

FIG. 6.

Series of cast shells obtained from a single individual of the Shore-Crab (*Carcinus maenas*) kept in an aquarium. The carapace of the largest is about  $2\frac{1}{2}$  inches wide. [Wall-Case No. 3.]

increase in size at each moult. The same point is illustrated in a different way by a drawing hung in this case, in which are superposed the outline of a Lobster before moulting and the outline of the same animal a few hours after the moult.

In a jar in the centre of the case are shown several specimens of the Edible Crab, of which one is in the act of moulting. The carapace has become separated from the abdomen and legs, and the body is beginning to be withdrawn from it.

On the right of the case is a series of cast shells obtained from a single individual of the Shore-Crab (Fig. 6). The crab was captured on 14th May, 1901. It was then in the second larval or Megalopa stage, and was found swimming at the surface of the sea. It lived in Mr. Waddington's aquarium till 20th July, 1904, and during that period it moulted seventeen times. All the cast shells, except two which were destroyed by accident, are exhibited.

In the lower part of the case two very beautiful series are exhibited, each obtained from a single Lobster in Mr. Waddington's aquaria, and together they give an almost complete picture of the

growth of the animal from an early post-larval stage until it reaches a marketable size. The younger series begins with a specimen of about  $\frac{2}{5}$ ths inch length of body, which moulted on

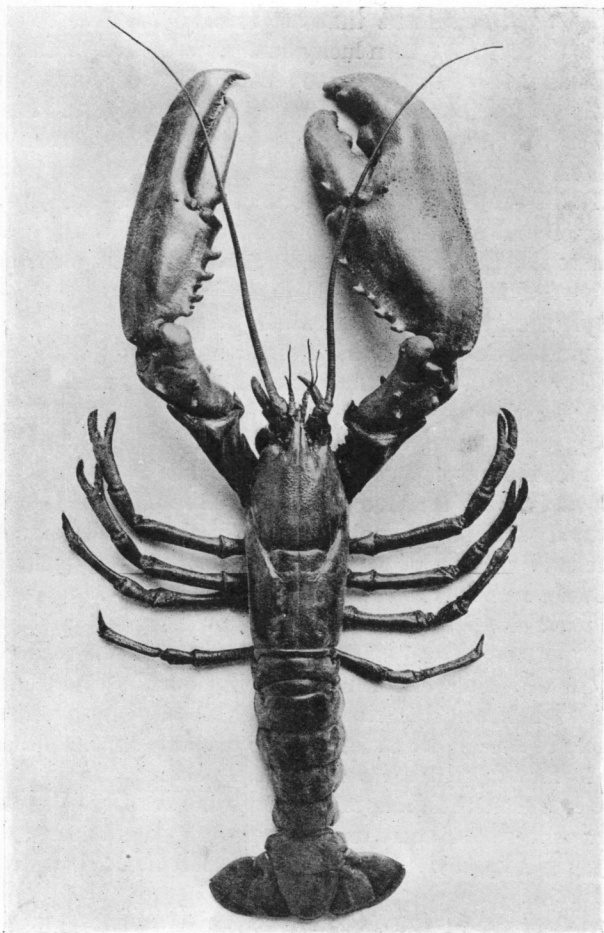


FIG. 7.

Common Lobster (*Homarus gammarus*). Length, from head to tail, 19 inches.

21st August, 1906; the latest of the fourteen moults exhibited was obtained on 8th June, 1909, when the animal was about  $4\frac{1}{8}$  inches in length. The second series begins with a specimen about  $4\frac{1}{2}$  inches long, obtained on 16th September, 1904.

Between that date and 31st July, 1909, when the lobster died, it moulted seven times and grew to a length of 9 inches.

**Size.**—It is probable that the Lobster goes on growing, although at a diminishing rate, for the whole of its life, and that the very large specimens that are found from time to time are individuals that have been lucky enough to live longer than usual.

