

Important parts of the mid, 'tween and fore brain (inferior lobes, central gray, striatum [?], etc.) belong to the same category as the tract and commissural cells of the medulla and cord. The nucleus of the posterior commissure and the olfactory apparatus cannot be compared with any structures in the cord or hind brain. There is no essential resemblance between the olfactory nerve and its central apparatus and the typical cranial nerves and their centers. The olfactory nerve has no segmental value.

*The Development of the Postcaval Vein in Didelphys Virginiana:* C. F. W. McCURE.

The variations in the mode of origin of the postcaval vein of the common opossum are so extreme as to preclude our formulating a typical arrangement for the species as a whole. The different modes of origin which characterize the postcaval vein in the adult are briefly as follows:

1. The postcaval vein may be formed through a union of the iliac veins which takes place *ventral* of the common iliac arteries (type I.);

2. Through a union of the iliac veins which takes place *dorsal* of the common iliac arteries (type II.); or,

3. Through a union of the iliac veins which takes place both *dorsal* and *ventral* of the arteries in question (type III.).

A study of the embryonic development of the posterior tributaries of the postcava shows, I think, how these variations have been derived. Embryos of 8.5, 12, 15 and 22 millimeters in length were examined.

In an embryo 8.5 millimeters in length the umbilical artery, on each side, *passed through a complete foramen* in the postcardinal vein, so that one portion of the circumarterial venous ring lay *ventral* and another *dorsal* of the artery. This foramen was situated near the point of union

of the external and internal iliac veins. In a subsequent stage the internal iliac veins approached each other in the median line and fused ventral of the caudal artery to form a common internal iliac vein.

The writer believes that the type of postcaval vein to be assumed by the adult depends upon the loss or persistence of those portions of the circumarterial venous rings which lie dorsal and ventral of the umbilical arteries.

If the atrophy affects the dorsal branches of the circumarterial venous rings, a postcava will result as in type I. If it is the ventral branches of the rings that atrophy, a postcava will result as in type II., but, if dorsal and ventral branches of the rings both persist, a postcava of type III. will be formed.

*The Development of Pigmental Color in Insects:* W. L. TOWER. (Read by title only.)

*Progressive Variation in a Given Generation of some Plants and Animals:* W. L. TOWER. (Read by title only.)

*Observations on the Habits of Hyalella dentata Smith:* SAMUEL J. HOLMES.

The observations on *Hyalella* that were made related to food habits, thigmotaxis, phototaxis, reactions to pressure and sexual habits. Experiments were performed with the end of determining the mode of sex recognition in *Hyalella*. That sight plays no important part in the process was proved by the fact that males whose eyes were blackened over with asphalt varnish succeeded as well as others in obtaining females. Neither did removal of the first and second pairs of antennae in the males prevent their obtaining mates. It is therefore improbable that the males are guided to the females by the sense of smell. Several females, some of which were recently torn from males, were placed within a

small enclosure of fine wire gauze in a dish of water. Several males were placed in the dish outside the enclosure, but none of them paid the slightest attention to the females, although they seized the females quickly enough when the enclosure was raised and the females were allowed to scatter through the dish. It is only when the males accidentally collide with the females while swimming that any attempt is made to seize them. When a female collides with another amphipod she curls up and remains quiet for a time, when, if not seized, she soon passes on. When two males collide, each apparently attempts to seize the other and carry him about as a female would be carried. Males have the instinct to seize and carry about other amphipods they meet with, and are only prevented from so doing by the similar attempts of the other individual. Males which are mutilated by the removal of the large second pair of gnathopods, so that they are no longer able to make effective resistance, are seized and carried about by other males just as females would be carried. Sex recognition in this species is apparently determined by the different modes in which the two sexes react to the contact of other individuals.

*Some Notes on Hybridism, Variation and Irregularities in the Division of the Germ-cell:* MICHAEL F. GUYER.

At one stage in the maturation of germ-cells, preceding the true reduction division, bivalent chromosomes are formed ordinarily; that is, only half of the regular number of chromosomes appear, but each of the new chromosomes is apparently double and equivalent to two of the simple type. In the spermatogenesis of hybrids, the formation of the bivalent chromosomes is frequently incomplete or defective, so that the resulting divisions are irregular and unequal. The greater the difference between the two individuals crossed, the more

marked is the disturbance in the maturation of the germ-cells of the hybrid offspring. In a paper two years ago before a meeting of the Western Naturalists (abstract, SCIENCE, February 16, 1900), I discussed this point in the case of hybrid pigeons and I suggested that these peculiarities in chromosome formation might point to a tendency in the chromatin of each parent species to retain its individuality, and that the extreme variability seen in the offspring of fertile hybrids was possibly to be attributed to this variability in chromatin distribution. In hybrid plants (cannas) I have since determined that practically the same irregularities occur, and, recently, Juel described abnormalities in the germ-cells of hybrid plants which are in nearly every respect parallel to those which I found in the pigeon; hence it seems to me that the same possible interpretation presents itself. Moreover, perhaps the same conception will hold in the case of the many plants, such as the geranium or apple, which will not come true from seed, but require propagation by means of slips or grafts.

To test this I have recently undertaken a study of the formation of the pollen grains in the geranium and I find that in it, as in hybrids, irregularities in the first division of the pollen mother-cell frequently occur, though in a less degree. In answer to the question as to why a plant will come true from a graft or slip and not from seed, it seems possible that we may have a clue in this apparent inability of the chromosomes to fuse normally to form the bivalent type of chromosome. In hybrids it would seem that the chromosomes from each parent lie side by side and divide in an ordinary manner to construct and maintain the body, but that when the germ-cells are to be matured the usual doubling of chromosomes which occurs at such times is incomplete, the result being that the chromatin is un-