material has not gone to a finish. The small intestines meet not far from the pylorus and communicate transversely, and a single piece continues thence to the anus, a distance of about seven feet. There is no distinction of small and large intestine, except a sudden enlargement at which two cœca are located (one for each component of the calf). There are two nearly complete circulatory systems but an umbilical artery is lacking from each side (the inner), and the internal iliac veins join and fuse in the middle line. There are two pairs of kidneys, and there are two bladders; one is in front of the other. They communicate at the fundus. The urethras are not developed; the hinder bladder has the urachus open and both bladders discharged by this passage. The ureters are symmetrically related to the two bladders; those of the outer kidneys, one from each body, discharging into the hinder bladder, while those of the two inner bladders communicate with the anterior bladder. There are two pairs of testes; the outer pair had descended, their vasa deferentia communicating with the hinder bladder, while the inner pair are still beside their kidneys and in communication with the anterior bladder.

Notes on the Trematodes of Lake Chautauqua, N. Y.: H. L. OSBORN. (Read by title only.)

Studies made in the biological laboratory of the Chautauqua College of Liberal Arts have shown that the adult stage of *Distomum (Microphallus) opacum*, Ward, is of frequent occurrence in the stomachs of the black bass, and its earlier stage in the crayfishes, where, instead of frequenting 'the space in the cephalothorax above the heart and sexual organs' (Ward, *Am. Mic. Soc. Trans.*, XV., p. 79, 1894), it is found invariably in the liver, whose effective area is frequently greatly reduced by the cysts. A second distomid occurs in the stomach of the black bass, though less frequently. It has been seen elsewhere by Wright and Linton and referred by them to *Distomum (Bundera) nodulosum*. It is not, however, identical with the European form and will very likely need to be recognized as a new species. It is characterized by a difference in the lateral lobe of the oral apparatus. Its earlier stages were found abundantly in crayfishes of the lake. They are found in nearly every crayfish examined, and occur encysted in the heart, gonads, muscle and surrounding spaces of that region. Two other species of distomids are frequent in fishes of the lake; one, an undetermined distomid of very minute size, occurs in the nearly digested slimy chyme gathered about the entrance to the small intestine, appearing like numerous minute black elongate specks scattered through the slime, and proving to be sexually mature forms, the black color due to the embryos filling the uterus. This species has not yet been located, and it seems to be not well known. Another little known and possibly new species occurs encysted in round black spots a millimeter in diameter in the skin of the fins and of the body generally, in rock bass and darters. Another distomid, unknown in the adult, was previously reported on from this locality (*Zool. Bull.*, p. 301, 1898) as occurring in *Anodonta plana* and causing the salmon-colored deposit on the inner surface of the valves of the shell. The *Anodontas* also always contain one or more individuals of *Cotylaspis* adhering to the surface of the kidney (*Zool. Bull.*, p. 85, 1898.) An extended article on these is now in course of publication. There is to be found encysted in the liver of the sunfishes a form that has not as yet been sufficiently studied to ascertain more than that it is a *Diplostomum*, or nearly related to it. Fur-

ther studies of all these forms are now being made.

The Eye of the Common Mole: James Rollin Slonaker.

The eye of the mole lies imbedded in the muscle beneath the skin, where it appears as an inconspicuous dark spot. It is situated well forward on the side of the snout.

The eye is degenerate and is no longer capable of functioning in distinct vision. The most noticeable changes which have occurred are:

1. The great reduction in the size of the eye.

2. The much crowded condition of the retina as a result of the decrease in size of the eye as a whole.

3. The noticeable reduction in the size, or the complete absence of the aqueous and vitreous chambers.

4. The varied modification of the shape and size of the lens. Also the peculiar cell structure of the lens.

All the structures of the normal mammalian eye are present in some form or other.

Two stages have been studied: (1) At birth, (2) the condition found in the adult. Very little difference is seen in these two stages excepting an increase in size.

The eye muscles and the optic nerve are easily traced back to the skull. At birth the nerve presents in its course from the eye to the skull a peculiar arrangement. The course is marked by numerous cells and few or no fibers. At the eye there is a rapid change from this cell condition to the fiber condition of the nerve tract. The fibers have not apparently grown much beyond the limits of the eye. In the adult the fibers can be traced to the skull.

The eye cleft may be seen in cross sections. It is very small and of practically the same diameter in both horizontal and vertical sections through it. It meets the eye at such an angle that it is impossible for rays of light, should any enter, to pass through the eye along the axis of vision.

All the elements of the normal retina are present, but, owing to the much crowded condition, the ganglion cell layer is much increased in thickness.

The lens, which is found in a great variety of shapes and sizes, is composed of peculiar cartilage-like cells with well-defined nuclei. It is therefore incapable of functioning as a normal lens.

It is very doubtful therefore whether the eye of the mole functions in any sense. At the best it can do no more than distinguish between light and darkness.

The Breeding Habits of Certain Fishes: Jacob Reighard.

1. Experimental evidence was offered that the nests of *Amia* are built by the male fish alone. Access to an area of the natural breeding ground was barred by a fyke net, in which fish that attempted to reach the breeding ground were caught and kept living. The males were removed from the net and placed in the natural enclosure behind it; the females were confined in a crate. Twenty-three nests were built by the males and of these only five ever contained eggs. These eggs were apparently all laid by one or two females that had gained access to the enclosure. The remaining eighteen nests were never used and were finally abandoned.

2. It was pointed out that the colors of the male *Amia* are protective in the breeding season. The fins are all colored green in harmony with the surrounding vegetation. The reticulation of the sides is in close imitation of the shadows cast by the interlaced and floating parts of water plants. The tail spot is strikingly like certain refraction images cast on the bottom