It is difficult to get accurate records of the size and weight of exceptional specimens. The one exhibited in Wall-case No. 3 (Fig. 7) is the largest in the Museum and is believed to have been caught on the coast of Scotland. It measures 19 inches from head to tail and probably weighed more than 15 lb. The American Lobster, found on the Atlantic coast of North America, is very similar to the European species, but grows to a larger size, occasionally reaching as much as 34 lb. weight.

**Asymmetry.**—A point on which information is often asked, the unlikeness in size and shape of the great claws of the Lobster and other Crustacea, is illustrated by specimens in Wall-case No. 1. In the preparations of the male and female Lobster (Fig. 5), for instance, or in the pair of claws from a very large Lobster in the lower part of the case, it will be seen that one of the claws is more massive than the other and that the fingers are armed with blunt knobs. It is, in fact, used for crushing the shells of animals on which the Lobster may be feeding, and is known as the "crushing-claw." The other is more lightly built, with sharp saw-like edges to the fingers, and is known as the "cutting-claw." There is no rule as to the side of the body on which either form of claw is found, "right-handed" and "left-handed" specimens being about equally common. In others of the higher Crustacea the disparity in size of the two claws is much greater than in the Lobster; many examples will be found in the table-cases. In some crabs the larger claw is more or less constantly on the same side of the body; that is to say, right-handed (or, more rarely, left-handed) individuals predominate.

Occasionally, in the Lobster, specimens with similar claws occur. Most commonly, in these, both claws are of the cutting type, but, very rarely, specimens like that shown in the lower part of Wall-case No. 1 are found, in which both claws are of the crushing type. The mode of production of such abnormalities is not fully understood, but it seems probable that in most cases it is associated with the regeneration of limbs removed by accident or thrown off after injury.

MODIFICATIONS CAUSED BY PARASITES.

A series of specimens, exhibited in Wall-case No. 2, illustrate the changes of structure produced in certain crabs which are infested by the degenerate Crustacean parasite *Sacculina*. It is a curious and significant fact that these changes affect almost exclusively the secondary sexual characters of the crabs. The details of the modifications are explained at length in the labels accompanying the specimens, and need not be recapitulated here ; but it may be said in general that the characters distinctive of either sex, *e.g.* the large chelipeds of the male, or the egg-carrying appendages of the abdomen in the female, become reduced in infected specimens, and that the male may even assume the characters of the female, although it would appear that females never take on distinctively male characters.

SYSTEMATIC SERIES.

The following table gives the system of classification which has been adopted in arranging the collection :—

Class *CRUSTACEA*.

Sub-class *BRANCHIOPODA*.

- „ *OSTRACODA*.
- „ *COPEPODA*.
- „ *CIRRIPEDIA*.
- „ *MALACOSTRACA*.

Division <i>Phyllocarida</i>	.	Order	<i>Nebaliacea</i> .
„ <i>Syncarida</i>	.	„	<i>Anaspidacea</i> .
„ <i>Peracarida</i>	.	{	„ <i>Mysidacea</i> .
			„ <i>Cumacea</i> .
			„ <i>Tanaidacea</i> .
			„ <i>Isopoda</i> .
			„ <i>Amphipoda</i> .
„ <i>Hoplocarida</i>	.	„	<i>Stomatopoda</i> .
„ <i>Eucarida</i>	.	{	„ <i>Euphausiacea</i> .
			„ <i>Decapoda</i> .



## Sub-class I.—BRANCHIOPODA.

(Table-case No. 1.)

