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GEOGRAPHICAL DISTRIBUTION; ORIGIN OF
THE BERMUDIAN DECAPOD FAUNA

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IN a report now in course of publication¹ on this group, 78 species, subspecies or named varieties are discussed, of which 16 have not been previously recorded from Bermuda. Among these, six are described as new.

Of the total number, 72, equal to 93 per cent., have been recorded also from the Florida Keys or the West Indies, or from both, demonstrating the close faunal relations of the two regions. The macruran Decapoda (35 species) show similar relations.

About 53 of the forms (about 68 per cent.) range from Florida to Pernambuco, Brazil, or farther south.

A considerable number, about 25 species, or 31 per cent., extend their range north of Florida to the coast of South Carolina or farther north, the greater portion of these reaching Cape Hatteras. Six or seven reach southern New Jersey.

Two species, *Callinectes sapidus*, *Eupanopeus Herbstii* and its var. *obesus*, range northward to southern New England, as permanent residents.

Several others occur occasionally or sporadically on this coast, being carried northward by the Gulf Stream, or by shipping, but fail to become naturalized so far north, owing to the cold of winter.

¹ *Trans. Conn. Academy of Sciences*, Vol. XIII, pp. 299-473, plates ix-xxviii.

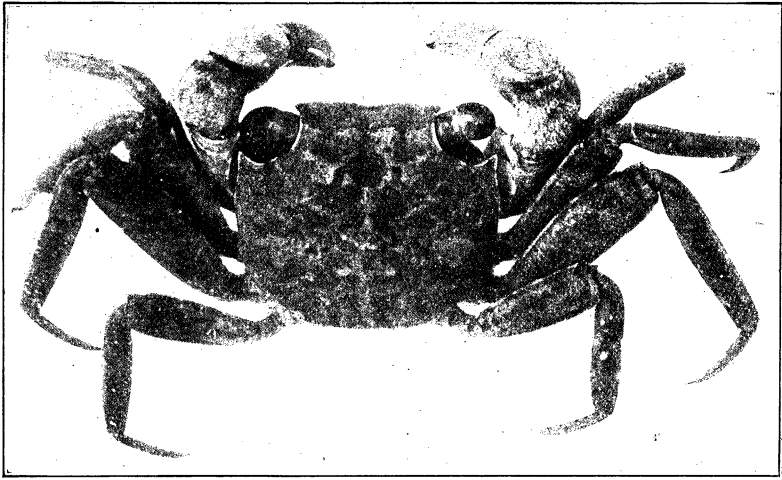


FIG. 1. *Sesarma Ricordi*, var. *terrestris*, nov. Co-type; \times about 2. Phot. A. H. Verrill.

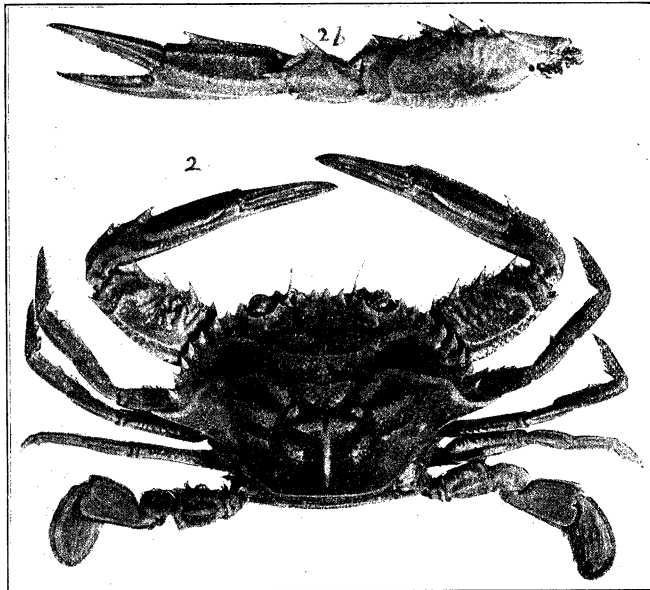


FIG. 2. *Achelous Smithii*, nov.; cotype, dorsal view; \times about $1\frac{1}{10}$; 2b, chela of the same, front view. Phot. A. H. Verrill.

It is evident, therefore, that the Bermuda decapod crustacean fauna is an offshoot or colony from the West Indian fauna, with only a slight admixture of species from other regions. In this respect the Crustacea agree with the Anthozoa, Mollusca, Echinoderms, etc.

The additions to the fauna of Bermuda, including the new species and varieties, are as follows:

* *Sesarma Ricordi, terrestris*, subsp. nov. See *Science*, Vol. XXVII, p. 491. Fig. 1.

* *Eupanopeus Herbstii, minax*, subsp. nov.

* *Eupanopeus bermudensis*, var. *sculptus*, nov.

