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 appearance in the neural tube: A transitory set that arise in connection with the original optic differentiation, and which completely disappear before the second set or true brain vesicles arise. The lateral expansions of the neural tube which constitute the beginning of the eye vesicles are elongated, and they are converted into the true optic vesicles in front and a succession of similar but smaller ones which are serially arranged behind the former. The latter series, which consists of six pairs of vesicles, is very transitory, passing through the stages of rise, culmination and decline within three or four hours' time.

The structures occur in normal embryos. Five hundred eggs were incubated and fifty embryos obtained at the right ages to show the history of these structures. They were studied in living specimens in warm salt solution. The observations were originally made in 1893 and verified and reverified in a variety of ways since that time. The specimens were sketched, photographed, sectioned and, in some cases, reconstructed. By placing the specimens under a dissecting microscope, where several can be viewed at the same time, and making a critical *comparative* study of all the embryos, they may be arranged in a graded series, the extremes of which differ considerably, but the intermediate embryos show slight gradations. In such a series it is observed that these vesicles do not, in any case, develop progressively to become brain vesicles, but undergo decline before the brain vesicles appear. At their period of greatest development—between the 24th and 26th hour, with six somites—there are six pairs; they are reduced during the next hour to four pairs, and, at about the 27th hour, with eight somites, they are reduced to two, which rapidly fade away. From this period the true brain vesicles begin to appear. The author's observations on the development of the brain vesicles agree with those of Duval, Platt and other observers. It was shown that the first set of vesicles are independent of the brain vesicles and have not before been figured.

The theoretical bearing of the facts is obvious, and, although the author designates these structures 'accessory optic vesicles,' from their connection with the original optic differentiation and from their resemblance to the primary optic vesicles, nevertheless he holds this view in the lightest way, ready to withdraw it whenever any better interpretation may be presented. The validity of the facts is held to be established, and their history has been carefully worked out. Demonstrations of these structures to those interested followed.

The Thoracic Derivatives of the Post-cardinal Veins in Swine. G. H. PARKER.

EMBRYONIC pigs of about six millimeters greatest length possess well developed right and left post-cardinals (posterior cardinal veins) which extend from the base of the corresponding posterior extremities anteriorly over the dorsal surfaces of the Wolffian bodies to the region of the heart. The thoracic portion of each post-cardinal persists from the region of the heart to the tenth pair of ribs, beyond which a new vessel, the accessory vein, is developed, reaching to a point some distance posterior to the last pair of ribs. The combination of the post-cardinal and accessory vein of the right side gives rise to the azygos vein; the corresponding veins of the left side produce the hemiazygos. The axygos and hemiazygos veins receive the intercostal veins of their respective sides, and become mutually connected by several transverse veins. In later embryonic life the cardinal portion of the azygos vein usually degenerates completely, and the right intercostal veins connected with this part find outlets through the corresponding part of the hemiazygos which persists in the adult pig. The