This Sub-class includes a number of very primitive Crustacea that differ widely from one another in many points of structure, but agree in having the appendages of the trunk, for the most part, flattened and leaf-like. It is divided into four Orders, of which the first three are specially interesting on account of their primitive characters. In the large number of the somites

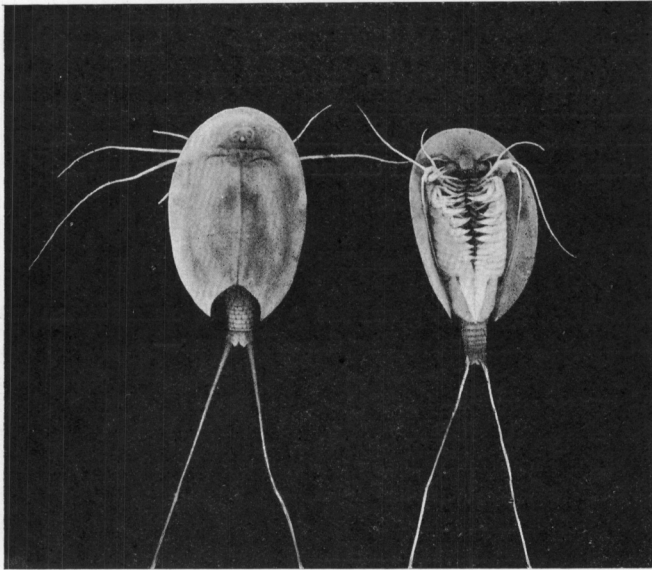


FIG. 8.

*Apus cancriformis*, from Kirkcudbrightshire, slightly enlarged.

[Table-case No. 1.]

(up to 40) and the uniformity of the limbs, as well as in some points of internal structure (heart, nervous system), they approach more closely than any other living Crustacea to the hypothetical ancestral type of the Class. In some respects, however, such as the reduction of the mouth-parts, they are considerably specialised.

In the Order ANOSTRACA there is no carapace, and the animals have a more worm-like appearance than is usual in Crustacea. The eyes are set on movable stalks. The males are distinguished

by the remarkable development of the antennae, which form complicated clasping organs for seizing the females. The "Fairy Shrimp" (*Chirocephalus diaphanus*), of which specimens are shown together with a coloured drawing from the living animal, occurs in the South of England in ponds and rain-puddles.

In the Order NOTOSTRACA the carapace forms a broad dorsal shield, resembling, at first sight, that of the Arachnidan King-crabs. *Apus cancriformis* (Fig. 8) is found in fresh-water pools and ditches in many parts of Europe, but it is very uncertain in its occurrence, and it may suddenly reappear in numbers after an absence of many years. Males are rarely seen. It was formerly found in several localities in the south of England, but no British specimens were seen for upwards of forty years, and the species was supposed to be extinct in this country. In 1907, however, it was discovered by Professor Balfour Browne, in Kirkcudbrightshire, and some specimens obtained by him are exhibited. The eggs of *Apus*, and indeed of most Branchiopoda, can survive being dried, and they may be carried from place to place in mud adhering to the feet of wading birds or in other ways. There can be little doubt that the appearance of the species in Scotland was due to introduction of the eggs in some such way from the Continent.

The species of the Order CONCHOSTRACA have the body enclosed in a bivalved shell, which resembles very closely the shells of some Molluscs. The genus *Estheria* (Fig. 9), of which specimens are exhibited, is of interest

on account of its geological antiquity; fossils referred to the genus occur in rocks of the Devonian period.

In the Order CLADOCERA the number of somites is small. There are from four to six pairs of trunk-limbs. The carapace generally forms a bivalve shell, enclosing the body and limbs but leaving the head free. The antennae are large and two-branched, and are used in swimming.

The Cladocera are generally very small animals, and from their jerky mode of swimming have received the name of "Water

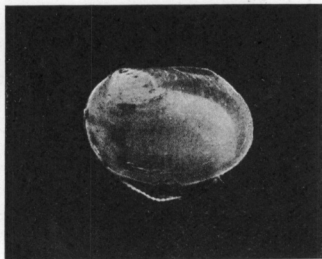


FIG. 9.

*Estheria melitensis* (slightly enlarged). [Table-case No. 1.]