This is a very large and varied group, comprising numerous families which are grouped under six Sub-orders.

In the Sub-order ASELLOTA the uropods are slender ; the basal segments of the legs are not coalesced with the body as in most other Isopoda ; the first pair of abdominal limbs are generally fused, in the female, to form an operculum, or cover for the remaining pairs. This group includes *Asellus aquaticus*, which is

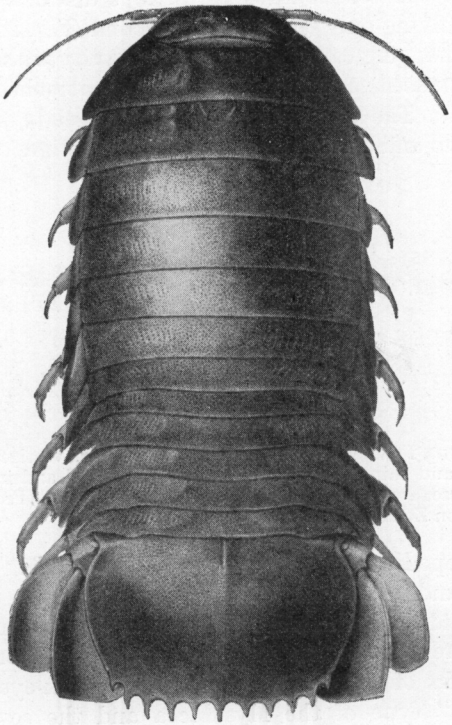

FIG. 23.

Bathynomus giganteus, about one-half natural size. (From Lankester's "Treatise on Zoology," after Milne-Edwards and Bouvier.) [Table-case No. 6.]

common everywhere in ponds and ditches in this country, and a very large number of marine species, mostly of small size.

The Sub-order PHREATOICIDEA includes a small number of very peculiar species found in fresh water in Australia and New Zealand. In these the body is flattened from side to side, and

the animals in other respects have a superficial resemblance to Amphipoda.

In the Sub-order FLABELLIFERA the terminal limbs of the abdomen (uropods) are spread out in a fan-like manner on each side of the telson. Many species of this group, belonging to the family *Cymothoidae*, are blood-sucking parasites of fish, and some of them are remarkable for being hermaphrodite (like the Cirripedia), each animal being at first a male and afterwards a female. Most of these parasites are found adhering to the surface of the body, behind the fins or under the gill-covers of the fish. A few, however, become internal parasites like the *Artystone trysibia* exhibited in this case, which has burrowed into the body of a Brazilian freshwater fish. This family includes the giant of the Order, the deep-sea *Bathynomus giganteus* (Fig. 23), which sometimes reaches an even greater size than the specimen exhibited.

A contrast in point of size is provided by the minute *Limnoria lignorum* belonging to the family *Sphaeromidae*, which, in company with certain other Crustacea, burrows in wood and is the cause of great damage to submerged structures of timber. An account of these boring Crustacea will be found in the Museum pamphlet "Marine Boring Animals" (Economic Series, No. 10).

The Sub-order VALVIFERA is characterised by the fact that the uropods form a pair of plate-like "valves" closing over the remaining five pairs of abdominal appendages. This Sub-order includes the species of *Idotea* common on the British coasts, one of which is shown in a coloured drawing hung in Wall-case No. 6. The family *Arcturidae* is remarkable for the long and sub-cylindrical body, very unlike that of the ordinary Isopods, and also for the great size of the antennae, on which the young cluster as in the specimen of *Arcturus baffini* (Fig. 24) exhibited here.

The Sub-order ONISCOIDEA comprises the familiar "Wood Lice" or "Slaters" so common in gardens. They are terrestrial animals adapted for breathing air, and sometimes having, in the abdominal limbs, tufted air-tubes like the "tracheae" of insects, which serve as respiratory organs. The terminal limbs of the abdomen are slender or minute, and the antennules are always small. The large "Sea Slater," *Ligia oceanica*, which is always found near the sea and sometimes actually in rock pools, is intermediate in many points of structure, as it is in habits, between the exclusively terrestrial species and their marine relatives. *Porcellio scaber* (Fig. 25) is one of the very common garden species.

