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The Larval Decapod Crustacea of Tropical West Africa

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The collection is large and includes examples from most groups. In many cases it is not possible to identify species, or even genera, but what could be identified, or even approximately identified, is interesting. The larvae of many deep water carids are still unknown. Those in the present collection belong chiefly to the *Oplophoridae* and, possibly, to the *Palaemonidae*. In most cases it is not worth while trying to identify them although certain of the *Acanthephyrids* can be named. The numerous Alpheid larvae have also been left, although they have been sorted out and the same applies to most of the crab zoeae and megalopae. Certain forms have, however, been identified, notably *Dorippe armata* which was turning from the zoea to the megalopa, *Hippa cubensis*, and some *Albunea* the species of which was not certain. One of the latter is unlike any form of *Albunea* known. There are many penaeids, the commonest being *Penaeus duorarum* which has been separated by BURKENROAD (1939) from *B. brasiliensis* and is closely related to that species. One specimen of the larva of *Rhynchocinetes rigens* was present which brings its distribution considerably further east. The larva of what is almost certainly *Latreutes parvula* has been identified and also that of *Lysmata moorei*. There are many phyllosoma larvae which, apparently, all but one, which is probably *Thenus*, belong to *Panulirus* and *Scyllarus*.

The classification used here is mainly that of GURNEY (1939) but the Caridea are classified according to HOLTHUIS (1951) whose monograph in these reports are of the greatest help in this work; also the monographs of MONOD (1956) on the Brachyura of West Africa, on the Porcellanidae of CHACE (1956), and on the Paguridae of FOREST (1955). I am much indebted to them for sending literature.

My best thanks are due to Dr. F. S. RUSSELL, Director of the Plymouth Laboratory for allowing me to work there.

MACRURA NATANTIA

Penaeidea.

*Penaeidae.**Aristaeinae.*

Gennadas sp. A few larvae from Station 31, two from Station 101 and several from Station 139. These are like GURNEY's figures (1924b, fig. 4) and HELDT (1938, p. 126) but it is impossible to identify them further.

Solenocerinae.

Solenocera (? *membranacea* H. Milne Edwards), see HELDT, 1938). Those closely resemble HELDT's figures. One post-larva and three larvae from Station 83, one larva from Station 25, two larvae from Station 52A, three larvae from Station 105, two larvae from Station 115.

Penaeinae.

The commonest species is *Penaeus duorarum* Burkenroad which occasionally occurs in large numbers. The next in numbers are larvae which almost certainly belong to *Parapenaeus*. These I have called ?*Parapenaeus* sp. They are very like the larvae described by HELDT (1938) as *Parapenaeus longirostris* but have no spine dorsally on the third abdominal somite as in that species. Otherwise the rostrum, general form and telson agree. GURNEY (1943) regards this dorsal spine on somite 3 as diagnostic for the genus compared with *Penaeopsis*. There are, however, larvae in the collection which agree much more with *Penaeopsis* as described by him and the I have called ?*Penaeopsis* sp. A fourth larva appears to belong to *Sicyonia* (?) *Sicyonia* sp., but this is rare. It agrees well with and is probably related to, the larvae described by GURNEY (1943) as *Sicyonia wheeleri*. A fifth larva apparently belongs to *Funchalia*, only one specimen.

Penaeus duorarum Burkenroad (Fig. 1). This is by far the commonest penaeid in the collection. It occurs at the following stations:— 28, 53, 82, 83 (several), 85, 101 (many), 105, 111 (many), 115 (several), 119 (many), 132 (many). Most of these are post-larvae. This species is closely related to *P. brasiliense* whose larvae are described by PEARSON (1939). (?)*Penaeopsis* sp. St. 28, 50, 111 (several), 112, 132 (several), 134.

(?)*Parapenaeus* sp. St. 85, 89, 132 (many).

(?)*Funchalia* sp. St. 28, one specimen.

Sicyoninae.

(?)*Sicyonia* sp. St. 99, 113.

Sergestidae.

Nearly all the specimens are damaged, especially the mastigopus and young stages, the legs and third maxillipedes in nearly all cases being lost. It is therefore very difficult to determine the species and many have been left unidentified. Mastigopus stages of what are almost certainly *Sergestes edwardsi*, *S. cornutus*, *S. corniculum* and *S. arcticus* occurred. Acanthosoma stages of *S. arcticus* and, probably *S. vigilax*. Elaphocaris stages of, probably *S. robustus* and *S. vigilax*. It is not possible to be certain of any of these as too little is known about them. They are noted here as being identical with or closely related to, the larvae described by GURNEY and LEBOUR (1940).

Sergestes. Group I. (Hansen).

Sergestes cornutus Kr. juv. (see HANSEN, 1922) one specimen. St. 111. A few mastigopus, damaged. St. 27. Several mastigopus, probably this species, badly damaged, St. 50.

Sergestes arcticus Kr. mastigopus, 5 specimens St. 85. One Acanthosoma, St. 89, four Acanthosoma, St. 83, seven Acanthosoma, St. 132.

Sergestes corniculum Kr. Probably this species, five mastigopus, St. 28, one mastigopus, St. 97.

Sergestes robustus Smith. Probably this species, two second elaphocaris, St. 132. One third elaphocaris, St. 132. Unidentified mastigopus, badly preserved and damaged, belong to Group I, St. 27, 30, 82, 83, 87, 97, 111.

Groups II. (Hansen).

Sergestes edwardsi Kr. Probably this species one juv. St. 50. One mastigopus, St. 101.

Sergestes vigilax Stimpson. Probably this species. Four Acanthosoma, St. 28. One Acanthosoma, St. 76. One elaphocaris, St. 132.

Lucifer.

Lucifer sp. Many *Lucifer* occurred. These have not been specially examined. St. 10 several, St. 53, St. 75 several, St. 81, 83, 101, 111, 112, several, St. 131.

*Caridea.**Atyidae.*

(?) *Atya africana* Bouvier, juv. HOLTHUIS (1951) found what he regarded as almost certainly this species. A few specimens, corresponding to his, occurred at St. 53, very near where his came from, off Liberia.

Oplophoridae (= Hoplophoridae Gurney).

The only larvae which can be certainly identified as far as the genus belong to *Acantheephyra*. Three adults are recorded by HOLTHUIS, the most frequent being *Acantheephyra sexispinosa* and *A. acantheelsonis*. Some of the present larvae almost certainly belong to these two species.

