

In *Testudo carolina* it is scale-like with the posterior a flattened rod, and the anterior portion far from the jugal.

There is nothing peculiar in the adult, but in the young the columella is small and slender, and in position and shape resembles that of a half-grown *Chelonia mydas*.

The stapes (sometimes called columella auris) in most birds, reptiles and amphibians, is a very slender rod with a disc at one end. The disc end is attached to the fenestra ovalis, while the external end is attached to the tympanic membrane.* The bone inclines forward at a decided angle. To reach the membrane it passes through a canal, or foramen, made by the folding in of the posterior part of the quadrate bone. The folding in is more complete in adult specimens, and the foramen near the front of the tympanic cavity.

In *Chelonia mydas* the canal is unusually open, and the stapes on one side only protected by muscles.

In *A. spinifer*, *Ch. serpentina* and *Macrochelys lacertina*, the stapes is completely surrounded by bone, the edges of the quadrate being sutured together, so as to form a foramen.

The edges touch in *H. odoratus*, but do not form a suture.

In *M. palustris* the space is open, but the edges of the quadrate approach quite near each other. This is a common form in the emydes. The exceptions are *Ch. insculptus*, where there is a suture, and *Chrysemys picta* and *Chelopus guttata* where the edges lap.

The suture is strongly marked in *T. carolina*.

Notice of the Discovery of the position of the Crural Processes in the Genus Atrypa.

BY WILLIAM GINLEY.

(Read before the American Philosophical Society March 1, 1878.)

It is already well known that, in 1867, Professor R. P. Whitfield, palæontologist of Albany, New York, announced the discovery of "a loop connecting the spiral cones" in the genus *Atrypa*.

In the Twentieth Regent's Report he describes in detail this loop with its position and affinities; accompanying his article is a plate showing various examples from different localities representing a wide geological distribution.

* Cuvier Ossements Fossiles IX, p. 355.

From his article I will quote only those parts expressive of his investigations and views upon the crural processes or loop :

"By carefully cutting and preparing favorable specimens, I have found that in place of the short crural processes so often figured, there is an entire and continuous loop connecting the spiral cones."

"From its origin in the posterior portion of the first volutions of the spires, the loop curves gently forward and upward ; the central or elevated portion lying between and behind the cones, and forming a more or less abrupt curve or prolonged into a point directed toward the dorsal valve."

In palæontological studies, it is of rare occurrence that the student obtains a specimen of the *Brachiopoda* in which the internal appendages are not coated with silica, calcite, or some other mineral, and not unfrequently it happens that we notice two or more parts connected by a deposit of this kind.

After having examined Professor Whitefield's Plate, and also many specimens from the localities cited by him, I am inclined to believe that his examples were, to a slight extent, coated as above described. In October 1877, I obtained, from the Devonian of Clarke County, Indiana, specimens of *Atrypa** whose internal appendages were replaced by silica, and appeared to be free from the usual coating.

It is hardly necessary to remark that these appendages are very fragile, and would hardly admit of the slightest touch, yet by careful cutting I was able to expose the posterior portion of the visceral cavity so as to permit of a close examination of the "loop connecting the spiral cones." Several specimens were examined, each one of which shows the "loop" to be composed of *two* long crural processes arising from the bifurcating of the posterior portion of the first volution of the cones. Following the convexity of the cones, they gently curve forward and upward, attaining a height of about one-third that of the cones. The extremities are separated by a space of about one sixty-fourth of an inch.

The crural processes gradually twist until the lower surfaces present themselves successively to the anterior and top, abruptly expanding and curving posteriorly, the extremities pointing downward, the ends opposing each other with a rounded, semi-circular edge, the convexity being upward, the lower anterior edge being slightly developed beyond the upper edge so that, upon looking from above, the space between the edges appears much wider in the middle. The specimens examined show the crural characters to be constant, and as above described.

When we consider the slight space existing between the crural extremities, and the frequency of their being coated, it is not to be wondered at that they should appear to be "joined and continuous."

* A variety of *A. reticularis* L.



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