

HAWAIIAN CIRRIPEDIA.

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In the course of dredging and trawling in Hawaiian waters during the summer of 1902, the steamer *Albatross* obtained a varied and interesting series of cirripedes, which are described in the following pages. With the exception of a single species of *Balanus* all the specimens were taken at depths of from 60 to 800 fathoms, most of them from between 200 and 300 fathoms.

The shore cirripedes of the islands are still practically unknown, only a few scattered records appearing in the monographs of Darwin and Gruvel.

Cirripedes have a practical importance chiefly from the prolific growth of the shore forms on all submarine objects, *Balanus*, *Conchoderma*, and *Lepas* largely composing the growths fouling ships' bottoms, buoys, etc. Since most forms do not penetrate wood, such growths are not permanently injurious, but are deleterious mainly from the expense attending their removal from time to time. They are almost as profuse upon metal as upon wooden bottoms, and have even been found on the screws of steam vessels.

In some places the larger forms of *Balanus* are eaten, the flesh resembling that of the lobster. There is good reason to believe that the larger species of the Pacific coast, such as *Balanus aquila*, *B. evermanni*, and the large *Balanus* found near Port Townsend, Washington, would afford a valuable addition to our resources of sea food, if they can be obtained in sufficient quantity.

The deep-water cirripedes are very abundant in many places, but no data are available to show to what extent they are eaten by fishes. They probably form an important item in the food supply of bottom-feeding forms.

LEPADIDÆ.

Scalpellum hawaiiense n. sp.

[Pl. iv, fig. 1-2.]

A species of the group C' of Gruvel's arrangement, the 14 valves being wholly calcified, the carina regularly curved and a rostral plate present. There is no subcarina. The capitulum is ovate, the anterior and posterior outlines about equally curved. The plates are covered with a thin pale olive-buff cuticle, and are all sculptured with fine cords radiating from the apices and more or less knotted or beaded by the intersection of the lines of growth.

Scuta with convex occludent and concave tergal margins, the lateral and basal margins straight. The anterior and lateral faces of the plate are about equal in area, and are separated by an arcuate diagonal angulation. Anteriorly the radial striation is finer.

Terga large and rhombic, with erect apices. The occludent margin is straight, the carinal margin straight above but convex where in contact with the carina. The scutal margin is nearly straight. The carina is extremely broad basally, the roof convex, the lateral angles prominent. It is curved throughout, but the upper half more so; apex terminal.

The upper lateral plate is triangular, with apical nucleus. Its scutal margin is longer than either of the other two, which are subequal. The rostrum is an excessively small, very narrow plate, visible below the apices of the rostral latera. The rostral lateral plates are low, obliquely triangular, with the apices contiguous at the median ventral line. The lateral edge is covered by the imbricating rostral margin of the inframedian lateral plate. The inframedian lateral plates are triangular, nearly equilateral, with apical umbo. The carinal lateral plates are subtriangular, embracing the lateral angles of the carina; their apices are recurved and project slightly. The peduncle is covered with horizontal, somewhat imbricating, smooth scales, which are rather sparsely tomentose, the hairs very delicate and rather long. Its total length is unknown, as the individual has been removed from its support by cutting the peduncle.

Length of capitulum 25, greatest breadth 16 mm.; greatest thickness, across the carino-lateral plates, 12 mm. Length of carina 21.5, diameter at base 9.5 mm.

Type, no. 32416 U. S. National Museum, from *Albatross* station 4181, near Kauai, in 811 fathoms, bottom manganese sand and globigerina ooze.

Scalpellum rubrum Hoek, from near Luzon, agrees with *S. hawaiiense* in the proportions of the valves, but it differs strikingly in color and surface sculpture. *S. hirsutum* is also related, though obviously different.

Scalpellum pacificum, n. sp.

[Pl. IV, fig. 3, 4.]

A form closely related to *Scalpellum australicum* Hoek.

The capitulum is acutely ovate, compressed, composed of 14 valves closely juxtaposed; these are covered with a very thin brownish film, which near the occludent margin bears a few scattered long hairs. The valves are sculptured with numerous, but not crowded, radiating threads, and on each of the side valves there is one more prominent ridge or angle extending from the umbo to the opposite margin, dividing the valve into two areas.

The scutum is convex, divided into two nearly equal areas by a slightly curved diagonal rib; the occludent and opposite lateral margins are slightly arcuate, the tergal and basal margins straight, the latter at an angle of 90 or a trifle less with the occludent border.

The tergum is larger than any other plate, triangular, with a distinct diagonal rib parting the narrow carinal from the large and triangular anterior area. The occludent margin is convex, the carinal a little undulating and the tergal or basal margin straight. The apex stands erect.

The carina is simply arched, with the flat roof bordered by distinct ridges; sides at about right angles with the roof, and broader near the upper extremity of the valve.

The upper lateral plate is trapeziform with the apex superior, the scutal margin concave, the basal and tergal margins equal, straight, and the very short carinal margin also straight.

The rostral lateral plate is subquadrate, short and broad, the length being about half the width. The curved beaks are connate on the occludent border above the rostrum, and do not project perceptibly. The upper and lower borders of the plate are subparallel and straight; the rostral border is concave. From the umbo a curved rib runs to the posterior basal angle. The rostrum is rudimentary, merely a linear trace.

