

THE PULMONARY ARCH OF LUNGLESS SALAMANDERS. BY MISS MAE WOLDT.

[Abstract.]

Although salamanders have long been studied, it was only recently discovered that some forms are lungless. Investigations have been made upon the mode of respiration and upon the modifications in the structure of the heart. As far as known, however, nothing has been published concerning the pulmonary arch. It is reasonable to suppose that the arch which, in amphibians, carries blood to the lungs would undergo more or less degeneration in the lungless salamanders. In the forms with lungs this arch also sends branches to the œsophagus. An investigation of lungless salamanders (*Plethodon cinereus* and *P. erythronotus*) shows that the pulmonary arch persists between the truncus arteriosus and the point of origin of the œsophageal branches; beyond this point it has disappeared. The pulmonary arch also sends branches to the skin. The salamander has, however, another skin artery, and it is not impossible that the disappearance of the lungs in the lungless forms finds its explanation in this double supply of blood to the skin. The function of supplying other parts of the body was at least important enough to prevent the entire disappearance of the pulmonary arch in the lungless salamanders.

AN INSTANCE OF BIRD FEROCITY. BY GLENN CULBERTSON.

During last May John Gabel, a student in ornithology, reported the following observation: While riding near Hanover Mr. Gabel's attention was attracted by the fluttering of wings in an osage hedge by the roadside and by cries as of a bird in distress. On dismounting and approaching to within ten or twelve feet of the place for a closer inspection he observed a Loggerhead Shrike (*Lanius ludovicianus*), impaling a Sparrow Hawk (*Falco sparverius*), upon the thorns of the osage tree. The Shrike was accomplishing this by beating the Hawk with its wings and by striking it with its beak.

On Mr. Gabel's nearer approach the Shrike became frightened and flew to a tree near by. The Sparrow Hawk remained impaled on the hedge thorns and continued to flutter frantically until it was on the point of being captured, when it was able to extricate itself and fly away.

In no instance have I known of the Shrike attacking so large a bird as the Sparrow Hawk, much less one so well able to defend itself. Whether or not the Hawk had become entangled in the hedge before the attack of the Shrike is not known, but that the Hawk was impaled on the thorns and that the Shrike was striking it with wings and beak is certain.

MATERIAL FOR THE STUDY OF THE VARIATION OF *ETHEOSTOMA CAPRODES*
RAFINESQUE AND *ETHEOSTOMA NIGRUM* *RAFINESQUE* IN TURKEY LAKE
 AND TIPPECANOE LAKE.* BY W. J. MOENKHAUS.

The matter contained in the present paper relates to two species of darters, *Etheostoma caprodes* and *Etheostoma nigrum* from Turkey Lake and Tippecanoe Lake.† The discussion is confined almost wholly to the variation in the dorsal and anal fins. In a few instances the scales in the lateral line and on the nape are also considered. The aim of this paper is to answer the following questions:

1. Do the sexes present any differences in their variations?
2. How do the specimens in Tippecanoe Lake differ from those of Turkey Lake?
3. Is the variation in the two species determinate with the locality; *i. e.*, do both vary in the same direction in the same locality?
4. Do the broods of one season differ from the broods of another season?
5. Are the variations of one fin correlated with the variations in the others?

I. DO THE SEXES PRESENT ANY DIFFERENCES IN THEIR VARIATIONS?

Inasmuch as all the specimens upon which the comparisons are to be made include the two sexes, it will be advisable to first determine just what modifications sex has upon the different structures. The specimens of *Etheostoma caprodes*

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† For the purpose of making a detailed comparison between the faunas of two units of environment, a Biological Station has been established on Turkey Lake, Kosciusko County, Indiana. Five miles from this lake is another lake of different shape and depth—Tippecanoe Lake. The two lakes are on opposite sides of the watershed separating the St. Lawrence from the Mississippi Basin. A physical survey has been made of these lakes, and as far as our means permit, the physical and biological conditions of the two lakes are being studied as two units of environment within which we wish to determine the extent of variation in the non-migratory vertebrates, the kind of variation, whether continuous or discontinuous, the quantitative variation, the direction of variation, and the annual or periodic variation and the effect of selection. The present is one of a series of papers illustrating these points.

C. H. E.