

later collectors. Its range is very extensive; from off Cape Hatteras to Maceio, Brazil; from Panama to southern California; Pacific Islands; Indian Ocean, etc. Common on the Florida reefs and Keys, and in the West Indies. Colon, Key West, and Egmont Key, W. Florida (Yale Mus.). Gulf of Calif. (Lockington).

Family **GALATHEIDÆ** Dana.

Munida Beanii, sp. nov.

FIGURE 52. PLATE XXVII, FIGURES 8, 9.

A small species, with an ovate carapace, widest opposite the third pair of legs. Transverse, elevated, ciliated ridges are well separated; about sixteen on the carapace, of which four or five are incomplete. Marginal spines about eight, small, acute, the most anterior largest;

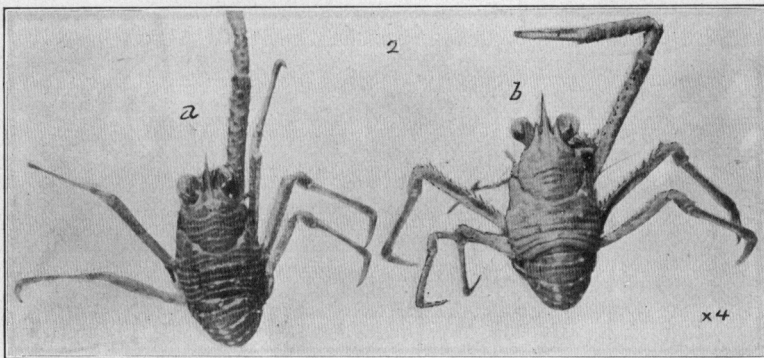


Figure 52—*Munida Beanii*; *a*, dorsal view of specimen with shorter ocular spines; *b*, specimen with longer ocular spines, \times about 3 times. Phot. A. H. V.

dorsal spines ten, very small; of these there are three on each side, anteriorly, in an obliquely transverse line, nearly parallel with the post-orbital border; the inner one is largest; a single spine on each side, behind the second ciliated ridge; a single one, on each side, behind the cervical groove.

Rostrum moderately long, tapered, nearly smooth, acute, triquetral, or with a slight dorsal carina. Orbital spines lanceolate, with sharply acuminate tips, in some cases nearly half as long as the rostrum and reaching the cornea of the eyes; in others not over one-third as long as the rostrum and shorter than the eye-stalk.

Eyes large on rather long, stout stalks; in several specimens the right eye is distinctly larger than the left (see figures). Chelipeds slender; the merus is nearly as long as the chela; the fingers gape at base, at least in the male, the thumb being curved downward at base rather abruptly; outer edge of thumb finely denticulate beyond the curve, edge and tips of finger fringed with short hairs. Entire surface of chelipeds finely spinulose, with minute flat transverse rugæ between the spinules, having ciliated edges. Ambulatory legs also spinulose. The largest specimen has the carapace 7.5^{mm} long; 4.5 wide; length of merus of cheliped, 8^{mm}; of chela, 9; of dactylus, 4^{mm}. Another specimen had the carapace 7^{mm} long, 4^{mm} wide. This species is closely allied to *M. simplex* Benedict, but Mr. Benedict, who has examined the specimens, considers them distinct. In the latter there are two pairs of spines behind the cervical suture; the rostrum is longer and more slender; the chelipeds are longer, and the chelæ longer in proportion to merus. Possibly these differences may be due in part or wholly to immaturity.

Seven specimens, No. 893, were dredged in 50 fathoms, on the Argus Bank, Oct. 13, 1905, by the expedition from the Field Museum of Natural History, under Dr. T. H. Bean, to whom it is dedicated.

HIPPIDEA, DE HAAN.

Hippideu Stimpson, 1859. *Hippoidea* Stimpson, 1860. *Hippidea* Ortmann, 1896.

Family **HIPPIDÆ** Stimpson.

Hippa Fabricius (restr.).

Hippa (*pars*) Fabr., Mant. Insect., pp. 329, 330, 1787; (restr.) 1798, type *H. adactyla*.

Remipes Latreille, 1806, and most later authors.

Hippa M. J. Rathbun, Proc. U. S. Nat. Mus., xxii, p. 301, 1900 (*non* M.-Edw.).

Miss Rathbun has restricted this generic name to the group typified by *adactyla*, the only species left in the genus by its author, in 1798.

Hippa cubensis (Saussure) Rathbun. *Sand-bug*.