Callinectes Danæ Smith.

Callinectes marginatus, larvatus (Ord.).

Achelous Smithii, nov. Fig. 2.

Achelous Gibbesii Stimpson.

Charybdella tumidula (Stimpson).

Mithrax cornutus Saussure.

Challenger Bank, 30 fathoms. Field Museum Nat. Hist., 1905.

Parthenope (Platylambrus) crenulatus (Saus.). Fig. 5.

Challenger Bank. Bermuda Biological Station, 1903.

Troglocarcinus corallicola, gen. et sp. nov. Fig. 3.

Parasitic in living corals (Mussa, Mæandra).

Dromia crythropus (Edw.). Fig. 7.

Argus Bank, 30-40 fathoms. Field Mus.

Dromidia antillensis Stimpson. Fig. 4.

Challenger Bank. Bermuda Biological Station, 1903.

* *Petrolisthes armatus, pallidus*. var. nov.

* *Munida Beanii*, sp. nov.

Argus Bank, 50 fathoms. Field Mus. Nat. History.

Dardanus venosus (M.-Edw.).

Previously recorded under the name of *D. insignis*, which is a distinct species.

* *Clibanarius hebes*. sp. nov.

Those with an asterisk prefixed are known only from Bermuda.

The following 25 species range northward on the American coast to or beyond South Carolina, as permanent residents:

<i>Ocypode arenarius</i> . (To N. Jersey.)	<i>Portunus Sayi</i> .
	<i>Achelous anceps</i> .
<i>Planes minutus</i> . (To N. Jersey.)	<i>A. Gibbesii</i> .
<i>Plagusia depressa</i> .	<i>A. spinimanus?</i>

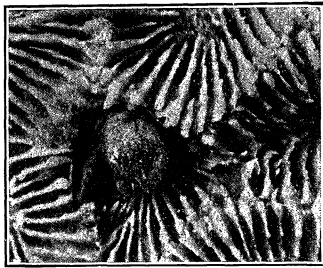


FIG. 3

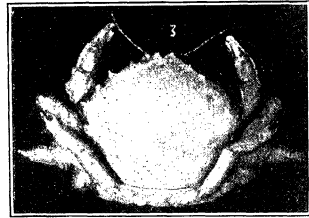


FIG. 4

FIG. 3. *Troglodarcinus corallicola*, nov., ♀, partially out of its den in a coral (*Mussa*) from Dominica I; × about 2. The crab was intentionally placed in a den belonging to an older individual, otherwise but little of it could be seen. Phot. A. H. Verrill.

FIG. 4. *Dromidia antillensis*; about nat. size. Phot. A. H. Verrill.

Cyzyloxanthops denticulatus.

Eupanopeus Herbstii. (To C. Cod.)

E. Herbstii. obesus. (To C. Cod.)

E. occidentalis.

Eurytium limosum. (To N. Jersey.)

Eriphia gonagra.

Callinectes ornatus.

C. sapidus. (To C. Cod.)

A. Smithii, nov.

A. Sebæ.

A. Ordwayi.

A. depressifrons.

Stenorhynchus sagittarius.

Podochela Rüsei.

Mithrax forceps.

Macrocaloma trispinosum.

Calappa marmorata.

Petrolisthes armatus.

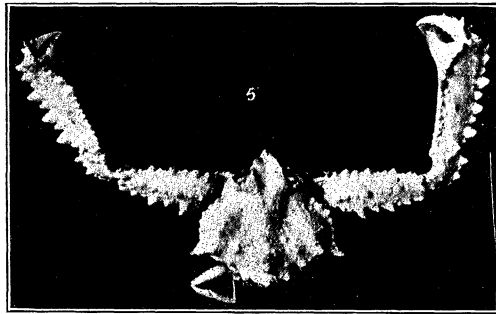


FIG. 5. *Parthenops crenulatus*; × about 3. Phot. A. H. Verrill.

Several of the species, mostly grapsoids, are found in most, or all, tropical seas, as well as in the West Indies. They are as follows:

Grapsus grapsus.

Geograpsus lividus.

Plagusia depressa.

Percnon planissimum.

Pachygrapsus transversus.
Planes minutus.

Domecia hispida.
Petrolisthes armatus.

Nearly all the widely distributed species, included in the last list, are found on the West Coast of Africa. But some additional species, common to Bermuda and the West Indies, are also found on the West African coast. Namely:

Goniopsis cruentatus. *Calappa marmorata.*
Callinectes marginatus ? larvatus. *C. gallus, galloides.*
Stenorhynchus sagittarius. *Hippa cubensis.*

Aside from the widely distributed grapsoid crabs, found in all tropical seas, very few of the Bermuda species are found on the Pacific coasts of Central and North America. But some others are represented there by closely allied species or subspecies. The species that have been considered identical by recent good authorities are as follows:

Goniopsis cruentatus. * *Domecia hispida.*
* *Grapsus grapsus.* *Epialtus bituberculatus* (varieties).
* *Geograpsus lividus.* * *Calappa gallus* (varieties).
* *Pachygrapsus transversus.* *Cycloës Bairdii* (varieties).
* *Planes minutus.* . *Petrolisthes armatus.*
* *Plagusia depressa.*
* *Percnon planissimum.*

Those preceded by an asterisk are circumtropical.

