

**Article II.—NOTES AND OBSERVATIONS ON CARBONIFEROUS  
FOSSILS AND SEMIFOSSIL SHELLS, BROUGHT HOME  
BY MEMBERS OF THE PEARY EXPEDITION  
OF 1905–1906.**

BY R. P. WHITFIELD.

PLATES I–IV.

Near the end of May, 1907, the Museum received a small collection of limestone fossils from G. A. Wardwell of the last Peary Expedition, said to have been collected at Cape Sheridan, Latitude  $82^{\circ} 27'$  north. On close examination they proved to be of Coal Measure types and all Brachiopods, consisting of species of *Spirifer*, *Productus*, *Orthothetes* (= *Streptorhynchus* King), *Syringothyris*, and a new genus *Arctitreta*, in all five genera, no forms but Brachiopods being represented.

On working out these fossils from the rock, I find them all representatives of forms that have been recognized by previous investigators of collections brought from the same region, with the exception of the unarticulated genus *Arctitreta*, and in looking over the various works accessible to me I find none closely allied to these except the forms figured in the Journal of the Royal Dublin Society for February, 1857. In tracing these into later publications, I find in the Quarterly Journal of the Geological Society of London, Vol. XXXIV, 1878, the article by R. E. Etheridge on the Palæontology of the coast visited by the Arctic Expedition under Capt. Sir George Nares, R. N., during the years 1875 and 1876. In that work, under the section CARBONIFEROUS, Class *Brachiopoda*, at p. 608, I find descriptions of many Carboniferous forms from the region of the Feilding Peninsula, a little northwest of Cape Sheridan, that are evidently from rocks that must be a continuation of the beds near Cape Sheridan, from which these specimens were obtained, though I have been informed by Mr. Wardwell that the slab from which these were obtained was not actually attached to the ledge when he collected them.

Taking into consideration the forms of Brachiopoda which are found among those sent to the Museum by the Peary Expedition, I will institute a comparison of my own views of the several species, with those expressed by Mr. Etheridge of each of the forms present. This I do because I cannot agree precisely with Mr. Etheridge's interpretations of their relationship with European species. The species represented in our collection, taking

them collectively, I should consider as strictly Carboniferous, and eminently an expression of an American Coal Measure fauna, according to identification of the species as usually recognized in this country.

*Streptorhynchus*, Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. XXXIV, p. 635, pl. xxix, fig. 4. There is an undoubted *Streptorhynchus* (*Orthothetes*) among our Cape Sheridan specimens which I have referred to *S. crenistria* King.

*Spirifer aldrichi* Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. XXXIV, p. 634, pl. xxix, fig. 2. We have a single dorsal valve resembling the figure given as above, only that it differs in dimensions. It is mostly an internal cast, the shell having been left on the rock from which the slab came before it was collected; it measured from the center to the extremity a little more than one and one eighth inches. Therefore it must have been over two inches and a quarter in its original state, while from beak to front it but slightly exceeds an inch; the mesial fold is simple and very broad in front; the plications are about nine on each side, possibly ten. They are also simple and show but little angularity; they present no surface sculpture, the shell being entirely gone. From its general form and proportions I have associated it with the *Syringothyris* herein described, and see no reason for changing the reference, and it is mentioned in my remarks under that species as such.

*Spirifer* sp. (allied to *S. granulifera* Hall) Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. XXXIV, p. 634. (See pl. xxix, fig. 3, referred to on p. 636 *loc. cit.*)

The dorsal valve which I have referred to *Syringothyris* under my remarks on *Spirifer aldrichi* is most nearly allied in form and general features to *S. granulifera* Hall, of any of those we have from Cape Sheridan. But the figure given on pl. xxix, in Mr. Etheridge's article, is so remarkably unlike *S. granulifera* Hall as to need no comparison.

*Spirifer* sp., allied to *S. grimesi* HALL, Geol. Iowa, Vol. I, pt. 2, p. 604, t. 14, figs. 1-5. (Pl. xxv., fig. 5, Quart. Jour. Geol. Soc., Vol. XXXIV.) We have a single internal cast of a dorsal valve which probably represents the specimen he figures. It differs, however, from *S. grimesi* Hall, in not having distinct plications, only being finely striate, even more finely than the *Streptorhynchus* sp., pl. xxix, fig. 4, of his article but it presents the muscular scar of *Spirifer*, dorsal side, while the figure in the Quarterly Journal represents that of the ventral valve.

*Spirifer cristata* Schlot, var. *S. octoplicata* (Sow.) Etheridge. There is nothing in our collection that can be identified with this form nor with the species as figured in Davidson's Monograph as referred to by Mr. Etheridge. There are two or three young Spiriferoids present in the collection, but

when closely examined they prove to be either the young of *Syringothyris* or of *Spirifer cameratus*.