The inframedian lateral plate is extremely narrow, linear, wedge-shaped, the narrow apex above. There is a low cord along each edge, and the apex is curved rostrad.

The carinal lateral plate is irregularly trapezoidal, with the umbo projecting a little beyond the carina. The carinal margin is straight; upper margin very oblique, straight; lateral margin short, straight. In carinal aspect, the two carinal latera appear as contiguous tricostate brackets under the two lateral ribs of the carina. The peduncle is short, wider above, covered with wide low scales, about seven scales in any longitudinal row.

Length of capitulum of type, from station 3907, 16.5 mm., greatest breadth 8.5 mm., diameter 3.8 mm.; length of peduncle 3.5 mm.

Length of capitulum, specimen from station 3824, 12.5 mm., width 6 mm.; length of peduncle 2 mm.

Type no. 32419, U. S. National Museum, from *Albatross* station 3907, south coast of Oahu, 315 fathoms, on the spine of a cidaroid sea-urchin, with *Pœcilasma*; bottom fine white sand and mud. Specimens also from station 3824, south coast of Molokai, 222 to 498 fathoms, on *Hyalonema*; bottom of coral rock and broken shell.

This species is more closely related to *S. australicum* Hoek^a, than to any other known form. It differs from that in the sculpture of the valves, each having a stronger diagonal ridge, and in the shape of the plates of the basal whorl, especially the rostral latera, which in the *Challenger* species are as high as wide. The inframedian and carinal latera also differ in several respects, and the umbo of the upper lateral plate does not imbricate over the scutum as it does in *S. australicum*. *Scalpellum hirsutum*, *S. tenue*, etc., are also allied species, but are clearly distinct by various characters.

Trilasmis eburneum Hinds.

Trilasmis eburnea Hinds, Voyage of the Sulphur, vol. 1, Mollusca, p. 72, pl. 21, fig. 5, 1844.

Pœcilasma eburnea Darwin, Monograph on Cirripedia, p. 112, pl. 2, fig. 5, 1851. Gruvel, Monogr. des Cirrhipèdes, p. 120, fig. 139 (copied from Darwin), 1905.

Albatross station 3845, south coast of Molokai in 60 to 64 fathoms, on spines of a *Cidaris*-like sea-urchin.

This rare species has been known hitherto only from specimens taken sixty years ago by the *Sulphur* on the coast of New Guinea. They occurred on the spines of an "*Echinus*." The Hawaiian specimens differ from them in being a little larger, the capitulum 3.4 mm. long, and slightly unlike in the shape of the carina, the upper part of which is more attenuated, while the basal cup is more flattened. While this variation is probably of no great importance, I have deemed it well to figure the scutum and carina of a Hawaiian individual.

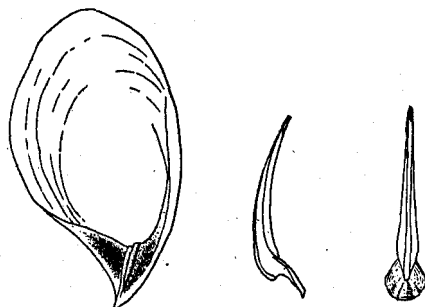


FIG. 1.—*Trilasmis eburneum*. Scutum and two views of carina.

Pœcilasma kæmpferi Darwin.

Pœcilasma kæmpferi Darwin, Monogr. Lepididæ, p. 102.

Albatross station 3984, between Honolulu and Kauai, 164 to 237 fathoms. Station 3839, south coast of Molokai, 259 to 266 fathoms. Station 3884, Pailolo Channel, 284 to 290 fathoms. Station 4117, north-west coast of Oahu, 282 fathoms. On the crab *Cyrtomaia smithi* Rathbun. Also stations 3811, south coast Oahu, 338 fathoms, and 4045, west coast Hawaii, 198 fathoms, on *Lambrus (Platylambrus) stellatus* Rathbun.

The species was originally described from Japan, attached to the crab *Inachus kæmpferi* De Haan. It is new to the Hawaiian fauna. A very similar form, *P. aurantia* Darwin, occurs at Madeira, and by some authors has been considered to form merely a variety of the Japanese *P. kæmpferi*.

If *Pœcilasma* is to be allowed to stand distinct from *Trilasmis*, it will be for species of the type of *P. kæmpferi*, most of which are cancericoles.

Pœcilasma bellum, n. sp.

[Pl. IV, fig. 6.]

The capitulum is elliptical, acute at both ends, and composed of five wholly calcified valves in close contact. White or flesh-tinted by the viscera showing through. The occludent and carino-tergal outlines are equally convex. The margins of the peduncle foramen flare laterally.

The scutum is very large, convex, its surface divided by a prominent angle passing in a curve from the beaks to the angle at the junction of carina and terga. The basal and occludent margins form a single symmetrical curve, the basal making no angle with the occludent. The carinal margin

^a Challenger Report, vol. VIII, Cirripedia, p. 118, pl. V, fig. 11.

is convex and the tergal straight. The plate has a dense and minute sculpture of fine radial lines which are irregular or divaricating, and a coarse sculpture of well-spaced wrinkles and furrows, parallel to the growing margins of the valve. The furrows and riblets are more emphatic in the baso-carinal area of the scutum, being crowded there into a strong corrugation. Inside there is a single massive tooth, bifid at its summit, under the umbo in each valve.

