ing to Hubbs[2] these belong in the same order, Malacopterygii, although the older workers placed these groups in different orders, Eventognathi and Isospondyli. Without going into the "pros and cons" of this question it is evident from the disposition of these families into separate orders that there are considerable differences between the two, both morphologically and physiologically. In the second place this constitutes the first record of infection of the gizzard shad by a Cestodarian parasite. All the other thirty-nine species of Caryophyllaeid parasites are found in members of the Catostomidae, Siluridae or Cyprinidae. Furthermore the infection is unusual because this fish normally harbors but few parasites. The author in collaboration with Essex examined 107 gizzard shad in 1925 from the Rock and Mississippi Rivers (the latter at Lake Pepin, Minnesota) and did not find a single infected specimen.[3] This dearth of parasitic fauna was explained by the fact that "The feeding habits of the gizzard shad seem to be such as to preclude the acquiring of an extensive parasitic fauna. Since it feeds largely on vegetable débris at the bottom of streams and lakes, very seldom ingesting animal food, there is little opportunity for parasites which have an extremely complex life cycle to find in it a suitable host." However, Van Cleave[4] in an examination of over three hundred gizzard shad finds a decided periodicity of infection by Acanthocephala; his examinations, being seasonal, show a decrease of these parasites during the summer months which explains why we did not find any Acanthocephalid infection. Dr. Simer examined fourteen of these from the Tallahatchie River. Only six possessed what a superficial examination classed as possible Cestodarian infection. Of these only one actually proved to harbor *G. confusus,* the other being plerocercoid larvae and Acanthocephala. By combining the records we have evidence of one case of infection by a Cestodarian, *G. confusus,* in over four hundred and twenty fish examined, or 0.23 per cent. From the statistical standpoint the evidence is overwhelming that this parasite is not naturally found in this host.

Dr. Simer was in Mississippi during the spring of 1927 when the flood waters were near their peak. This meant that the entire biological balance was upset, for both fishes and fish food were not only disturbed but even swept away. It is but a step further to visualize the gizzard shad, *Dorosoma cepedianum,* eating infected intermediate hosts containing *G. confusus* or securing direct infection if this method prevails, and thus becoming accidentally infected by this parasite. Surely the evidence at hand points to this as the only logical explanation.

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[2] C. L. Hubbs, "A Check-list of the Fishes of the Great Lakes and Tributary Waters, with Nomenclatorial Notes and Analytical Keys," Univ. of Mich. Mus. Zool., Misc. Pub. No. 15, 77 pp., 1926.

[3] Essex, H. E., and G. W. Hunter, III, "A Biological Study of Fish Parasites from the Central States," *Trans. Ill. St. Acad. Sci.,* 19: 151–181, 1926.

[4] H. J. Van Cleave, "Seasonal Distribution of Some Acanthocephala from Fresh-water Hosts," *Jour. Parasit.,* 2: 106–110. 1916.

CEPHENOMYIA SP. KILLING DEER

DUE to the severity of the winter and the excessive snowfall in the higher mountains the black-tailed deer, *Odocoileus hemionus,* of this region have been forced into the valleys, and have been fed regularly on the feed grounds with the cattle or on separate feed grounds or in feed racks. In the middle of January they began to appear on the lower foothills and occasionally in the fields where they visited the hay stacks. Regular feeding was started in early February and continued until they started moving back into the hills. The feed grounds below Gunnison were located at the Hillside School, about three miles below Gunnison, and at regular intervals down the river.

When the deer first came down they were practically all poor and weakened. Feeding restored their vitality on all grounds except at the Hillside School. On this ground it was noted that the young deer and some of the older failed to recover strength. During the latter part of February some of the young died. In early March the death-rate became much higher, and at the present time more than sixty deer have died. Autopsies showed conditions quite normal except in the head, where the larval stage of *Cephenomyia* sp. were found in abundance. Clusters of the larvae were found hanging attached to the nasopharynx in such masses as to almost completely stop the nasal passages. In one autopsy fifty-four larvae were taken. In this deer the tissues of the lower nasal passages were highly inflamed, and in the upper left sinuses infection had set in and had extended to the left lobe of the brain on which there was also a hemorrhage. These larvae ranged in size from a half inch long to mature larvae.

No early symptoms of infection were visible except a general weakness and emaciation. In the deer captured for the local park extreme restlessness was observed for twenty-four hours before death. In these cases (seven head) the animals died in what seemed to be extreme agony with the head severely drawn back toward the shoulders. On the feed grounds other than that at Hillside there have been only occasional deaths.