The species referred to under this heading I have identified with the genus *Syringothyris* Winchell. Among our specimens we have several individuals of different sizes, from three fourths of an inch to two inches in transverse diameter measured on the hinge line. It has the same lamellose or zigzag structure of the plication and a very high vertical cardinal area, a large broad deltidial foramen, simple plication and simple fold, with a deep broad sinus on the ventral side. The valves are long transversely with only about half the length from hinge to front. Our largest ventral valve is much mutilated, the surface shell being pretty much denuded, and the apex of the valve crushed, but the substance of the shell on the cardinal area is about half retained. The apex indicates the internal tube characteristic of the genus *Syringothyris*, as well as the general form of the valves.

The largest dorsal valve represents a shell about two inches broad, with a length, from beak to front, of one inch and an eighth, having had a perfectly vertical cardinal area. It shows a mesial fold, simple, rapidly widening forward, and rather highly elevated, with about eight or nine simple plications on each side. On a smaller individual where the shell is partially preserved, the plications are more angular and rugose, resembling those of *Spiriferina*.

As this Arctic species cannot possibly be the same as McCoy's *Cyrtina lamellosa* or *laminosa*, nor yet Davidson's *Spirifer laminosa*, I shall venture to designate it as ***Syringothyris arctica***, new species.

*Spirifer duplicicosta* Phill. We have no form comparable to Phillip's species, and nothing that will compare with the figures given in Davidson's Monograph referred to by Mr. Etheridge. He remarks, however, that one specimen of the lot resembles *Spirifer striatus* Martin, which he says is a closely allied form. He also refers to *S. fasciger* Kesserling, which he considers the same as the British species and those from the Feilden Isthmus, with the remark, "that one specimen resembles *S. striatus*." I shall have something further to say later in this paper on this subject.

*Spirifer* allied to *S. pennatus* (Owen) Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. 34, p. 633, pl. xxix, fig. 1. I have seen nothing among these Cape Sheridan specimens resembling this form.

Under the head of *Spirifer duplicicosta* Mr. Etheridge states that one of his specimens resembles *S. striata* Martin. We have a number of ventral valves and three dorsal valves, all more or less imperfect, which might without careful study and comparison be thought to represent *S. striata*, but when closely examined they invariably show the striæ — or rather plications, for such they really are — to be grouped more or less distinctly into fascicles, and by this one feature differ radically from all the various

forms of the *S. striata* type known in the American Lower Carboniferous or Coal Measure rocks, and intimately ally them with our American widely distributed and characteristic Coal Measure *Spirifer camaratus* Morton; in fact one of the dorsal valves, partially hidden under a group of *Productus*, is as well marked and characteristic a *Spirifer camaratus* as any specimen in our extensive Coal Measure collection. Besides these features, the species is usually laterally extended on the hinge line, while *S. duplicicosta* has generally rounded cardinal angles, a feature which distinctly separates the two forms. Still both of them, judging from Davidson's statement in his Monograph, are apt to show both varieties. And his figures given on Plate II (figures 13 and 13a), of Part V, Carboniferous Brachiopoda, referred to *S. attenuata* Sowerby, copied from the figures in Mineral Conchology, Vol. V, plate 493, quite resembles *S. camaratus* on one side.

*Spirifer lineatus* Martin. (Comp. *S. pseudolineatus* Hall, Geol. Rep. Iowa, 1858, p. 645; pl. 20, fig. 4.) Some six or eight valves of *Spirifer lineatus* of various sizes are present among these Cape Sheridan specimens, the largest among them being one and a quarter inches in transverse diameter, and a ventral valve. As most of them seem to be dorsal valves, they were at first looked upon as *Athyris*, probably *A. royssi* L. Eveille. But a single specimen had a sharper beak, and was apparently without perforation. I succeeded after considerable labor in uncovering the entire beak and in obtaining the hinge line and dentidial fissure so as to make it positively *Spirifer lineatus*.<sup>1</sup> The specimens usually show the concentric lining and some of the punctæ for the attachment of the setæ which characterize both of these species. All of these valves but one are of the usual nearly circular form, but the one exception is a dorsal valve denuded of shell and having a transverse diameter about as three to two of the length from beak to front. Another valve, a ventral, also denuded of shell, has about the normal proportions of length and breadth but had a plainly defined mesial furrow and shows the usual elongate lanceolate muscular scar.