Remipes cubensis Saussure, Rev. Mag. Zool., (2), ix, p. 503, 1857; Crust. Antilles and Mex., Mem. Soc. Phys. Nat. Hist. Genève, xiv, p. 452, pl. ii, figs. 19, 20, 1858. Rankin, Ann. N. Y. Acad., xi, p. 237; op. cit., xii, p. 533 (Bermuda).

Remipes scutellatus Miers, Jour. Linn. Soc. London, xiv, 1879, p. 319. Henderson, Voy. Challenger, Zool., xxvii, p. 138, 1888. (?Not *Hippa scutellata* Fabricius. Ent. Syst., ii, p. 474, 1793.)

Remipes Barbadosis Stimpson, Proc. Philad. Acad., 1858, p. 229 [67]; Ann. Lyc. Nat. Hist. N. York, x, p. 120, 1871.

Hippa cubensis Rathbun, Proc. U. S. Nat. Mus., xxii, p. 300, 1900 (W. Africa).

FIGURES 53, 54.

The carapace is somewhat depressed. The antennæ are much smaller than in the related species of the eastern U. S. coast. (*Emerita talpoidea*.)

The females are much larger than the males and usually more numerous in collections.

Our specimens, taken in spring and October, are without eggs. Henderson records a number of specimens taken at Bermuda by the Challenger, in May, several of which carried eggs.

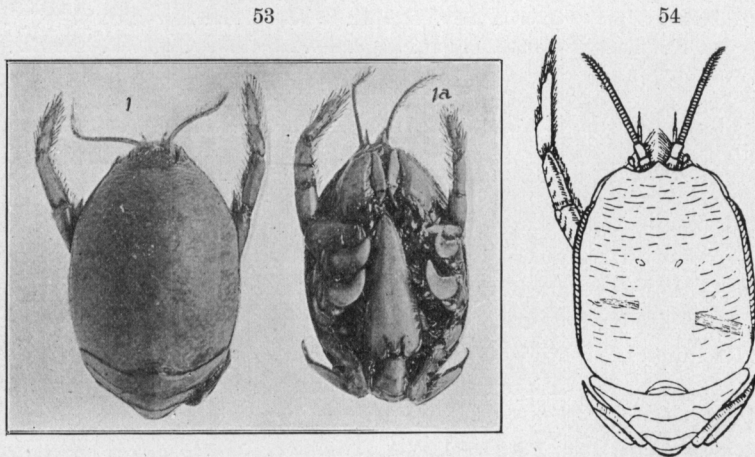


Figure 53.—*Hippa cubensis*; 1, dorsal; 1a, ventral view; \times about $1\frac{1}{4}$. Phot. A. H. V.

Figure 54.—The same; carapace, enlarged, after Saussure.

Adult female specimens are about 20 to 23^{mm} long, by 17 to 19^{mm} wide; the males are about 12^{mm} long. One of the largest females is 22^{mm} long; 18.5 wide.

It lives in the shifting sands at and below low-tide level. When laid bare by the waves it can quickly retreat backward into the sand for some depth.

It is not uncommon at Bermuda, on sandy shores, but requires special search. It was in the early collections of Jones, Goode, and Merriam. Also obtained by the Challenger Expedition. Rankin records it from Cooper's Island.

Its range is from the Florida Keys to Brazil and to West Africa and the adjacent islands. Common in most of the West Indies. Abundant on the shores of Cuba (Saussure); Old Providence, April, 9, 1884, with eggs (Str. Albatross, Smith).

Cape Verde Islands (Studer, Miers, etc.); Dahomey (Osorio); Quinchoxo (Studer); Ascension Island (Miers, Benedict); Bahamas (Rankin); Dominica I. (A. H. Verrill, 1906). Brazil (coll. Hartt, Yale Mus.).

Family **ALBUNEIDÆ** Stimpson.

Albunea oxyophthalma Miers.

Miers, Jour. Linn. Soc. London, xiv, p. 329, pl. v, figs. 14, 15, 1879. Benedict, Anom. Crust. Porto Rico, p. 139, 1901. Verrill, these Trans., xi, pp. 18, 62, pl. viii, fig. 1, 1901 (Bermuda, *oxycephala* on p. 18 by error).

? *Albunea Paretii* Guerin, Rev. et Mag. de Zool., ser. ii, vol. v, p. 48, pl. i, fig. 10. Kingsley, Proc. Philad. Acad. Sci. for 1879, p. 409 (W. Florida).

PLATE XXVIII, FIGURE 1.

This species is peculiar in having eleven or twelve spines each side of the central rostral tooth, and unusually long eye-stalks. In the closely related species (*A. Gibbesii*) of the U. S. coast, there are only nine or ten teeth on each side.

