A-M [orse, E.S.]

1871

HARVARD UNIVERSITY.

LIBRARY

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY.

18.039

Library of Alpheus Hyatt

September 18, 1902.

II. ZOÖLOGY.

1. ON THE CARPAL AND TARSAL BONES OF BIRDS. By EDWARD S. MORSE, of Salem, Massachusetts.

THE author stated that he had followed with great interest the work of Huxley, Cope, and others, in tracing out the ornithic character in the Dinosauria. While following these relations, he had noticed a marked difference in the characters of the two classes. It seemed strange that a group of bones so persistent in the reptiles, as well as in the mammalia, should be so obscure, or wanting, in birds.

Owen objects to the term *tarso-metatarsus*, as he believes the existence of a tarsus has not been demonstrated. W. S. Parker, in 1861, on the osteology of the *Balæniceps Rex*, queries if the lower articular portion of the tibia is not the homologue of the mammalian astragalus, and not an epiphysis.

Gegenbaur has now shown that, in an early stage of the chick, there is a proximal tarsal ossicle, and a distal tarsal ossicle; the proximal one anchylosing with the tibia, the distal one likewise anchylosing with the metatarsus. Thus, the term *tarso-metatarsus* is not only correct, but the nature of the segment in question is explained by it.

While this was a great step toward a proper understanding of these parts, Mr. Morse believed that a nearer relation would be found in the discovery of another proximal tarsal bone. In reptiles, — even in the low Batrachians, — however few in number the tarsal bones might be, there were always in the proximal series one corresponding to the tibia, and another corresponding to the fibula.

He had found this feature in birds. The following embryos were studied : —

- Bank Swallow, *Cotyle riparia*.
- Cave Swallow, *Hirundo lunifrons*.
- King Bird, *Tyrannus Caroliensis*.
- Crow Blackbird, *Quiscalus versicolor*.
- Cow Blackbird, *Molothrus peccoris*.

Bluebird, *Sialia sialis*.

Chipping Sparrow, *Spizella socialis*.

Yellow Warbler, *Dendroica æstiva*.

Wilson's Thrush, *Turdus juscenscens*, and the

Spotted Sand-piper, *Tringoides macularius*.

In these he had found three distinct tarsal bones, — two in the proximal series answering to the astragalus and calcaneum or the *tibiale* and *fibulare* of Gegenbaur, and one in the distal series representing the *centrale*.

The first two anchylose at an early stage, and present an hour-glass-faced articular surface, as described in the astragalus of Læ-laps by Professor Cope. The final ankylosis of these conjoined ossicles with the tibia formed the bicondylar trochlea so peculiar to the distal end of a bird's tibia.

The distal tarsal ossicle became united with the proximal ends of the metatarsals as Gegenbaur had shown.

In the carpus he had found four perfectly distinct ossicles, — two in the proximal series, and two in the distal series; the bones of the proximal series remaining free, while the bones of the distal series unite with the base of the mid and outer metacarpal.

Thus we have in the wing, as in the leg, the joint between the first and second carpal series.

In the Kingbird and Yellow Warbler he had found a fifth carpal on the radial side.

2. ON THE MECHANISM OF FLEXION AND EXTENSION IN BIRDS' WINGS. By ELLIOTT COUES, of Fort McHenry, Maryland.

I DESIRE to bring to the notice of the Association, and of ornithologists in general, a certain mechanism in the wings of birds, which has not received the attention that is warranted by its interest and importance. No discovery is claimed; for probably the point cannot have been overlooked: nevertheless, having seen no account of it, I am led to believe that it will be new to many, as it was to myself when I first detected it.

I will first briefly recapitulate the well-known points of osseous