

ZOOLOGICAL CLUB, UNIVERSITY OF CHICAGO.

MEETING OF NOV. 20, 1901.

'Experiments in Grafting *Hydra*': MARY HEFFERAN.

These experiments were carried on during the year 1900 at the University of Chicago, and were based upon the similar work of Rand (1899) and Miss Peebles (1900). A comparison of the behavior of lateral grafts in the two species *Hydra fusca* and *Hydra viridis* showed a marked difference in the process of regulation. In the former, the graft moved up the stock until the head ends of stock and graft were of the same length, forming a Y-shaped figure. Then the two trunks gradually fused into one. A graft inserted very low down on the stock, i. e., in the aboral $1/5$, might constrict off from the foot. In *Hydra viridis* the process was quite the contrary. The graft moved down the stock instead of up, and finally separated from it at the foot instead of fusing as in *Hydra fusca*. The difference in size of the two species and the action of capillarity is suggested as an explanation of these different processes. In tangent grafts fusion took place the more readily as the area of union was increased in grafting. When poles were reversed separation took place if the area of union was so large that the polyps were unable to twist around in order that fusion could follow with poles in the same direction. It was impossible to build up *Hydra* of abnormal length by grafting several polyps together end to end. Normal form was regained usually by constriction and separation at the point of grafting, or when the compound was not much more than the ordinary length, by gradual reduction through absorption. In a few cases buds formed on such compounds soon after grafting. These buds arose entirely out of the budding region of the individual components, but within what would be the budding zone of the whole. The general results may be summed up in the words of Wetzell, '95: 'Ueberall zeigt sich ein deutliches Streben, die normal Gestalt wieder herzustellen.'

MEETING OF DEC. 4, 1901.

'Some Observations upon the Eye of *Bdelostoma Stouti*': B. M. ALLEN.

The eyes of this Pacific coast myxinoid show a very primitive structure, which is in reality the result of a complex process of degeneration. The eyeball is found imbedded in a mass of fat about three times its size. In one case, the eye was found to lie some distance beneath the outer surface of the mass of fat. Normally, however, the corneal surface lies on a level with the surface of the fat and is often flattened to form a rather extensive free surface. No eye muscles nor traces of such were discovered. No oculomotor nerves were found. No traces of them are discoverable in embryonic life (Kupffer). There is no trace of a crystalline lens. According to G. C. Price and Kupffer, a rudiment of a lens occurs at a very early stage of embryonic life, but very soon disappears. The choroid and sclerotic coats are represented by a very thin layer of unpigmented, non-vascular connective tissue without any appreciable distinction between corneal and sclerotic portions. The retina remains in the early condition of an optic cup, the outer layer (pigment layer) not being fused with the remaining layers. All specimens showed the layer in question to be widely separated from the bulk of the retina. This pigment layer is composed of a single layer of cubical cells devoid of pigment as far as I could ascertain. A layer corresponding to that of the rods and cones in higher vertebrates is clearly present. The nuclei of these structures (outer nuclear layer) are strikingly well developed and regularly arranged. Certain characteristic cells of the inner nuclear layer could be readily made out. It is impossible at present to give an accurate account of the minute histological details of this or of any other part of the retina, owing to the lack of living material. The ganglionic layer is represented by cells scattered irregularly throughout the inner reticular layer. Fibers from these last named cells can be traced in a more or less direct course to the optic nerve. The outer rim of the optic cup is in many cases differentiated in such a manner as to suggest a rudimentary iris. A structure unmistakably like an iris was found in one specimen examined. The cellular structure of this rudimentary iris is almost identical with

that of the pigment layer. No indications of muscle fibers or pigment are to be seen. Certain deeply staining coagula within the optic cup give evidence of a vitreous body. Some large, clearly marked cells, probably those of the vitreous body, are found attached to the surface of the retina. Evidences of a choroid fissure are to be seen in the fact that the ventral portion of the retina is thinner than the dorsal in almost all specimens. In one case the choroid fissure was found to persist. The most striking feature, however, is the extreme variation. The optic nerve enters the eye at various angles. Variation occurs in all parts of the eye, and is especially notable in the measurements of the thickness of the retina and the dimensions of the eye as a whole.

C. M. CHILD,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE 350th regular meeting was held on Saturday evening, February 22.

C. H. Townsend spoke on 'The Present Status of the Carp in American Waters,' saying that in spite of much adverse comment this fish was rapidly assuming an important place in this country and that no less than \$400,000 worth was sold annually, largely in New York. It was the source of the principal fishery in the Illinois River where the bass had increased in spite of statements that carp destroyed the spawn and young of bass. The speaker believed that when the proper methods of raising and cooking carp were better appreciated it would find much favor and be an important article of food, especially among those who could not afford the prices for the most desirable species. It would be impossible to propagate the finer species of fish on a sufficient scale to keep pace with our growing population and as the carp could be readily raised it would supply the deficiency caused by the lack of other fishes.

C. P. Hartley presented a paper on 'The Pollenation of Immature Flowers,' saying that, in order to save labor, plant breeders sometimes apply pollen to flowers at the time they emasculate them. Because fair success

has often resulted from this method it is now quite universally taken for granted that pollen placed on immature pistils will remain there until the pistils are receptive and then fertilize the flowers. Experiments with tobacco prove that there are flowers that are killed and caused to fall from the plants by being pollinated before their pistils are mature; and microscopic study of flowers so treated shows that the pollen germinates on the stigmas sending pollen tubes down the immature pistils into the ovaries. This growth of pollen tubes in the ovaries among ovules not sufficiently mature to admit of fertilization causes the flowers to fall. Tobacco flowers fall in about thirty-six hours after being prematurely pollinated. If pollinated when almost mature, *i. e.*, eighteen or twenty-four hours before the flowers would have opened, many will set fruit; but if pollinated two, three or even four days before maturity, the flowers invariably fall, separating smoothly from the plant at the base of the peduncles.

Datura flowers are also killed by premature pollination, though unlike tobacco flowers they do not fall but wither away and fail to develop seeds. Doubtless other kinds of flowers will be found to be injured by premature pollination. The growth of the pistils of cotton blossoms is checked by premature pollination and flowers pollinated one day before maturity do not set so many nor produce as good fruits as those pollinated at maturity. Tomato blossoms fail to set fruit when pollinated six days before maturity, the failure being due to loss of vitality in the pollen. If the flowers on becoming mature be again pollinated they set fruits. Orange blossoms pollinated nine days before maturity are not injured but continue their growth and mature good fruits. This is true of seedy as well as of navel oranges and the fact that flowers of the navel oranges so treated result in fruits containing good seeds, proves that the pollen so early placed on the stigmas successfully fertilizes the flowers.

The experiments show that certain kinds of flowers are killed by being pollinated too young; other kinds fail to set fruit because the pollen placed on the young stigma loses its vitality before the pistil becomes receptive,