(?) *Acantheephyra sexispinosa* Kemp (Fig. 2). Several specimens from St. 28, from off the Gold Coast from over 3000 m., one from St. 85, unfortunately lost, and one post-larva from St. 139, off Liberia. The larvae are closely related to those of *Acantheephyra purpurea* of which all the larval stages are known (in LEBOUR, GURNEY and LEBOUR, 1941). As *A. purpurea* does not occur so far south (see KEMP, 1939) it seems almost certain that the larvae belong to *sexispinosa*. The full number of dorsolateral spine on the telson have not appeared, but this is also the case in the larva of *A. purpurea*.

(?) *Acantheephyra acantheelsonis* Bate (Fig. 3). One post-larva from St. 139, off Liberia (1750 m. wire). The telson has 17 dorsal-lateral spines and the rostrum is toothed above and below.

(?) *Acantheephyra acutifrons* Bate (Fig. 4). A post-larva, very badly preserved with short rostrum from St. 139 may belong to this species. This has a very pronounced hook on the third abdominal somite and five teeth on the rostrum; probably three teeth each side of the telson. This species is also recorded by HOLTHUIS from Liberia.

The telson of all these three species of post-larvae are alike at the posterior end with a small outer spine, two inner long spines and a central spine.

Larval *Acantheephyrids* occur at St. 28, 134 and 139. These may belong to the above-mentioned species but they are badly preserved and it is not possible to be certain.

Unknown larva, probably belonging to the *Oplophoridae*, from St. 82, one specimen and a fragment (Fig. 5), 1700 m. wire out, 5200. This larva which is unlike any known cannot be identified but it is worth noting it is almost certainly an *Oplophorid*, possibly a *Notostomus*. No larval *Notostomus* is known but we know something about *Acantheephyra*, *Systellaspis* and *Oplophorus* (see GURNEY and LEBOUR, 1940) and the present larva does not agree with any of these. *Acantheephyra* has small eggs and so does *Notostomus*. *Systellaspis* and *Oplophorus* have large eggs with larvae which hatch out in a fairly well developed state.

The present larva measure 5.7 mm. in length which indicates that it comes from a fairly small egg but not so small as in *Acantheephyra*. It is well developed in many ways but has a large amount of remaining yolk with oil globules. Pleopods show as small knobs under the skin. The eyes are conspicuous and free. The legs are very backward but show beginning of exopods on all. The telson is well developed with setose uropods and rounded apex with a central spine and six spines each side, the fourth the

largest, and there is one dorso-lateral spine far up the side. This type of telson does not quite agree with any known form of larva. The rostrum is rounded and covers the eyes so that it is not unlike the shape of *Notostomus robustus*. A large and very late larva from Bermuda, possibly a *Notostomus*, is described by LEBOUR (1952).

It is impossible to prove that this larva belongs to any known form but it seems that it might be a *Notostomus* and that it hatches in a very undeveloped state in some ways but is forward in others.

The fragment shows part of the front of the rostrum with eyes and antennae and is similar to the whole specimen.

Rhynchocinetidae.

Rhynchocinetes rigens Gordon (Fig. 6). One late larva occurred. It corresponds well with the larva described by GURNEY (GURNEY and LEBOUR, 1941) from Bermuda where both the adult and larvae occur commonly. The species was originally described by GORDON (1936) from Maderia and so far these are the only localities known for the species which is the only one inhabiting the Atlantic. This record shows a greatly extended range of habitat. The specimen is a late larva with characteristic long antennal flagellum (broken). It occurred at St. 33 (17°11' N., 24°52' W., S 100, about 4000 m.) Canary Is. to Cape Verde Is.

Some unidentified larvae are of interest but cannot be placed. They have no exopod on the fifth leg, therefore cannot belong to the *Oplophoridae*. Nearly all the legs are broken but what remain show that they have long powerful exopods on legs 1—4, the endopods being either long or short.

The most conspicuous of these larvae is a very large one, only one specimen from St. 82 (5°27' N., 0°07' E. S200, 1700 m. wire out). This I have called Larva A (Fig. 7). Length 65 mm. No exopod on leg 5, the other legs not well developed and rather short. No chelae formed. Long exopods on legs 1—4. Long conspicuous eyes. A very large hump on abdominal somite 3. Rostrum inflated into a crest with 16 teeth dorsally and some, incompletely developed below. A narrow denticulated rostrum shows beneath the crest. Telson with 4 dorso-lateral teeth and 6 + 6 terminal teeth, the end rounded. The telson showing beneath the skin has 3 + 3 teeth. Orbital spines and pterygostomial spines occur on the carapace.

It is possible that this larva belongs to *Nematocarcinus*. The larvae of this genus are not known although KEMP (1907) has suggested that a *Caryciphus* larva from the Bay of Biscay may belong to it. KEMP's larva has a simple long rostrum and could not be the same as the present form. It is, however, possible that the larva described above is a *Nematocarcinus*. The telson under the skin is not at all unlike the adult telson of *Nematocarcinus* figured by KEMP (1910), the legs, however, are short and show a very great

difference from any adult. *Nematocarcinus cursor* has been recorded by HOLTHUIS from the expedition.

Other larvae (Fig. 8a & b) not identified, appear to belong to the Palaemonidae. It is, however, by no means certain that they do. The chief feature is a leaf-like crested rostrum. In one case a long toothed rostrum can be seen underneath the crest. All have a hump on the third abdominal somite. The legs are long with long exopods, in some cases very hairy, but nearly all the legs are damaged or wanting. There is no exopod on leg 5. It is impossible to refer these larvae certainly to any family although they have certain affinities with the Palaemonidae, especially in the telson. These occur at St. 29, 134 and 139.

Hippolytidae.

Several unidentified hippolytidids occur. Among them are many *Eretmocaris* larvae most of which are certainly a species, or more than one species, of *Lysmata*, others are of a different type resembling some of those figured by GURNEY (1937b) who has shown that some of these *Eretmocaris* larvae cannot belong to the *Hippolytidae*.

Lysmata sp. probably *Lysmata moorei* (Rathbun). This is the commonest of the *Eretmocaris* larvae in the collection. The adult has been recorded by HOLTHUIS from the expedition. The larva occurs in numbers at St. 132. One specimen had the legs intact and so closely corresponds with *Lysmata seticaudata* which CAROLI (1918) proved to be the adult of *Miersia clavigera* Chun that it seems certain that this *Eretmocaris* is a *Lysmata* and, almost certainly is *Lysmata moorei*. Other *Eretmocaris* similar in most ways to *Lysmata* larva occur at St. 27, 28, 52, 52A, 53, 82, 97, 101, 111, 132 and 134 and these were mixed with others of different types. Some from St. 101 are like GURNEY'S B.R. II (GURNEY, 1937b) but not identical. One resembling *Eretmocaris corniger* Bate occurred at St. 92 (see GURNEY, 1937b, Sp. AV).

