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CONTRIBUTIONS TO THE GEOLOGY AND PALEONTOLOGY OF THE CANAL ZONE, PANAMA, AND GEOLOGICALLY RELATED AREAS IN CENTRAL AMERICA AND THE WEST INDIES

CIRRIPEDIA FROM THE PANAMA
CANAL ZONE

By HENRY A. PILSBRY
Of the Academy of Natural Sciences, Philadelphia

CHAS. E. RESSER
U.S. NATIONAL MUSEUM
WASHINGTON, D. C.

Extract from Bulletin 103, pages 185-188, with Plate 67



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CIRRIPIEDIA FROM THE PANAMA CANAL ZONE.

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The small number of barnacles collected show the following relations. The Pleistocene and Pliocene species are identical with recent Atlantic coast and Caloosahatchie Pliocene species, respectively, and are distinctively Atlantic forms. Of the Oligocene and Miocene species, one has relatives in both oceans, another only in the Pacific; the affinities of the third being doubtful.

BALANUS EBURNEUS Gould.

Balanus eburneus PILSBRY, Bull. U. S. Nat. Mus., No. 93, 1916, p. 80, pl. 24, figs. 1-1c, 2, text-figs. 14 and 15, and synonymy.

This recent species is represented by four individuals from Station 5867, the wall being preserved complete, but without opercular plates. The smooth surface and the closely, regularly septate parietal tubes are characteristic, the septa forming cells about equal in length and breadth, throughout the tubes.

Locality and geologic occurrence.—They are from a dark mud formation about 10 feet above the present sea level, near lower end of Gatun Locks. Pleistocene series. D. F. MacDonald, collector. April, 1911. Cat. No. 324297, U.S.N.M. Five specimens, from Station 5868, from Mount Hope, in swamp ditch, in black mud formation; Pleistocene; D. F. MacDonald, 1911. Cat. No. 324290, U.S.N.M.

Ten specimens of the same were taken at Station 6038, also from black mud from lower end of Gatun Locks. Pleistocene series. D. F. MacDonald, collector, 1911. Cat. No. 324293, U.S.N.M.

BALANUS GLYPTOPOMA Pilsbry.

Plate 67, figs. 1-3.

Balanus concavus glyptopoma PILSBRY, Bull. U. S. Nat. Mus., No. 93, p. 102, pl. 21, fig. 2; pl. 22, figs. 2-2c.

The walls only of several groups growing on oysters and scallops were collected. They agree with the above species described from the Pliocene of the Caloosahatchie River, and show some additional characters, notably the color. The radii are broad. The parietes are weakly ribbed longitudinally, the intervals in the best preserved individuals being of a deep livid brown color, the low ribs white. The parietal tubes are crossed by many septa, down to the base; these are a little less regular than in *B. eburneus*, most of the cells being longer

than wide, exactly as in the type of *B. glyptopoma*. There are 16 tubes in the rostrum of one of the specimens figured (fig. 2). The basis is profusely porous, the pores septate (fig. 3, left hand and middle individuals of group shown in fig. 1). The middle specimen of this group is 31 mm. high, the rostro-carnial diameter about 22 mm.

B. glyptopoma was described as a subspecies of *B. concavus* Bronn, but it differs from that by the closely septate parietal tubes, and is evidently a distinct species. In *B. concavus* the tubes are filled up near the summits, and are open, with very few septa below, or none in the American subspecies. The Miocene form formerly referred to *B. glyptopoma* is a distinct subspecies of *B. concavus*.

Location and geologic occurrence.—The specimens are from Station 5903, across Chagres River and about 200 to 225 feet above it, top of hill opposite Alhahuela, in a gray tufaceous limestone, Cat. No. 324298, U.S.N.M. and Station 5906a, 50 to 75 feet below 5905, Cat. No. 324299, U.S.N.M. Both collected by D. F. MacDonald. Upon mentioning to Dr. William H. Dall that I had identified a Pliocene barnacle from these Stations, he kindly informed me that "both are above the Oligocene strata and separated from the latter by an unconformity. They are doubtless Pliocene. 5906a is the lower of the two horizons."

Mexico. From the Sayula District of Chiapas, on the Arroyo Chapapoapam. Pliocene series. Dr. C. W. Hayes and others, collectors; 1911. Station 5886. One specimen, without opercular valves. Cat. No. 324291, U.S.N.M.

BALANUS CONCAVUS RARISEPTATUS, new subspecies.

Plate 67, fig. 4.

In form this barnacle is somewhat cylindrical with contracted summit in the adult stage, convexly conic when young. The orifice is ovate. The walls are only slightly roughened longitudinally. The carinolateral compartments are narrow, the parietes about one-third as wide as the lateral compartments. The radii are wide with oblique summits, without pores; the articulating edges being crenulated. The parietal tubes have very few, irregularly scattered, transverse septa. There are 29 tubes in the rostrum of the type-specimen. Another, of equal size, has 17 tubes in the lateral, 6 in the carinolateral compartment.

Length, 27 mm.; carino-rostral diameter, 22.5 mm.; lateral diameter, 21 mm. In the largest individual exposed the rostrum is 35 mm. long.

This form is represented by a group of about 16 individuals growing upon and largely concealing a single old one of about 37 mm. basal diameter. Probably three generations are present. They were

in a tufaceous limestone. The tubes of the walls are solidly filled with calcite.

This was at first thought to be a smooth form of *Balanus concavus* Bronn, but on cutting it the parietal tubes were found to be much more numerous. In a specimen of *B. concavus* from the British Red Crag (Pliocene), No. 12058, U.S.N.M., there are 19 tubes in the rostrum, which is 65 mm. long. Most of these tubes have transverse septa at long, irregular intervals, but in some places near the edges the septa are rather close, though irregular.

