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## A Comparison of *Cyclopecten nanus* Verrill and Bush and *Placopecten magellanicus* (Gmelin)

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Recently during a study of shell characteristics of the young of the sea scallop *Placopecten magellanicus* (Gmelin) the author had occasion to check closely the existing literature in search of similar work on this species done by others. The only detailed description found of the young of this species was that of Jackson (1890) in his memoir *Phylogeny of the Pelecypoda*.

The description and figures offered by Jackson for young *P. magellanicus* of 2 to 6 mm. differed radically from similar sized specimens in our collection. The material examined for this study included a large series of specimens ranging in size from 0.3 mm. to 180 mm. in which it was easy to follow the progressive changes in shell development from the early post-larval to the adult form. Since we were sure of our identification it was desirable to procure the original specimens used by Jackson in order to determine their identity. According to Jackson his original specimens were entered in the Smithsonian Institution Catalogue as number 62307.

We were unable to locate lot number 62307 at the United States National Museum but later found part of the original lot in the Mollusk Department at the Museum of Comparative Zoology. Several labels informed us that the specimens had passed from the Robert T. Jackson collection to the collection of the Boston Society of Natural History and from there to the

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M.C.Z. collection. Jackson's collection label reads "dredged by the *Albatross*, Station 2612, off Cape Hatteras in 52 fathoms. U.S. Nat. Mus. No. 62307. Gift of W. H. Dall."

As we suspected, they proved to be another species; indeed, at the time of Jackson's memoir the species had not yet been named.

Verrill (1897) described and figured the species in his study of the Pectinidae, giving it the name *Cyclopecten nanus*. A year later in another publication Verrill and Bush (1898) remarked that *C. nanus* resembled the young of *P. clintonius* [= *P. magellanicus*] more than any other native species but thought a detailed comparison unnecessary because of the marked differences in the two species. However, Verrill, an authority on this group, failed to recognize Jackson's error even though he had occasion to refer often to the memoir in his monograph of the Pectinidae.

There is evidence that past workers have had difficulty in identifying the young of *P. magellanicus*. This will be brought out subsequently in a discussion of the synonymy.

The purpose of this paper is twofold. First, to compare the young and adult shell of the sea scallop as this is essential for species identification. Second, to give more adequate descriptions and figures of the two species in question in order to make clear their major differences. Since specimens of *C. nanus* average about 5 mm. in height, young sea scallops of this size range will be used for comparison.

The value of Jackson's memoir is not lessened by the misidentification, the specific name being of little importance in this case. His careful descriptions and illustrations added materially to our understanding of the complexities found within the Aviculidae and their allies.

#### ACKNOWLEDGMENTS

We wish to express appreciation to Dr. Harald A. Rehder, Curator of Mollusks at the Smithsonian Institution, for the loan of *C. nanus*, including the type; to Mr. Richard Foster, associate at the Mollusk Department in the Museum of Comparative Zoology at Harvard University, for his aid in helping identify *C. nanus*; and to Dr. William J. Clench, Curator of Mollusks and Dr. Ruth D. Turner, Research Associate, for the

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### Genus **Placopecten** Verrill

*Placopecten* Verrill 1897, Trans. Connecticut Acad., **10**, p. 69.

Type species, *Pecten clintonius* (Say) [= *Placopecten magellanicus* (Gmelin)], by original designation.

Shell large, rounded, compressed, and with sharp, rather thin edges. The valves meet ventrally and gape dorsally near the hinge-line. Valves subequal, the right flatter, smoother and paler. Radial and concentric sculpture present on both valves but more pronounced in the left (upper). Wings small in adult, nearly symmetrical and sculptured. Byssal notch small in adult; pectinidial teeth lacking in adult, present in young. Inner surface smooth except for a crystalline structure within the pallial line. Hinge-line with a single ligamental groove along the wings separated by a prominent internal resilium.

### **Placopecten magellanicus** (Gmelin)

Pl. 35, figs. 1, 2; Pl. 36, figs 1, 2; Pl. 38, fig. 2; Pl. 39, fig. 2

*Ostrea grandis* Solander 1776, Portland Cat., p. 50, p. 99 [nomen nudum].

*Ostrea magellanica* Gmelin 1791, Syst. Nat., Ed. 13, **6**, p. 3317.

*Pecten magellanicus* (Gmelin). Lamarck 1819, Anim. s. Vertèbres, **6**, p. 165. ed. Deshayes, **7**, p. 134, 1834.

*Pecten tenuicostatus* Mighels and Adams 1841, Proc. Boston Soc. Nat. Hist., **1**, p. 49.

*Pecten fuscus* Linsley 1845, American Journ. Sci., (1) **48**, p. 278 [nomen nudum]; "Linsley" Gould 1848, American Journ. Sci., (2) **6**, p. 235, fig. 6 [non Linsley].

*Pecten brunneus* Stimpson 1851, Shells of New England, p. 58, in errata. [New name for *P. fuscus* Gould, non Linsley.]

*Pecten tenuicostatus solidus* Verkrüzen 1881, Jahr. Deut. Malak. Gesell., **8**, p. 97.

*Pecten clintonius* "Say" Verrill 1884, Trans. Connecticut Acad. Sci., **6**, (1), p. 261. [non Say.]

*Pecten tenuicostatus aratus* Verrill 1884, *op. cit.*, p. 262.

*Pecten clintonius tenuicostatus* Verrill 1884, *op. cit.*, p. 262.

*Pecten pleuronectes* Jacobs 1885, Proc. Newport Nat. Hist. Soc., 1884-5, Doc. 3, p. 71. [nomen nudum.]

*Pecten (Pseudamusium) striatus* "Müller" Dall 1889, Bull. U.S. Nat. Mus., No. 37, p. 34. [non Müller.]

