in this region is sharply separable from the cerebro-spinal, and there is no evidence that the facial ganglion is in process of transformation into a sympathetic ganglion. In Amiurus the geniculate is much larger and crowded still more closely up to the Gasserian. It can however be clearly shown that the r. lateralis accessorius in both Gadus and Amiurus is composed mainly of communis fibers and receives no fibers from the Gasserian ganglion.

From these results, and those of Strong, Kingsbury and others, it appears that the peripheral nervous system of Menidia presents us with a paradigm applicable in the broad view to the Ichthyopsida as a whole.

The Teleost gastrula and its modifications: F. B. SUMNER.

The prevailing view that the germ-ring alone furnishes the mesoderm and the entoderm must be revised, as well as the view that in teleosts, the periphery of the plastoderm represents the whole blastopore.

A specialized portion of the blastopore occurs at the posterior end of the embryonic shield a little anterior to the margin. In *Muræna* and probably some other fishes, this takes the form of an open invagination of the 'Deckschicht.' The cell thus invaginated becomes the gut hypoblast. The cavity persists for a while as that of Kupffer's vesicle. Thus Kupffer's original account, written in 1868, was very near the truth, although ignored or rejected by most of his successors.

In the cat-fish, trout and some others this blind sac is replaced by a solid ingrowth, such as Kowalewski described for the gold-fish. Kupffer's vesicle is formed in this mass of cells which, in the trout, at least, probably furnishes the whole gut epithelium.

In the case of *Scorpæna* and probably many other pelagic fish eggs, this reduction has still further progressed, and we find at the posterior middle point of the blastoderm a small nodule of cells, causing a thickening of the 'Deckschicht.'

The present writer finds a condition in *Amia* quite comparable to that in *Muræna*. Although the egg of the former is holoblastic, its gastrula is very like that of the Teleosts and far different from that of the Amphibia. Dean has already pointed out in *Amia* the homologue of Kupffer's vesicle. The present writer also finds a rudimentary syncytium or periblast with giant nuclei.

On the embryology and phylogeny of Chimæra: BASHFORD DEAN.

The embryology of a chimæroid throws interesting light on the relations of this doubtful group. By this means the characteristic structures of Holocephali are shown to have arisen from distinctly Selachian conditions: the palato-quadrate in *Chimæra colliei* is thus early separate from the cranium: the frontal clasper is to be regarded as the homologue of a spine of first dorsal fin, which in ontogeny, owing to the precocious growth of the enormous eyes, shifts into its anterior position: the dental plates arise from separate anlagen, which in general are in the adult represented by the tritoral areas.

C. colliei spawns near Monterey, California, throughout the entire year, in deeper water (about 75 fathoms, sp. gr. 1.027, 55° F.). It deposits two eggs almost simultaneously. First cleavage about 26 hours after egg is deposited: early cleavages separated by intervals of from 3 to 6 hours. The young escapes from the egg-case in about 250 days. Polyspermy occurs. Blastula and gastrula distinctly shark-like. Early embryo with broad medullary folds. After closure of folds embryo differentiates as chimæroid. Eye increases enormously in size, altering the shape of the head, and accompanies ventral displacement and ob-