

Some remarks on the Brachiopods of the Chalk in Denmark.

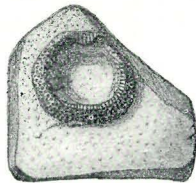
By
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With one plate.

I. Survey of the new species of Brachiopods described by the author in 1909 and 1911.

1. *Crania tubulosa*.

1909. K. BR. NIELSEN: Brachiopoderne i Danmarks
Kridtstaflejringer. P. 26, Tab. I, Fig. 12.



Crania tubulosa 2:1.
Interior of the affixed ventral valve.

THE ventral valve of this species is of frequent occurrence in the Danish white chalk, where it is always found to have been cemented by the whole surface to Echinoidea, Terebratulæ, or other organisms.

The ventral valve has a rounded, four-sided circumference. The posterior muscular impressions are oval, and only very slightly marked; the anterior muscular impression leaves, as a rule, no trace. There is therefore generally no septum at all. The shell consists almost exclusively of a highly thickened calcareous ring. The inner surface is as a rule not calcified at all, so that the underlayer is seen lying free inside the margin.

The species is easily recognisable from the fact that the highly thickened margin is formed by the fusion of parallel calcareous tubes, having a narrow entrance in the hollow of the shell and a broader opening on the outside of the margin. The calcareous mass is thus

not cavernous in section, but appears perforated like a sieve when the tubes are broken across, and longitudinally furrowed if the section cuts lengthwise through the tubes.

2. *Crania Rosenbergii*.

1909. K. BR. NIELSEN: Brachiopoderne i Danmarks Kridtallejringer. P. 27, Tab. I, Fig. 13.



Crania Rosenbergii 2:1.
Interior of the ventral valve.

The only specimen found is that referred to in 1909. Only the ventral valve is known. This is rounded, quadrilateral and has been attached by its whole surface. The margin is highly thickened, not porous, but finely granulated on the outer side. At the back the margin curves partly round the posterior muscular impressions, which are only faintly visible, slightly projecting between them. The inside of the valve is perfectly smooth. The anterior muscles have not left any impression here. There is no septum.

3. *Crania faxensis*.

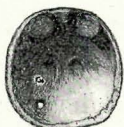
1911. K. BR. NIELSEN: Brachiopoderne i Faxe. P. 606, Tab. 12, Figs. 3—7.



Interior of the ventral valve.



Ventral view.



Interior of the dorsal valve.



Dorsal view.

Crania faxensis 6:1.

The species is only known from a certain particular Bryozoan stratum at Faxø.

The dorsal valve is rather convex and cap-shaped, the umbo lying perpendicularly over the posterior margin. The circumference forms a quadrilateral oblong with rounded corners. The posterior adductor impressions are the largest, and are kidney-shaped, with the convex side facing the medial line. The anterior adductor impressions lie somewhat in rear of the centre of the valve, almost joining in the medial line, slanting a little way out towards the rear, then turning at a sharp angle forward and outwards.

The limbus is narrow, and almost smooth, stretching a little way backwards between the two posterior muscular impressions. On the outside, the shell is furnished with from 28 to 50 faintly marked ribs, stretching out from the umbo to the margin, where they generally end, extending, however, in some cases beyond the margin whence they project as small spines.

The ventral valve is a quadrilateral oblong, with greatest breadth in the foremost part; the angles are rounded off. The valve is flat. The posterior muscular impressions are oval, fairly large, and lie far back. The anterior ones are small, oval, and lie one on either side of the point of the septum, which is very faintly marked. The triangular adjustor impression is distinctly marked, at the sides of the posterior muscular impressions. The limbus is narrow, and only indistinctly granulated, making no projection before the adjustor impression. Between the two posterior impressions, however, a broad projection is formed, most prominent at the sides, and thus obtaining a bow-shaped outline from the hinder part of the inner surface.

The inner surface is flat, frequently exhibiting digitate impressions and spear-point shaped figures in front of the low septum. On the outer side, the umbo, which is situated close to the hindmost margin, forms a small

knob-shaped projection, from which the numerous faintly marked ribs extend, numbering about 50. Here also the ribs may extend as spines beyond the margin.

4. *Terebratula cincta*.

1911. K. BR. NIELSEN: Brachiopoderne i Faxø.
P. 609, Tab. 12, Figs. 16—19.



Dorsal view.



Left side.



Ventral view.

Terebratula cincta 6:1.

In the Bryozoan and coralline limestone at Faxø, a small *Terebratula* is found, differing from others in external sculpture.