*Pecten (Pseudamusium) mülleri* "Dall" Verrill 1897, Trans. Connecticut Acad. Sci., **10**, p. 78. [non Dall.] [Corrected in addenda and errata, p. 96, *op. cit.* as follows: "Page 78, line 22. For *mulleri* read *striatus*."] ]

*Description.* Shell resting on right valve, large, 125 to 200 mm. in size (about 5 to 8 in.), subcircular, compressed (Pl. 35, figs. 1, 2). Valves subequal, slightly convex, the right somewhat flatter in form, smoother in sculpture and paler in color. Shell valves moderately thin, lips simple. The valves gaping near the dorsal hinge-line but meeting along the ventral margin with the left (upper) valve slightly overlapping. Radial sculpture apparent in both valves in the form of raised ribs which are more pronounced in the left valve and sometimes imbricated. Concentric sculpture consisting of inconspicuous lamellae or growth lines which at intervals are more prominent due to occasional marginal growth stoppage with subsequent thickening of the shell in that area. Color of left valve usually various shades of reddish brown, rarely shades of yellow or lavender; of right valve pale cream to white. Hinge-line simple, straight, edentulous, provided internally with a thin hinge ligament overlying a narrow groove which is separated by a triangular resilium centrally located between the beaks of the valves. Wings of the left valve small and nearly equal, of the right valve asymmetrical due to a small shallow sinuation at the base of the anterior wing which forms the byssal notch. The dorso-lateral slope above the notch ridged, pectinidial teeth obsolete in the adult. Inner surface lustrous and smooth unless roughened by secretions laid down in repairing damage caused by boring organisms. Adductor muscle and pallial scars quite distinct; in some specimens the suspensory gill muscle scars also clearly seen. Area within adductor muscle scar has a pearly luster; area outside the muscle scar, but within the boundary of the pallial line, is of a crystalline structure. Adductor muscle scar almost centrally located, just slightly nearer the dorsal and posterior border; the scar in the left valve much larger.