The tergum is wedge-shaped, closely corrugated parallel to its scutal border, but with two rounded, contiguous ribs running along the opposite or outer border. The apical angle is less than 90° . Inside smooth, with a minute tooth at the scutal margin of each tergum near the occludent end.

The carina is narrow distally, but from the middle down it widens rapidly, the sides becoming much broader and at the same time flaring laterally. They are corrugated parallel with the scutal margin. The roof of the carina is very narrow throughout, widening gradually and slightly upward and with a median hollow or furrow. Inside there is a massive transverse septum at the lower two-fifths of the carina, rising in a blunt articulating tooth at each side.

The peduncle is very short, cylindrical, circularly wrinkled, covered with a tough flesh-colored integument.

Capitulum, total length 14.5, breadth 6.4, diameter 3 mm. Scutum, length 11.7, breadth 5.7 mm. Tergum, length 6.2, breadth 2.2 mm. Carina, length 10, breadth 2, diameter 2 mm. Length of peduncle 2 mm.

Albatross station 4117, northwest coast of Oahu, 241 to 282 fathoms, bottom of coral sand and foraminifera, in copious numbers on large spines of a sea urchin. Also station 4117, 253 to 282 fathoms, in nearly the same place. South coast of Oahu, 315 fathoms, fine white sand and mud. Station 3998, vicinity of Kauai, 228 to 235 fathoms. Stations 4090, 4097, 3883, and 3866, Pailolo channel, between Maui and Molokai, 277 to 304 fathoms, bottom of fine gray sand and globigerina ooze. Station 3839, south coast of Molokai in 259 to 266 fathoms.

In the straightening out of the basal margin to bring it parallel to the occludent edge, *P. bellum* is like *Megalasma striatum* Hoek. The system of sculpture, the very short peduncle, the internal ridge across the cavity of the carina, and the situs on sea-urchin spines are also features approximating *Megalasma*; but that genus differs by the slightly higher position of the umbo of the scutum, on the occludent margin, and the much broader crest of the carina. On the whole, *P. bellum* may be said to stand intermediate between *Pacilasma carinatum* and *Megalasma*. *Pacilasma bellum* is an abundant species on fine sand bottoms throughout the Hawaiian group, always seated on large *Echinus* spines, frequently sharing them with *Alepa*s. It is a handsome little barnacle, very constant in all its features.

Dichelaspis hawaiiensis n. sp.

[Pl. iv, fig. 5.]

The capitulum is much compressed, unsymmetrically long ovate, supported on a nude peduncle half the length of the capitulum or shorter. The valves are in contact only at their ends. The general integument is smooth.

The scutum is L-shaped, the basal segment narrower than the occludent, the latter widening above to its oblique termination, and about twice the length of the basal segment. The tergum is irregularly triangular, with blunt apex, slightly concave and very long carinal margin, and with a notch near the occludent end of the scutal margin for the reception of the distal end of the scutum. An arcuate furrow runs upward from this notch. The carina is arcuate and extends upward well beyond the middle of the tergum. It is widest in the middle, and at the base is expanded in a biramosse appendage clasping the top of the peduncle, which it half encircles. The peduncle is stout, cylindrical, and circularly wrinkled.

Length of capitulum, 6.5 mm., breadth 3.2 mm.

Type, no. 32409, U. S. National Museum, from Hawaiian Islands, collected by the *Albatross*, 1902, attached to a slender gorgonian.

This species is more closely related to *D. orthogonia* Darwin than to any other. It differs from that in the shorter basal portion of the scutum, the simpler shape of the tergum, and the more broadly clasping basal appendages of the carina. Unfortunately the station number was not preserved, so that the exact location can not be given.

ALEPAS Rang.

Nude, leathery forms, with a single filamentous appendage on each side, and a long, many-jointed caudal appendage. About a dozen species hitherto known are mostly from deep water.

The primary division of the genus should be into those forms which have the endopodite or both rami reduced on the fifth and sixth pairs of cirri, and those in which the rami are not reduced and are subequal in all. In *A. rex*, described below, the fifth and sixth endopodites are so specialized. In *A. percarinata* they are unreduced and subequal.

The forms taken by the *Albatross* were seated upon large sea-urchin spines and gorgonians on a bottom of fine sand and mud, such as sea urchins ordinarily inhabit.

Alepas percarinata, n. sp.

[Pl. IV, fig. 8.]

The capitulum is irregularly ovate, dorsally carinated, much longer than the slender peduncle, straightened on the occludent margin, without trace of calcareous or chitinous plates. Color pale brown.

The orifice is very small, not protuberant, less than half the length of the capitulum, with puckered