The ventral valve is strongly vaulted, oval, and slightly pointed towards the rostrum, which is only short, faintly curved, with a foramen, large in proportion to the size of the shell, at the point. No deltidium is discernible. The characteristic feature of the valve is the manner in which the growth lines appear. These are very numerous, following each other in close succession, and very prominent, giving the profile a highly serrate appearance.

The dorsal valve is flatter. The exterior sculpture is just like that of the ventral. No brachial skeleton has been observed.

Size: Length 6 mm, breadth 4 mm, thickness 3 mm.

5. *Argiope Ravnii*.

1909. K. BR. NIELSEN: Brachiopoderne i Danmarks
Kridtstøtvejring. P. 47, Tab. I, Fig. 39.



Dorsal view.



Left side.



Ventral view.

Argiope Ravnii 8:1.

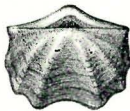
Argiope Ravnii is a very small species, easily distinguishable from other Danish *Argiopea*. It is triangular in form, with pointed rostrum, the two remaining angles being rounded. It has a distinctly marked medial furrow, broad and smooth, without secondary folds. The only other larger folds in the shell are two on either side of the medial furrow. The foramen is large and triangular in form. The hinge margin is straight, without any extension of the dorsal valve along the same, whence arises the triangular form. Within, a single median septum is found.

Size: Length $1\frac{1}{2}$ mm, breadth 1 mm.

It is found in the Danian, both in older Bryozoan strata (Kagstrup) and younger (Faxø).

6. *Argiope Posseltii*.

1909. K. BR. NIELSEN: Brachiopoderne i Danmarks Kridtfløjrer. P. 48, Tab. I, Figs. 46—48.



Dorsal view.



Left side.



Ventral view.

Argiope Posseltii 9:1.

Argiope Posseltii is a small species of *Argiope* of the usual pentagonal form. It is distinguished by a deep medial furrow in both valves without secondary folds. The ribs often project far beyond the margin of the valve, especially the two which form the boundaries of the smooth medial furrow. The number of ribs varies from 6—8.

The rostrum is curved, pointed, with comparatively large foramen. The hinge margin is straight, with wing-shaped extensions of the dorsal valve. Within, a single median septum is found.

Size: Length and breadth 2 mm, thickness 1 mm.

Found in the Danian, both in older and younger Bryozoan strata.

7. *Argiope Pindborgii*.

1911. K. BR. NIELSEN: Brachiopoderne i Faxe.
P. 612, Tab. 12, Figs. 23-26.



Dorsal view.



Left side.



Ventral view.

Argiope Pindborgii 8:1.

The species is known only from Faxe, and only from a single coralline stratum in the centre of the quarry, and a single Bryozoan stratum at its western end.

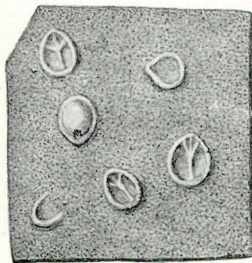
It is distinguished by its strongly vaulted shells.

The ventral valve is of rounded pentagonal form, with large rostrum, only slightly curved. There is a deep sinus, medially situated, which divides the outer side of the valve into two side lobes. These are occasionally divided by a furrow, forming thus four broad folds. The area is formed by a narrow strip on either side of the foramen, which is very large, through which the beginning of the large, medially situated septum is seen.

The dorsal valve is a rounded quadrilateral, with a deep sinus medially situated, exactly corresponding to the ventral.

8. *Thecidium Grönvallii*.

1909. K. BR. NIELSEN: Brachiopoderne i Danmarks
Kridtaflejringer. P. 51, Tab. I, Fig. 67.



Thecidium Grönvallii 4:1.

In a Bryozoan stratum in Jutland (Aggersborggaard) six small *Thecidia* have been found, on a shell of *Ostrea*. These are characterized by their being attached by practically the whole surface of the ventral valve, the margin being thus but very slightly prominent. The circumference is of a rounded triangular form. The inner side of the ventral valve is almost smooth, no brachial skeleton observed.

Size: Length 2 mm, breadth $1\frac{1}{2}$ mm.

9. *Thecidium danicum*.

1911. K. BR. NIELSEN: Brachiopoderne i Faxø.
P. 613, Tab. 12, Figs. 31—34.



Dorsal view.



Left side.



Interior of the dorsal valve.

Thecidium danicum 8:1.

The species occurs in the Bryozoan and coralline strata at Faxø, and is also known from Rejstrup.

