cided which part of the body corresponds to the posterior adductor. According to Quatrefages, it is a muscular band passing transversely between the handles of the pallets. His discussion of this point is connected with another, namely, the nature of the long tubular portion of the body behind the valves. Deshayes limits the extent of the mantle to the part covered by the shell, and considers all the rest of the animal as formed by the siphons ; the branchiæ and part of the other viscera in this view are contained in the siphons. Quatrefages argues that the siphons commence at the point where their retractor muscles are inserted, namely, at the muscular ring corresponding to the pallets. This reasoning is plausible ; but it is difficult to accept the view that the retractor muscles of the siphons and the posterior adductor muscle are so closely connected as Quatrefages thinks ; in other *Isomya* the retractors of the siphons and the posterior adductor are distinct and separate. Deshayes believes that the single adductor between the valves results from the fusion of the two muscles usually separate. Jeffreys believes that the posterior adductor is really present between the posterior parts of the valves ; but the opinion of a conchologist on a question of morphology is not of very great weight. In other *Isomya* the visceral (parieto-splanchnic) ganglia are attached to the ventral surface of the posterior adductor. In *Teredo* these ganglia are situated at the posterior end of the body proper, some distance behind the shells, and immediately behind the generative organ. It is here probably that the rudiment of the posterior adductor, if it exists, is to be sought ; or, if it does not exist, it is here that it originally was placed.

It is evident that the anatomy of *Teredo* has not yet been in­vestigated from the point of view of modern morphology ; but as far as can be judged at present the body proper extends back some distance behind the shells, to the posterior limit of the visceral mass. The part between this and the pallets is a tubular prolonga­tion of the mantle chamber containing the extended gill laminæ, and beyond the pallets are the separate siphons. Besides the visceral ganglia a cerebral and a pedal pair are present. The stomach is provided with a large crystalline style. The function of the pallets is to form an operculum to the calcareous tube when the siphons are withdrawn into it. In some species the external or narrower end of the calcareous tube is provided with transverse laminæ projecting into the lumen ; and in some the external aper­ture is divided by a horizontal partition into two, one for each siphon.

The *Teredo,* according to Quatrefages, is dioecious, though Gwyn Jeffreys believes it to be hermaphrodite. As in the case of the oyster, the ova are retained in the branchial chamber during the early stages of their development. The segmentation of the ovum is unequal, and leads to the formation of a gastrula by epibole. By the growth of a preoral lobe provided with a ring of cilia, and by the formation of a mouth and an anus, the trochosphere stage is reached. A pair of thin shells then appear on the sides of the larva, connected by a hinge on the dorsal median line, and the foot grows out between mouth and anus. By the time the larvæ “swarm,” or leave the branchial cavity of the parent to live for a time as free- swimming pelagic larvæ, the valves of the shell have grown so large as to cover the whole of the body when the velum is retracted ; the foot is also long, cylindrical, and flexible, and can be protruded far beyond the shell. The valves of the shell at this stage are hemi­spherical in shape, so that the whole larva when its organs are retracted is contained in a globular case.

Concerning the later changes of the larva and the method by which it bores into wood nothing or little is known from direct observation. Much has been written about the boring of this and other marine animals, but even yet the matter cannot be said to be satisfactorily elucidated. Osler, in a paper in *Phil. Trans.,* 1826, argued that the *Teredo* bores by means of its shells, fixing itself by the surface of the foot, which it uses as a sucker, and then rasping the wood with the rough front edges of the shell-valves. This view was founded on the similarity of the arrangement of the shells and muscles in *Teredo* to those occurring in *Pholas,* in which the method of boring described was actually observed. W. Thompson, in a paper in the *Edinb. New Phil. Journ.,* 1835, supported the view that the excavation is due to the action of a solvent secreted from the surface of the animal. Albany Hancock, again *(Ann. and Mag. Nat. Hist.,* vol. xv. ), thinks that the excavating power of *Teredo* is due to silicious particles embedded in the anterior portion of the integument, in front of the valves. But the actual existence of either silicious particles or acid secretion has been denied by others. Jeffreys believes that the foot is the organ by which the animal burrows. In the larger number of Lamellibranchs the foot is doubtless a burrowing organ, and it is difficult to see how the limpet hollows out the rock to which it is attached if not by means of the surface of its foot. At the same time it is difficult to explain how the soft muscular foot can penetrate into hard wood. The process is of course slow, and Jeffreys supposes that particles are detached one by one from the moistened surface to which the foot is applied. In any case the valves are covered by an epidermis, which could scarcely be there if they were used in burrowing.