(?) *Latreutes parvulus* (Stimpson) Fig. 9. This species is recorded by HOLTHUIS (1951) from Sierra Leone and off French Guinea. A larva which certainly belongs to this genus (see GURNEY, 1936a, 1937b) occurs at several stations and almost certainly is this species. About 4 mm. long, with rostrum, telson and appendages agreeing with the known larvae of the genus, occur at St. 108 (many), 53, 89, 111, 129, and 137.

Other members of the family, not identifiable occurred at the same stations.

Processidae.

A number of *Processa* larvae occur, both of the ordinary kind and with large spines. It is known that although the larvae may be very different they may belong to adults which are much alike (GURNEY, 1937a; LEBOURN,

1941). It is therefore not possible to identify the species. HOLTHUIS (1951) records several species from the expedition.

Processa larvae occur at St. 28, 53, 76, 78, 82, 89, 132, 134 and 138.

Alpheidae.

A large number of Alpheid larvae occur but it is not possible to refer them to adults. *Althanas* sp. occurs once. The most interesting of the larvae is one which GURNEY (1938a) describes as D2 and thinks may be an Alpheid. This occurs occasionally. *Althanas* sp. larvae St. 89. GURNEY'S larvae D2, probably an alpheid, St. 115, 132.

Alpheid larvae, unidentified, occurred at St. 27, 50, 52, 76, 83, 85, 101, 111, 114, 115, 119, 130, 132, 134 and 144.

Palaemonidae.

The only identifiable Palaemonid larvae were three specimens of *Palaemon elegans* Rathke (= *Leander squilla* Ortmann). The whole larval history of this species has been described by GURNEY (as *L. squilla*) from NORFOLK (1924a). It is a freshwater or coastal species, the larvae occurring in the plankton. The larva agrees well with GURNEY'S description and figures. They occurred at St. 52. HOLTHUIS (1951) has recorded the adults from the Cape Verde Islands.

There are many other Palaemonid larvae in the collection, mostly Pontoniidae. Although these have been separated out it is not possible to assign them to any species. They occurred at St. 27, 28, 29, 52, 52A, 53, 76, 83, 85, 97, 98, 100, 101, 103, 111, 122, 129, 132, 134, 144, and 146.

(See above under unidentified larvae).

Crangonidae.

The only Crangonid larvae identified is *Pontophilus sculptus* (Bell), a few specimens from St. 101. HOLTHUIS has recorded this species from the region. There are late larvae and post-larvae, badly preserved.

A very small post-larval crangonid, probably *Pontophilus* sp. occurred at St. 53.

Amphionidae.

Amphion. GURNEY (1936b) has shown that the larval genus *Amphion* is probably the larva of *Amphionides* Zimmer. So far no very well preserved specimens of *Amphionides* are known and the identification is not certain, although very probable. *Amphion* occurs at St. 27, 28, 58, 85 and 100.

*Scyllaridea.**Panuliridae.*

Phyllosoma larvae of two types occur in fair numbers in the collection — *Panulirus* sp. and *Scyllaris* sp. Both from near the coast to the region of the Cape Verde Islands. A third form, presumably *Thenus* (see GURNEY, 1936b) occurs once from Angola, St. 138.

The whole series of larvae of *Panulirus argus* (see LEWIS, 1951) and *Scyllarus arctus* (see STEPHENSEN, 1923) are known and GURNEY (1936b) has described Phyllosomas not precisely identified. It is probable that the *Panulirus* species is *P. rissoni* (Desmarest) = *P. regius* de Brito Capello which is common in the region. As it is impossible to be certain of the species I have regarded them merely as *Panulirus* sp. *Scyllaris* sp.

Panulirus sp. St. 30, many, mostly late, 33, many, mostly late, 52 A, two, Stage IV, 76, one, first stage, 77, three, first stage, 97 one, late stage, 138 many, a few early, mostly late stages.

Scyllaridae.

Scyllarus sp. This is the commonest phyllosoma in the collection. Many stages occur, from about the third to late. St. 27, 10 medium stage, St. 28, 2 late stages, St. 33 one late stage, St. 50, six young and medium stages, St. 67, a few early and late stages, St. 85, two stage 3, two late stages, St. 91, eight late stages, St. 99, one first stage. St. 132 one medium stage, St. 134 three medium stages, badly damaged. St. 138, several, badly damaged. St. 144 many, 3rd stage to late.

Thalassinidea.

Several thalassinids occur in the collection including a few adults. These latter were referred to Dr. I. GORDON of the British Museum (Natural History) who has kindly, as far as possible, identified them. These are:—

Axiopsis (sub-genus *Axiopsis*) one, *Callianassa* (sub-genus *Callichirus*) one, and two species of *Upogebia*. Dr. GORDON'S identification, which I quote are as follows:—"St. 43. *Axiopsis* (*Axiopsis*) sp. near *consobrina* de Man 1928. The only records for DE MAN'S species so far are East Indian 'Siboga' stations. St. 131. *Callianassa* (*Callichirus*) sp. runs down to *audax* in DE MAN'S Key, 1928, but is not that species, nor is it *guineensis* de Man. Probably undescribed. St. 75. Two distinct species:—Ovigerous female is *Upogebia* (*Upogebia*) very near *fallax* de Man. The only known record is from Samoa Island. Your specimen seem to have a rather more slender first peraeipod with fewer carpal spines. The smaller specimen is *Upogebia* (*Upogebia*) near *ceratophora* de Man in DE MAN'S Key (1928) also only known from Japan

and East Indies. St. E. VIII. Both specimens are also the *Upogebia* near to *fallax* de Man. St. VIII. Another specimen of the above (nr. *fallax*)".

In the larvae the *Axiidae* and the *Callianassidae* are well represented but there are only a few *Upogebiidae*.

Axiidae.

These occur frequently and at several stations and all, except one from St. 144, belong to Group A of GURNEY 1938b). Thalassinid D1 or very near. LEBOUR (1941) hatched a post-larval axiid from a larva belonging to this group, in Bermuda. This was an *Axiopsis* s. g. *Paraxiopsis* showing that GURNEY was right in placing these larvae in the *Axiidae*. All are long larvae with long rostrum and conspicuous dorsal spine on abdominal somites 2-5. A few young stages occur but much the most frequent were late stages. It is probable that most of these larvae belong to the *Axiopsis* (sub-genus *Axiopsis* near *consobrina*) referred to above. The Axiid larvae occurred at the following station: St. 50, several, possibly more than one species, St. 52 (no date) five axiids, probably more than one species. St. 83, one axiid, St. 111, a few young thalassinids, probably axiids, St. 119, 2 axiids (probably two species), St. 132 several axiids of usual type, one Stage II, similar to GURNEY's thalassinid D IX with small paired spines on abdominal somites 2-5.