It is a small species, generally found firmly fixed to other shells: corals, Bryozoa, or similar forms.

The ventral valve is almost pear-shaped, with the pointed end turning backwards; here the large, smooth, triangular deltidium is found. The attaching surface is of variable size, always smaller, however, than in the case of the previous species, for which reason this form is always found to rise more from the under-layer than the foregoing.

The inner side of the valve is smooth, only the margin being faintly radially striped. The outer side is smooth, with faint growth lines.

The dorsal valve is of rounded quadrilateral shape, with a fairly broad limbus, furnished with radially extending series of small knots. The septum is low, rising somewhat towards the rear, where it stands out with

a sharp margin, dividing the hollow of the valve into two parts, each containing a single calcareous leaf forming an oval. The outer side is uneven, somewhat grained, with faint growth lines, slightly domed outwards, with prominent umbo.

Size: Length $1\frac{1}{2}$ mm, breadth $1\frac{1}{2}$ mm, height 1 mm.

II. A Development Series of *Rhynchonella* in the Danian.

That *Rhynchonella incurva* Schloth and *Rh. faxensis* Posselt should be varieties of the same species appears at first sight somewhat remarkable, the two forms exhibiting considerable difference in typical development, and being easily distinguished one from another (Pl. 5, Figs. 1—4 and 17—20), but with abundance of material, especially from other localities than Faxe and Herfølge, it is possible to obtain a good impression of the transition forms, and one then finds a development series which is of considerable interest.

In the older Danian (Stevns and Kagstrup) the form is of considerable size, (Figs. 1—4), with a deep sinus, always containing a greater or lesser number of secondary folds. The rostrum is only slightly curved, and the foramen therefore distinctly visible when viewing the specimen from the dorsal side. In these strata, the variation is only slight, even fragments, especially the parts at the sinus, being easily recognisable.

It is otherwise at Faxe. Here, the species is only of frequent occurrence in the projecting central part of the quarry, where an unhardened coralline lime is found, containing very well preserved fossils. I have not succeeded in finding the species in the Bryozoa lime.

The species is here smaller in size (Figs. 5—8 and 9—12) and very variable. Some forms are found which mostly resemble those from Stevns and Kagstrup (Figs.

5—8) as well as forms in which the secondary folds of the sinus are entirely lacking, and finally, forms in which the sinus is completely obliterated, so that the anterior margin forms a straight line.

The rostrum is in all cases somewhat more curved than in the previous forms.

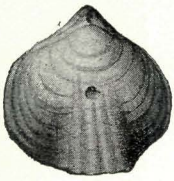
Finally, we find in the Bryozoa lime, most frequently and typically at Herfølge, where the species goes up into the *Crania stratum*, the well known large form, having as a rule, deep sinus without folds, and highly curved rostrum. This is the form which was earliest known, and which has given its name to the group. (Figs. 17—20). Its rostrum being highly curved, the foramen is not easily seen. Among the many specimens which I have seen, only one points back to the previous forms, having a faint secondary folding of the sinus (Figs. 13—16); this shows, however, distinctly that it is correct to refer both forms together to a series which has developed in the course of the Danian period.

LITTERATURE:

- K. BR. NIELSEN, 1909: Brachiopoderne i Danmarks Kridtfaejringer. Kgl. danske Vidensk. Selsk. Skr., 7 R., naturvidensk. og mathem. Afd. VI. 4, Pag. 129—178, 2 Tavler.
- K. BR. NIELSEN, 1911: Brachiopoderne i Faxø. Medd. fra Dansk geol. Forening. Bd. 3, Pag. 599—618, 1 Tavle.

Explanation to plate 5.

- Figs. 1—4. *Rhynchonella incurva*, SCHLOTH. var. *faxensis*, POSSELT. Older Bryozoan limestone, Stevns. $\frac{3}{2}$.
- Figs. 5—8. The same variety. Koralline limestone, Faxe. $\frac{2}{1}$.
- Figs. 9—16. Intermediate forms between *Rhynchonella incurva* f. *typica* and var. *faxensis*. Younger Bryozoan limestone, Herfølge. Figs. 9—12: $\frac{2}{1}$; Figs. 13—16: $\frac{1}{1}$.
- Figs. 17—20. *Rhynchonella incurva*, SCHLOTH. f. *typica*. Younger Bryozoan limestone, Herfølge. $\frac{1}{1}$.



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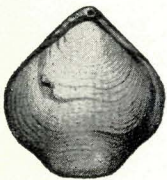
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