbers used. The higher potency of digitalis at high altitudes reflects changes in state of the emetic and circulatory functions at high levels and indicates the desirability of reducing the dosage of the drug at high levels so as to avoid undesirable and toxic reactions.

6397

Artificial and Hereditary Suppression of Sacral Vertebrae in the Fowl.*

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An understanding of the action of hereditary factors in regulating structural expression is likely to be facilitated by finding ways of reproducing the same effects by other than genetic means. To this end, the conditioning of either of 2 allelomorphic forms irrespective of the genotype is a principal desideratum. The present note records the few fragmentary data obtained from an attempt in this direction. Suppression of several of the sacral and caudal vertebrae in the fowl producing the condition known as "rumplessness" has long been known, and has been studied by Du Toit,¹ Dunn,² and Landauer,³ who have described the anatomy and genetics of the condition. The latter authors have also pointed out the occurrence of occasional spontaneous non-hereditary cases which differ little, if at all, from those of the hereditary type. Owing to the extreme rarity of the sporadic cases (not over 1 in 1000, according to Dunn), it has hitherto seemed improbable that much could be learned of their genesis.

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¹ Du Toit, P. J., *Jenaische Z. f. Naturwissensch.*, 1913, 49.

² Dunn, L. C., *J. Hered.*, 1925, 16.

³ Landauer, Walter, *J. Hered.*, 1928, 19.

The simultaneous appearance of 3 such cases among a small number of chicks hatched for another experiment suggested a search for the cause of the anomaly. Since the abnormal chicks were from artificially incubated eggs, the occurrence of some disturbance before or at the time of most rapid differentiation of the caudal end of the embryo seemed probable. Consequently tests were made in which the temperature was varied in different ways during the first 6 or 7 days of incubation. In one series it was possible through the kindness of Dr. Landauer to test eggs from fowls which were hereditarily rumpless, and should consequently be expected to produce a considerable proportion of rumpless chicks (Dunn and Landauer). From 116 eggs of the rumpless strain there were obtained 24 chicks which reached a stage where their condition could be determined with reasonable certainty. From 84 eggs of a normal (White Leghorn) strain 52 usable chicks were secured. The results were as follows:

Eggs from the rumpless strain incubated at 97° - 98° throughout gave 6 normal and 1 doubtful embryo; 97° - 98° for 4-6 days followed by 103° gave 5 normal and 5 rumpless; 103° throughout gave 4 normal and 3 rumpless.

Eggs from the normal strain incubated at 97° - 99° throughout gave 21 normal; 97° - 99° for 5-6 days followed by 2 or more at 103° gave 11 normal; 97° - 99° for 6 days, 103° one day, then 97° - 98° gave 1 normal, 1 rumpless; 99° - 100° for 5 days, 101° one day, then 103° gave 2 normal, 1 rumpless; 103° throughout gave 7 normal; 103° for 4 days, then 97° - 99° gave 5 normal, 2 rumpless; 104° - 105° for 4 days followed by 101° - 103° gave 1 normal.

Of the 52 chicks in this series from normal parents there were 4, or about $7\frac{1}{2}\%$, that were rumpless. All of these came from eggs which had been subjected to fluctuating temperatures during the first week of incubation. There is little indication that a consistently low temperature even 4° to 6° below normal, is in itself conducive to rumplessness.

Owing to lack of material it has not been possible to experiment further with eggs from rumpless strains, but similar tests with eggs from other normal strain have continued to yield about the same proportion of rumpless chicks. Some of the latter embryos have been sectioned and compared with genetically rumpless specimens which they are found to resemble in general features and in showing a considerable range of variation. The conclusion consequently seems justifiable that by this admittedly crude and non-quantitative method some advance has been made toward solving one part of the prob-

lem. A certain percentage of non-hereditary rumpless specimens can be produced.

Presumably the condition is brought about through a slowing of the growth rate just when the posterior end of the body should be in the state of its most rapid differentiation, a time, according to Stockard,⁴ when any arrest is likely to produce lasting effects. That the condition is one of arrested development is further indicated by a rather frequent occurrence of ectopic viscera among these specimens.

These results with eggs of normal stock suggest that the genetic form of the trait may similarly be determined by a differential retardation at some critical moment. The available eggs were not sufficient to test this point, but so far as they go the data are suggestive, inasmuch as from eggs incubated at consistently low temperatures there were 6 normal embryos and one doubtful, while from those incubated wholly or in part at higher temperatures there were 9 normal and 8 rumpless chicks. It is regretted that it has not yet been possible to make tests to determine whether genetically rumpless embryos may have their general metabolism sufficiently slowed during the first week of incubation to reduce the differential to a point that would permit development of normal sacral and caudal vertebrae.

At present something can be done toward making an embryo of normal genotype develop, or fail to develop, a tail. It remains to be determined how a similar control may be exercised over a genetically rumpless embryo.

6398

Effect of Intravenous Injection of Ethyl Alcohol on Gastric Secretion in Man.*

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Of the tests of gastric secretion, that employing alcohol as the stimulus is one more commonly used clinically. The recent use of

⁴ Stockard, Charles R., *Am. J. Anat.*, 1921, **28**.

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