Callianassidae.

Several different larvae belonging to this family occurred. Most of these belong to Type I of GURNEY (1942). A few belong to his Type II. These last are probably the *Callianassa* (*Calichirus*) sp. as identified by Dr. GORDON.

Callianassa larvae were obtained at the following stations:—St. 50, one, Type I (? *Trypaea* sp.), St. 53, five, Type II, probably the *Callianassa* referred to above (telson spines 15.1.15, four pairs of pleopods. St. 78, 2, type I; St. 83, one. This is very like the larva of *Callianassa filholi* (*Trypaea* sp.) described in its first stage from New Zealand (LEBOUR, 1955). St. 111, several, Type I, St. 112, several Type I (*Trypaea* sp.). This is the same larva described from the Benguela Current with serrations on the abdominal somite (LEBOUR, 1954). St. 144, four, Type I, similar to those from St. 112.

Upogebiidae.

Typical *Upogebia* larvae occurred at St. 31, 52A, 112 and 144 (eight specimens). These may belong to either of the adults recorded above.

ANOMURA

Galatheidaea.

*Galatheidae.**Galatheinae.*

Only a few specimens are present. These are all post-larvae and juveniles, and all have lost their legs. All but one, a young *Munida*, apparently belong to the genus *Galathea* but beyond this they have not been identified. *Galathea* spp. St. E. VIII, 39, 40, 44, 135, 145, 146 and 148.

Munida sp. juv. St. 135.

Porcellanidae.

See CHACE, 1956.

Several Porcellanids occur in the collection. The most common being a species of *Petrolisthes* which from its megalopa is identified as *P. cessaci* (A. Milne-Edwards) which is common in N. Africa. A very large larva of the *Petrolisthes* type (Fig. 13) occurs also fairly commonly and sometimes with the megalopa. This almost certainly belongs to the same species. It is the only *Petrolisthes* larva seen although another megalopa occurs which can be identified as *P. monodi* Chace. The megalopa of *Porcellana longicornis* also occurs although no larvae of this species were seen (see LEBOUR, 1943). A Porcellanid larva of the *Porcellana* type occurs frequently and was found with the *Petrolisthes* larvae. It has, however, a certain definite difference from the typical *Porcellana* in the telson, for the end prominence, instead of ending in a hair on each side before the sixth seta, has a definite small spine. This seems to exclude the larva of *P. longicornis* and *P. platycheles* (see LEBOUR, 1943). It is possible that these larvae belong to *Polycheles* or *Polyonyx*. They have four pairs of pleopods as in *Porcellana platycheles* and all the *Petrolisthes* larvae known. I have not attempted to name this larva referring to it merely as Porcellanid larva indet.

Petrolisthes cessaci (A. Milne-Edwards) (Fig. 10). St. 111. Several megalopae occur, all with the legs absent. The larvae which I have attributed to this species are large with very long rostrum, four pairs of pleopods and telson of the usual.

Petrolisthes form with a central tooth.

Megalopae St. 67, 111 (many), 132, larvae St. 67, 111.

Petrolisthes monodi Chace (Fig. 11). Megalopae at St. 63.

Porcellana longicornis L. (Fig. 12). Megalopae at St. 53, 76.

Porcellanid larvae indet. (Fig. 13). St. 27, 80, 111 (many), 150, 180.

Paguridae.

The most important pagurids are large Glaucotohoes. These I have sent to Dr. R. FOREST at the Museum National, Paris, who is kindly describing

them with his other Glaucotohes. Besides these there are some larvae and post-larvae of the *Diogenes* type and a very few larvae of the *Eupagurus* type.

Dardaninae (= Diogeninae in Macdonald, Pike Williamson) see FOREST 1955.

Large glaucotohes from St. 28, 91, 95 (much damaged), 159.

Small glaucotohes and larvae, probably *Diogenes* sp. St. 87, 99, 112, 132.

Eupagurinae.

Larvae belonging to this group, not identified, St. 53, 80, 114, 132.

Hippidea.

Albuncidae.

These are two *Albunea* larvae in the collection, Species A much larger than the other, Species B. Three adults are recorded from W. Africa (see MONOD, 1956) and it is not possible to attribute the larvae to any of these. Almost certainly, however, they must belong to one of the three:—*A. paretoi* Guerin, *A. carabus* (L.) or *A. intermedia* Balss. There is also another larva, one specimen only, probably an *Albunea* but unlike any of the larva so far encountered. This I have called *Albunea* (?) sp.

The only *Albunea* larva whose species is known for certain (if MENON, 1933 is right in his identification), is *A. symnista* from Madras. GURNEY (1942) describes two larvae, species unknown.

Albunea species A (Fig. 14). This is the same type as MENON's and GURNEY, species A, fig. 111 (1942). The larva is large, ca. 5 mm. from the tip of the rostral spine to the end of the carapace. The rostrum is fairly long, the lateral spines short. The telson is elongated with many short spines posteriorly and the late stages have a uropod with a setose exopod and rudimentary endopod. The late stage has well developed non-setose pleopods on somites 2—5.

From St. 50, between Freetown and Port Marshall, several specimens, early and late, St. 85 near Acera, one damaged specimen (unfortunately lost), St. 67 off Ivory Coast, two specimens, St. 132, off Port Marshall, two specimens, St. 137, St. Paul de Loanda, tidal zone, one specimen.

Albunea species B (Fig. 15). Of the type of Fig. 110 of GURNEY (1942). Much smaller than A with short rostral and lateral spines. 1.76 mm. between the tip of the rostral spine and the posterior end of carapace. The telson very broad with large lateral spines. Conspicuous lateral spines on somite 5. From St. 50, Sierra Leone, one specimen, St. 67, Ivory Coast, several, 52 A, two specimens.

Unknown larva, probably an *Albunea* sp. but unlike any known (Fig.

16) occur at St. 97. This has a long rostrum and very long lateral spines and a large dorsal knob on the carapace. The telson corresponds to *Albunea* A of GURNEY.

Hippidae.

There is only one species of *Hippa* recorded from W. Africa — *Hippa cubensis* (Saussure). At two stations *Hippa* larvae were caught, St. 67 off the Ivory Coast and St. 132, off Angola. Both at the surface with net S100. As *Hippa cubensis* is recorded from both these localities (see Moxon, 1956) it is almost certain that the larvae belongs to this species. *Hippa cubensis* (Fig. 17); the larvae are large, up to 8 mm. or more from the end of the rostral spine to the posterior margin of the carapace. They closely resemble the known larvae of *Hippa talpoida* (see SMITH, 1877) and *Hippa asiatica* (see MEXON, 1933) both of which have been described fairly fully. Apparently there are five larval stages before the megalopa and the "Atlantide" form shows early and late stages. The third stage is figured here showing the very long rostrum and lateral spines which easily distinguish it from the other two species. The larva in the third stage measures 8 mm. from the tip of the rostrum to the end of the carapace. The lateral spines are nearly as long as the rostral. The eyes are conspicuous and just external to the eye the carapace is produced into a blunt process, not seen in the other two species. The appendages are much the same. There are knobs ventrally on the second to the fifth abdominal segments showing the pleopods underneath. The uropods are well developed with a longish exopod and a small knob representing the endopod. At the end of the exopod are five long setae, one of which is longer than the telson. The telson bears at its posterior end about 30 fine teeth.

