cover. Their coloration and the tubercles or spines on the head and body, sometimes with the addition of skinny flaps and filaments, closely resemble their surroundings, and constitute the means by which these defenceless creatures escape detection by their enemies. These protective structures are most developed in the Australian genus *Phyllopteryx,* one of the most singular types of littoral fishes.

Sea-horses belong to the tropics and do not extend so far north as pipe-fishes. They are abundant at suitable localities, chiefly on the coral-banks of the Indo-Pacific Ocean. Some thirty species are known, of which the majority belong to the genus *Hippocampus* proper. Their size varies from 2 to 12 inches in length ; but in China and Australia a genus *(Solenognathus)* occurs the species of which attain to a length of nearly 2 feet ; they, how­ever, in form resemble pipe-fishes rather than sea-horses. The species which may be sometimes seen in aquaria in Great Britain is *Hippocampus antiquorum,* from the Mediterranean and the coasts of Portugal and France. The food of the sea-horses consists probably of very small invertebrates and the fry of other fishes. Like the other Lophobranchiates, they take great care of their progeny. The male *Hippocampus* carries the ova in a sac on the lower side of the tail, in which they are hatched ; in the other genera no closed pouch is developed, and the ova are embedded in the soft and thickened integument of either the abdomen or the tail.

SEAL. In the article Mammalia (vol. xv. p. 442) will be found a general account of the distinguishing character­istics of the animals constituting the sub-order *Pinnipedia* of the order *Carnivora,* and their divisions into families and genera. It only remains to give some further details respecting those members of the group to which the term “seal” is properly restricted (the sub-family *Phocinæ),* especially those which inhabit the British coasts.

Although seals swim and dive with the greatest ease, often remaining as much as a quarter of an hour or more below the surface, and are dependent for their sustenance entirely on living prey captured in the water, all the species frequently resort to sandy beaches, rocks, or ice­floes, either to sleep or to bask in the sun, and especially for the purpose of bringing forth their young. The latter appears to be the universal habit, and, strange as it may seem, the young seals—of some species at least—take to the water at first very reluctantly, and have actually to be taught to swim by their parents. The number of young produced is usually one annually, though occasionally two. They are at first covered with a coat of very thick, soft, nearly white fur, and until it falls off they do not usually enter the water. This occurs in the Greenland and grey seal when from two to three weeks old, but in the common seal apparently much earlier. One of this species born in the London Zoological Gardens had shed its infantile woolly coat and was swimming and diving about in its pond within three hours after its birth. The movements of the true seals upon the ground or ice are very different from those of the *Otariæ* or eared seals, which walk and run upon all four feet, the body being raised as in the case of ordinary quadrupeds. The hinder limbs (by which mainly they propel themselves though the water) are on land always perfectly passive, stretched backwards, with the soles of the feet applied to each other, and often raised to avoid contact with the ground. Sometimes the fore limbs are equally passive, being placed close to the sides of the body, and motion is then effected by a shuffling or wriggling action produced by the muscles of the trunk. When, however, there is any necessity for a more rapid mode of progression, the animals use the fore paws, either alternately or simultaneously, pressing the palmar surface on the ground and lifting and dragging the body forwards

in a succession of short jumps. In this way they manage to move so fast that a man has to step out beyond a walk to keep up with them ; but such rapid action costs con­siderable effort, and they very soon become heated and exhausted. These various modes of progression appear to be common to all species as far as has been observed.

Most kinds of seals are gregarious and congregate, especially at the breeding season, in immense herds. Such is the habit of the Greenland seal *(Phoca grœnlandica),* which resorts in the spring to the ice-floes of the North Sea, around Jan Mayen Island, where about 200,000 are killed annually by the crews of the Scotch, Dutch, and Norwegian sealing vessels. Others, like the common seal of the British islands *(Phoca vitulina),* though having a

wide geographical range, are never met with in such large numbers or far away from land. This species is stationary all the year round, but some have a regular season of migration, moving south in winter and north in summer. They are usually harmless, timid, inoffensive animals, though, being polygamous, the old males often fight des­perately with each other, their skins being frequently found covered with wounds and scars. They are greatly attached to their young, and remarkably docile and easily trained when in captivity ; indeed, although there would seem little in the structure or habits of the seal to fit it by nature to be a companion of man, there is perhaps no wild animal which attaches itself so readily to the person who takes care of and feeds it. They appear to have much curiosity, and it is a very old and apparently well-attested observation that they are strongly attracted by musical sounds. Their sense of smell is very acute, and their voice varies from a harsh bark or grunt to a plaintive bleat. Seals feed chiefly on fish, of which they consume enormous quantities ; some, however, subsist largely on crustaceans, especially species of *Gammarus,* which swarm in the northern seas, also on molluscs, echinoderms, and even occasionally sea-birds, which they seize when swimming or floating on the water.

Although the true seals do not possess the beautiful under-fur (“ seal-skin ” of the furriers) which makes the skin of the sea-bears or *Otariæ* so precious, their hides are still sufficiently valuable as articles of commerce, together with the oil yielded by their fat, to subject them to a devastating persecution, by which their numbers are being continually diminished (see below, p. 581 *sq.).*

Two species of seals only are met with regularly on the British coasts, the common seal and the grey seal. The