Although the deer have been fed in previous years in this region there has been no unusual number of deaths among the herds. Pierce[1] states the goat head bot is native in California on the deer but that there is little evidence of its effect. Herms[2] lists the genus *Cephenomyia* as being present in the black-tailed deer, *Odocoileus columbianus*. Through the courtesy of Dr. Sam McCampbell, deputy state entomologist of Colorado, Dr. Bourne, of the veterinary department of the Colorado Agricultural College, and Dr. T. D. A. Cockerell, of the University of Colorado, the identification of these larvae has been confirmed as being those of *Cephenomyia* sp.

The present rate of destruction of the deer from this cause makes the problem of game conservation in this region a serious one.

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SOLAR ECLIPSES

IN the issue of SCIENCE for May 24, 1929, page x, it is stated that Professor John A. Miller, of Swarthmore College, has just observed his seventh total solar eclipse, all seven having been clear. It is further stated that "no other astronomer has seen as many, though one has been to nine and another to eight." In this latter connection may I draw attention to the record of David Todd, professor emeritus of astronomy at Amherst College, who has been to the following eclipses: 1878, July 29, Texas; 1887, Aug. 19, Japan; 1889, Dec. 22, West Africa; 1896, Aug. 9, Japan; 1900, May 28, Tripoli, Barbary; 1901, May 18, Singkep, Dutch East Indies; 1905, Aug. 30, Tripoli, Barbary; 1914, Aug. 21, Russia; 1918, June 8, Florida; 1919, May 29, Brazil; 1925, Jan. 24, New York. Though the above list of attendance at eclipses is longer than that of any other astronomer, eleven in all, the majority were obscured by clouds, only four having yielded entirely successful results.

MILLICENT TODD BINGHAM

SCIENTIFIC BOOKS

Colour and Colour Theories. By CHRISTINE LADD-FRANKLIN. New York, Harcourt Brace and Co. 1929.

THE contributions of Mrs. Ladd-Franklin to color theory are familiar to all psychologists, but her work has never received adequate recognition from physicists, possibly for the reason that most of her papers have appeared in psychological magazines. These papers are now brought together in a volume of the International Library of Psychology, Philosophy and Scientific Methods.

Mrs. Ladd-Franklin first developed her theory of vision in 1892. She reported its essential features at the Psychological Congress held in London and published it in detail in the *Zeitschrift für Psychologie* in the same year. An English account appeared in *Mind* during the following year. These papers and her article on "Vision" in Baldwin's Dictionary (1902) are reprinted in full, together with several later articles which discuss specific visual phenomena and reply to various objections raised against the hypothesis.

The problems and difficulties of explaining color vision are too well known to need more than brief allusion. The three-component theory of Young and Helmholtz ignores yellow, which psychologists regard as a primary visual phenomenon. The six-component theory of Hering and others admits yellow, white and black as primary phenomena, but assumes that red and green result from antagonistic retinal processes, whereas actually they are not complementary. It is not surprising that physicists are inclined to favor the Helmholtz hypothesis and physiologists the Hering hypothesis, while psychologists find objections to each. Mrs. Ladd-Franklin's theory meets the objections to both these explanations by assuming that color vision originated first of all in a blue-yellow differentiation of the primitive achromatic retinal processes and that later the yellow component differentiated into green and red processes. It should be noted that this interpretation has found favor with a large number of psychologists, though her explanation of the black sensation is not so generally accepted. In the present volume are included a number of shorter papers by recent writers who have adopted the Ladd-Franklin theory, in which the black sensation and other visual problems are treated from her standpoint.

The book is provided with many excellent diagrams and color charts and has a glossary of technical visual terms. The exposition is clear and logical. It is to be hoped that physicists and others interested in color phenomena will have their attention drawn to this alternative theory of vision, which solves many of the difficulties presented by the classical theories.

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Meteorology. By DAVID BRUNT. 112 pages, 19 illustrations. Oxford University Press. 1928. $1.00.

IT is a rare pleasure to find an elementary work on any science that one can unreservedly recommend. This book by an important official in the Meteorological Office, London, affords that pleasure. It

[1] D. Dwight Pierce, "Some Milk Goat Problems in California," State of Calif. Dept. of Agriculture, Special Bulletin No. 22. 1922.

[2] William B. Herms, "Medical and Veterinary Entomology," Macmillan, New York. 1923.