Brachyura.

Crab zoeae and megalopae occur at many stations but it is not possible to identify them without much useless labour and, except for certain definite types, notably Raninids and Dorippids, they have been left for the most part unidentified. Very large megalopae from St. 99, 115 and 119 are Ocypodids. There appear to be many Xanthids, Grapsids and Portunids especially zoeae, unidentified, occurred at St. 27, 29, 33, 34, 44, 46, 53, 57, 67, 75, 76, 83, 85, 91, 92, 96, 97, 99, 101, 111, 112, 115, 132, 134, 137.

Megalopae unidentified occurred at St. 33, 37, 52, 52A, 53, 67, 76, 85, 91, 97, 99, 101, 111, 115, 119, 132, 134, 137, 140, 150.

Gymnopleura.

Raninidae.

There are two species of raninid larvae in the collection, species A and species B. No species of *Ranina* proper is recorded by Moxon (1955) (with

the exception of one very doubtful record of *Ranina ranina*, see MONOD, (1955)).

One of the present larvae specimens (Fig. 18) closely resembles the figure of *Ranina ranina* (see AIKAWA, 1941) of known parentage from Japan. It must be closely related. It seems also to be AIKAWA's *Lithozoea kagosimaensis* (1933, Fig. 38).

The second larva (Species B) is the same as GURNEY's figure of a raninid from Bermuda (1942) collected by myself and figured (LEBOUR, 1949).

It is not possible to identify these larvae further.

Raninid A occurred at St. 52A, off Port Marshall, several very badly damaged late stages. St. 53, off Port Marshall, one very badly damaged late stage. St. 76, off Accra, several early and late stages. St. 83, off Accra, four and a fragment, late stages. St. 111, one very much damaged late stage, off Bonny River.

Raninid B. Five early stages from St. 91, between Accra and Lagos.

Oxystomata.

Dorippidae.

Two dorippid larvae occur in the collection, one which is certainly *Dorippe armata* is abundant (although these vary in size and amount of small prickles on the abdomen I cannot find any substantial difference in any of them and they occur in all stages (apparently I to III). That it is undoubtedly *D. armata* is proved by a number of larvae occurring which are changing to megalopae. In these specimens (from St. 99, off Liberia) the zoeal abdomen is still present whilst the carapace and legs are usually entirely megalopa. The chelae in some instances are so developed that it can be proved to be *D. armata*.

The second larva only occurs once, and is the same as GURNEY's *Dorippe* larva (1924, p. 194, fig. 77) with long lateral spines. GURNEY suggests that this larva is a *Cymopolia* or *Ethusa* but later (1942) describes *Ethusa* larva according to MENON (see MENON, 1937). It is probable that he was right in the first instance. It is difficult to fit in MENON's *Ethusa investigatorius* because it agrees almost exactly with all larvae of *Dorippe* known—now quite certainly known.

CANO (1893) describes the larva of *Dorippe lanata* and this closely resembles the present larvae of *D. armata*. Apparently the only substantial difference is the length of the pleopods showing that *lanata* probably has four zoeal stages and *armata* only three. AIKAWA (1933) describes two zoeae which he calls *Ethuzoeae E. koreana* and *E. lineata*. There are more like GURNEY's *Dorippe* referred to above. Later (1937) he describes *Dorippe*

granulata de Haan larva which he obtained from the berried crab. Thus it is certainly a *Dorippe* and agrees with *D. lanata* and *D. armata*. His *Dorippe* A and B are also of the same type and are certainly *Dorippe*. We can thus be sure of the characters of *Dorippe* larvae (and must be doubtful of MEXON'S *Ethusa investigatorius* which appears to agree with *Dorippe* in all the zoeal stages. *Dorippe* thus has three or four zoeal stages, very long rostral and dorsal spines but no laterals, very long narrow abdomen with a long forked telson with a strong lateral spine each side near the base and two long narrow setae in the fork. The pleopods are non-setose.

Agreeing with this description are *Dorippe armata*, from the present collection and *Dorippe lanata* (see CANO, 1893) and *Dorippe granulata* (see AIKAWA). Also his *Dorippe* spp. A and B. MEXON'S *Ethusa investigatorius* larvae (1933) also agree with these. We must therefore infer either that the larvae of *Dorippe* and *Ethusa* are indistinguishable or that there has been some mistake in naming this larva.

The second dorippid type known is represented by GURNEY'S *Dorippe* (1924, fig. 77) which he regarded probably as *Ethusa* or *Cymopolia* and AIKAWA'S *Ethuzoea*—*E. koreana* and *E. lineata*. These all have long lateral spines but otherwise agree in essentials with *Dorippe*. CANO (1891) describes and figures the larvae of *Ethusa* which has small lateral spines. KURIAN (1956) describes the larva of *Ethusa mascaronae* (Herbst) which is similar to CANO'S. *Dorippe armata* White ex Miers (Fig. 19) occurs in all stages and at many stations, all near the coast, from Liberia, Lagos, Nigeria and French Guiana, in surface hauls. The last stage has very short pleopods and in this differs from *D. lanata* described by CANO. It is possible that larvae of *D. lanata* may occur mixed with those of *D. armata* as they must be very much alike but I could find no material difference and have called them all *armata*. CANO'S description and figures are very good and differ so little from *armata* that it is unnecessary to describe them, except where changing to the megalopa. The surface of the abdomen and telson are covered with very fine spines. The fourth and fifth abdominal somites have conspicuous lateral spines. The abdomen hangs freely from the megalopa in several specimens from Station 99. The carapace of the megalopa measures 3.2 mm. and bears two strong spines laterally as in the adult. The chelae are like the adult—one very strong with teeth, the other with a long chela without teeth. *D. armata* larvae occurred at St. 52, 53, 67, 83, 85, 96, (changing to megalopa), 101, 111, and 150. The largest number came from St. 67, off Liberia.

The second form, which only occurred once, St. 27, off the Canaries, evidently belongs to a different genus. This has long lateral spines and is the same as GURNEY'S, *Dorippe* larva (1924, p. 194, fig. 77). This is probably an *Ethusa* or closely related.

