

ART. II.—*Observations upon some of the Brachiopods, with reference to the genera Cryptonella, Centronella, Meristella, and allied forms; by JAMES HALL. Abstract of a paper read before the Albany Institute, February 3d, 1863.*¹ (Communicated by the author.)

(Concluded from vol. xxxv, page 406.)

In the *Thirteenth Report on the State Cabinet* (p. 74, 1860), I proposed the Genus *Meristella*, to embrace certain species before included under the Genus *Merista*, and which were shown not to possess the peculiar shoe-lifter process, or transverse septum, characteristic of the latter genus. I remarked as follows: "Restricting, therefore, the signification of the genus *Merista* to such forms as were originally included by Prof. Suess under that name, it becomes necessary to designate those species of similar form, but without the peculiar appendage of the ventral valve, by another generic term; and I would therefore suggest the name of *Meristella*, proposed by me last year."²

After describing the genus, I cited as illustrations several species from the Lower Helderberg group; and gave figures of the exterior of *Meristella princeps* and *M. nasuta*, the latter species from the Upper Helderberg group.

In the same Report I described three other species of the genus, viz: *Meristella Haskinsi*, *M. Barrisi* and *M. Doris*, but without giving illustrations of these.

Since, on the one side, this genus has been claimed to be equivalent to *Athyris*, and, on the other, the same author has placed some of its species under a later created genus *Charionella*, it seems necessary to repeat some of the characters of the genus in this connexion.

Genus MERISTELLA Hall, 1860.—The genus includes *terebratuloid* or *Athyroid* forms which are ovoid, more or less elongate, sometimes elliptical in outline, and not unfrequently transverse or sub-circular; valves unequally convex, with or without a median fold and sinus, and this feature usually confined to the lower half of the shell. Ventral beak more or less closely incurved (when closely incurved apparently imperforate), terminated by an aperture, the lower side of which may be formed by the umbo of the dorsal valve, or by a deltidium. Area none.³

¹ From the Transactions of the Albany Institute, with some verbal corrections and the introduction of subsequent observations by the author.

² In the *Twelfth Report on the State Cabinet*, 1859, page 78, in referring *Atrypa naviformis* of vol. ii, *Pal. N. Y.* to *Merista*, I said: "This species, and some others of the Clinton and Niagara groups, differ somewhat from true *Merista*; and should these differences prove of generic importance, I propose for them the name *Meristella*."

³ Those species with the ventral valve closely incurved are *apparently* imperforate, since no foramen is visible above the umbo of the dorsal valve. In the separated valves of these species, I have not seen any deltidium; an open triangular space exists above the points of the dental lamellæ, and this communicates with the open cavity of the valve.

Valves articulating by teeth and sockets. Surface smooth or marked by fine concentric lines of growth, not lamellose, and indistinct or obsolescent radiating striæ, which are usually more