The Isopods belonging to the Sub-order EPICARIDEA are all parasitic on other Crustacea, and their structure presents, in the

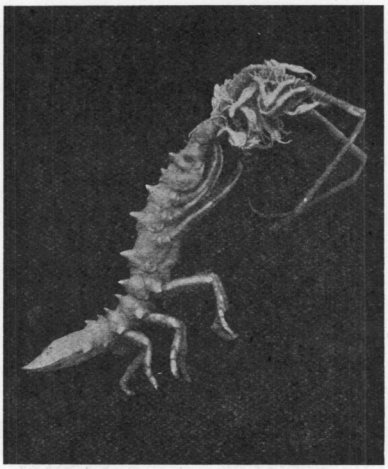

FIG. 24.

Arcturus baffini, female, carrying a cluster of young ones on its antennae. [Table-case No. 6.]

adult state, a great variety of modifications. The two sexes are often very dissimilar in size and shape, and some species are hermaphrodite. A specimen of the common Prawn (*Leander serratus*) is exhibited which has, on one side of the carapace, a swelling due to the presence in the gill-chamber of the parasite *Bopyrus squillarum*. The female of the parasite, taken out of the gill-chamber, is shown alongside. The male, in this species, is almost microscopic in size, and is commonly found clinging to the under side of the female.

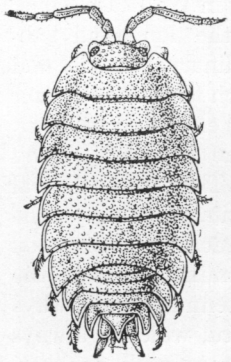

FIG. 25.

Porcellio scaber, female, dorsal view, enlarged. (From Lankester's "Treatise on Zoology," after Sars.)

A still more remarkable form is shown in the drawings of *Portunion maenadis*, a parasite of the Common Shore Crab, *Carcinus maenas*. The figure on the right shows the parasite *in situ* in the shell of the crab. The yellow mass is

the greatly developed brood-pouch, which is distended with eggs. The figure on the left represents a younger specimen removed from the crab and further enlarged. The flaps of the empty brood-pouch have been turned back.

Order 5.—Amphipoda.

(Table-case No. 7.)

As regards the segmentation of the body, the sessile eyes, and some other characters, the members of this Order agree with the Isopoda, but the body is usually compressed from side to side, the abdominal appendages are not respiratory, and there are gill-

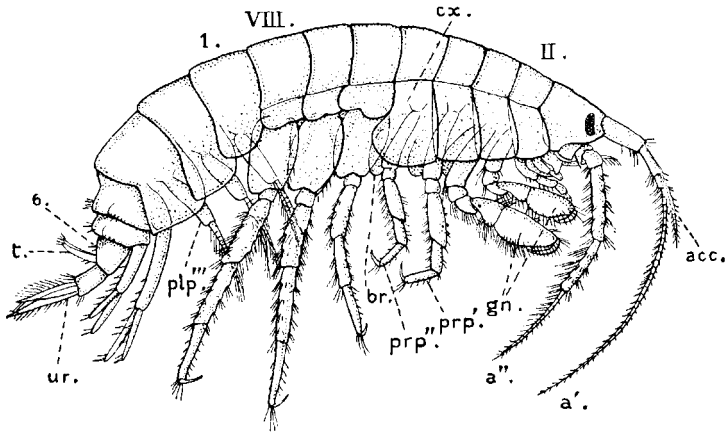

FIG. 26.

Gammarus locusta, male, from the side, enlarged. *a'*, antennule; *a''*, antenna; *acc*, accessory (inner) flagellum of antennule; *br*, gill-plate; *cx*, coxal plate (the expanded first segment of the leg); *gn*, the two pairs of "gnathopods" (prehensile legs); *plp'''*, abdominal appendage of third pair; *prp'*, *prp''*, first and second peracopods or walking-legs; *t*, telson; *ur*, uropod; II., VIII., second and eighth thoracic somites; 1, 6, first and sixth abdominal somites. (From Lankester's "Treatise on Zoology," after Sars.)

plates attached on the inner side of the bases of some of the thoracic limbs.