Calappidae.

Calappa sp. A megalopa and a young stage occurred at St. 99 with many *Dorippe*. The young stage (Fig. 20) measures 3.2 mm. across the carapace. A megalopa occurred at St. 97. This is very like the megalopa of *C. flammea* from Bermuda (see LEBOUR, 1944).

Leucosiidae.

Only one species belonging to this family occurs in the collection. This is not an *Ebalia* as it has conspicuous lateral spines. It is apparently the same as my "Ebalia-like zoea" from Bermuda (LEBOUR, 1944). It also resembles AIKAWA's *Leucozoea tridentata* (1933, fig. 55). *Leucozoea* is only a name given by AIKAWA to a certain kind of zoea. MENON's (1937) *Leucosia* sp. is like the present one but with much longer spines. He is doubtful it is a *Leucosia*, but as we know a *Philyra* (*P. pisum* de Haan from Japan hatched from the parent (AIKAWA, 1929) and it has no lateral spines and MENON's *Philyra* has only knobs in the place of spines it is likely that the present species belongs to *Ilia spinosa* Miers (= *Leucosia spinosa*) which is common in W. Africa and that MENON is right in his surmise. It is impossible to be sure of the identity of this larva (Fig. 21) which occurred at St. 144, many (off Freetown), St. 134 off Angola, St. 115 off Cameroons, St. 144 off Sierra Leone, St. 150 French Guinea, St. 91, off Gold Coast.

List of Species to the Stations

- | | |
|--|--|
| St. 10, 34°12' N. 12°04' W., 4000 m,
15.XI.1945, NSP, 35 mw, 16.18 hour.
<i>Lucifer</i> . | St. 28, 22°59' N. 20°30' W., 3000 m,
S100, 10 mw, 18.30 hour.
<i>Penaeus duorarum</i> Burkenroad.
<i>Penaeopsis</i> sp.?
<i>Funchalia</i> sp.?
<i>Sergestes corniculum</i> Kr. (probably).
<i>Sergestes vigilax</i> Stimpson (probably).
<i>Acanthephyra sexispinosa</i> Kemp (?).
<i>Eretmocaris</i> sp.
<i>Processa</i> sp.
<i>Palaemonidae</i> sp.
<i>Amphion</i> sp.
<i>Scyllarus</i> sp.
<i>Dardaninae</i> sp. |
| St. 25, 26°57' N. 17°10' W., 2000 m,
30.XI.1945, S100, 10 mw, 21.30 hour.
<i>Solenocera</i> (? <i>membranacea</i> H. Milne Ed-
wards). | St. 29, 20°04' N. 22°33' W., 4000 m,
5.XII.1945, 18.00 hour.
<i>Palaemonidae</i> aff.
<i>Palaemonidae</i> .
<i>Brachyura</i> . |
| St. 27, 24°30' N. 19°11' W., 3000 m,
2.XII.1945, S100, 10 mw, 19.00 hour.
<i>Sergestes cornutus</i> K.
<i>Eretmocaris</i> sp.
<i>Alpheidae</i> sp.
<i>Palaemonidae</i> .
<i>Amphion</i> sp.
<i>Scyllarus</i> sp.
<i>Porcellanidae</i> sp.
<i>Brachyura</i> .
<i>Ethusa</i> sp. (probably). | |

- St. 30, 19°51' N. 22°42' W., about 4000 m,
5.XII.1945, S100, 10 mw, 21.15 hour.
Palinurus sp.
- St. 31, 18°57' N. 23°28' W., about 4000 m,
6.XII.1945, S100, 10 mw, 15.10 hour.
Gennadas sp.
Upogebia sp.
- St. 33, 17°11' N. 24°52' W., XII.1945,
S100, 10 mw, 20.00 hour.
Rhynchocinetes rigens Gordon.
Palinurus sp.
Scyllarus sp.
Brachyura.
- St. 31, Porto Grande, St. Vincent, Cape
Verde Is. 8.-10.XII.1945.
Brachyura.
- St. 39, San Pedro Bay, St. Vincent, Cape
Verde Is. 10.XII.1945.
Galathea sp.
- St. 40, off San Pedro Bay, St. Vincent,
Cape Verde Is. 11.XII.1945.
Galathea sp.
- St. 44, 10°22' N. 16°22' W., 41-49 m,
17.XII.1945.
Galathea sp.
Brachyura (zoea).
- St. 46, 9°23' N. 15°07' W., 19.XII.1945.
Brachyura (zoea).
- St. 50, 7°16' N. 13°29' W., 30.XII.1945.
S100, 10 mw, 19.30 hour.
(?) *Penaeopsis* sp.
Sergestes cornutus Kr.
Alpheidae sp.
Scyllarus sp.
Axiidae sp.
Callianassa sp.
Albunea (species A).
Albunea (species B).
- St. 52, off Monrovia, Liberia, 2-3.I.1946,
NDL, 20.00 hour.
Eretmocarid sp.
Alpheidae sp.
Palaemonidae sp.
- St. 52.
Solenocera (? *membranacea* H. Milne Edw.).
Eretmocarid sp.
Palaemonidae sp.
Palinurus sp.
Upogebia sp.
Albunea sp. B.
Brachyura (megalopae).
Ranidae species A.
- St. 53, off Port Marshall, Liberia, 12 m,
4.-7.I.1946, S100 & NDL.
Penaeus duorarum Burkenroad.
Lucifer sp.
Alya africana Bouvier (?).
Eretmocarid.
Latreutes parvulus (Stimpson).
Processa sp.
Palaemon elegans Rathke.
Palaemonidae.
Pontophilus sp. (probably).
Callianassa sp.
Porcellana longicornis L.
Eupagurinae.
Brachyura (zoeae & megalopae).
Raminidae (sp. A).
Dorippe armata.
- St. 57, 5°59' N. 10°26' W., 62 m, 8.I.
1946, VG.
Brachyura (zoeae).
- St. 58, 5°50' N. 10°30' W., 95 m, 8.I.
1946, VG.
Amphion.
- St. 63, 4°17' N. 7°11' W., 350 m, 11.I.
1946, VG.
Petrolisthes monodi Chace.
- St. 67, 4°29' N. 6°41' W., 11.I.1946,
S100, 10 mw, 20.30 hour.
Scyllarus sp.
Petrolisthes.
Albunea (species A & B).
Hippa cubensis Saussure.
Brachyura (zoeae & megalopae).
Dorippe armata White ex Miers.
- St. 75, 4°43' N. 1°41' W., 46 m, 21.I.