The young scallop at a size of about 5 mm. has some features

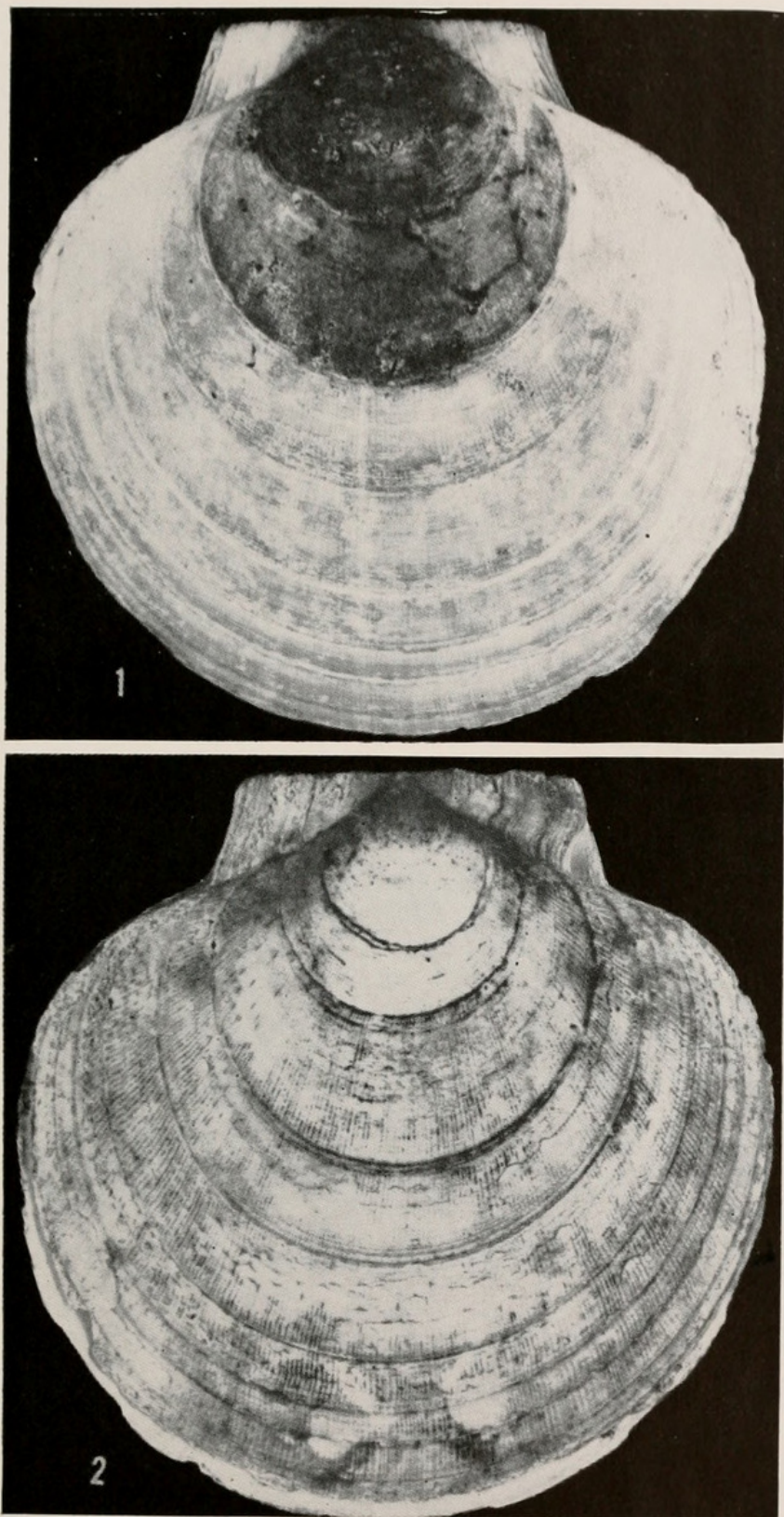


Plate 35

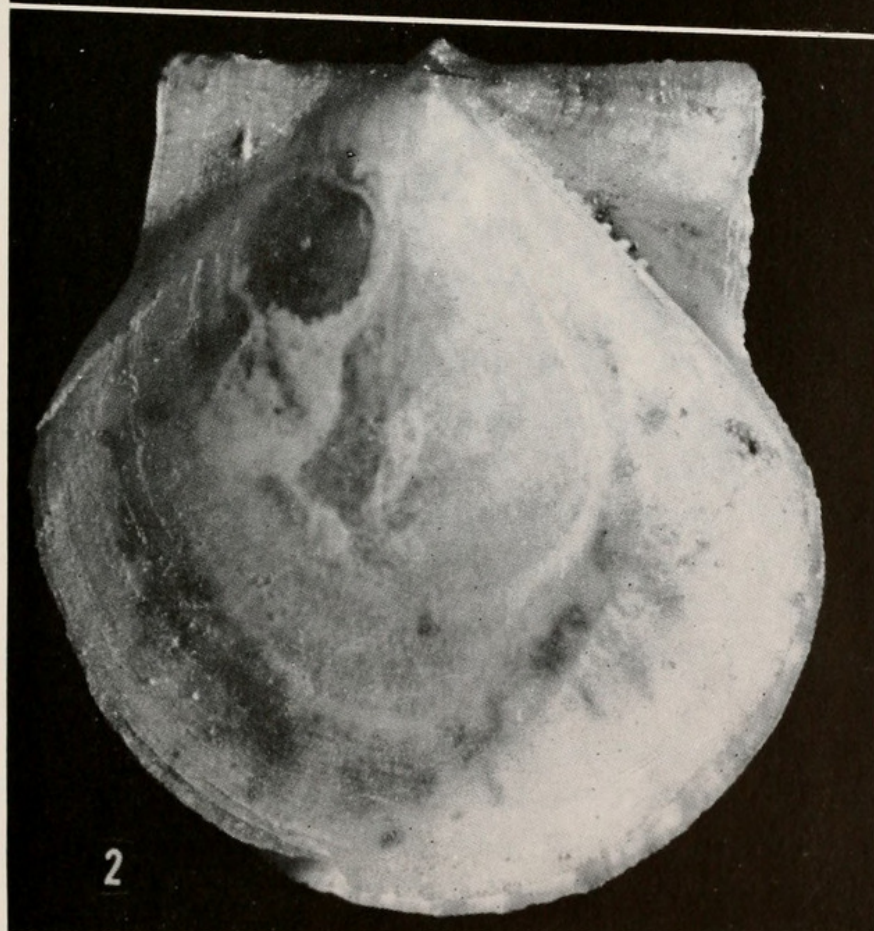
Fig. 1. *Placopecten magellanicus* (Gmelin). Exterior of left (upper) valve of a mature specimen. (0.5 $\times$ )

Fig. 2. The same. Exterior of right valve of a mature specimen. (0.5 $\times$ )

## Plate 36

Fig. 1. *Placopecten magellanicus* (Gmelin). Exterior of left valve of a young specimen. (14×)

Fig. 2. The same. Exterior of right valve of a young specimen. (14×)



which are quite dissimilar from those of the adult (Pl. 36, figs. 1, 2). The valves are subcircular, higher than long, the right somewhat flatter. Both valves thin, the right especially so. Lips fragile, meeting at the ventral margin, the upper or left valve slightly overlapping. The gaping of the valves below the wing less noticeable than in the adult. Umbo of left valve prominent, overlapping the hinge-line. Sculpture of left valve more pronounced. Radial sculpture present in left valve as fine vermiculated lines within strong ribs; radial sculpture lacking in right valve at this size. Concentric sculpture strong in left valve, but very fine and delicate in right. Shape of hinge and resilium similar to the adult except that the hinge-line is proportionately wider. Wings large, fairly well developed, the anterior ones well sculptured. Wings nearly equal except that the anterior wing of the right valve is sharply keeled in forming the byssal notch and is separated from the body of the shell by a narrow groove. Pectinidial teeth present along a raised ridge, there being 15 in the 5.7 mm. scallop in figs. 1, 2, Pl. 36; teeth sometimes lacking or few in number. Inner surface smooth, the muscle scar distinct, the pallial line somewhat less so but with crystalline structure present within its confines. Muscle scar well off center, more so in the right valve (Pl. 38, fig. 2). Right valve much thinner and more translucent than left so that the muscle and pallial scars show through. A layer of prismatic structure can be defined in the thin right valve. The prisms are irregular in shape and are laid down in an uneven concentric pattern (Pl. 39, fig. 2). The prismatic layer cannot be seen in sizes much larger than 5 mm. and is more apparent in smaller specimens.

| height  | length  | location                                            |
|---------|---------|-----------------------------------------------------|
| 5.7 mm. | 5.0 mm. | Nantucket Shoals (N. Lat. 40°33'; W. Long. 69°28')  |
| 60.2    | 59.3    | East Georges Bank (N. Lat. 41°23'; W. Long. 66°25') |
| 102.1   | 102.1   | East Georges Bank (N. Lat. 41°23'; W. Long. 66°25') |
| 130.2   | 132.7   | East Georges Bank (N. Lat. 41°23'; W. Long. 66°25') |
| 178.0   | 188.0   | Cape Cod Bay, near Brewster, Massachusetts          |

*Types.* The location of the type specimen of *Ostrea magellanica* Gmelin is unknown. Gmelin referred to Chemnitz, Conch. Cab. 7, Pl. 62, fig. 597 and this is here selected as the type figure. The locality, Straits of Magellan, given by Gmelin, was in error. The type locality is here designated as Georges Bank,

off Massachusetts where over 80% of the total commercial catch is obtained.

*Remarks.* *Placopecten magellanicus* (Gmelin) is a very common scallop as well as the largest found in the waters of the Northwest Atlantic. The largest specimen ever recorded, as indicated by the literature, measured 230 mm. in length, 208 mm. in height (Norton 1931).

