parts of the brain, as well as all other of the portions of the body show an increased growth in weight at this time, and therefore there is no particular reason for assuming that the growth of the cerebellum at this period is activated by any special factor which is not influencing the other parts of the body.

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Carotin in Perillus bioculatus (Fab.) and its derivation from the lymph of Leptinotarsa decemlineata (Say).

By L. S. PALMER and HARRY H. KNIGHT.

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One of us[1] has shown that the variations in the hypodermal color pattern of the stink-bug *Perillus bioculatus* (Fab.) from white and black to red and black (with various intermediate yellow and black forms) are not caused by inheritance but by variations in physiological activity, which can be controlled by the temperature of the environment, and influenced by sexual functions, such as egg laying. The food of the stink-bug is always highly colored with orange-yellow pigment for it consists almost exclusively of the eggs and larvae of the potato beetle, *Leptinotarsa decemlineata* (Say), as well as the adult beetle itself. When the larvae and adult beetles are attacked the golden yellow lymph is the only portion eaten.

A chemical examination of the pigment in the lymph of the potato beetle showed that it consists exclusively of carotin. No other carotinoids could be detected. The concentration of carotin in fresh lymph obtained from 200 full-grown larvae was found to be 0.0136 per cent, which is as high as is encountered in fresh green leaves.

The red and yellow colors in the hypodermis of the stink-bug were also found to be due to carotin. Some water-soluble

[1] Knight, H. H., *19th Report, State Entomologist of Minnesota,* 1922, 50.

substance yielding yellow solutions was also present in the hypodermis, but it is doubtful whether it contributed greatly to the color pattern.

With the exception of the early work of Physalix[2] on the red pigment in the bug *Phyrrhocous apterus* L., this is the first definite identification of carotin in Hemiptera and establishes for the first time the biological origin of carotin in an insect in a manner analogous to the identification of the source of carotin in cattle in an earlier experiment by one of us.[3]

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Anthocyanin and flavone-like pigments in phytophagous and predaceous forms of Hemiptera.

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The identification of carotin as the chief cause of the red and yellow hypodermal colors seen in the predaceous stink-bug *Perillus bioculatus* (Fab.), reported in the preceding abstract, suggested an examination of the red pigment of other Hemiptera. It was found that red pigment in phytophagous and predaceous families of this order of insects is not limited to one type of substance. Water-soluble pigments appear to be more common than carotin. The aphid (*Tritogenaphis rudbeckiae,* Fitch) owes its vermilion color chiefly to an anthocyanin-like pigment, although small quantities of carotin also occur in the bug. On the other hand the red color of the red and black patterned phytophagous box-elder plant-bug (*Leptocoris trivitatus,* Say), the milk-weed plant-bug (*Lygaeus kalmii,* Stal), the bladder-nut plant-bug (*Lopidea staphyleae sanguinea,* Kngt.), the maple plant-bug (*Coccobaphes sanguinareus,* Uhler), and the predaceous Assassin-bug (*Eulyes illustris,* Stal) is due to a flavone-like pigment.

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2 Physalix, C., *Compt. rend.*, 1894, cxviii, 1282.

3 Palmer, L. S., and Eckles, C. H., *J. Biol. Chem.*, 1914, xvii, 191.