(*c*) The third, from 10 mm. to about 80 or 100 mm. It is characterized by a number of changes which are positive as contrasted with degenerative. There are also distinct degenerative processes taking place during this period.

(*d*) The fourth, 80–100 mm. to death. It is characterized by degenerative processes only.

The eye of *Amblyopsis* appears at the same stage of growth as in normal fishes developing normal eyes. The eye grows but little after its appearance.

All the developmental processes are retarded and some of them give out prematurely. The most important, if the last, is the cell division and the accompanying growth that provide the material for the eye.

The lens appears at the normal time and in the normal way, but its cells never divide and never lose their embryonic character.

The lens is first to show degenerative steps and disappears entirely before the fish is 10 mm. long.

The optic nerve appears shortly before the fish reaches 5 mm. It does not increase in size with the growth of the fish and disappears in old age.

The scleral cartilages appear when the fish is 10 mm. long; they grow very slowly, possibly till old age.

There is no constant ratio between the extent and degree of ontogenic and phylogenic degeneration.

The eye is approaching the vanishing point through the route indicated by the eye of *Troglichthys*.

There being no causes operative or inhibitive, either within the fish or in the environment, that are not also operative or inhibitive in *Chologaster agassizii* which lives in caves and develops well-formed eyes, it is evident that the causes controlling the development are hereditarily established in the egg by an accumulation of such degenerative changes as are still notable in the later history of the eye of the adult.

The foundations of the eye are normally laid, but the superstructure, instead of continuing the plan with additional material, completes it out of the material provided for the foundations. The development of the foundation of the eye is phylogenic; the stages beyond the foundations are direct.

Asymmetry in the Rattulidæ, and the Biological Significance of Asymmetry in some Lower Organisms: H. S. JENNINGS.

The Rattulidæ are a family of Rotifera having an unsymmetrical form. The body presents the appearance of having been twisted, so that primitively dorsal structures are on the right side at the anterior end, and on the left side at the posterior end. An oblique ridge on the dorsal surface passes from the rear forward and to the right, ending frequently in one or two teeth on the right side. It was shown that this twisted form is an adaptation to the method of life and behavior of the animals; they swim in a spiral, of which the twisted body forms a segment, and the oblique ridge marks the course of the spiral. The reaction to stimuli is also correlated with this form. It was further pointed out that such an unsymmetrical form is common among small organisms which swim in a spiral course and react to stimuli in the characteristic manner described in the paper; this is true for example of most of the free-swimming Infusoria. If radial symmetry be considered characteristic of a fixed life, bilateral symmetry of an active life in which dorsal and ventral surfaces have different relations with the substratum, we may on similar grounds distinguish an unsymmetrical or spiral type,

characteristic of swimming organisms which follow a spiral path, keeping the same side of the body always directed toward the axis of the spiral. A large number of organisms show this type of structure.

On the Early Development of Spermophilus Tridecemlineatus, a new Type of Mammalian Placentation: THOMAS G. LEE.

Spermophilus differs from other rodents in a temporary fixation of the blastocyst to the antimesometrial wall of the uterine cavity. Later the blastocyst detaches and the true placenta develops on the mesometrial wall. The uterine lumen resembles a capital T, the cross-bar being the mesometrial side. Tubular glands open on all mucous surfaces, later disappearing in the antimesometrial region. The ovum, entering the uterine cavity at the close of segmentation, forms a small blastocyst consisting of an outer or trophoblast layer and an inner cell-mass, which differentiates into ectodermal and entodermal portions. At the antiembryonal pole of the trophoblast a multinucleated syncytial mass develops which projects from the free surface. This fixation mass perforates the uterine epithelium and touches the growing vascular connective tissue. Enlarging, it becomes a rounded mushroom-shaped mass, convex next the connective tissue, cupped next the blastocyst. The thin margins gradually extend between the epithelium and connective tissue. Later numerous root-like processes develop composed of fine longitudinally striated protoplasm; these extend into the connective tissue of the mucosa. The anti-mesometrial portion of the uterine cavity loses its epithelium and rapidly dilates to accommodate the growing blastocyst. The fixation mass becomes a more and more shallow cup and the roots atrophy and disappear; the result being the separation of the blastocyst from its attachment. By means of a zone of trophoblast external to the germinal area the embryonal pole of the blastocyst becomes attached to the margins of the transverse mesometrial portion of the uterine cavity which retains its epithelial lining and forms the site of the true placenta. Later development is similar to that of the European form, *Spermophilus citellus,* described by A. Fleischmann. A detailed description of these stages with plates and discussion of literature will soon be published.

Demonstration of the Placentation of Spermophilus (stereopticon): THOMAS G. LEE.

Variation in the Box Elder Bug (Leptocoris): H. B. WARD.

Some Alaskan Sipunculids: H. B. WARD.

Cell-Homology: EDMUND B. WILSON.

In an analysis of the conception of cell-homology, it was pointed out that here, as elsewhere, the essential criterion of genetic homology is that of common ancestral descent, and that no purely embryological criterion is in itself adequate. That cell-homologies may be merely incidental or secondary to regional homologies of the egg as a whole applies equally to all forms of genetic homology and constitutes no valid argument against cell-homology; but, owing to the plasticity of cleavage-forms, cell-homologies may be more readily modified or even obliterated than other forms of homology. For practical purposes cells of like prospective value, giving rise to homologous structures, may, irrespective of their origin, be called *equivalent;* those of like ontogenetic origin and position may, irrespective of their fate, be called *homoblastic;* but neither equivalent nor homoblastic cells are necessarily homologous. The term homology (partial or complete) is applicable in cleavages of like pattern which have been derived from a common ancestral