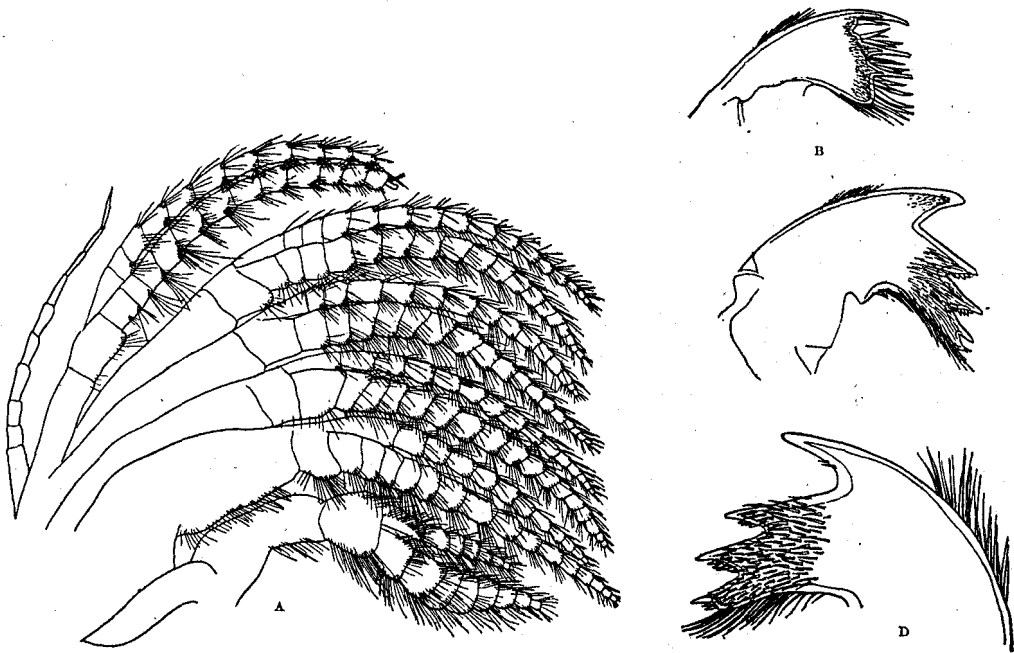


FIG. 2.—*Alepas percarinata*. A, Cirri of the left side; B, maxilla; C, mandible; D, mandible of specimen from station 3828.

lips. The dorsum is acutely carinated, the edge of the keel smooth. The surface is finely wrinkled transversely. The short slender peduncle is coarsely wrinkled, and sparsely warty, a few scattered warts also appearing on the adjacent base of the capitulum.

Length of capitulum 9 mm.; breadth 7 mm., diameter 5 mm. Length of orifice 3 mm.; length of peduncle 4 mm., diameter 2 mm. (Cotype, station 4116.) Another specimen (station 3866): Length of capitulum 12.5 mm., breadth 10 mm., diameter 6 mm. Length of orifice 4 mm. Length of peduncle 5 mm., diameter 3-5 mm.

Mandible with three teeth and two spines at the lower extremity. The upper tooth is largest, the second about midway of the toothed margin; the third is more slender. The lower edges of the second and third teeth are denticulate by the projection of short colorless spines. The lower border of the mandible is densely pilose (fig. 2, c).

Maxillæ very irregularly spinose, the strongest spine at the upper edge, an irregular notch below it. There are two nearly as large in the median part (fig. 2, B).

The cirri (fig. 2, A) are rather short. The exopodites have 8, 15, 17, 18, 18, 14 joints in the first to sixth pairs of limbs, respectively, the endopodites being usually a little more slender and with 7, 14, 14, 15, 16, 12 joints. The caudal appendage is long and slender, composed of 13 long joints, with but few bristles (fig. 2, A). The penis is closely wrinkled and annulate, with a few bristles and a pencil of hairs at the tip.

Albatross station 3866, Pailolo Channel, between Molokai and Maui, in 283 fathoms, bottom of gray mud and fine sand. Also stations 4116 and 4117, northwest coast of Oahu, 241 to 282 fathoms, on bottom of coral sand and foraminifera; station 3839, south coast of Molokai, 259 to 266 fathoms, bottom of light brown mud and sand, everywhere on large *Cidaris*-like sea-urchin spines.

This *Alepas* belongs to the group having cirri with subequal rami. It is externally distinguished by the absence of plates in the integument, the small orifice and the acute dorsal keel. *A. pedunculata* Hoek, is perhaps the most nearly related form, differing by some details of the denticulation of the mandibles and maxillæ, by the absence of red spots dotting the capitulum, etc.

The oldest specimens lose the sharpness of the dorsal keel, and become plumper.

At station 3828 off the south coast of Molokai, 281 to 319 fathoms, broken shell bottom, a sea-urchin spine was brought up carrying two specimens of *Alepas* similar to *A. percarinata* except that they show no traces of a dorsal keel except close to the base of the capitulum. The latter is 4 mm. long—a size which in *percarinata* is very strongly keeled. The cirri and caudal appendage are as in *A. percarinata*, but the joints of the tailpiece bear pairs of bristles near the sutures. The mandibles (fig. 2, D) differ by showing no lower point distinct from the fourth tooth, the two sides being alike in this respect. The maxillæ scarcely differ from those of *A. percarinata*. The general agreement is so close that I am disposed to believe that the specimens may have lost their carinæ by accidental means; but if it be a normal form, a new species is indicated.

***Alepas rex*, n. sp.**

[Pl. IV, fig. 7.]

A large species with irregularly ovate, obese capitulum, longer than the peduncle, straightened on the occulter margin, and without trace of calcareous or chitinous plates. Color pale ochre yellow, a little darker on the peduncle.