This species is dredged commercially in depths ranging from 10 to 60 fathoms. Verrill and Smith (1874) recorded them from Passamaquoddy Bay and Bay of Fundy in depths as shallow as 1 fathom. Bush (1893) recorded fragments from depths of 7 to 813 fathoms but not living in depths less than 9 nor more than 146 fathoms. Our records extend the bathymetric range to 210 fathoms.

The adult is easily recognized for there are no closely related species in its range. However, the young differs sufficiently from the adult to be easily confused with several small species of *Pecten*. Comparison of the adult sea scallop and the young at a size of about 5 mm. shows the following major differences. The adult scallop shell is moderately thick and heavy, the young scallop thin and fragile. The shape changes with age: the height is greater than the length in small scallops, the shell is almost circular at about 100 mm., but in larger sizes has a correspondingly greater length than width. The adult shows more pronounced sculpture than the juvenile. The fine radial lines present in the upper valve of the young are lost in the adult, leaving only distinct ribs; conversely the fine radial lines in the lower valve of the adult have not yet formed in the very young. The wings in the young are much larger proportionally but less strongly sculptured. The anterior of the right valve is strongly keeled, and so more sharply defines the byssal notch. Pectinidial teeth are usually found in the young but are not formed after the shell reaches about 25 mm. The muscle scar of the adult is more centrally located than that of the young, especially on the right valve.

Much of the synonymy of *Placopecten magellanicus* can be attributed to the fact that the young of the sea scallop was not recognized as such. For example: Mighels, in Mighels and Adams (1841), described *Pecten tenuicostatus*, four specimens of which had been taken from the stomach of haddock in Casco

Bay, Maine. Later, in Mighels and Adams (1842) he stated, "this is unquestionably a very rare species. It does not appear to be very nearly allied to any of the other species found on our coast. Further research will be necessary to determine whether or not the specimens already found are mature." In 1843, Mighels cleared up the question of maturity when he wrote as follows: "*P. tenuicostatus*, Nob., I am now fully convinced is nothing more than the very young of *P. magellanicus*. Capt. W. found them at all ages at Nashe's Island, with which I have been enabled to form a series, from the size of a dime to that of 6 or 7 inches in width and from which it is plainly to be seen that they gradually and almost imperceptibly merge into each other." Thus Mighels neatly synonymizes his *P. tenuicostatus*. Unfortunately, too many later workers either failed to notice this work or refused to recognize earlier names and so the name *P. tenuicostatus* appears in many important papers.

Other synonyms appearing in the literature directly or indirectly as a result of the misidentification of young sea scallops include *Pecten fuscus* Linsley (1845), a nude name subsequently described and figured by Gould (1848), *Pecten brunneus* Stimpson (1851), *Pecten (Pseudamusium) striatus* Müller by Dall (1889), and *Pecten (Pseudamusium) mülleri* Verrill (1897).

There have been occasions over the years when controversies have arisen regarding the question of the name for the sea scallop (see Verrill 1897, Dall 1898). There is no need to review once again the pros and cons of name preference. However, during a review of practically all major references pertaining to the sea scallop, a record was kept of the specific name preferred by the various authors in their publications. The results are listed below.

| Specific name               | Number of publications |
|-----------------------------|------------------------|
| <i>magellanicus</i>         | 106                    |
| <i>tenuicostatus</i>        | 53                     |
| <i>grandis</i>              | 28                     |
| <i>clintonius</i>           | 17                     |
| <i>fuscus</i>               | 10                     |
| <i>brunneus</i>             | 2                      |
| <i>striatus</i>             | 1                      |
| <i>mülleri</i>              | 1                      |
| Total publications examined | 218                    |

It is clear that *P. magellanicus* is by far the most commonly accepted name.

The synonymy of *P. magellanicus* can be extended to include certain fossil synonyms by those who believe the modern and fossil form to be one and the same. Dall (1898) was able to separate the species on the basis of a careful study of a large series of recent and fossil forms. Since the separation of the fossil and recent species is so well documented, the fossil synonymy has not been included in this paper.

*Range.* From the northern shore of the Gulf of St. Lawrence to Cape Hatteras. Sea scallop beds of sufficient extent and density to support a fishery occur from Port au Port Bay, Newfoundland (N. Lat.  $48^{\circ}30'$ ) to the Virginia Capes (N. Lat.  $36^{\circ}50'$ ) (Posgay 1957).

*Specimens examined.* The specimens from the stations listed below are among those received at the Fish and Wildlife Laboratory at Woods Hole, Massachusetts for study and analysis. The lots from Canada were collected by biologists of the Fisheries Research Board of Canada and kindly placed at our disposal. All other lots were taken during 1958 and early 1959 by Bureau of Commercial Fisheries personnel as part of a bottom sampling program. A set of the material examined from each station has been deposited at the Museum of Comparative Zoology. The vessels *Sandy Point*, *Charlotte*, *Whaling City*, *Dartmouth*, and *Jacquelyn* referred to below are equipped to fish scallops and with the exception of the *Charlotte* have been under government charter at various times to aid in special research studies.

*Western Atlantic:* NEWFOUNDLAND: *Sandy Point*, W. of Current Island (N. Lat.  $51^{\circ}10'$ ; W. Long.  $56^{\circ}50'$ ) in 20 fathoms. NOVA SCOTIA: Buoy Ground, Bay of Fundy, Digby (N. Lat.  $44^{\circ}45'$ ; W. Long.  $65^{\circ}47'$ ). MAINE: W. of Dix Island (N. Lat.  $44^{\circ}01'$ ; W. Long.  $69^{\circ}05'$ ) in 40 fathoms. MASSACHUSETTS: *Charlotte*, Cape Cod Bay (N. Lat.  $41^{\circ}50'$ ; W. Long.  $70^{\circ}24'$ ) in 12 fathoms; *Whaling City*, northern edge of Georges Bank (N. Lat.  $42^{\circ}05'$ ; W. Long.  $66^{\circ}50'$ ) in 35 fathoms; *Albatross III*, 10 miles W. of Corsair Canyon, eastern Georges Bank (N. Lat.  $41^{\circ}23'$ ; W. Long.  $66^{\circ}25'$ ) in 51 fathoms; *Dartmouth*, east side

