Report on the Radiolaria Collected by H.M.S. Challenger During the Years 1873-1876, Second Part: Subclass Osculosa;

Ernst Haeckel

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Ernst Haeckel

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Transcriber's note:

Text enclosed by underscores is in italics (_Actissa_).

The underscore also denotes a subscript, so _c__1 is an italic c with a subscript (note that there are two underscoreds between the "c" and the "1").

Text enclosed by hash marks is in "gesperrt" (wide-spaced) type (#Larcoidea#).

Page numbers enclosed by curly braces (example: {25}) have been incorporated to facilitate the use of the Index.

Some typographical errors in the printed work have been corrected. They are listed at the end of the text.

The Addenda & Errata (Second Part, pp. 1763-4) have been applied without further comment.

REPORT ON THE SCIENTIFIC RESULTS OF THE VOYAGE OF H.M.S. CHALLENGER DURING THE YEARS 1873-76

Under the Command of Captain George S. Nares, R.N., F.R.S. and the Late Captain Frank Tourle Thomson, R.N.

Prepared Under the Superintendence of
the Late Sir C. Wyville Thomson, KNT., F.R.S., &c.
Regius Professor of Natural History in the University of Edinburgh
Director of the Civilian Scientific Staff on Board
and Now of
John Murray
One of the Naturalists of the Expedition

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SECOND PART

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By ERNST HAECKEL, M.D., Ph.D., Professor of Zoology in the University of Jena.

SECOND PART.--OSCULOSA.

(#NASSELLARIA AND PHÆODARIA.#)

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{889}LEGION III. NASSELLARIA,

VEL MONOPYLEA, VEL MONOPYLARIA (PLS. 51-98).

Nassellaria (_inclusis_ Spyridinis), Ehrenberg, 1875.
Monopylea, Hertwig, 1879.
Monopylaria, Haeckel, 1881.
Cyrtida et _Acanthodesmida_, Haeckel, 1862.
Cricoidea, Bütschli, 1882 (L. N. 40, p. 537) = NASSELLARIA.

Definition.--Radiolaria with simple membrane of the central capsule, which is monaxon or bilateral, and bears on one pole of the main axis a porous area (porochora), forming the base of a peculiar intracapsular cone (podoconus). Extracapsulum without phæodium. Skeleton siliceous, very rarely wanting. Fundamental form originally monaxon, often dipleuric or bilateral.

The legion NASSELLARIA vel MONOPYLEA, in the extent here defined, was constituted in 1879 by Richard Hertwig in his work Der Organismus der Radiolarien (pp. 133-137). He gave to this large group the rank of an order, and united in it the two families Acanthodesmida and Cyrtida, which I had constituted first in 1862 in my Monograph (pp. 237, 265, 272); but he added, too, as a third

family the Plagiacanthida, united by me with the former. In the first system of Ehrenberg (1847, _loc. cit._, pp. 53, 54), four families belonging to the MONOPYLEA were enumerated, the Halicalyptrina, Lithochytrina, Eucyrtidina, and Spyridina. He united the three former under the name "Polycystina solitaria," which he afterwards changed into NASSELLARIA (1875, Abhandl. d. k. Akad. d. Wiss. Berlin, p. 157).

In my Monograph of the Radiolaria (1862, pp. 265-345) forty-four genera of NASSELLARIA were enumerated (six Acanthodesmida and thirty-eight Cyrtida), whilst the total number of genera in the whole class of Radiolaria at that time amounted to one hundred and thirteen. But owing to the astonishing number of new and interesting forms of this legion which I afterwards detected in the collection of the Challenger, in 1881 I distinguished in my Prodromus not less than three hundred and seventeen genera. These were disposed in five large main groups, retained in the present Report, with twenty-six families, viz., (1) #Plectoidea# (with three families), (2) #Stephoidea# (with four families), (3) #Spyroidea# (with four families), (4) #Botryodea# (with three families), and (5) #Cyrtoidea# (with twelve families). The first two groups have an incomplete or rudimentary skeleton, and may be united in the order #Plectellaria#, whilst the other three families possess a complete latticed shell, and {890}may be united as #Cyrtellaria#. The former correspond to the Acanthodesmida, the latter to the Cyrtida in my Monograph.

The character common to all MONOPYLEA or NASSELLARIA, which separates them from all other Radiolaria, was first recognised by Richard Hertwig in 1879, and consists in the singular structure of the monaxonian central capsule, bearing on the basal pole a peculiar

porous area or operculum, the "Porenfeld;" we call it shortly the "porochora." It represents a circular or elliptical porous plate on the basal pole of the vertical main axis of the central capsule, and bears a peculiar "podoconus" or "Pseudopodien-Kegel," a conical body of singular structure, protruding inside the membrane into the capsule. The pseudopodia arising from this peculiar "podoconus" proceed from the capsule piercing the "porochora," whilst the other parts of the capsule are not perforated.