The orifice is slit about half the length of the capitulum, its lips a little crenulated, or irregularly warty; in adults they do not protrude. The ventral side is elsewhere rounded; the dorsum is marked by a low ridge or angle. The surface of the capitulum is irregularly pitted, somewhat wrinkled, and sparsely asperate with small warts, each with a brownish tip. The surface of the peduncle is much and deeply wrinkled transversely. It is cylindrical, and expands basally to clasp the supporting surface. The dimensions of two individuals are given below:

	No. 1.	No. 2.
	mm.	mm.
Length of capitulum.....	21	22
Breadth of capitulum.....	20.5	19
Diameter of capitulum.....	16	15
Length of orifice.....	11.5	13
Length of peduncle.....	19	22
Diameter of peduncle.....	10	9

The mandibles (fig. 3, B, D) have two strong teeth and two much smaller, more slender ones at the lower extremity (fig. 3, B), or there may be three at the lower extremity (fig. 3, D), the two figured being from the right and left sides of the same individual.

The maxillæ (fig. 3, A) have a densely spiny edge, which is deeply excavated below the upper spine.

The cirri are long and graceful. The first pair is much shorter than the others, the rami broad, composed of about 32 and 17 joints, profusely bristly. The second pair has very long rami armed with very

long spines, with some shorter ones around their bases (fig. 3, c), joints 58 to 61. The third pair is similar, with 72 and 70 joints. Fourth pair similar. Fifth pair with the rami very unequal, the exopod with 84 joints, the endopod slender and much shorter, with about 33 joints. The sixth pair is similar, exopod with 83, endopod with 30 joints (fig. 3, F). The caudal appendage is small, with 13 joints (fig. 3, F). The penis (fig. 3, E) is of the usual multi-annulate type, sparsely hairy.

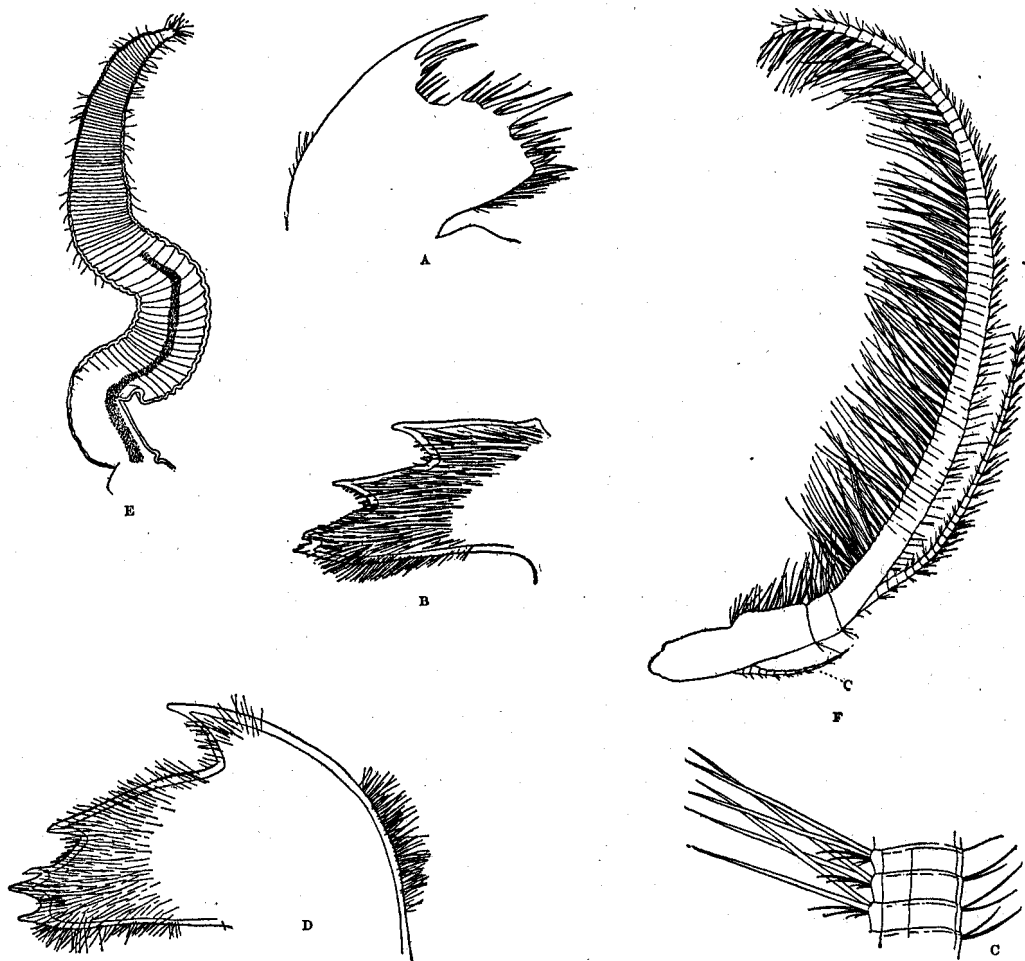


FIG. 3.—*Alepas rex*. A, Maxilla; B, D, mandibles; C, detail from 2d pair of cirri; E, penis; F, last cirrus and caudal appendage, c.

Albatross station 3998, vicinity of Kauai Island, 228 to 235 fathoms, bottom of coarse broken coral, sand and shells. Specimens seated on dead stems of gorgonians.

Four adult specimens were taken on two gorgonia stems, each specimen surrounded by a group of young and larval individuals. The young are more strongly keeled than the adults, the keel being somewhat uneven. They are similarly beset with little warts. The mouth projects decidedly more than in the old specimens.

The cypris larvæ just attaching are about 1.5 mm. long.

VERRUCIDÆ.

Verruca halotheca, n. sp.

[Pl. iv, fig. 9, 10.]