*Productus semireticulatus* (Martin) Etheridge, Quart. Jour. Geol. Soc., Vol. XXIV, 1878, p. 629. We have a number of specimens of *Productus* that might be referred to this species were it not for many remarkable discrepancies in their characters as compared with those of that species as found both in Europe and America. In the first place the northern shell is more deeply sulcated on the ventral valve than is usual on *P. semireticulatus*. In this respect it more resembles *P. horridus* of the Permian, but this is always distinctly marked with linear ribs or lines, and does not possess the

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<sup>1</sup> The only other American species which this closely resembles is the one in the Keokuk limestone which Hall described as *S. pseudolineatus*, but which is much larger and broader, with a distinct mesial fold which this species seldom or never possesses.

cardinal spines so prevalent on that species. The Arctic shell is always narrowed or compressed on the sides of the beaks behind, while in *P. semireticulatus* the beak is broad and short with a hinge line as wide as any part of the shell, while here it is commonly contracted, and on the exterior the ventral valve is but faintly marked by the concentric lines which is so characteristic in *P. semireticulatus*. On the interior of this northern shell the disc of the inner valve is very flat and the geniculations sharp and abrupt, while the cavity of the ventral is deep and much more strongly sulcated than the exterior. Aside from all these discrepancies, when the shell is viewed in profile it is seen to be more strongly curved or geniculate than almost any other referred to that extremely variable species. If it is to be referred to it at all I would suggest it to be coupled with the term *arctica*, as *Productus semireticulatus arctica*.

*Productus mesolobus* (Phill.) Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. XXXIV, p. 620; Phil. Geol. Yorkshire, Vol. II, p. 215, t. 7. figs. 12 and 13. Not *P. mesolobus* as figured from Russia and Ural Mountains.

There is nothing in the Cape Sheridan collection corresponding with these references, nor with *P. fimbriatus*.

*Productus costatus* Sow., Min. Conch., Vol. VI, pl. 560, fig. 1;—Davidson, Monog., t. 32, fig. 2-9.

None of our specimens will match any of these references. All of the Cape Sheridan specimens have a remarkably narrowed beak, and are usually very deeply sulcated along the central line but more especially so in the interior. They are also remarkably free from spines or spine bases and have even regular lines and are nearly destitute of concentric undulations on the disc or on the beak portions.

*Productus weyprechtii*? (Toula) Etheridge, Quart. Jour. Geol. Soc. Lond., Vol. XXXIV, p. 631.

*Productus sulcatus* var. *borealis* Houghton, Jour. Royal Dublin Soc., Feb. 1857, p. 60, pl. 7, figs. 1 and 7.

I should doubt the identity of any of these Cape Sheridan species of *Productus* being equivalent to Toula's species *P. weyprechtii* as quoted by Mr. Etheridge, and should much prefer to go back to Houghton's name *P. sulcatus* var. *borealis*, or, owing to the use of the name *P. sulcatus* as a synonym of *costatus* by Mr. Davidson and others, I should prefer to call it simply *Productus borealis* Houghton.

*Productus verneuillianus* De Koninck, Recherches sur les Animal Foss., Productus and Chonetes, p. 163, pl. xviii, fig. 6.

De Koninck, in the above quoted work, gives a species of *Productus* under the above specific name. It is, however, so insignificant in size that it seems improper to refer to it as a name for a moderately sized shell.

There are, however, two specimens of *Productus* among these Cape Sheridan fossils, one of which must have been fully an inch wide on the hinge when entire and the others about three fourths of an inch, that are so nearly like the enlarged figures given by De Koninck under the above specific designation that it seems discourteous not to refer to them. The two specimens are given natural size on the plate, with the name appended as a suggestion, and future collections may or may not confirm the reference.

*Productus longispinus* Sow. var. *wabashensis*, N. & P. A single individual of the species, and of the var. *wabashensis*, is present in the collection. It so distinctly and unmistakably belongs to this species and variety that no one could mistake it. The specimen is without striæ and without spines. In size, form and shape it so exactly resembles those from the Coal Measures of the United States of America that it looked like an old friend when I first saw it, and it caused me to wonder how so small an individual had rambled so far from home, for it seems to be entirely alone, no vestige of another having been detected. This single individual is perhaps a little longer from beak to front than the normal form. The *P. verneuillianus* De Koninck, above commented on, looks much like an overgrown specimen of this species, but besides being much larger than this, it is decidedly more angular, flatter, with a broader and deeper mesial depression.

Beyond the species discussed in the above pages, there are the evidences of three distinct species of *Rhynchonelloides* that are undeterminable as to species. One of them is a finely plicated shell resembling *Camarotechia*, with highly elevated fold. The others are more like *Camarophoria*, but all so imperfect as to be beyond identification without other and more perfect material.

