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On the evolution of the Peridinina and the peculiarities of organization which approximate them to the Noctilucae

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literata, and *Eupithecia linariata*, *pimpinellata* (both the last-named doubtfully recorded as occurring in Scotland), and *hyperborata*.

Comparing the whole known Lepidopterous fauna of Norway (east and west of the Fjeld) with that of Scotland, but confining the comparison to the Macrolepidoptera, the Scottish Microlepidoptera not being yet sufficiently worked out, we get the results shown in the following Table:—

	Number of species in Norway.	Number of species in Scotland.	Species common to both countries.	Norwegian species not found in Scotland.	Scottish species not found in Norway.
Rhopalocera	92	39	31	61	8
Sphinges { Sphingidæ .. 14 } 30		14 { 6 } 25	12 { 4 } 19	2 { 8 } 11	2 { 2 } 6
{ Sesiidæ .. 12 }		5 { 5 }	3 { 3 }	1 { 1 }	2 { 2 }
{ Zygænidæ .. 4 }					
Bombyces	76	69	55	21	14
Noctuæ	210	200	139	71	61
Geometræ	188	184	133	55	51
Together	596	517	377	219	140
Heterocera alone	504	478	346	158	132

Of the 140 species occurring in Scotland and not known in Norway, 80 (or more than half) are met with in Sweden—namely, Rhopalocera 5, Sphingidæ 1, Sesiidæ 1, Zygænidæ 2, Bombyces 12, Noctuæ 37, and Geometræ 22.—*Nyt Magazin for Naturvidenskaberne*, Bind xxvii. pp. 7–13.

On the Evolution of the Peridinina and the Peculiarities of Organization which approximate them to the Noctiluçæ. By M. POUCHET.

The author brings forward some observations which, he thinks, reveal a new order of phenomena in the genesis of the Peridinians. His observations were made in the Bay of Concarneau, when the towing-net collected daily the following species:—*Ceratium furca*, Ehr.; *C. tripos*, Nitzsch; *C. tripos*, var. *megaceros*; *Dinophysis acuta*, Ehr.; ? *Protoperidium pellucidum*, Bergh; *Peridinium divergens*, Ehr.; ? *Diplopsalis lenticula*, Bergh; ? *Glenodinium cinctum*, Ehr.; ? *Gymnodinium gracile*, Bergh; ? *Prorocentrum micans*, Ehr.

The different varieties of *Ceratium furca* and *tripos* always oc-

curred, as usual, isolated, of equal size, and with no traces of any geneseic operations, until, on October 9, a single cast of the net furnished no fewer than three forms of *Ceratia*, namely *C. tripos* and its var. *megaceros* and *C. furca*, arranged in chains of two, three, and up to eight individuals joined end to end. There was a rolling sea; the boat was four or five miles off the shore; and the depth was 80–100 metres. These curious chains are probably formed at the bottom. The mode of union of the individuals is as follows:—The aboral or posterior horn (anterior of Stein) is inserted by a truncated extremity at the left-hand margin of the ventral depression of the succeeding individual, just at the point of termination of the transverse furrow. The individuals in chains were motionless, with neither flagellum nor cilia.

This arrangement, and especially the apparent anterior evolution, would seem to approximate the *Ceratina* to the Diatoms and Desmids, while other peculiarities appear to indicate a relationship between these creatures and the *Noctiluca* closer than that accepted by Stein, who places his group Scytomonadina between the latter and the Peridinina. Some large *Ceratia* allied to *C. divergens*, and about 0·160 millim. in length, show remarkable characters. The protoplasm, protected by the carapace, is slightly rose-coloured, with a large spherical nucleus and some drops of oily appearance and of a bright chamois-colour; the creature is asymmetrical, and as if twisted upon its axis; the extremity (truncated as usual) of the aboral horn appears excavated into a groove; and on the right-hand side of the ventral depression there is a strong projection in the form of a lip (Claparède and Lachmann, Stein). All these characters occur in a striking manner in the *Noctiluca*, especially at the moment of an ascent of these creatures to the surface of the sea:—flagellum (Huxley, Robin, Stein); envelope hyaline, resistant, sometimes distinctly reticulated; rosy coloration of the protoplasm, with a nucleus and oily drops of the same dimensions and the same colour; well-marked asymmetry in the basal piece of the tentacle and lip projecting on the right side (Huxley, Robin).

The analogy becomes still more manifest if, instead of spherical floating *Noctiluca*, we take the forms which have already puzzled Busch, and which are not found at the surface, but at the bottom of the vessels in which the products of fishing have been collected. In these the internal framework (formed, not by a style or bacillus, but by two kinds of glumes) produces, by its extremities, three processes or horns—two in front, pointed, and more or less recurved, and a third aboral, excavated into a groove. The size of these tricuspid *Noctiluca* (0·190 millim.) scarcely exceeds that of the large *Ceratia* from which they seem to have issued, to become subsequently swelled up by accumulation of water in lacunæ originally independent of their protoplasm. In these *Noctiluca* there is often a prominent curved projection, which seems to mark the contour of the ciliary circlet. Of the formation of the tentacle the author can say nothing, and he remarks that the suggested relationship is purely hypothetical.—*Comptes Rendus*, October 30, 1882, p. 794.