Shell white, flattened above, with steep sides, almost perpendicular to the base of attachment, which has a rounded contour. Surface moderately corrugated with concentric growth ridges. Movable scutum small, flat, with an acute apex and three articular ridges, the middle one strongest. Movable tergum larger, quadrate, flat, with three strong imbricating articular ridges. Fixed scutum roughly quadrate divided by an oblique sulcus into two nearly equal triangles. Fixed tergum of very irregular shape, divided into three triangular areas; its umbo adjacent to that of the movable tergum, but not quite marginal. The carina articulates with the rostrum by means of three large and several smaller teeth, forming a zigzag suture; each tooth terminates a ridge. It articulates with the fixed tergum by a single tooth projecting into the tergum near the base. The rostrum is irregularly cone-shaped, minus a segment, in shape somewhat like the anterior valve of some chitons. It has several radiating ridges on the carinal side. Greatest rostro-carinal length at base 14 mm., at umbones 12 mm., breadth 12.5 mm. Height from base to apex of rostrum, fixed scutum or carina, 8 mm.

Length of the straight rostro-carinal hinge of the opercular valves 10 mm. Length of scutum from this line to umbo 5.5 mm. Length of tergum 6 mm.

Type, no. 32423 U. S. National Museum, from station 4060, northeast coast of Hawaii Island, in 913 fathoms, on a pebble of volcanic rock.

A single specimen of this large *Verruca* was obtained. It is clearly distinct from any of those described by Darwin, Hoek, or in Gruvel's recent monograph, though related to *V. trisulcata*, *spengleri*, etc. It is chiefly notable for the flat top, absence of salient umbones, and the generally inornate appearance. It is the largest *Verruca* yet described. A few detached valves of a small individual were taken at station 3998, vicinity of Kauai Island, in 228 to 235 fathoms, with *Catophragmus* and *Pacilasma*.

CHTHAMALIDÆ.

Genus *CATOPHRAGMUS* Sowerby.

This genus has hitherto been known by two species: *C. imbricatus* Sowerby, from Antigua and *C. polymerus* Darwin from New South Wales, both of which are described in Darwin's monograph on the Balanidæ. The first, *C. imbricatus*, is a very rare barnacle. Both of the species are littoral, associated with or growing on *Tetraclita* and other shore forms.

A third species of the genus, from still another part of the world, is represented by certain mutilated individuals dredged by the *Albatross* near Kauai in about 230 fathoms. It is very distinct from the others by its well developed caudal appendage—that organ being absent in *C. polymerus*, very small in *C. imbricatus*. Moreover, the valves show many points of difference, and the mandibles, maxillæ, and cirri are unlike in various details.

Catophragmus darwini n. sp.

[Pl. v.]

General form of the animal uncertain, since it is known only by broken capitula, which are *Balanus*-like, made up of valves of dense and porcelain-like texture; white. There are at least three whorls of plates, the first whorl consisting of scuta and terga, the second of carina, latera, and rostrum, the third of imbricating basal plates.

The scutum (pl. v, fig. 7 outside, fig. 4 inside), is triangular, sculptured with rather widely spaced ribs parallel to the basal margin. The occludent and basal margins are straight. The tergal margin is somewhat convex, and on the apical half bears a projecting wing or articular ridge with serrate edge and closely grooved and costate surface. This wing projects into the articular groove of the tergum. Inside the scutum shows a beveled, obliquely costate and thick occludent border, a slightly reflexed apical area, and a series of fine sharp grooves running inward from the teeth at the free edge of the articular ridge or wing. The scar of the adductor muscle is not noticeable. The length of the scutum is 5.3 mm.

The tergum (pl. v, fig. 6 outside, fig. 8 inside) is triangular, sculptured like the scutum, but showing weak radiating striæ, also, and with a sharp ridge followed by a depressed band near and parallel to the scutal margin. The carinal margin is straight, the basal a little concave, and the scutal margin is slightly convex. The articular ridge projects far on the scutal side, sloping inward, and is about half as long as the scutal margin, from which it is separated by a deep articular furrow. Inside the apical and scutal margins of the valve and articular ridge are margined by a wide border sculptured with growth lines. Elsewhere the valve is smooth and white.

The carina (pl. v, fig. 1, 3) is shaped much like that of *Balanus*, or like the anterior valve of a chiton, since it surrounds the opercular valves behind and at the sides. Outwardly it is tripartite, with a median curved triangle (the "roof"), sculptured with about five unequal low radial ridges, and two flat lateral triangles; the whole being sculptured with wide-spaced grooves parallel to the basal margin and parted by flat intervals. The umbo is apical. The lateral borders are somewhat crenulated.



FIG. 4.—*Catophragmus darwini*. A, Maxilla; B, mandible; C, caudal appendage; D, fifth cirrus.

The carino-lateral plate (pl. v, fig. 1, Cl.) consists of a triangular, erect, radially six-ribbed area and a projecting ribless triangular wing on the occludent side above; the whole sculptured with spaced grooves parallel to the basal margin, becoming oblique on the wing.

The rostrum (pl. v, fig. 2, 5) resembles the carina in shape, but is smaller, with only three prominent radial ribs. The rostro-lateral plate (pl. v, fig. 2, Rl) is triangular, sculptured with four wide ribs and the usual spaced grooves parallel to the basal margin. The plates of the next lower or third whorl are small, subtriangular, and of three shapes, doubly winged (pl. v, fig. 2, lower left-hand plate), winged on one side (fig. 2, lower right-hand plate), or without lateral wings (fig. 2, intermediate plate). The base is unknown.