Among these Carboniferous forms I find one species that has puzzled me greatly, as it mimics so exactly a form characterizing earlier periods. For some time I could scarcely conceive of a form so closely resembling a Silurian genus so extremely rare as *Siphonotreta*, associated with several such eminently Coal Measure species as *Streptorhynchus crinistriata*, *Spirifer carmeratus*, *Reticularia lineata*, and a group of *Productus* so plainly characteristic of Coal Measure rocks.

For some time I delayed considering it as strictly belonging to the series, as the specimens were all imperfect, and all apparently ventral valves, which, owing to their apparent distortion, I concluded were only distorted *Streptorhynchus* with highly imperfect cardinal areas. Until near the end of my studies of the Cape Sheridan series I had wished to get a figure of the *Productus*, and it became necessary to separate it from the block of a group which had been photographed. In doing this I broke off quite a fragment and it revealed the specimen depicted by figure 1 on Plate II. This at once

showed the real nature of previously imperfect material and decided the claim to consideration as a member of the Cape Sheridan fauna.

The determination of the genus to which it can belong now is a question to be decided. It evidently belongs to Beecher's NEOTREMATA but will not fit into any of the established genera under that group, and I propose for it a new genus under the name of *Arctitreta*, with the following diagnosis.

***Arctitreta*,<sup>1</sup> new genus.**

Unarticulated Brachiopodous shells, having depressed convex valves, the pedicel valve the larger with a flattened cardinal area divided in the middle by a triangular fissure provided with a convex deltidium; apex with a minute perforation. Muscular scar large, situated in the upper apical portion of the valve, flabelliform, bilateral, shell striated, fibrous under the microscope. Dorsal valve unknown.

Type, *Arctitreta pearyi* sp. nov. Coal Measure limestone in the Arctic Region.

***Arctitreta pearyi* n. sp.**

**PLATE II, FIGS. 1-4.**

Shell of moderate size, the type specimen being just one inch in length on the dorsal valve, broadly ovate in outline, very depressed convex, the apical portion most convex and nearly flat toward the basal margin. Cardinal area moderately large, flat, divided by a narrow median fissure and generally covered by a slightly convex deltidium. Surface marked by sharp angular radiating striæ, strongly diverging toward the margins in the upper lateral portions. Interior surface of shell strongly striato-pustulose, more strongly so around the flabellate muscular scar.

*Geological position and Locality.*—In Carboniferous limestones bearing Coal Measure fossils, at Cape Sheridan, Grant Land, N. Am., latitude 82° 27' north. Collected by Engineer J. A. Wardwell of the S. S. 'Roosevelt,' 1906.

In addition to the Carboniferous fossils, members of the Expedition brought a number of *Astarte borealis* and *Saxicava rugosa* obtained from several different stations, extending from Wrangle Bay and Lincoln Bay up to Cape Sheridan, and from raised beaches and banks ranging from twenty to one hundred and fifty feet above sea level and from near river banks to a distance of two miles inland. Some of the shells seem much like living or very recently dead shells, while others show considerable decay. The *Saxicava* are not more decayed looking than many of the Quarternary specimens, found at localities in Maine, on Lake Champlain, or near Quebec, Canada. The *Astarte* look very much like recently dead shells picked up on our own sea beaches. The *Astarte* is much larger than any of the many fossil species in our Miocene and later Tertiaries and as we had no speci-

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<sup>1</sup> *Arctos*, northern, and *tretos*, perforated.

mens of *Astarte borealis*, I sent a few valves to Dr. W. H. Dall at Washington who informed me they were *A. borealis* Schum.

It would seem probable, from the different elevations above sea level at which these various lots occur, that there has been considerable movement taking place in the elevation of the land within these regions within a comparatively short time, judging by the condition of the preservation of the shells. The specimens are listed at follows:

Lot No. 80. Wrangle Bay, June 8, 1906. *Astarte borealis*. Badly decayed. Found two hundred yards inland, at about twenty feet elevation.

Lot No. 81. Cape Sheridan, Lat.  $82^{\circ} 27'$ , June 28, 1906. Mostly *Saxicava rugosa*. Found one mile inland, and at seventy feet elevation above sea level. Picked up on the shore of a lake. These shells are mostly in fair condition and would hardly be considered as in semifossil condition. A few of them show weathering and decay.

Lot No. 82. Found  $1\frac{1}{2}$  miles inland, and at 150 feet elevation, Lat.  $80^{\circ} 30'$ . *Astarte borealis*, some of which show decay and others preserve considerable epidermis. Some shells in this lot are of heavier build with higher beaks, resembling in aspect *Astarte lens* Stims. from the Quarternary beds at Woodfords Corners, Deering, Maine, presented to the museum by Dr. A. Parsons of Portland, Me.