The only Bermuda specimen known to me is the one recorded in 1901. It was found buried in the beach sand by Mr. T. G. Gosling. It is, no doubt, nocturnal in its habits.

Its range is from West Florida to Brazil. St. Christophers, Cayenne, and Brazil (Miers). Sarasota Bay, W. Florida (Kingsley).

PAGURIDEA, Stimpson, 1859.

Family **CENOBITIDÆ**. *Land Hermit Crabs.*

Cenobita Diogenes (Latr.) Edw. *Land Hermit Crab.*

Pagurus Diogenes Latr., Encyc., pl. 284, figs. 2, 3 (after Catesby).

Cenobita Diogenes H. M.-Edw., Hist. nat. Crust., ii, p. 240, pl. ii, figs. 11-14, 1837. Smith, these Trans., ii, p. 38 (Brazil). Rankin, op. cit., p. 533, 1900 (Bermuda). Benedict, Anomura Porto Rico, p. 139, 1901 (descr.). Verrill, Geology of Bermuda, Amer. Journ. Science, ix, p. 338, 1899, fig. 12; these Trans., vol. xi, pp. 464, 708, fig. 22a; The Bermuda Islands, pp. 52, 296, fig. 22a (habits); these Trans., vol. xii, pp. 158, 179, 196, 197, fig. 60, 1906 (fossil).

FIGURE 55.

This is the only land hermit crab of this faunal region. Easily recognized by the large, massive, purplish left chela; stout ambulatory legs; the wide compressed propodus of the left leg of the second pair; and the compressed eye-stalks.

Not uncommon at Bermuda and often found on the high sand hills, far away from the shore, and in gardens. Large specimens usually occupy fossil shells of *Livona pica*, which have weathered out from the soft æolian limestones. These fossil shells were doubtless carried from the shore to the ancient sand dunes by the remote ancestors of these same crabs.

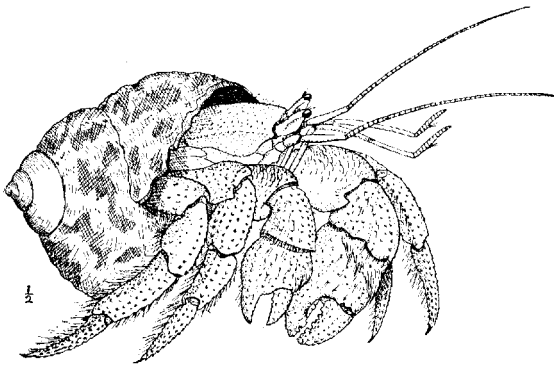


Figure 55.—Land Hermit Crab in shell of *Livona pica*, about $\frac{2}{3}$ nat. size. From living specimen by A. H. V.

Its range is from Florida Keys to Brazil. Key West, Santa Cruz, Dominica I. (Yale Mus.). Andros I. and Nassau (Rankin). Found on nearly all West India Islands.

A fossil Bermuda specimen, in a shell of *Livona pica*, is in the Yale Mus. (coll. Jones).

Family **PAGURIDÆ**. *Hermit Crabs*.

Calcinus sulcatus (M.-Edw.). Stimp. *Red Hermit Crab*.

Pagurus sulcatus M.-Edw., Ann. Sci. Nat., ser. 2, vi, p. 279, 1836; Hist. nat. Crust., ii, p. 230, 1837.

Calcinus sulcatus Stimpson, Proc. Acad. Nat. Sci., Philad., 1858, p. 234. S. I. Smith, these Trans., ii, p. 17, 1869 (Brazil). Hilgendorf, Monats. Preuss. Akad. Wiss., Berlin, 1878, p. 823. Henderson, Rep. Challenger, Zool., vol. xxvii, Anomura, p. 61. Verrill, these Trans., x, p. 578, 1900. Benedict, Proc. U. S. Nat. Mus., xvi, p. 939, 1893; Anom. Porto Rico, p. 141, pl. v, figs. 3, 3a, 1901 (descr.).

Pagurus tibicen White (*variety*), List of Crust. in the British Museum, p. 61.

Calcinus tibicen Rankin, Ann. N. York Acad., xii, p. 533, pl. xvii, fig. 1, 1900 (descr. colors, etc.).

Calcinus obscurus Stone, in Heilprin, op. cit., p. 149 (*non* Stimpson).

FIGURES 56, 57. PLATE XXVIII, FIGURE 7.