- Galathea* sp.
Brachyura (zoeae).
- St. 76, 4°50' N. 1°17' W., 23.I.1946,
 S100, 10 mw, 21.45 hour.
Sergestes vigilax Stimpson (probably).
Processa sp.
Palaemonidae.
Palinurus sp.
Porcellana longicornis L.
Brachyura (zoeae & megalopae).
Raninidae (species A).
- St. 77, off Accra, Gold Coast, 26.I.1946,
 S100, 10 mw, 20.00 hour.
Penaeus duorarum Burkenroad.
Panulirus.
- St. 78, Christiansborg, Accra, Gold Coast,
 shore, 28.I.1946.
Processa.
Callinassa.
- St. 80, 5°33' N. 0°01' W., 29.I.1946,
 NSP, 30—0 m.
Porcellanid sp.
Eupagurinae.
Brachyura (megalopae).
- St. 81, 5°28' N. 0°03' E., 29.I.1946, NSP,
 55—0 m.
Lucifer.
- St. 82, 5°27' N. 0°07' E., 30.I.1946, S200,
 25 mw, 16.30 hour.
Penaeus duorarum Burkenroad.
Notostomus sp. (possibly).
 Larva A (possibly *Nematocarcinus*).
Eretmocarid.
Processa.
- St. 83, 5°29' N. 0°20' E., 29.I.1946, S100,
 10 mw, 21.30 hour.
Solenocera (? *membranacea* H. Milne-
 Edwards).
Penaeus duorarum Burkenroad.
Sergestes arcticus Kr.
Lucifer sp.
Alpheidae.
Palaemonidae.
Axiidae.
Callinassa.
- Raninidae* (species A).
Dorippe armata White ex Miers.
- St. 85, 5°37' N. 0°38' E., 30.I.1946, S200,
 25 mw, 17.00 hour.
Penaeus duorarum Burkenroad.
Parapenaeus sp. (?).
Sergestes arcticus Kr.
Acanthephyra sexispinosa Kemp (?).
Alpheidae.
Palaemonidae.
Amphion sp.
Scyllarus sp.
Albunea (sp. A).
Brachyura (zoeae & megalopae).
Dorippe armata White ex Miers.
- St. 87, 5°44' N. 0°55' E., 31.I.1946, NSP,
 15—0 m, 10.30 hour.
Diogenes sp. (probably).
- St. 89, 5°37' N. 0°55' E., 31.I.1946, NSP,
 100—0 m, 12.20 hour.
Parapenaeus sp. (?).
Sergestes arcticus Kr.
Latreutes parvulus (Stimpson)?
Processa sp.
Athanas sp.
- St. 91, 5°44' N. 1°02' E. 31.I.1946 S100,
 10 mw, 23.15 hour.
Scyllarus sp.
Paguridae (Dardaninae).
Brachyura (zoeae & megalopae).
Raninidae (species B).
Illia spinosa Miers (probably).
- St. 92, 6°01' N. 2°21' E., 1.II.1946, S100,
 10 mw, 19.45 hour.
Eretmocarid corniger Bata (resembling).
Brachyura (zoeae).
- St. 95, Ibegi, W. of Lagos, Nigeria,
 Mangrove, swamp, dredge.
Paguridae (Dardaninae).
- St. 96, off Lagos, Nigeria, 40—51 m,
 14.II.1946, OT.
Brachyura (zoeae).
Dorippe armata White ex Miers.
- St. 97, 6°06' N. 3°41' E., 14.II.1946,
 S200, 10 mw, 21.00 hour.

- Eretmocaris* sp.
Palaemonidae.
Panulirus.
Albanca sp. (probably).
Brachyura (zoeae & megalopae).
Calappa sp.
- St. 98, 5°56' N. 4°26' E., 15.II.1946.
 NSP, 96--0 m.
Palaemonidae.
- St. 99, 5°58' N. 4°38' E., 15.II.1946.
 NSP, 55--0 m.
Sicyonia sp. (?).
Scyllarus sp.
Diogenes sp. (probably).
Brachyura (zoeae & megalopae).
Dorippe armata White ex Miers.
Calappa sp.
- St. 100, 6°06' N. 4°29' E., 15.II.1946.
 NSP, 25--0 m.
Palaemonidae.
Amphion sp.
- St. 101, 5°59' N. 4°36' E., 15.II.1946.
 S200, 25 mw, 16.07 hour.
Gennadas sp.
Penaeus duorarum Burkenroad.
Sergestes edwardsi Kr. (probably).
Lucifer sp.
Eretmocaris sp.
Alpheidae.
Palaemonidae.
Pontophilus sculptus (Bell).
Brachyura (zoeae & megalopae).
Dorippe armata White ex Miers.
- St. 103, 4°38' N. 5°19' E., 17.II.1946.
 40 m, DT & OT.
Palaemonidae.
- St. 105, 4°24' N. 5°25' E., 17.II.1946.
 S100, 10 mw, 20.10 hour.
Solenocera (? *membranacea* Milne-Edwards).
Penaeus duorarum Burkenroad.
- St. 108, Awafi, Niger Delta, shore.
 20.II.1946.
Latreutes ? *parvulus* (Stimpson).
- Penaeus duorarum* Burkenroad.
Penaeopsis sp. (?).
Sergestes cornutus Kr.
Lucifer sp.
Eretmocaris sp.
Latreutes ? *parvulus* (Stimpson).
Alpheidae.
Palaemonidae.
Axiidae.
Callinassa sp.
Porcellanidae.
Brachyura (zoeae & megalopae).
Raninidae (species A).
Dorippe armata White ex Miers.
Petrolisthes cessaui (Milne-Edwards).
- St. 112, 4°12' N. 7°05' E., 22.II.1946.
 NSP, 15--0 m.
Penaeopsis sp. (?).
Lucifer sp.
Callinassa sp. Upo.
Opogebia sp.
Diogenes sp. (probably).
Brachyura (Zoeae).
- St. 113, 4°05' N. 7°09' E., 22.II.1946.
 NSP, 30--0 m.
Sicyonia sp. (?).
- St. 114, 4°01' N. 7°12' E., 22.II.1946.
 52 m, PG.
Alpheidae.
Eupagurinae.
- St. 115, 4°01' N. 7°23' E., 22.II.1946.
 S100, 10 mw, 21.45 hour.
Solenocera (? *membranacea* Milne-Edwards).
Penaeus duorarum Burkenroad.
Alpheidae.
Brachyura (zoeae & megalopae).
Illa spinosa Miers.
- St. 119, 2°55' N. 9°21' E., 28.II.1946.
 S100, 10 mw, 19.56 hour.
Penaeus duorarum Burkenroad.
Alpheidae.
Axiidae (probably 2 species).
Brachyura (megalopae).
- St. 122, 1°29' S. 8°50' E., 4.III.1946.
 S100, 10 mw, 20.00 hour.