*Teredo* grows and burrows at an extremely rapid rate : spawning takes place in the spring and summer, and before the end of the year the animals are adult and their burrows of large size. Quatre­fages relates that at Guipuzcoa (N. Spain) a ferry-boat was sunk accidentally in the spring, and was raised four months afterwards, when its timbers were already rendered useless by *T. pedicellata.* How long the animals live is not accurately known, but Quatre­fages found that they nearly all perished in the winter. This can­not be generally the case, as the size of the tubes varies so greatly. In Holland their greatest ravages are made in July and August. Iron ships have nothing to fear from their attacks, and the copper sheathing now almost universally used protects wooden hulls. A great deal of loss is, however, caused by *Teredo* in harbour works and shipping stages, and the embankments in Holland are con­tinually injured by it. The most efficient protection is afforded by large-headed nails driven in in close proximity. Soaking wood in creasote is not a certain safeguard ; Jeffreys found at Christiania in 1863 that a large number of harbour piles previously soaked in creasote had been completely destroyed by *T. navalis.* Coal tar and the silicate of lime, used for coating stonework, have been sug­gested as protective coverings, but they do not seem to have been adequately tested.

Species of *Teredo* occur in all seas. The animal was known to the ancients and is mentioned by Theophrastus, Pliny, and Ovid. In 1715 it is mentioned by Valisnieri, in 1720 by Deslandes. In 1733 great attention was drawn to it on account of the discovery that the wooden dykes of Holland were being rapidly destroyed by ship-worms, and that the country was in danger of inundation. Three treatises were published concerning the animal, by P. Mas- suet, J. Rousset, and Godfrey Sellius. The work of the last-named, which was the best, described the anatomy of the creature and showed that its affinities were with bivalve molluscs. The truth of Sellius’s view was not grasped by Linnæus, who placed *Teredo* together with *Serpula* in the genus *Dentalium* ; but its proper position was re-established by Cuvier and Lamarck. Adanson, unaware of the work of Sellius, in 1757 believed himself to be the first to discover the molluscan affinities of *Teredo.* It will not be necessary to give here a definition of the genus taken from any systematist ; it will be sufficient to point out that the long cy­lindrical body with its two small anterior polygonal valves, the absence of a ligament and accessory valves, the muscular ring into which are inserted the calcareous pallets, and the continuous calcareous tube lining the hole bored by the animal are the diagnostic features.

Jeffreys, in his *British Conchology,* gives the following species as British:—*Teredo norvegica,* Spengler; *T. navalis,* Linn.; *T. pedi­cellata,* Quatrefages; *T. megotara,* Hanley. *T. norvegica* occurs chiefly on the west coast of Great Britain. It was taken by Thompson at Portpatrick in Wigtownshire, and occurred in Jef- reys’s time in abundance at Milford Haven. This species has been described by Gmelin and a number of British authors as *T. navalis,* Linn. It is distinguished by having the base of the pallets simple, not forked, and the tube semi-concamerated at its narrower pos­terior end. The length does not usually exceed a foot. It is the *T. navium* of Sellius. *T. navalis* has been identified from the figures of Sellius, to which Linnæus referred ; Sellius called it *T. marina.* It occurs on all the western and southern coasts of Europe, from Christiania to the Black Sea, and is the species which causes so much damage to the Dutch embankments. The pallets of this species are small and forked, and the stalk is cylindrical. The tube is simple and not chambered at its narrow end. *T. pedicellata* was originally discovered by Quatrefages in the Bay of Los Pasages on the north coast of Spain ; it has also been found in the Channel Islands, at Toulon, in Provence, and in Algeria. In *T. megotara* the tube is simple and the pallets like those of *T. norvegica* ; it occurs at Shetland and Wick, and also on the western shore of the Atlantic, where its range extends from Massachusetts to South Carolina. *T. malleolus,* Turton, and *T. bipinnata,* Turton, belong to the West Indies, but are often drifted in floating timber to the coasts of Europe. Other occasional visitants to the British shores are *T. excavata, bipartita, spatha, fusticulus, cucullata,* and *fimbriata.* These were described by Gwyn Jeffreys in *Ann. and Mag. Nat. Hist.,* 1860. *T. fimbriata* is stated to be a native of Vancouver’s Island. A kind of ship-worm, the *Nausitora dunlopei* of Perceval Wright, has been discovered in India, 70 miles from the sea, in a stream of perfectly fresh water, namely, the river Kumar, one of the branches of the Ganges. *T. corniformis,* Lam., is found burrowing in the husks of cocoa-nuts and other woody fruits floating in the tropical seas ; its tubes are extremely crooked and contorted for want of space. Fossil wood and palm-fruits of Sheppey and Brabant are pierced in the same way.

Twenty-four fossil species have been recognized in the Lias and succeeding beds of Europe and the United States. The sub-genus *Teredina,* Lam., is a fossil of the Eocene of Great Britain and France.

*Literature.—*See, besides the works already mentioned, Godfrey Sellius, *Historia Naturalis Teredinis seu Xylophagi Marini,* 1733 ; Adanson, *Histoire Naturelle du Sénégal,* Paris, 1757 ; Quatrefages, *Annales des Sci. Nat.,* 1848-50 ;