The MONOPYLEA are therefore "Merotrypasta," like the following fourth legion, the PHÆODARIA or CANNOPYLEA. But in these latter we find on the basal pole of the monaxonian capsule only one single large main opening, prolonged into a peculiar tube, and there is no trace of the typical "podoconus," characteristic of all NASSELLARIA. The latter agree, however, with the former in the possession of a basal opening, serving for the emission of the pseudopodia, and in the monaxonian fundamental form, arising from this structure. Therefore these two legions of "Merotrypasta" exhibit a wider divergence from the ACANTHARIA and SPUMELLARIA, the two legions of "Holotrypasta," in which the central capsule is everywhere perforated by innumerable small pores (compare above, pp. 5, 6, 716).

The Skeleton in all NASSELLARIA consists either of pure silica, or of a peculiar silicate; never of acanthin (as in all ACANTHARIA). The siliceous bars and beams constituting it are invariably solid (as also in the SPUMELLARIA); never hollow (as in the PHÆODARIA). In the small family of Nassellida alone (with the two genera _Cystidium_ and _Nassella_) the skeleton is entirely absent. In all other genera of NASSELLARIA the siliceous skeleton is more

or less developed; imperfect, or quite rudimentary in the #Plectellaria# (#Plectoidea# and #Stephoidea#), but perfect and forming a regular lattice-shell in the #Cyrtellaria# (#Spyroidea#, #Botryodea#, and #Cyrtoidea#). The different forms of this skeleton exhibit an extraordinary variety, but may be reduced to a few very simple fundamental forms, or even to a single, most simple original form. The comparative morphology is more interesting, but also more difficult to understand than in any other Radiolaria.

The geometrical fundamental form of the skeleton is in all NASSELLARIA monaxonial, the vertical main axis of the body, which is already indicated by the axis of the central capsule with two different poles, being also expressed constantly in the form of the skeleton. The lower or basal pole of the latter always exhibits a different shape from that of the upper or apical pole. This difference is so striking in nearly all MONOPYLEA, that the two poles may be determined on the first view.

{891}In the great majority of NASSELLARIA not only is the monaxonial fundamental form expressed, but also the dipleuric or bilateral, so that the symmetrical halves of the body may be easily determined; the right and left halves exhibit the same symmetry as in the vertebrates, so that we may distinguish an anterior ventral and a posterior dorsal face of the body. The whole form is in this case determined by three dimensive axes, perpendicular to one another, two of which are heteropolar, the third is homoeopolar. The apical pole of the vertical main axis (principal or longitudinal axis) is different from the basal pole. The ventral pole of the horizontal sagittal axis (or dorso-ventral axis) is different from the dorsal pole. The right pole of the horizontal transverse axis (lateral or frontal axis)

is equal to the left pole. Therefore the sagittal or median plane of the body (in which the principal and the sagittal axis are crossed) divides it into symmetrical equal halves and is perpendicular to the frontal axis.

Three different original elements of structure are recognisable in the majority of NASSELLARIA, viz., (1) a vertical simple ring, the primary or sagittal ring, placed vertically in the sagittal plane and enclosing the median plane of the central capsule; (2) a basal tripod, composed of three diverging radial rods, which are united on the basal pole of the central capsule and are either expanded horizontally or descend; (3) an ovate or subspherical, simple lattice-shell, the cephalis or capitulum, which surrounds the central capsule and exhibits a peculiar structure on its basal pole.

These three important original elements of structure--the sagittal ring, the basal tripod, and the latticed cephalis--are so united in the majority of NASSELLARIA that the cephalis rests upon the tripod and includes the sagittal ring wholly or partially. The simplest realisation of this typical union is afforded by the Archiperida and Tripospyrida, and these may be derived from the simpler important Stephanid _Cortina_ (Pl. 83, fig. 9; Pl. 92, fig. 21; Pl. 97, fig. 1). In this and in all other tripodal NASSELLARIA, the three basal rods or the "cortinar feet" are constantly so arranged that an odd or posterior rod, the "caudal foot" (_c_) is opposed to the two anterior paired rods, the "pectoral feet" (one right, _p_", and one left, _p_'). The caudal foot lies in the sagittal plane, and is prolonged upwards into the dorsal rod of the sagittal ring (_b_), and over this in a free ascending spine, the "apical horn" (_a_). The curved ventral rod of the ring (_r_) is united above with the base of the apical horn, below with the

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