of Great South Channel, 30 miles E. of #10 buoy (N. Lat.  $41^{\circ}06'$ ; W. Long.  $68^{\circ}45'$ ) in 30 fathoms. RHODE ISLAND: *Jacquelyn*, 10 miles S.E. of Block Island (N. Lat.  $41^{\circ}05'$ ; W. Long.  $71^{\circ}22'$ ) in 30 fathoms; *Albatross III*, 5 miles N.W. of Atlantis Canyon (N. Lat.  $40^{\circ}00'$ ; W. Long.  $70^{\circ}18'$ ) in 210 fathoms. NEW JERSEY: *Albatross III*, 42 miles N.E. of Barnegat Light (N. Lat.  $39^{\circ}53'$ ; W. Long.  $73^{\circ}15'$ ) in 30 fathoms; *Albatross III*, 50 miles E. of Cape May (N. Lat.  $38^{\circ}31'$ ; W. Long.  $73^{\circ}52'$ ) in 32 fathoms. VIRGINIA: *Albatross III*, 60 miles E.S.E. of Cape Henry (N. Lat.  $36^{\circ}45'$ ; W. Long.  $74^{\circ}44'$ ) in 42 fathoms. NORTH CAROLINA: *Albatross III*, 45 miles N.E. of Cape Hatteras (N. Lat.  $35^{\circ}46'$ ; W. Long.  $74^{\circ}51'$ ) in 80 fathoms; *Albatross III*, 40 miles N.E. of Cape Hatteras (N. Lat.  $35^{\circ}48'$ ; W. Long.  $74^{\circ}53'$ ) in 45 fathoms (all USFWS).

### Genus *Cyclopecten* Verrill

*Cyclopecten* Verrill 1897, Trans. Connecticut Acad., **10**, p. 70.

Type species, *Pecten pustulosus* Verrill, by subsequent designation, Suter, Manual of New Zealand Mollusca, 1913, p. 880.

Shell thin, rounded, with simple margins and prominent wings. In the typical species the right valve has regularly spaced concentric lamellae which allow the shell to be highly flexible at the margins. The upper valve usually radially sculptured, with rows of arched lines which may be pustulated, cancellated or scaled. Umbos fairly prominent and projecting beyond the wide hinge-line. Wings well developed, angular, subequal. Byssal notch strong, pectinidial teeth absent or few.

### *Cyclopecten nanus* Verrill and Bush

Pl. 37, figs. 1, 2; Pl. 38, fig. 1; Pl. 39, fig. 1

*Pecten magellanicus* "Gmelin" Jackson 1890, Mem. Boston Soc. Nat. Hist., **4**, p. 347. [non Gmelin.] [Description and figures of young only.]

*Cyclopecten nanus* Verrill and Bush [in] Verrill 1897, Trans. Connecticut Acad. **10**, p. 85 [*C. parus* on p. 93, in error].

*Description.* Shell small, 5 to 7 mm. in size (about  $\frac{1}{4}$  inch.), subcircular, the length somewhat greater than the height (Pl. 37, figs. 1, 2). Valve subequal, the left (upper) valve the more inflated. Valves thin, meeting at margins, lips simple, the right valve particularly fragile where it approaches the ventral mar-