The mandibles (fig. 4, B) have three large teeth and a group of denticles at the lower extremity. The maxillæ (fig. 4, A) have the usual pair of strong spines above; the lower moiety of the margin projects beyond the upper, both being densely bristly. The first pair of cirri is much shorter than the others, with wider rami, each of 10 joints, densely bristly. The rami of the third pair have about 21 joints and are like those of the following cirrus. The posterior cirri have about 25 joints. The rami of each cirrus are subequal throughout and are much curled; they have small tufts at the articulations, and a continuous series of long spines along the concave side, about four pairs of spines on each joint (fig. 4, D, fifth cirrus). The caudal appendage is long and slender, of 13 joints (fig. 4, C). The penis

is very long, perhaps longer than the longest cirri, and it is apparently not annulated. There is a tuft of hairs at the end and some sparse, short hairs along its length.

Type, no. 32407 (hard part) and no. 32408 (soft part) U. S. National Museum, from *Albatross* station 3998, vicinity of Kauai Island, in 228 to 235 fathoms, on bottom of coarse, broken coral, sand, shells, and rock; with *Pacilasma bellum*, *Alepa percarinata*, and a few small odd valves of *Verruca halothea*.

Fragments of two or three individuals were taken, the largest and most perfect being drawn in plate v, figures 1 and 2, in which the following plates are preserved in place: Carina (c), carino-lateral (Cl.), terga (T), scuta (S); and in another individual the rostrum (R), rostro-lateral (Rl), and four plates of the third whorl. Figures 3 (top view of carina) and 5 (anterior view of rostrum) represent detached valves of another individual or individuals.

BALANIDÆ.

Balanus amphitrite Darwin.

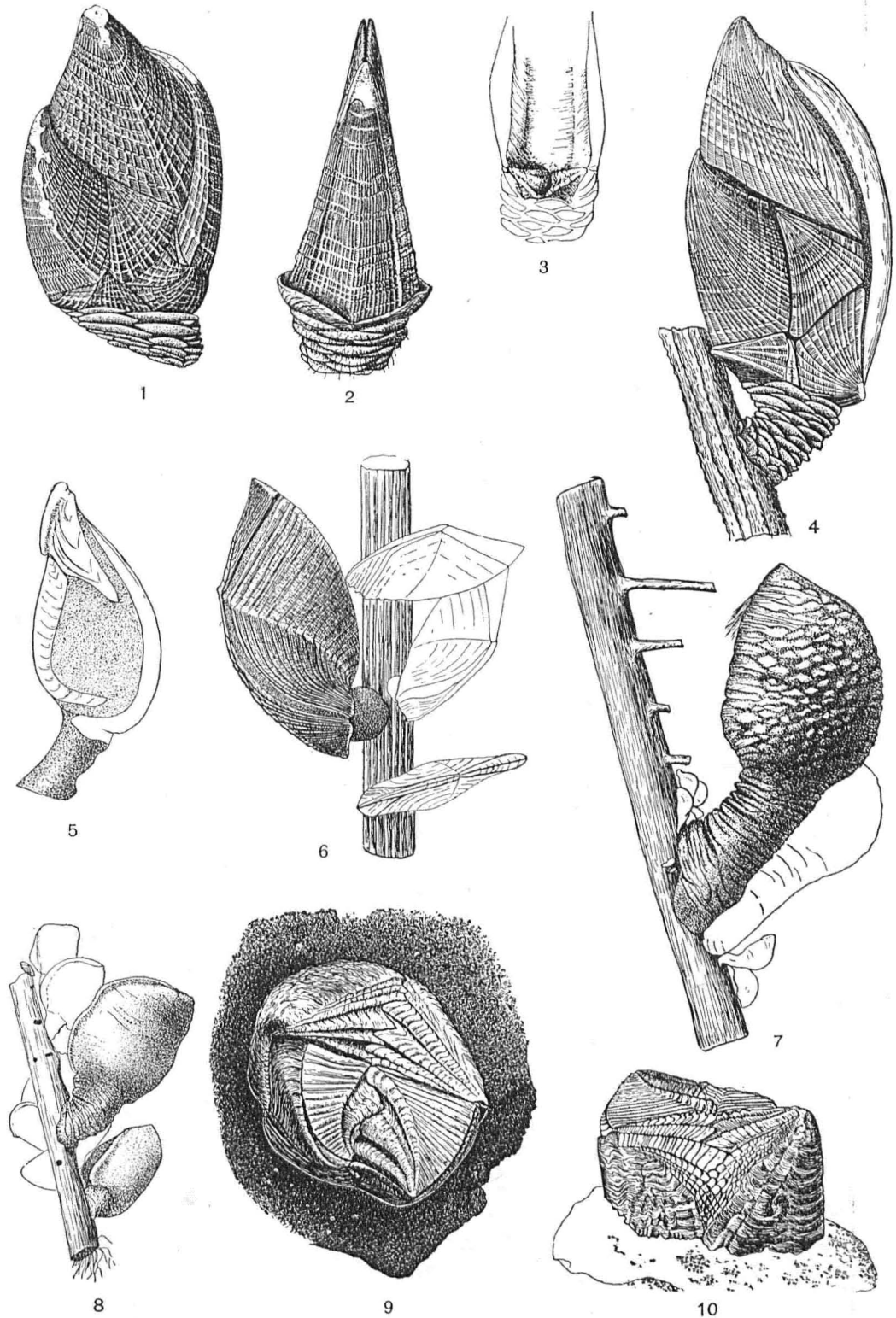
Balanus amphitrite Darwin, Monograph on the Balanidæ, p. 240.