The relation of this form to *B. concavus* can not be exactly estimated until the opercular plates are found. It may be an ancestral form of *concavus* or a distinct species. Meantime, it is readily recognizable by the characters of the compartments.

Locality and geologic occurrence.—Panama Canal Zone. From 85 foot cut, just on north side of big swamp, on relocated line Panama Railroad, 1½ to 2 miles beyond Camp Cotton toward Monte Lirio. Gatun formation. Miocene series. D. F. MacDonald and T. W. Vaughan collectors, 1911. 1 cluster; Cat. No. 324292, U.S.N.M.

BALANUS (HESPERIBALANUS?), species.

A small, conic barnacle having a basal diameter of about 7 or 8 mm. is represented by several compartments and one incomplete specimen, without opercular valves. The walls are smooth except for slight ripples parallel to the base. They are solid, having no parietal tubes. The compartments are rather thick for so small a barnacle, and when parted the articulating edges of the radii and the opposed sutural surfaces are seen to be conspicuously crenulated. The basis is calcareous, thin, and seems to have radial threads on its inner face.

These characters indicate a species of the subgenus *Hesperibalanus*, or possibly *Solidobalanus*. Neither group has been recognized hitherto in American tertiary deposits, or in the recent faunas of the Panamic region or western Atlantic. The specimens do not seem characteristic enough to serve as the basis of a new species, though they can not, I think, be referred to any described form.

Locality and geologic occurrence.—They were collected by MacDonald and Vaughan in the "lowest fossiliferous bed, the third below the lowest limestone bed, Las Cascadas section, Gaillard Cut. Lower part of upper half of Culebra formation. Oligocene." Station 6020a, Cat. No. 324295, U.S.N.M.

A single valve was taken one-fourth mile south of Empire Bridge, from lower dark clay beneath lower conglomerate, lower part of Culebra formation, Oligocene; Station 6012a; Cat. No. 324296, U.S.N.M.

LEPAS INJUDICATA, new species.

Plate 67, fig. 5.

This species is based upon a calcareous plate believed to be the scutum of a Lepadid barnacle. It is thin, trapezoidal in outline, the basal border straight, almost equal to the length, and a little contracted or narrowly bent in. The tergal extremity is broad and somewhat convex. The ocludent margin is almost straight. The surface has the curvature of an ordinary *Lepas*, such as *L. anatifera*, and is sculptured with coarse, unequal concentric folds, with, towards the growing edges, some rather fine concentric striation.

The fossil is imperfect at the tergal end, but if restored according to the lines of growth it would be about 25 mm. long; width 23 mm.

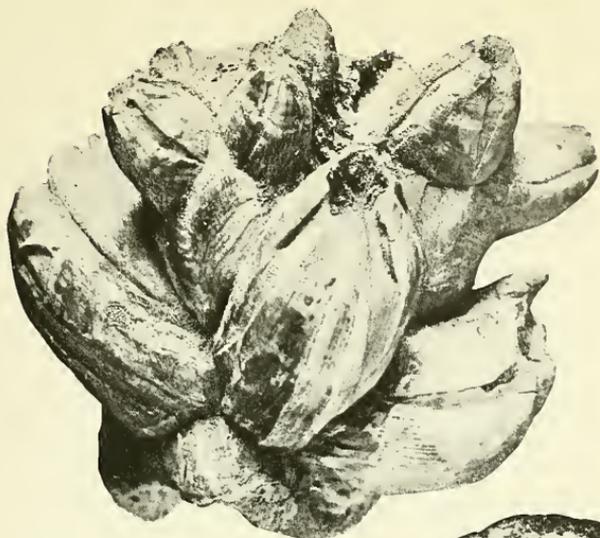
That the fossil has been correctly interpreted is by no means certain. If Lepadid, as believed, the very obtuse tergal end probably indicates a small, transversely placed tergum, not running between scutum and carina, or perhaps none. Either condition would denote greater specialization than the modern genus *Lepas*. However this may be, the fossil is specifically recognizable by its form and sculpture, and we must await the finding of further material to reveal its nature.

Locality and geologic occurrence.—The holotype is No. 324448, U.S.N.M. It was found by MacDonald and Vaughan in a section of the bluffs exposed along the Panama Railroad. Relocation, about 3,500 feet south of Gatun Railroad Station, in bed No. 6033*b*, Gatun formation. Miocene series.

EXPLANATION OF PLATE 67.

- FIG. 1. *Balanus glyptopoma* Pilsbry. Lateral view of group from Station 5903.
 2. Rostral view of a specimen of *B. glyptopona* growing on *Pecten*, Station 5903, the outer lamina of the wall removed. Length of rostrum 16 mm.
 3. Basal view of fig. 1.
 4. *Balanus concavus rariseptatus* Pilsbry. Type.
 5. *Lepas injudicata* Pilsbry. Type.





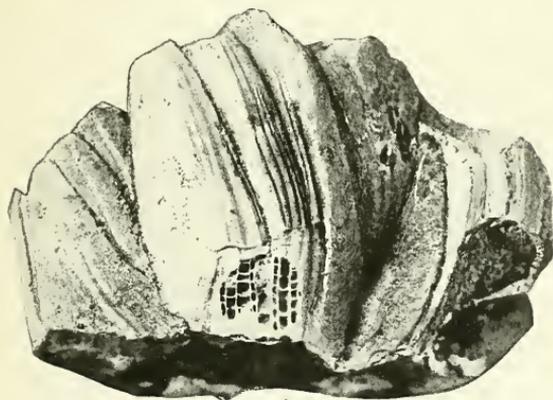
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3



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1



2

PANAMA CIRRIPEDES.

FOR EXPLANATION OF PLATE SEE PAGE 188.