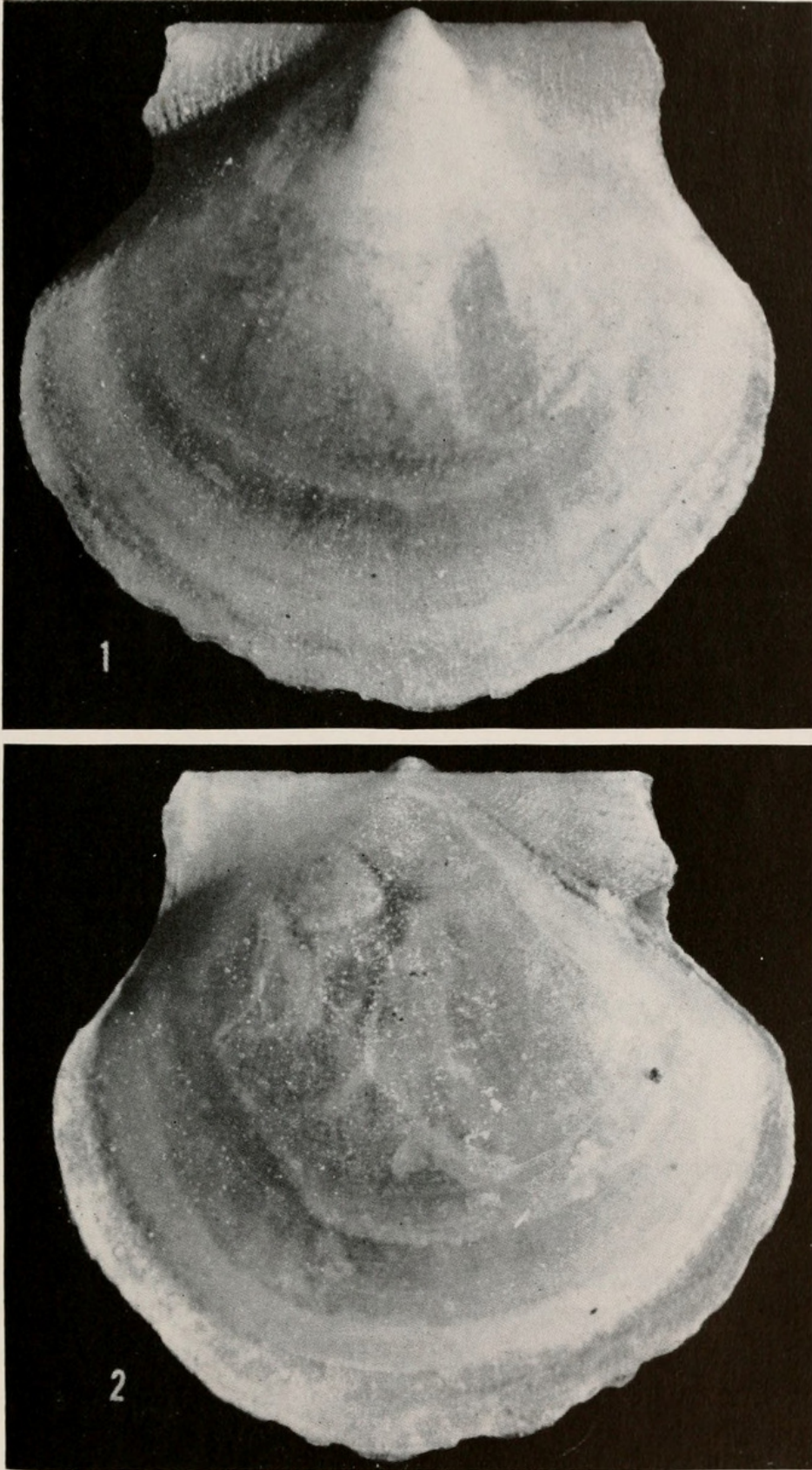


Plate 37

Fig. 1. *Cyclopecten nanus* Verrill and Bush. Exterior of left valve. Lectotype. (15 $\times$ )

Fig. 2. The same. Exterior of right valve. Lectotype. (15 $\times$ )

gin. Color grayish white, sometimes mottled. Sculpture fine and delicate, the upper valve covered with fine radiating lines which are lacking in the bottom valve. Umbonal area cancellated as a result of the sharp concentric ridges which are crossed by the radiating lines. Right valve surface nearly smooth except for very fine regularly spaced concentric lamellae. Hinge margin wide, straight. Internal ligament small, semi-rounded, centrally located well up in the umbo. Internal hinge-plate broad and crossed by numerous transverse lines. Wings strong, large, nearly equal in the left valve, unequal in right because of the formation of a byssal notch at the base of the anterior wing. Byssal notch acute and angular, its margin lacking pectinidial teeth. Anterior wings of both valves with strong, ribbed structure. Inner surface smooth, glossy, and translucent. Muscle scar distinct and visible through the shell. Pallial scar very indistinct or not visible. Edge semi-flattened on bottom valve. Thin layer of prismatic structure easily visible in right valve in specimens of all sizes. Prisms rectangular in shape and laid down in a regular concentric pattern (Pl. 39, fig. 1).

| height  | length  | location                          |
|---------|---------|-----------------------------------|
| 3.7 mm. | 4.1 mm. | Off Cape Hatteras, North Carolina |
| 4.7     | 4.9     | Off Cape Hatteras, North Carolina |
| 5.0     | 5.5     | Off Chesapeake Bay, Virginia      |
| 6.2     | 6.8     | Off Chesapeake Bay, Virginia      |

*Types.* The type specimens of *Cyclopecten nanus* Verrill and Bush are located in the United States National Museum. USNM No. 44624 is here designated as the lectotype. The type locality is here restricted to Station 2307 of the United States Fish Commission steamer *Albatross* from off Cape Hatteras, North Carolina from which the lectotype was collected.

*Remarks.* *Cyclopecten nanus* Verrill and Bush appears to be a rather common species judging by the material to be found in our leading museums. We were able to examine hundreds of specimens from various sources, of which most were single valves. The largest specimen measured 6.8 mm. in length, 6.2 mm. in height. Verrill (1897) and Verrill and Bush (1898) reported the size of one of the largest specimens as length 7.0 mm., height 6.0 mm. and also mentioned that although very small, the species seemed to be adult.