Lot. No. 83. Shells dug from side of river bank, eight feet from (below?) the surface and twenty feet above sea level, by G. A. Wardwell. Cape Sheridan, Lat.  $82^{\circ} 27'$ , May 28, 1906. *Astarte borealis*. Most of the valves preserve more or less of the epidermis.

Lot No. 84. Lat.  $83^{\circ}$ , June 9, 1906. *Astarte borealis* and *Saxicava rugosa*, found  $\frac{3}{4}$  mile inland, at 35 feet elevation, 25 feet above the river bed, by G. A. Wardwell. Rather poorly preserved.

Lot No. 85. Principally *Saxicava rugosa*. Found  $\frac{3}{4}$  of a mile inland and at 60 feet elevation. Lat.  $82^{\circ} 27'$ .

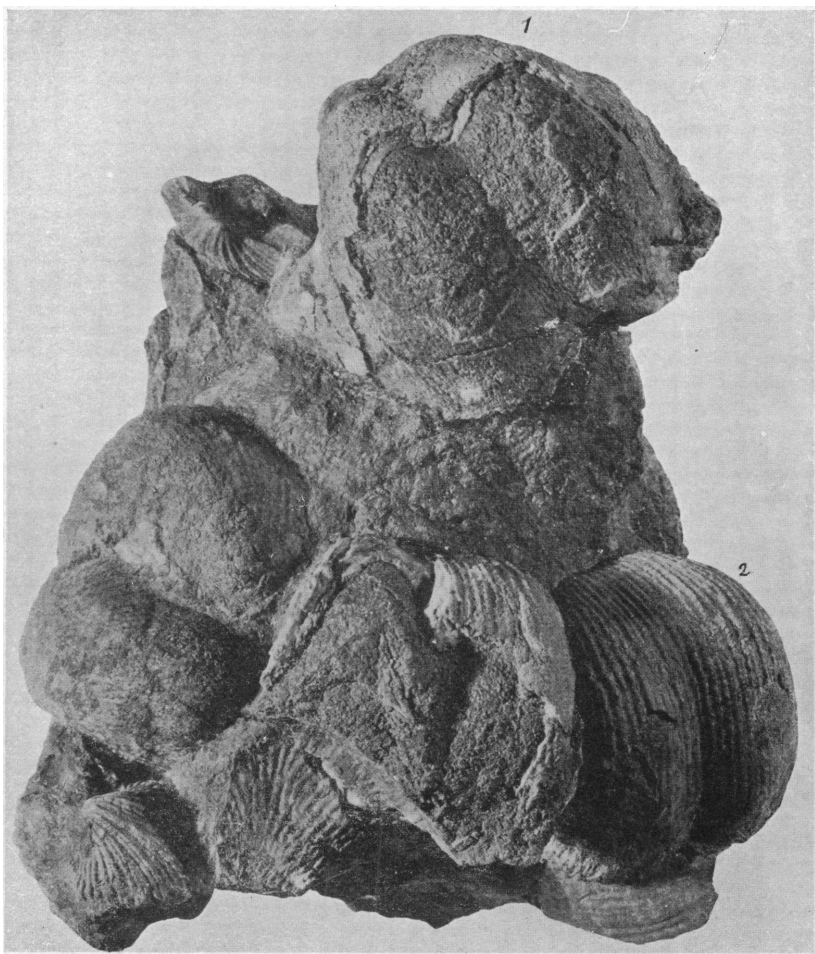
Lot. No. 86. Lincoln Bay, Sept. 1, 1905, collected by Charles Percy, Sr. Two miles inland, at 100 feet elevation, Lat.  $82^{\circ} 16'$ . *Astarte borealis*, some of very large size and smooth, a few with epidermis well preserved. Some of them have the smooth silky black epidermis so perfectly preserved, that it would seem they could not have been out of the water any great length of time. A number of them are of exceedingly large size, and many are badly decayed.





#### EXPLANATION OF PLATE I.

The figure on this Plate is from a photograph of a group of the Cape Sheridan fossils that has been cleared out from the limestone to show more clearly the different species associated in the limestone. The group was afterward dismembered in order to reveal more clearly some of the specimens. This group is given principally to show the specimen (fig. 1) of *Productus borealis* Houghton, which is equivalent to *P. weyprechtii* (Toula) Etheridge, or *P. sulcatus* Sowerby.



ARCTIC FOSSILS.





