

- 13 (105). "**On the biological relationship of nucleoprotein, amyloid and mucoid**": **P. A. LEVENE** and **JOHN A. MANDEL**.

The authors endeavored to ascertain the nature of the carbohydrate groups in the protein molecule. It was found that by heating nucleoprotein on a water bath with a 5 per cent. solution of sulfuric acid, a product could be obtained that had the properties of a polysaccharid or of a glucosid, and which contained in its molecule a small proportion of sulfuric acid ( $S = 0.5$  per cent.). On treating nucleoproteins with alkali, substances were obtained containing a much greater proportion of sulfuric acid ( $S = 3.5$  per cent.;  $N = 8.8$  per cent.). The substances thus obtained were found to possess the properties of glucothionic acids containing small quantities of nucleic acid.

Glucothionic acid has hitherto been recognized as a constituent of mucoid and amyloid. The results of this investigation place the three groups of substances in genetic relationship.

- 14 (106). "**On the imperfection of Mendelian dominance in poultry hybrids,**" with demonstrations of photographs and plumage-charts: **C. B. DAVENPORT**.

According to the Mendelian formula one of the pair of characters that are opposed in hybridization dominates over the other, occluding it; the dominated, or recessive, character reappears in its pristine purity when the hybrids are interbred.

A careful examination of the facts shows that in poultry hybrids the dominant character is frequently modified by the presence of the recessive and in the direction of the latter. For example, white plumage color may dominate over black, but the white hybrid shows some black feathers; white dominates over buff plumage, but the hybrids have a buff cast. Pea comb is dominant over single, but the middle lobe of the hybrids is unusually high. Narrow nostril is dominant over the high nostril of the Polish fowl, but the hybrid nostril is exceptionally wide. When the hybrids are interbred the recessive character reappears in about one-fourth of the hybrids, but often so modified as to be scarcely recognizable. The gorgeous bright red and golden but recessive plumage of the Japanese long-tailed fowl reappears in the second hybrid generation as a dull brick red, much mottled with black. The fact of the

mutual contamination of characters in hybrids justifies the warnings given by breeders as to loss of characters in hybridization, and the care that they exercise to maintain pure races.

15 (107). "The mechanism of conduction and coördination in the heart, with special reference to the heart of *Limulus*":

A. J. CARLSON. (Presented by RUSSELL BURTON-OPITZ.)

I. *The Rate of Conduction.* — It is advocated, chiefly by Engelmann, that the rate of conduction of an impulse in the heart is too low (20 cm. to 30 cm. per sec. in the frog; 2 m. to 4 m. per sec. in the dog) to take place in the nervous tissue. The slow conduction in the heart is thus construed as an argument in favor of the myogenic theory. This is based on the erroneous assumption that all nervous paths in the same animal conduct with the same, or practically the same, rapidity. The author has shown that this is not the case even for the motor nerves to the striated muscles. On the contrary the rate of conduction in the nerve stands in direct relation to the rapidity of contraction of the muscle supplied by the nerve.<sup>1</sup> On this principle one would expect the *rate of conduction* in the intrinsic nervous plexuses of the alimentary tract and of the heart of a vertebrate to be as much slower than that in the motor nerves to the skeletal muscles, as the *contraction* of heart-muscle and muscle of the digestive tract is slower than that of skeletal muscle. The rate of conduction in the intrinsic nerves of the vertebrate heart has not yet been determined. In the heart of *Limulus*, this can be done by the ordinary graphic method. The author has shown that in the heart of *Limulus* the rhythm is neurogenic, not myogenic, and that the conduction and coördination take place in the nervous and not in the muscular tissue.<sup>2</sup> The proofs of these conclusions are demonstrative. The author has lately measured the rate of conduction in the intrinsic heart nerves of this animal and has found it to be 40 cm. per second. The rate in the motor nerves to the limbs as found by the author is 325 cm. to 350 cm. per second. That is to say, *the rate of conduction in the nervous plexus in the heart is from eight to ten times slower than in the peripheral motor nerves.*

<sup>1</sup> Carlson: *American Journal of Physiology*, 1904, x, p. 401.

<sup>2</sup> Carlson: *American Journal of Physiology*, 1904-'05, xii, p. 67; also, p. 471.