It is well known that a considerable number of species of Mollusca, Echinoderms, Anthozoa, etc., as well as Crustacea, are common to West Africa, Brazil and the West Indies. Such species may have originated on the African coast and thence migrated across the Atlantic to South America, and thence northward to the West Indies, Florida and Bermuda, during recent geological times. All the species of Decapod Crustacea having this wide range exist for a considerable length of time as free-swimming larval forms, in the zoëa and megalops stages. These larval forms may be carried long distances by the prevailing oceanic currents, especially in the regions of the trade winds.

It is scarcely admissible to suppose that they could have

traveled in the opposite directions, against the currents, unless by human agency, in recent times.

Many Crustacea, including the higher and more active forms, especially the grapsoid and cancrivora crabs, are in

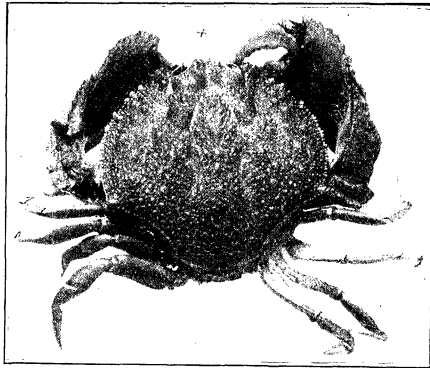


FIG. 6. *Cyclops Bairdii*, var. *atlantica*, nov., $\frac{2}{10}$ nat. size. Phot. A. H. Verrill.

the habit of hiding among the clusters of barnacles, etc., attached to the bottoms of vessels, and in this way they may be carried across the oceans in any direction, so long as the temperature of the water is suitable for their existence. In this way many tropical species reach the New England coast in summer, but die out during the winter.

Several species of crabs and shrimps habitually live among floating *sargassum*, or attached to floating drift-



FIG. 7.. *Dromia erythropus* from Dominica, with a flat Chalimid sponge held over its back, about $\frac{1}{2}$ nat. size. Phot. A. H. Verrill.

wood. This is the case especially with *Planes minutus*, *Portunus Sayi*, and some others. That they have migrated to Bermuda in this way is very evident, for they do so constantly, day by day, at the present time.

But the majority of the species common to Bermuda and the West Indies do not have such habits, and must have migrated northward in the free-swimming larval stages. The directions of the Gulf Stream and prevailing wind currents are favorable for the transportation of free-swimming animals from the Bahamas, Cuba, etc., to the Bermudas.

On the other hand, very few, if any, strictly East American species have established themselves in the Bermudas, notwithstanding the constant passage of vessels in that direction for nearly three hundred years. Perhaps the temperature of the Gulf Stream is too high to allow such species to be carried across it, or they may not be able to endure the summer temperature of the Bermuda waters.

There are, likewise, no Decapod species of European or Mediterranean origin known in the Bermuda fauna, though such are known to occur in other orders, especially in those groups that habitually cling to the foul bottoms of vessels.

It would be of great scientific interest, as well as evident economical benefit, to experiment with the introduction of edible East American and West Indian crustacea that do not now exist at the Bermudas. Among those that might succeed are the large southern rock crab (*Menippe mercenaria*); the West Indian rock crab (*Carpilius corallinus*); the southern variety of the edible blue crab (*Callinectes sapidus*); and many others. Probably their fertilized eggs could be transported far more easily than the adults, and in vastly greater numbers. With suitable arrangements at the new Bermuda Biological Station, such eggs could easily be hatched and the young liberated in great numbers, in suitable places.

It would probably be useless to attempt to introduce those species that are restricted to our coast north of

Cape Hatteras, such as the common lobster, but there seems to be no reason why any species from the Carolina coasts or the Florida Keys should not flourish in Bermuda if once introduced there in considerable numbers and protected from their enemies at first.

Probably hundreds of species have been accidentally carried there, singly or in small numbers, in past times, which have failed to establish themselves, either because they became too far separated to find their mates at the breeding season, or because they were too soon eaten up by voracious fishes. Yet a single female crab, carrying fertilized eggs, might succeed in introducing the species, for their eggs often amount to 5,000, or even 10,000 at one time. Aside from edible species, the introduction of the smaller kinds would afford a large additional supply of food for useful fish, and thus benefit the fisheries.