## EXPLANATION OF PLATE II.

### *ARCTITRETA PEARYI* Whitfield.

Fig. 1. View, nat. size, of the best ventral valve, retaining the shell on the upper part of the valve.

Fig. 2. Enlargement to two diameters of an imperfect ventral valve, showing the short ridged stria. The beak has been slightly clipped.

Fig. 3. Enlargement (2 $\times$ ) of the cardinal area and deltidium of another specimen.

Fig. 4. Enlargement (3 $\times$ ) of the cardinal area of the specimen, figure 2.

### *PRODUCTUS WABASHENSIS*.

Fig. 5. View, nat. size, of the specimen which I have referred to this species, but which might properly be referred to as a young example of the following.

### *PRODUCTUS VERNEUILIANUS*.

Figs. 6 and 7. Views, nat. size, of two valves referred to this species.

### *PRODUCTUS SEMIRETICULATUS ARCTICUS*.

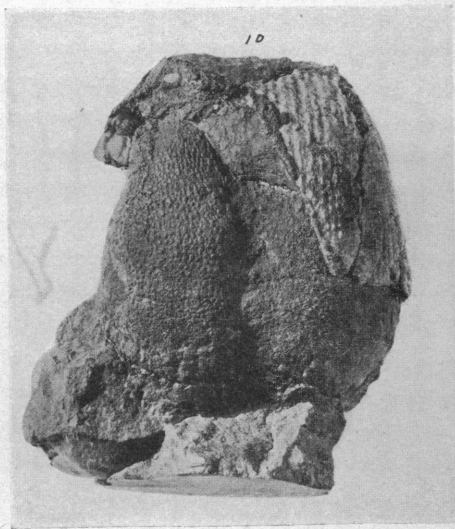
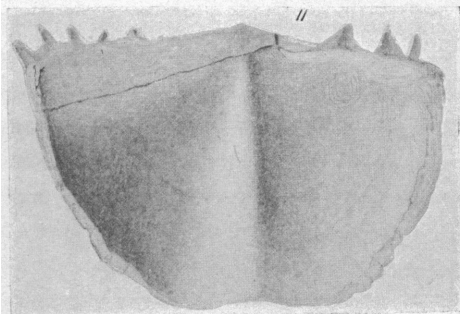
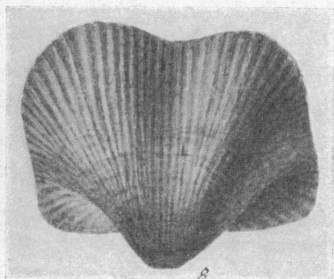
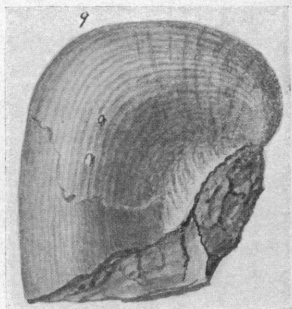
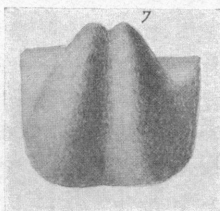
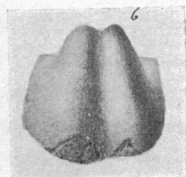
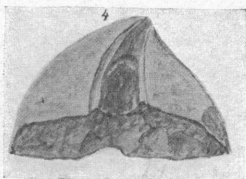
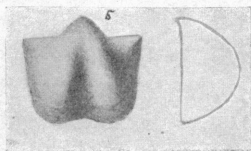
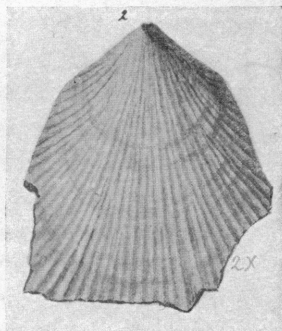
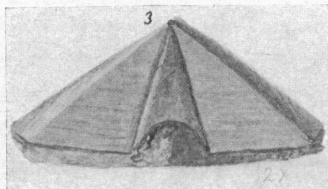
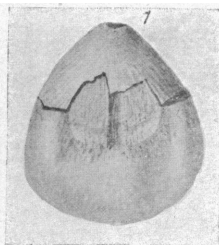
Fig. 8. View, nat. size, of the top of the shell seen at fig. 2, on the group given on Plate I. The beak is towards the observer to show its narrow elongated form in contrast to the short broad beak of *P. wabashensis*, usually seen.

Fig. 9. Side view of the same specimen taken over from the group.

Fig. 10. Photographic view of another specimen to show the pustulate structure of the inside of the ventral valve and the great thickness of shell filling the mesial depression in the casts.