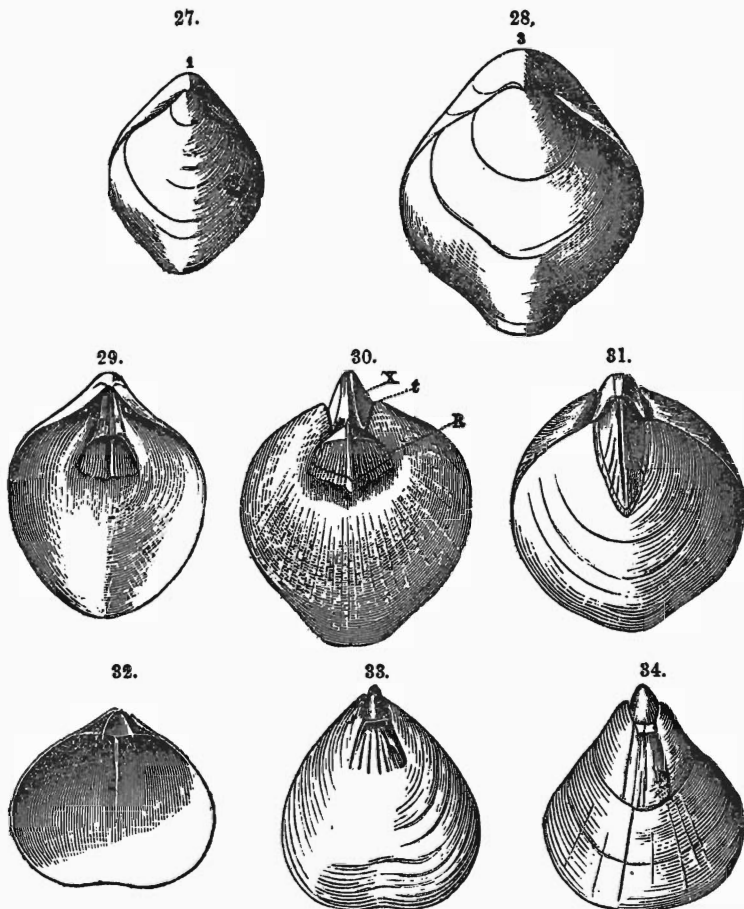


Fig. 27. *Meristella nasuta* = *Atrypa nasuta*, Conrad.—Dorsal view of a young individual.—Fig. 28. An older individual.—Fig. 29. Interior of the ventral valve.—Fig. 30. Cast of the dorsal valve.—Fig. 31. Dorsal view of the same species.—Fig. 32. Interior of the dorsal valve of *M. arcuata*, showing the hinge plate and median septum.—Fig. 33. Cast of ventral valve of *M. Barrisi*.—Fig. 34. Cast of ventral valve of *M. Haskinsi*.

conspicuous in the cast or exfoliated surfaces than on the exterior. Shell fibrous.

The ventral valve is much thickened on each side towards the beak, and the rostral cavity margined by flattened dental

* The casts of *M. Barrisi* and *M. Haskinsi* are obtained from solid specimens by removing the shells, and therefore have not that sharpness of the muscular markings which we find in weathered casts.

lamellæ, which extend downwards to the commencement of the muscular impression, and terminate at the edge of the shell in blunt tooth-like processes. The muscular impression forms a somewhat broadly triangular depression in the valve just below the rostral cavity. In the cast of this valve we have the reverse of these features.

In the dorsal valve there is a strong hinge plate or process, the prominent part of which is broadly triangular, somewhat depressed or spoon shaped in the centre, and supported below by a median septum which reaches from one-third to one-half the length of the valve, and on each side, marked by deep dental fossets, while the anterior angles are produced into the crura which support the internal spires.

Spires arranged as in *Athyris* and *Merista*, being a double cone with the apices directed outwards. From the lower lateral margins of the cardinal process or hinge plate, there is a callosity extending beneath and anterior to the dental fossets, and joining with the thickened margin of the valve, as in the other allied genera.

In the cast of the dorsal valve we have the mark of the median septum, with an elongate, lanceolate muscular impression, reaching nearly to the middle of the valve. The imprint of the triangular process, and the cavities made by the crura are often preserved.

The species of this genus may be readily distinguished from *Merista* by the absence of the shoe-lifter process, which, in numerous specimens compared, constitutes the principal difference between the two genera.⁵

The illustrations on the preceding page will serve to show more clearly the characteristics of this genus.

In the dorsal valve of *M. Barrisi* we have a hinge plate, with a median septum reaching more than one third the length of the shell, and the same characters exist in *M. Haskinsi*. In *M. Doris* the rostral cavity and muscular impression of the ventral valve are much elongated, and resemble what I have heretofore shown in *Meristella levis*.⁶ The dorsal valve has a strong extended median septum and hinge structure as in the other species.⁷

The proportions of length of rostral cavity and muscular impression, vary in different species; and the muscular impression becomes much stronger and deeper in the older shells, when the valve as before remarked becomes thickened at the sides and

⁵ On plates 39 and 41 of *Pal. N. Y.*, vol. iii, may be found some illustrations of the casts of species of this genus.

⁶ *Palaontology of New York*, vol. iii, plate 39.

⁷ In reclaiming these species of *Meristella*, I am not impugning the validity of the genus *Charionella* of Mr. Billings, for none of these have the characters of the dorsal valve of *Charionella* as represented on page 274, No. 33 of the *Canadian Journal*, which is not only clearly unlike *Meristella*, but very distinct from any genus of *Spiriferidæ* before described.

towards the beak. This character pertains to the limestone specimens, while those in the Hamilton shales, as figs. 7 and 8, have thinner shells, and less deep and strong muscular impressions.