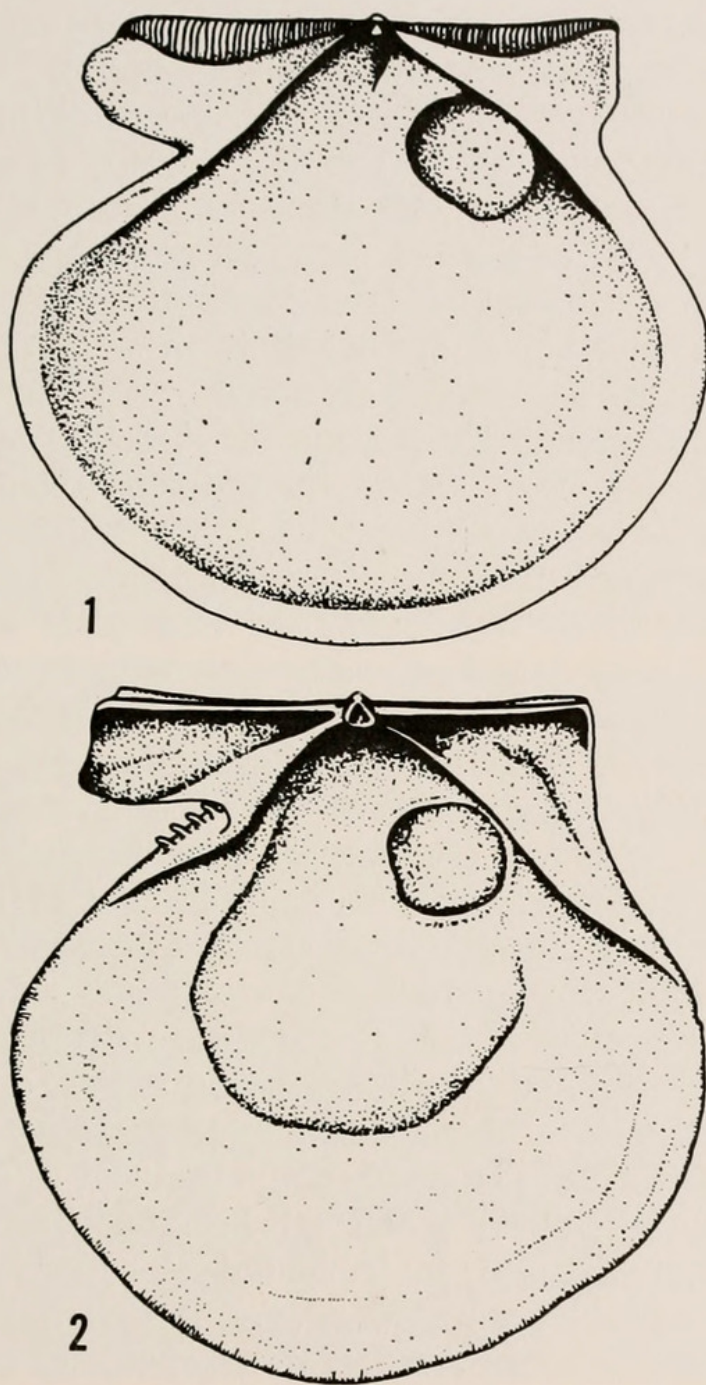


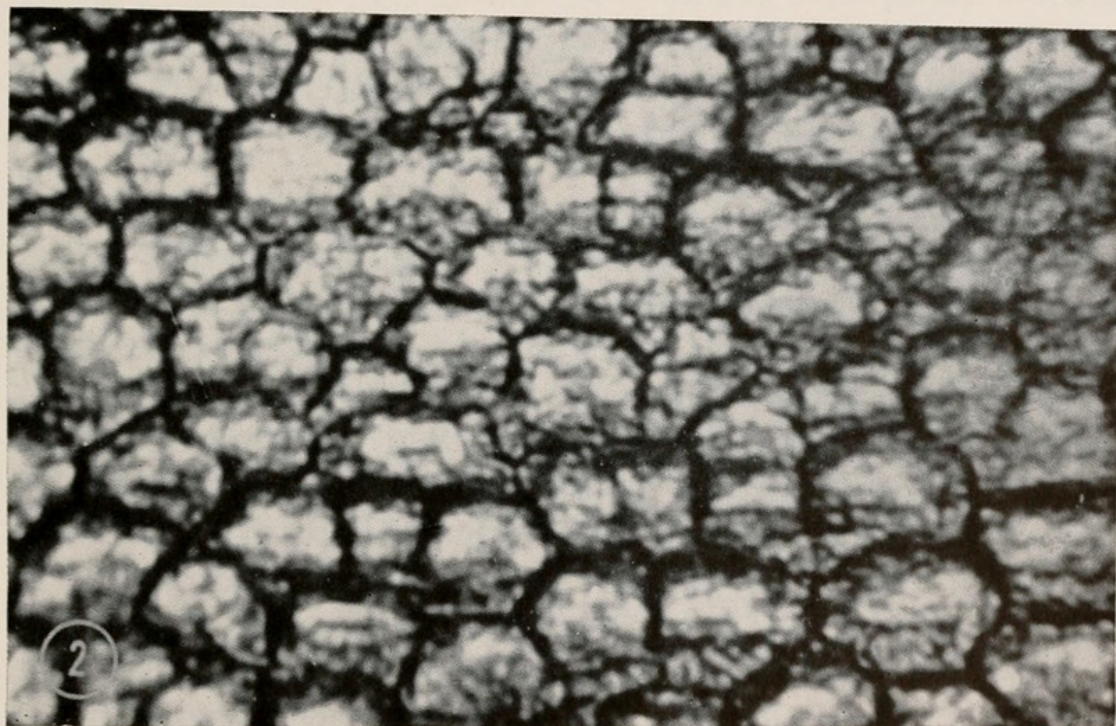
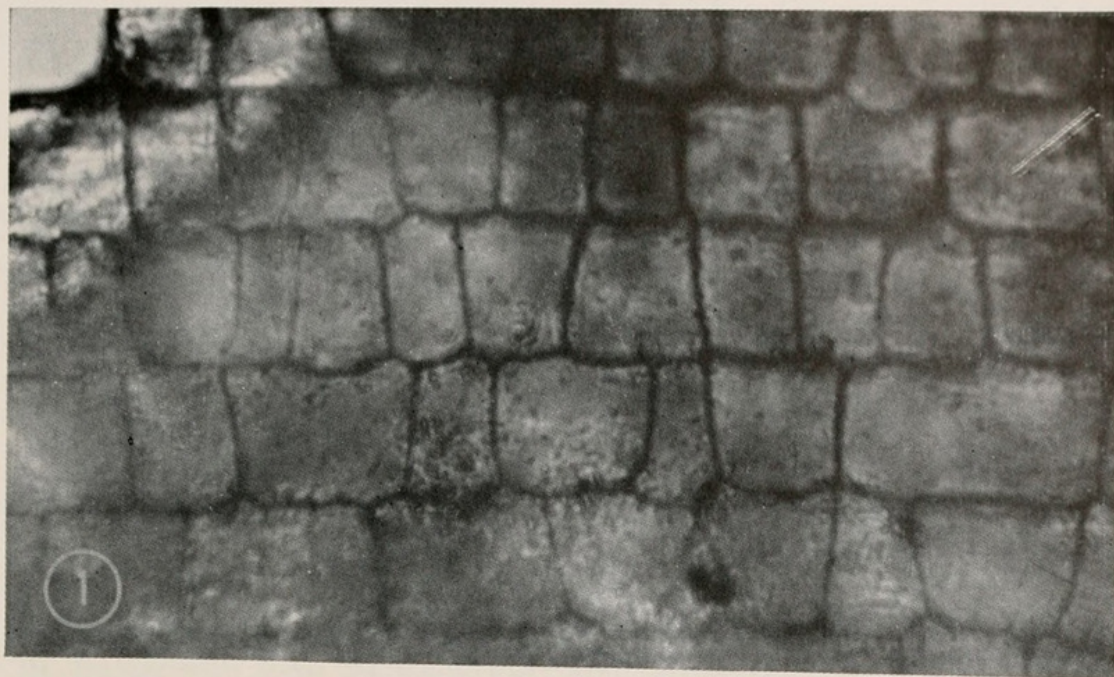
Plate 38