### *PRODUCTUS BORRILIS* Houghton.

Fig. 11. View, nat. size, of a dorsal valve referred to this species showing remains of spines along the hinge, allying it to *Productus borralis*.









### EXPLANATION OF PLATE III

#### SPIRIFER (MARTINIA) LINEATA Martin.

Fig. 1. An imperfect dorsal valve, nat. size, mostly denuded of the shell.

Fig. 2. View of a ventral valve, retaining the shell in most parts. Nat. size.

#### SPIRIFER CAMERATUS Manton.

Fig. 3. View of a dorsal valve, nat. size, which underlies the imperfect *Productus* on the lower middle portion of the group figured on Plate I, but which cannot be seen in that figure.

Fig. 4. View of an imperfect ventral valve of this same species showing the usual fasciculate disposition of the stria which distinguish it from *Spirifer striatus* Sowerby.

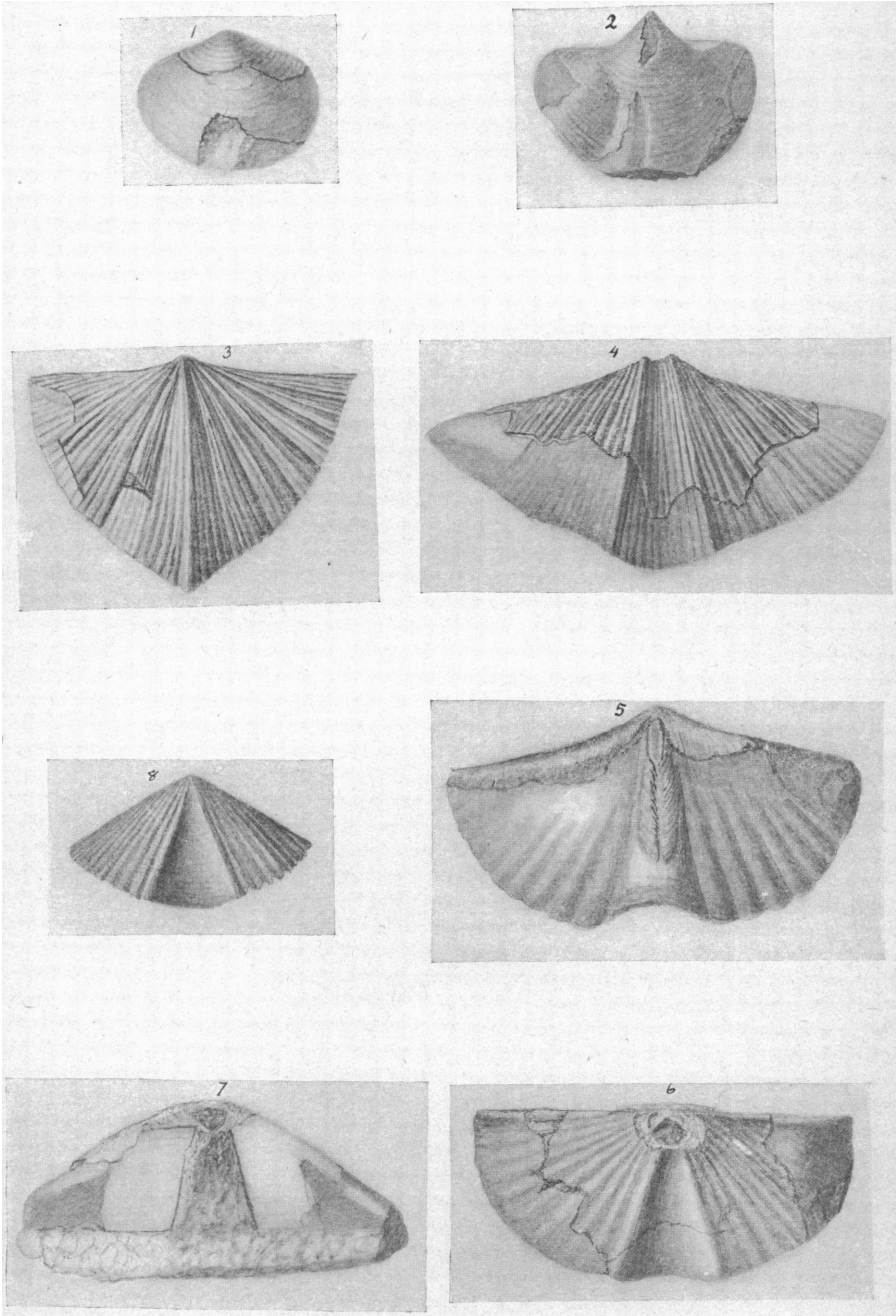
#### STRICKOSTRIPS AETHIOA.