- St. 129, 6°07' S. 12°20' E., 15.III.1946,
NSP, 10 -0 m.
(?) *Latreules parvulus* (Stimpson).
Palaemonidae.
- St. 130, 6°00' S. 12°14' E., 15.III.1946,
NSP, 15 -0 m.
Alpheidae.
- St. 131, 5°58' S. 12°08' E., 15.III.1946,
NSP, 25 -0 m.
Lucifer sp.
- St. 132, 6°46' S. 12°23' E., 15.III.1946,
S 100, 10 mw, 20.30 hour.
Penaeus duorarum Burkenroad.
(?) *Penaeopsis* sp.
(?) *Parapenaeus* sp.
Sergestes robustus Smith.
Sergestes vigilax Stimpson (probably).
Lysmata moorei (Rathbun) (probably).
Eretmocaris sp.
Processa sp.
Alpheid.
Palaemonidae.
Scyllarus sp.
Axiidae.
Petrolisthes sp.
Digenes sp. (probably).
Eupagurinae.
Albunea (sp. A).
Hippa cubensis (Saussure).
Brachyura (zoeae & megalopae).
- St. 134, 7°35' S. 12°46' E., 16.III.1946,
S 100, 10 mw, 20.15 hour.
Penaeopsis sp. (?).
aff. *Palaemonidae*.
Eretmocaris sp.
Processa sp.
Alpheidae.
Palaemonidae.
Scyllarus sp.
Brachyura (zoeae & megalopae).
Ilia spinosa Miers (likely).
- St. 135, 7°55' S. 12°38' E., 17.III.1946,
235-460 m, ET & ST.
Galathea sp.
Munida sp.
- St. 137, St. Paul de Loanda, Angola
- Latreules parvulus* (Stimpson)?
Albunea (spec. A).
Brachyura (zoeae & megalopae).
- St. 138, 7°40' S. 7°56' E., 24.III.1946,
S 100, 10 mw, 20.30 hour.
Processa sp.
Thenus sp. (presumably).
Panulirus sp.
Scyllarus sp.
- St. 139, 1°30' N. 10°10' W., 2.IV.1946.
Gennadas sp.
(?) *Acanthephyra sexispinosa* Kemp.
(?) *Acanthephyra acanthetelsonis* Bate.
(?) *Acanthephyra acutifrons* Bate.
aff. *Palaemonidae*.
- St. 140, 4°10' N. 12°18' W., 4.IV.1946,
S 100, 10 mw, 0.05 hour.
Brachyura (megalopae).
- St. 144, 8°22' N. 14°08' W., 13.IV.1946,
S 100, 10 mw, 0.00 hour.
Alpheidae.
Palaemonidae.
Scyllarus.
Callianassa sp.
Upogebia sp.
Ilia spinosa Miers (likely).
- St. 145, 9°20' N. 14°15' W., 13.IV.1946,
32 m, ST & OT.
Galathea sp.
- St. 146, 9°27' N. 14°48' W., 13.IV.1946,
ST & OT, 51 m.
Palaemonidae.
Galathea sp.
- St. 148, 9°57' N. 15°22' W., 25 m,
14.IV.1946, ST.
Galathea sp.
- St. 150, 10°22' N. 16°34' W., 15.IV.1946,
S 100, 10 mw, 20.00 hour.
Porcellanid.
Brachyura (megalopae).
Dorippe sp.
Ilia spinosa Miers.
- St. 159, off Bathurst, Gambia, 10 m, DC

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Key to Figures

- Fig. 1. *Penaeus duorarum* Burkenroad, post-larva, carapace 2.5 mm. long. St. 119. a, side view, b, telson.
- Fig. 2. (?) *AcanthePHYra sexispinosa* Kemp, ca. 40 mm. long. Post-larva. St. 139. a, side view, b, rostrum, c, telson.
- Fig. 3. *AcanthePHYra acanthetelsonis* Bate, ca. 35 mm. long. Post-larva. a, side view, b, rostrum, c, telson. St. 139.
- Fig. 4. (?) *AcanthePHYra acutifrons* Bate, post-larvae, ca. 12 mm. long. a, side view, b, rostrum, c, telson. St. 39.
- Fig. 5. (?) Ophiophorid larva indet. 5.7 mm. long. a, side view, b, head, c, telson. St. 82.
- Fig. 6. *Rhynchocinetes rigens* Gordon, late larva, ca. 14 mm. long. St. 33. a, rostrum, b, telson.
- Fig. 7. Larva A, indet. St. 82, 67 mm., long. a, side view, b, telson.
- Fig. 8. Unknown larvae, probably Palaemonids. a, b, c, d, rostrum and telson of two species. St. 29 and 139.
- Fig. 9. (?) *Latreules parvulus* (Stimpson) ca. 4 mm. long. a, side view of whole animal, b, carapace, c, carapace, dorsal view, d, second legs, end of telson.
- Fig. 10. *Petrolisthes cessaiei* (A. Milne Edwards), a, carapace of megalopa, b, 5th leg, telson and uropods. St. 111.
- Fig. 11. *Petrolisthes monodi*, Chace, front of carapace of megalopa. St. 53.
- Fig. 12. *Porcellana longicornis* L. front of carapace of megalopa. St. 76.
- Fig. 13. Porcellanid larva, indet. Telson. St. 111.
- Fig. 14. *Albunea* sp. A, ca. 5 mm. long from tip of rostrum to posterior end of carapace. a, side view, b, telson. St. 50.
- Fig. 15. *Albunea* sp. B, ca. 1.76 mm. from tip of rostrum to end of carapace. a, side view, b, telson. St. 50.
- Fig. 16. (?) *Albunea* sp. unknown form, rostrum 3.2 mm. long. a, side view, b, telson, c, from above. St. 97.
- Fig. 17. (?) *Hippa cubensis* (Saussure), 8 mm. from tip of rostral spine to end of carapace. a, side view, b, telson, c, rough sketch of carapace and spines. St. 67.
- Fig. 18. Raninid larva, species A, ca. 6 mm. from tip of rostrum to tip of dorsal spine. St. 83.
- Fig. 19. *Dorippe armata* White ex Myers. a, changing to megalopa, carapace 2.5 mm. long, b and c, first legs, d, abdomen of last zoea still attached, e, f, telson. St. 99.
- Fig. 20. *Calappa* sp. juv. carapace 3.2 mm. long. a, dorsal view, b, 1st leg. St. 99.
- Fig. 21. (?) *Ilia spinosa* Miers, 2.5 mm. from tip of rostrum to tip of dorsal spine. a, side view, b, carapace, posterior, c, telson. St. 144.





