favorable effects on the protein metabolism is less than .5 gram per kilogram.

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Inheritance of plumage color in poultry.

By **C. B. DAVENPORT.**

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The experiments of Dr. C. C. Guthrie who transplanted hens' ovaries to foster mothers of different plumage color from their own and was led to the conclusion that the engrafted ovaries became functional and their eggs gained certain characteristics from the foster mothers' are not at all convincing to the student of normal heredity of plumage color in poultry; indeed, they justify the opposite conclusions. To test these experiments, I transplanted ovaries from a cinnamon-colored, heavy-boot, pea-combed, four-toed, low-nostriled hen which breeds true to a white, non-boot, V-combed, five-toed, high-nostriled hen, and mated her with a cock whose characters resembled those of the hen from which the eggs had been borrowed. Had the engrafted ovary been functional, the chicks must all have been like the cock. Actually, they were exactly what expectation calls for when such a cock is mated to a hen like the so-called foster-mother. The engrafted eggs are not functional; the ovary had regenerated.

Six experiments of this sort were made altogether and in no case was there evidence of a functional graft; far less of an influence on the eggs of the foster mother's soma.

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A new and comparatively rapid method for the detection of liquefying bacteria.

By **JOHN C. TORREY.**

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The results obtained by Feldstein and Weil[1] with Ostwald's viscosimeter in an investigation of the interaction of ferment and

[1]*Proc. of the Soc. for Exper. Biol. and Med.*, 1910, vii, 61.

anti-ferment suggested to the writer that this apparatus might be of service for the early detection of the liquefying propensities of those bacteria, which under the methods commonly employed, may not reveal this function for one to four weeks. The identification of *Bacillus coli* in the bacteriological examination of water requires several tests, all of which may be completed within four days, with the exception of that for the action of the bacillus in question on gelatin which calls for a fourteen-day incubation at 20° C. It is generally agreed, among sanitarians, that a shortening of the period of this test is highly desirable, but, although a number of expedients have been suggested, none have been found sufficiently simple and reliable to warrant adoption.

Two special advantages pertain to the use of the viscosimeter in the study of bacterial digestion of gelatin. First, it permits incubation of the cultures at the most favorable temperature, whether it may be 37° C., or higher, thus obtaining rapid growth and enzyme production, although it should be added that these activities are not always correlated; and second, it enables one to detect very slight reductions in the viscosity of the medium, in fact long before any visual change is apparent. It has been found, that, although the majority of cultures, growing well at 37° C., and showing the first evidence of liquefaction at room temperature within three to ten days, may be detected by this method within twenty-four hours, it is best to make the examination after forty-eight hours. After this incubation practically all of the actively growing cultures, which required up to fourteen days for the production of the first visual traces of liquefying activity at 20° C., had produced sufficient change in the viscosity to permit detection. For the still slower liquefiers, those ordinarily requiring a three to four weeks test at 20° C., and for the cultures which grow sluggishly, an incubation of four to six days is necessary for the unquestioned revelation of their fluidifying propensities.

The details in regard to the methods employed and the results obtained will be given elsewhere. Briefly, fifteen per cent. nutrient peptone gelatin, tubed in 4 cubic centimeter amounts, was seeded with a definite dosage of twenty-four-hour agar growth of the culture, emulsified in salt solution. These seeded tubes to-

gether with suitable controls, were then sealed with paraffin and incubated at 36° C. In testing for liquefaction, each gelatin culture and also the control tube were diluted with an equal amount of distilled water and filtered through paper. A viscosimeter tube was selected of sufficient caliber so that the control diluted gelatin passed through in about four minutes. With this control time as a basis, the degree of change lnduced in the gelatin by the cultures under consideration could be readily and accurately determined.

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On the nature of chemical stimulation and on the influence of neutral sodium salts on various forms of chemical stimulation.

By **RALPH S. LILLIE.**

[*From the University of Pennsylvania.*]

Evidence from many sides indicates that the primary change in the stimulation of an irritable tissue is a sudden increase in the permeability of the boundary layers or "plasma-membranes" of the constituent cells or elements The resistance to the escape of diffusible substances, including carbon dioxide, is thus diminished, and there results a corresponding acceleration of the energy-yielding oxidations. With increase in the permeability to ions, there is naturally also associated a change in the electrical polarization of the plasma-membrane—hence the characteristic "action-current" of stimulation. The primary and critical change, increase of surface permeability, may be produced by the electric current, by sudden changes of temperature or contact, by mechanical shock, or by the action of various chemical substances.

Chemical stimulation, on this view, results from the action of those substances which affect the constituents of the plasma-membrane in such a manner as suddenly to increase its permeability to the critical degree required. Now the plasma-membrane is primarily a colloidal structure, consisting mainly of prothins and lipoids intimately intermixed, possibly intercombined. We should, therefore, expect its structure or consistency to be altered, and its permeability correspondingly increased or decreased, by sub-