I have already (*Thirteenth Report on the State Cabinet*, pp. 73-75, and illustrations on p. 93) pointed out the distinction between *Athyris*=*Spirigera* and *Meristella*. This difference is everywhere clear and unmistakable, in the external lamellose surface of the one, and the almost smooth character of the other. The muscular impressions of the ventral valve of *Athyris* are at once distinguishable from those of *Meristella*; as may be seen on comparison of figs. 35 and 36 with figs. 29 and 30.

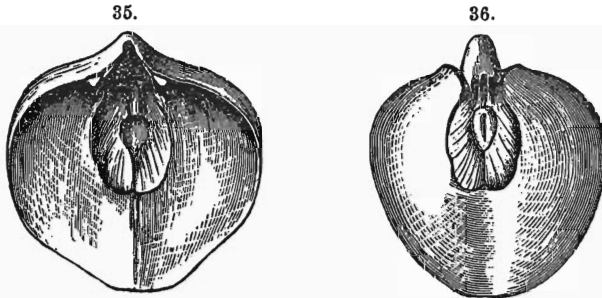


Fig. 35. Interior of ventral valve of *Athyris spiriferoides*.—Fig. 36. Cast of same.

In the dorsal valve, the muscular impressions differ from *Meristella*; the hinge plate is of somewhat different character, and the median septum is scarcely developed.

Note on the Genus LEPTOCÆLIA.—Among the specimens sent to me by Dr. Rominger, are two individuals of *Leptocœlia concava*, showing the existence of internal spires; and a careful examination of my own collections from the Lower Helderberg group has shown several specimens possessing these internal organs which have their apices directed obliquely outwards, and are connected near their origin by a strong vinculum on the dorsal side. After repeated examinations of a large number of the Oriskany sandstone species, from which the characters of the genus were mainly drawn, I have failed to detect internal spires. The form of the internal loop, as represented in the figures of the genus, was ascertained, as stated by me, mainly from cavities remaining in the crystalline filling of the shell. There were no appearances of spires, nor does a re-examination of the specimen afford any farther information, or indicate in any manner that spires have ever existed. The crura can be traced to the division at the process, and below this is a flat cavity.

A critical re-examination of the fossils referred to this genus shows that there are at least three distinct types, in their external form and features, which, in the absence of positive knowledge of the internal structure, were grouped together. A far-

ther examination shows some peculiarities of hinge structure in each one of them, which are probably connected with more important difference of the internal parts. One of these types is indicated in the two strongly plicated species of the Oriskany sandstone, which have a median sinus near the front of the ventral valve, with two of the plications often closely incurved. Another type is that of *Leptocælia concava*, and allied forms, which are more finely plicated, and where there is a sinus on the dorsal valve, though not distinctly defined. The third type is represented in *Leptocælia (Atrypa) planoconvexa*, which has a somewhat undefined depression on the dorsal valve, and a form of cardinal process unlike the other species. The internal structure of this species is still unknown.

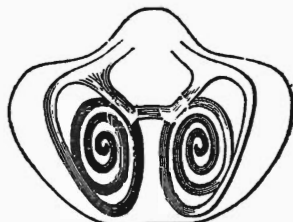
The *Leptocælia imbricata* proves to be a *Trematospira*, and the same characters are apparent in *L. disparilis* of the Niagara group, the concavo-convex form of the shell being the only apparent deviation from typical forms of that genus. The *Terebratulula lepida* of Goldfuss, as shown in the collections of Dr. Rominger, possesses internal spires precisely similar to those of *Trematospira camura*.

The *L. concava*, both in its external characters and in the arrangement of the crura and vinculum, differs from *Trematospira*, and with the knowledge at present possessed, I am compelled to separate this species from those last named, and from the *L. flabellites*, *L. fimbriata* and *L. acutiplicata*, I would propose to indicate forms of this external character with similar crura and spires as *Cælospira*.

The difficulty constantly attending the references of the Brachiopoda, to establish genera from external form and characters, renders it very desirable to search for the interior organization and appendages; but the condition of specimens does not always admit of satisfactory investigations, and not unfrequently the specimens possessed are so few as almost to preclude examinations of this kind.

As an example of the diversity of internal structure in similar external forms, I may mention the *Terebratulula altidorsata* of Barande, which so nearly resembles the *Centronella Glans-fagea* that it might readily be mistaken for that shell. On cutting and macerating specimens of the former, they prove to possess internal spires arranged as in *Meristella*, removing it from the family of the *Terebratulidæ*. I have not been able to determine whether the shell of this species is punctate or fibrous, from the specimens I possess.

37.

*Cælospira concava.*