The colors appear to be pretty constant, in the Bermuda examples, and last very well in formalin or alcohol. The legs and chelæ in

one of the fresher specimens are mostly dark red, becoming brighter red on the margins and at the joints; the chelæ have a patch of dark olive brown on the middle of both sides of the palm; the tips of the dactylus and thumb are white or pale yellow; the whole surface of the chelipeds and ambulatory legs, except on the white

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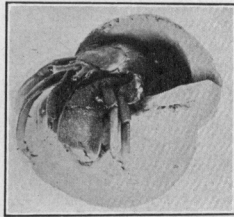


Figure 56.—*Calcinus sulcatus*, about natural size. Phot. A. H. V.

tips, is covered with very small round spots of blue; these are also present on the carapace anteriorly. The ambulatory legs are brownish red or bright red, with a band of white or pale yellow on the distal end of the carpus and proximal end of the dactylus, and a narrower one at the base of the nail, which is black. The basal joints of the ambulatory legs are white and pale reddish underneath.

57

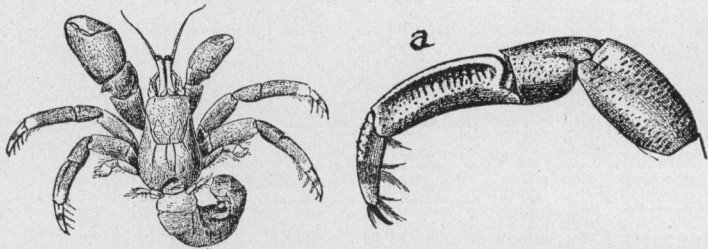


Figure 57.—*Calcinus sulcatus* removed from shell; a, second left leg of same, more enlarged to show sulcus; after Benedict.

The outer maxillipeds and the basal joints of the antennæ beneath are dark olive green or yellowish green; flagellum of antennæ orange-yellow. The eye-stalks are light orange-red, with a pale yellow or white band close to the eye. The anterior part of the carapace is red or brown, like the chelæ, and has a median patch of dark olive-green; posterior part bluish white or purplish white, irregularly spotted with red or brown; in some there is a large ill-defined patch of white about the suture or on the sides. The variations are mainly in the darker or lighter shades of color. The young

and some adults are pale red, instead of brownish red. In some there is but little white on the tips of the chelæ; this is often preceded by an orange tint; in some the white bands of the legs are bordered by pale purple.

Some of the females taken by the members of the Biological Station, in June and July, 1903, carried eggs.

"It is closely allied to *C. tibicen* Dana and *C. obscurus* Stimpson, but differs remarkably from both of them in the deep and rugose sulcus on the outer side of the propodus of the left leg of the second ambulatory pair. This sulcus is very marked, extends the whole length of the segment, and is limited on the upper side by a sharp carina. From the *obscurus* it differs moreover in having the carapax broader in front, and the antero-lateral angle more prominent, and not rounded as it is in that species."

"Length of body from front of carapax to tip of abdomen, 23.5^{mm}; length of left hand, 7.6; breadth of left hand 4.5." (S. I. Smith.)

This is a common species in shallow water at the Bermudas. We obtained numerous specimens in 1898 and 1901. It is in the early collections made by Jones, Goode, and Merriam. Dr. Rankin records females carrying eggs, taken in midsummer. It was also obtained by the Bermuda Biological Station, 1903, and the Field Nat. Hist. Museum, October, 1905.

Its range is from Florida to the Abrolhos Islands, Brazil (Smith). Pernambuco and Maceio, Brazil, on reefs (Rathbun).

Dardanus venosus (Edw.) *Red-veined Hermit Crab.*

Pagurus venosus H. M.-Edw., Ann. des. Sci. Nat., ser. 3, vol. x, p. 61, 1848.

Stimpson, Notes, No. i, Ann. Lyc. Nat. Hist. N. York, vii, p. 82 [36], 1859.

Petrocheirus insignis M. J. Rathbun, Branner-Agassiz Exp. to Brazil, p. 144, 1900 (*non* Saus. sp.*). Verrill, these Trans., x, p. 578, 1900 (*non* Saus.).

Pagurius insignis Benedict, Anomura Porto Rico, p. 141, 1901 (*deser., non* Saus. sp.).

FIGURES 58, 59.

This species sometimes grows to large size. It is handsomely colored in life.

It has been repeatedly confused with *D. insignis*, as indicated in the synonymy,† but is very distinct from that species, as the accompanying figures show.

* *Pagurus insignis* Saussure, Crust. Antilles, Mex., Mem. Soc. Phys. Hist. Nat. Genève, xiv, p. 453, pl. iii, figs. 20, 20a, 1858.

† Stimpson's description was very brief, but characteristic. Mr. Benedict, op. cit., 1901, has given a much better description of it, under the name of *insignis*.