divides symmetrically, always (*Discoœclis*?), or occasionally (*Leptoplana*). This cell is probably to be regarded as the prototype of the second somatoblast of annelids and mollusks, which divides symmetrically to form the 'primary mesoblasts,' the mesoblast bands (ento-mesoblast) being a new formation and the ecto-mesoblast ('larval mesenchyme,' etc.) being homologous with the mesoblast of the polyclades. This interpretation is sustained by the fact that the posterior cell of the fourth quartet may contain entoblastic elements largely developed (*Crepidula*), considerably reduced (*Nereis*) or reduced to a pair of rudimentary or vestigial cells (*Aricia, Spio*). The latter strikingly illustrate ancestral reminiscence in cell-lineage, and represent the penultimate stage in a series which begins with the polyclade. These facts and others were urged in support of the cell theory of develment and the value of cell-lineage in the investigation of homologies.

The Characters and Phylogeny of the Amblypoda. H. F. Osborn.

As a result of the recent explorations by the American Museum of Natural History, a complete skeleton of *Coryphodon* has been procured and mounted, as well as a nearly complete skeleton of *Pantolambda*, not only one of the oldest geological, but the most archaic type of ungulate, from a morphological standpoint, hitherto discovered. The restoration of this animal shows it was completely plantigrade, progressing upon the plantar and palmar surfaces of the feet, like a bear. There is an os-centrale carpi as in the *Creodonta*, and the whole skeleton, is strongly impressed with the Creodont type, reinforcing the evidence already derived from the Phenacodontidæ, that the Ungulata sprang from Unguiculate animals. This restoration agrees with a prior restoration of *Periptychus*, and the resemblances between these two skeletons are very marked, supporting the author's views expressed in 1893, that *Periptychus* should be placed among the Amblypoda. This gives this very ancient order of ungulates a very wide functional variation from small arboreal types to the huge *Uintatheres* of the Eocene. The evolution of the skull can now be fully traced out, and in *Coryphodon* we observe the rudiments of the frontal and parietal horns of *Uintatherium*.

A Series of Specimens Illustrating the Development of the Chick. Mrs. S. P. Gage.

These illustrate Professor Gage's idea that in an embryological series for a museum all stages sufficiently different to be easily recognized by the naked eye are to be included, to the adult condition. They are the unincubated germ, the 12, 18, 24, 36, 48, 60, 72 and 96-hour chick; and from this point on to hatching are at intervals of one day, ending with a chick just emerging from the shell at the 21st day. Mounted skins of chicks 24 hours and six days after hatching, of one in the stage known commercially as a broiler and of a hen and rooster complete the series.

All the specimens were fixed in 10 per cent. nitric acid, washed to free from yolk and preserved in alcohol. From the 7th day on, the membranes were too extensive to show both them and the chick, and parallel series were arranged in the same jar, one to exhibit the chick and one the membranes.

The earlier stages were mounted on cover glasses, which had been albumenized and built up in a slightly convex form with collodion and brushed with a coating of collodion containing lamp black. The germ was floated on to the cover under alcohol and fixed in place by thin collodion. Glass strips to fit the jars were prepared by albumenizing and (unless the glass were black) coating with thin collodion containing lamp black, thus giving a strongly con-

trasting background. The cover glasses were mounted on the glass strips and held in position by collodion.

For the older stages, where the membranes stretch far around the yolk, thick (6 per cent.) collodion was moulded in Reighard's watch glasses, hardened in chloroform and coated with black collodion. The membranes were then floated over the mass, fixed in position with thin collodion, and these mounted specimens without membranes were fastened in position on the glass slides with collodion.

A separate series was made to show the change of form of the brain in course of development.

On the Amblyopsidæ. C. H. EIGENMANN.

THE members of the Amblyopsidæ and their distribution are as follows: *Chologaster cornutus*, abundant in the lowland swamps of Virginia and Georgia; *Chologaster Agassizii*, subterranean streams of Tennessee and Kentucky; *Chologaster papilliferus*, springs of Union and Jackson counties, Ill.; *Amblyopsis spelæus*, subterranean streams of the Ohio Valley; *Typhlichthys subterraneus*, subterranean streams of the Ohio Valley, chiefly south of the Ohio River; *Typhlichthys rosæ*, subterranean streams west of the Mississippi.

The eyes of all the species except those of *Ch. Agassizii* have been examined. In *Chologaster* the eyes are normally placed and functional. *Ch. papilliferus* possesses the better eyes, but even here many signs of degeneration are apparent, the inner layers of the retina being less in thickness than the pigmented layer. In *Ch. cornutus* the pigmented layer forms two-thirds of the thickness of the retina, the nuclear layers are each composed of a single series of nuclei and the ganglionic layer of cells widely separated from each other. The lens and vitreal body are normal. In all the species examined the eyes have sunk beneath the surface, the lens and vitreal body have practically disappeared; the eye has, as a consequence, collapsed and is minute. Part of the ganglionic layer forms a central core of cells in *Amblyopsis* and *T. subterraneus*. In the former the pigmented layer is highly developed; in the latter, while still present, it is entirely without pigment. In *T. rosæ* the eye has degenerated further than in the eastern species. The central core of ganglionic cells has disappeared; the pigmented layer is imperfect; the inner reticular layer occupies a central, or rather posterior, position around which the nuclear layers are placed. Lens and iris are gone, and the entire eye is but 40–50 μ in diameter.

Conclusions: The three species of blind fish are of independent origin. The results of degeneration are not the same on the homologous structure of the eye in the three species. The degeneration is not the result of arrested development or of ontogenic degeneration. The eye of the Amblyopsidæ, reaching its greatest point of degeneration in *T. rosæ*, is the result of phyletic degeneration begun before the fish entered the caves. Their degenerate eyes are not primarily due to their habitat in caves, *i. e.*, to the absence of light; rather are they found in the caves because they were largely able to do without the use of their eyes, and therefore succeeded in establishing themselves in the caves. In this they were aided by their peculiar method of raising their young in their gill cavities.

The two Common New England Salamanders, Desmognathus and Spelerpes, and their Importance as Laboratory Animals. H. H. WILDER. (Read by title only.)

Accessory Optic Vesicles in the Chick Embryo. W. A. LOCY.

IT was shown that in chick embryos two distinct sets of vesicles make their appear-