Fig. 5. View of a dorsal valve referred to this species, which is denuded of shell except along the hinge line.

Fig. 6. A ventral valve with a little of the calcareous shell retained, but the beak is broken away.

Fig. 7. View of the cardinal area of the same valve, nat. size.

Fig. 8. A young ventral valve preserving the shell, which shows the zigzagging cross-lines described by Etheridge as a feature of *smaller* and





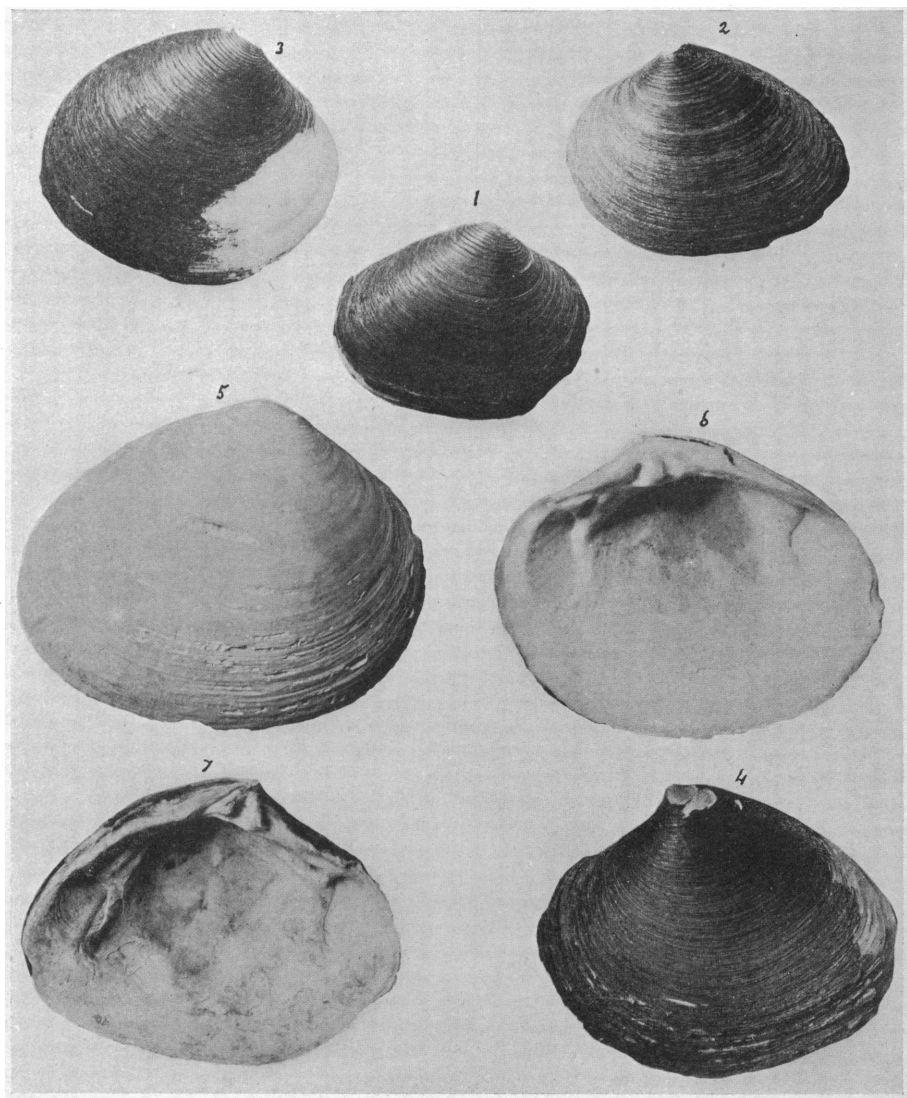
## EXPLANATION OF PLATE IV

### ASTARTE BOREALIS Schum.

The specimens illustrated on this Plate were collected near Cape Sheridan, Grant Land, N. Am., at Lat.  $82^{\circ} 16'$ , by Charles Percy, Esq., of the Peary Expedition, Sept. 1, 1905; at a point two miles inland and at an elevation of about 100 feet above sea level. This must have been on a raised beach, consequently they are in a *semifossil* condition. Some of them, however, retain the black silky epidermis and are all in a quite perfect condition of preservation.

They all differ considerably in form and features from any of the figures of *A. borealis* Schum. that I have been able to see; and differ enough from most figures to be classed as a distinct species. It, however, has already received so many distinct specific designations, that it is not worth while to add to their number.





SEMIFOSSIL SHELLS.