Fig. 1. *Cyclopecten nanus* Verrill and Bush. Right valve. Interior view of same specimen as shown in Pl. 37, figs. 1 and 2. (12 $\times$ )

Fig. 2. *Placopecten magellanicus* (Gmelin). Right valve. Interior view of same young specimen as shown in Pl. 36, figs. 1 and 2. (12 $\times$ )

*C. nanus* does not even superficially resemble *Placopecten magellanicus* (Gmelin) when comparing specimens of similar size. Although the shell of the young sea scallop is thin and somewhat delicate as compared to the adult it in turn appears thick and substantial when compared to the finer structure of *C. nanus*. In young *P. magellanicus* the height usually exceeds the length, this being the opposite in *C. nanus*. In both species the wings are prominent, the umbo in the upper valve pronounced and overlying a wide, straight hinge-line. The radial and concentric sculpture is better developed in the sea scallop; also the anterior wing of the lower valve is more sharply defined with the byssal notch more acute. In the sea scallop the margin below the notch is pectinated; this feature is lacking in *C. nanus*. In *P. magellanicus* the hinge-plate has a narrow, submarginal ligamental groove extending its length with the exterior margin of the valve recurved inward partly over the groove (Pl. 38, fig. 2). In *C. nanus* the hinge-plate is thin in the middle, relatively broad on each wing with numerous fine, transverse striations (Pl. 38, fig. 1). The internal cartilage in *C. nanus* is small and rounded, in *P. magellanicus* larger and more triangulate. The muscle scars are similarly positioned in both species and can be seen through the translucent valves. In *C. nanus* the pallial line scar is not apparent, but in the sea scallop it is not only clearly visible but a nacreous secretion of crystalline structure is deposited within its confines which further outlines this area. In *C. nanus* the margin of the under valve is very thin and fragile, somewhat flattened, and highly flexible. This allows the bottom valve to fit snugly against the upper (Pl. 37, fig. 2). The lip of the under valve of the sea scallop is flexible in the very young but has almost lost this characteristic at the size of 5 mm. A well-developed prismatic layer can be seen in both species. However, in *C. nanus* the prisms are rectangular in shape and laid down regularly in a concentric pattern whereas in *P. magellanicus* the prisms are irregularly shaped—usually 5- or 6-sided and arranged in a haphazard concentric fashion.

When the two species are placed side by side, the above differences are easily seen. However, if only one species is available the following major differences clearly define the species.



## Plate 39

Fig. 1. *Cyclopecten nanus* Verrill and Bush. Surface of right valve near edge of shell to show prismatic structure. (about 700 $\times$ )

Fig. 2. *Placopecten magellanicus* (Gmelin). Surface of right valve of young specimen near edge of shell to show prismatic structure. (about 600 $\times$ )

1. In *C. nanus* the length is usually greater than the height. The opposite holds in *P. magellanicus*.

2. Pectinidial teeth are usually well-developed in small *P. magellanicus*. None is formed in *C. nanus*.

3. In *C. nanus* many transverse lines are apparent within the hinge-plate on the wings. In *P. magellanicus* there is but a single, thin, longitudinal groove running the length of the hinge-plate except where interrupted by the internal ligament.

4. In *P. magellanicus* the pallial scar is distinctly outlined by deposition of a partly crystallized substance within its confines. The pallial scar is either not visible or very poorly defined in *C. nanus*.

5. In the under valve of *C. nanus* the prismatic structure is easily visible. The prisms are rectangular and deposited in orderly concentric fashion. In *P. magellanicus* the shell is thicker and the prismatic layer is less easily seen. The prisms are irregular in shape and irregularly though concentrically deposited.

*Range.* From off Chesapeake Bay, Virginia to off Mayagüez, Puerto Rico. According to Verrill (1897, 1898), *Cyclopecten nanus* Verrill and Bush was taken in considerable numbers by the U.S. Fish Commission in 1884 off the Atlantic Coast at three stations opposite Chesapeake Bay, Virginia and Cape Hatteras, North Carolina in 43 to 132 fathoms. Dall (1927) recorded the species from off Fernandina, Florida in 294 fathoms. It has also been dredged from off Palm Beach, Florida and at points along the Florida Keys by private collectors. Dall (1901) and McLean (1951) recorded the species from deep water near Mayagüez, Puerto Rico. It is a fairly common species in the deeper waters.

*Specimens examined.* VIRGINIA: *Albatross*, station 2265, off Chesapeake Bay, 70 fathoms, temperature 57.9° C (USNM); *Albatross III*, station 5-4, cruise number 126, S.E. of Lightship *Winterquarter*, 130 fathoms (MCZ). NORTH CAROLINA: *Albatross*, station 2307, off Cape Hatteras, 42 fathoms; *Albatross*,

station 2310, off Cape Hatteras, 132 fathoms (all USNM); *Albatross*, station 2612, off Cape Hatteras, 52 fathoms (MCZ); off Cape Lookout in 52 fathoms (USNM). FLORIDA: off Palm Beach in 60 fathoms (T. L. McGinty); off Miami in 65 fathoms (USNM); S.E. of Carysfort Reef, Key Largo in 66–117 fathoms; S.E. of Sombrero Key, Key Vaca in 22–66 fathoms; S.E. of Looe Key, Big Pine Key in 25–50 fathoms (all MCZ); off Key West in 87 fathoms (USNM). CUBA: Bahía de Cochinos (N. Lat.  $22^{\circ}09'$ ; W. Long.  $81^{\circ}11'$ ) in 117–225 fathoms (MCZ).

## ABBREVIATIONS

MCZ — Museum of Comparative Zoology, Harvard University

USNM — United States National Museum

USFWS — United States Fish and Wildlife Service

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