Some small specimens taken from the bottom of a tug at Honolulu are similar externally to figure 2e of plate v of Darwin's Monograph, except that the compartments diverge less above, the aperture being somewhat smaller and hardly dentate. The basal length of the largest specimen is 15 mm. The terga resemble figure 2k of the same plate.

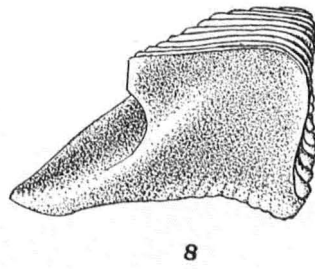
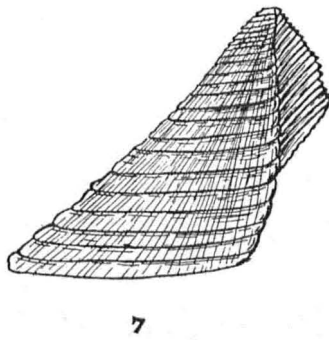
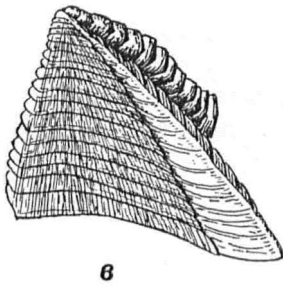
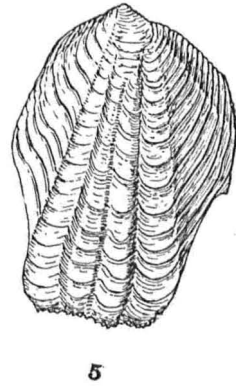
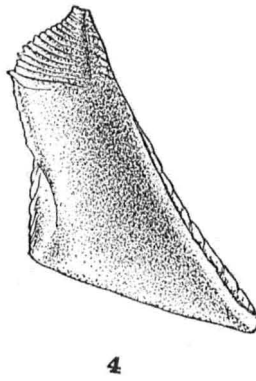
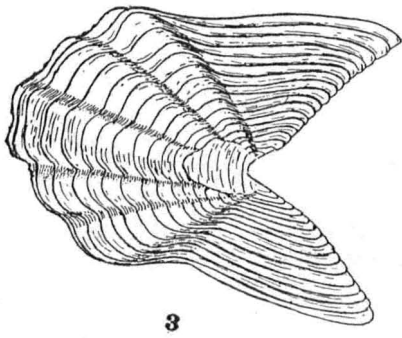
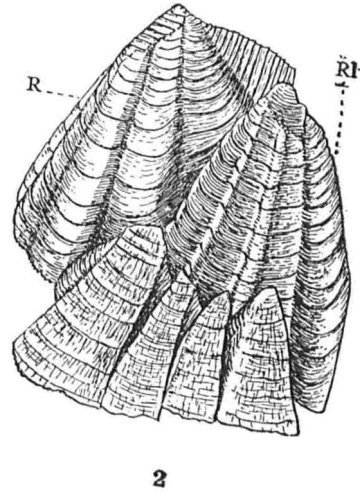
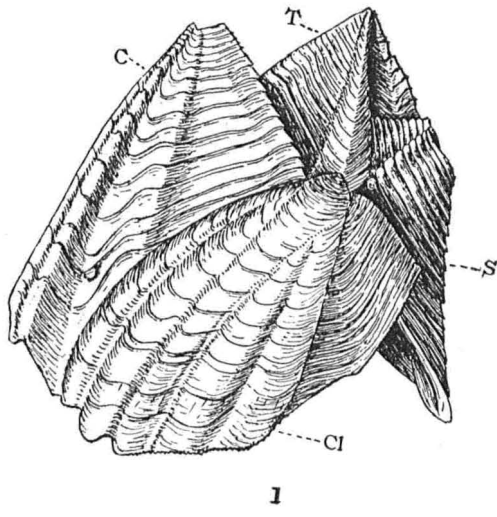
It is difficult to pronounce upon the subspecies or variety of *B. amphitrite* to which these specimens are referable. They are probably not full grown, and a much larger gathering would be essential for a satisfactory study of the Hawaiian race.

Balanus sp.

The tangles brought up numerous *Cidaris*-like spines encrusted with small barnacles 2 to 3 mm. in diameter, at station 4062, northeast coast of Hawaii, 83 to 113 fathoms. They are too young to be identified with certainty.



1-2. *Scalpellum hawaiiense*. Type, side and carinal views.
 3. *Scalpellum pacificum*. Detail of structure at base of carina.
 4. *Scalpellum pacificum*. Type.
 5. *Dichelaspis hawaiiensis*. Type.
 6. *Pacilasma bellum*. Type.
 7. *Alepas rex*. Type.
 8. *Alepas percarinata*. Cotypes.
 9-10. *Verruca halotheca*. Type. Top and carino-rostral views.



Catophragmus darwini.