The Amphipoda are grouped under three Sub-orders.

In the Sub-order GAMMARIDEA are included the typical Amphipoda, in which the body is more or less stout, the abdomen well developed, and the eyes generally small. The most familiar members of this Sub-order are perhaps the Sandhopper, *Talitrus saltator*, and the Shorehopper, *Orchestia gammarellus*. These

two species are exceedingly common all round our coasts. They are almost terrestrial in their habits, burrowing in the sand above high-water mark, and sometimes at a little distance from the sea. The two are often found together, and it is perhaps incorrect to imply that they are distinguished in popular speech, but *Talitrus* is stated to be more common on sandy beaches, while *Orchestia* is often found among rocks.

More typical representatives of the Gammaridea, however, are

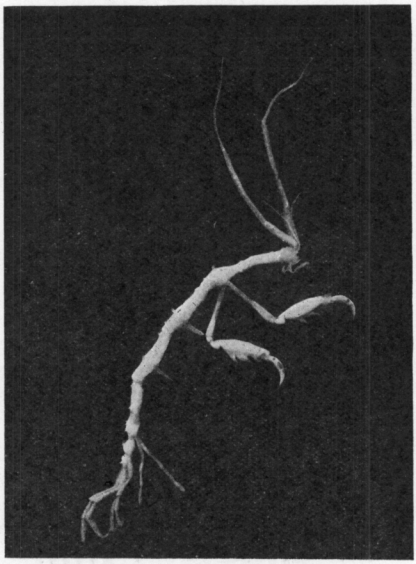

FIG. 27.

Aegina spinosissima, one of the Caprellidae, slightly reduced.
[Table-case No. 7.]

the numerous species of *Gammarus*, of which some live in the sea, and others, like the very common *Gammarus pulex* of this country, in fresh water. Specimens and a drawing of *Gammarus locusta* (Fig. 26) are shown in this case, and a coloured drawing of the same species, from life, is hung in Wall-case No. 6.

Of the other Gammaridea exhibited, it need only be said that some, like *Eurythenes gryllus* and *Stegocephalus ampulla*, show the large size reached by some species in Arctic Seas, where they swarm in extraordinary profusion ; that *Acanthogammarus godlewskii* is one of a host of remarkable species, all closely related

to the common *Gammarus*, found in Lake Baikal; and that the little *Chelura terebrans* is, of all Amphipoda, perhaps the most directly important to man on account of its destructiveness to marine timber.

The members of the Sub-order HYPERIIDEA can generally be recognised by the very large eyes, which may cover almost the whole surface of the head. The first thoracic limbs (maxillipeds) are reduced. Most of the species are pelagic in habit, living at the surface of the open sea. One of the most remarkable is *Phronima sedentaria* which lives on various pelagic organisms, like jelly-fishes and salps, and often carries about with it as a kind of cloak the remains of its prey. One of the two specimens here shown is enclosed in a barrel-shaped case, the remains of a swimming-bell of one of the Siphonophoran jelly-fishes.

In the Sub-order CAPRELLIDEA the body is either slender and thread-like (Caprellidae), or broad and flattened (Cyamidae). The abdomen and its limbs are vestigial.

The *Caprellidae* (Fig. 27) are generally found among Zoophytes or seaweeds. A group of specimens mounted in natural surroundings is shown in Wall-case No. 4.

The *Cyamidae*, or "Whale Lice," are parasitic on Whales, and are sometimes found in large numbers clinging to their skin.

Division 4.—HOPLOCARIDA.

(Table-case No. 8.)

Four or five of the posterior thoracic somites are free from the carapace. There is no brood-pouch. Two movable segments are separated from the anterior part of the head, bearing respectively the pedunculate eyes and the antennules, and there is a movable rostral plate in front of the carapace. The first five pairs of thoracic limbs are subchelate, and the second pair very large. The last three pairs carry exopodites. There are tufted gills borne by the first five pairs of abdominal appendages.

This division includes the single order STOMATOPODA, the members of which are abundant in the warmer seas. They are generally easily recognised by the characteristic form of the large claws, which are not pincer-shaped, like those of Lobsters and Crabs, but have the last segment shutting down, like a knife-blade, on the segment before it.

One species of *Squilla* (*S. desmarestii*) occurs occasionally

on the South Coast of England, and the much larger *S. mantis* (Fig. 28), of which specimens are exhibited from the Mediterranean, is said to have been found off the coast of Cornwall. Both species are used for food in Mediterranean countries.

The Stomatopoda have a prolonged larval development, in the course of which the larvae assume very striking forms, and often

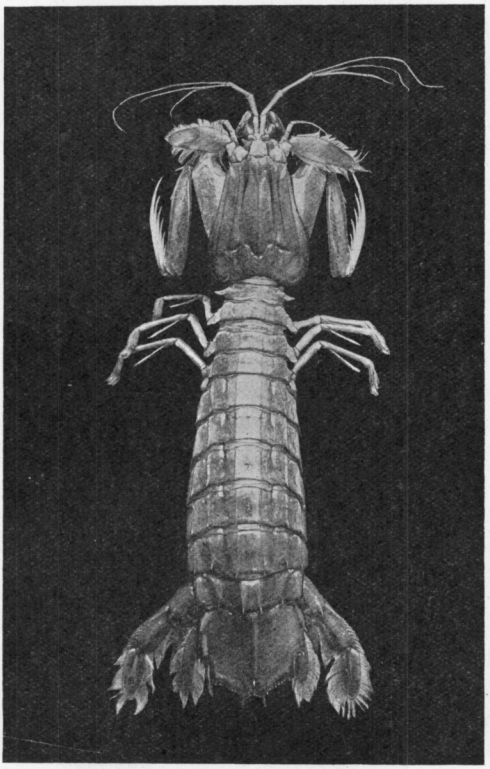

FIG. 28.

Squilla mantis, about one-half natural size. [Table-case No. 8.]

attain a large size. They were formerly supposed to be independent species of Crustacea, and received the generic names of *Erichthus*, *Alima*, etc. The " species " *Lysioerichthus edwardsii*, of which a specimen is exhibited, has been found to be the larval state of *Lysiosquilla glabriuscula*.

Division 5.—EUCARIDA.

The carapace is coalesced dorsally with all the somites of the thorax. There is no brood-pouch.

Two Orders of very unequal size are included in this Division :—

Order 1.—*Euphausiacea.*
„ 2.—*Decapoda.*

Order 1.—Euphausiacea.

(Table-case No. 8.)

The members of this Order were formerly included with the Mysidacea in the Order "SCHIZOPODA." They are, however, very closely allied to the Decapoda, and are distinguished from

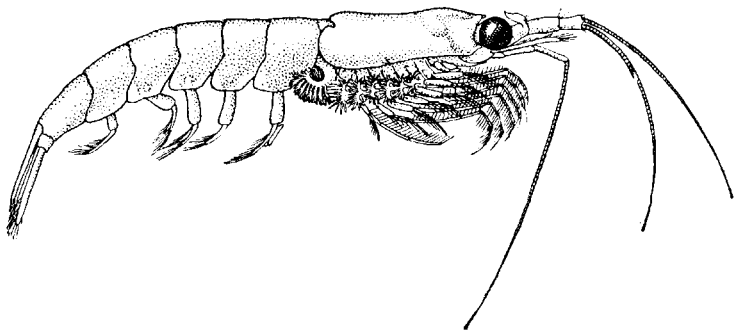

FIG. 29.

Meganyctiphanes norvegica, male, from the side, about twice natural size. (From Lankester's "Treatise on Zoology.")

the more primitive types of that Order chiefly by the fact that they possess only a single series of gills (podobranchiae), and that none of the thoracic limbs is distinctly modified as a maxilliped.

Most of these animals, like some of the lower Decapods, are phosphorescent. The light-producing organs, situated on various parts of the body and limbs, were formerly described as "accessory eyes;" they are seen as little red spots along the sides of the body in the coloured drawing of *Nematoscelis microps* exhibited in this case.

Meganyctiphanes norvegica (Fig. 29), one of the larger species of the Order, occurs in deep water off the British coast. In Loch Fyne, where the specimens here exhibited were obtained, the species forms an important food of the herring.