

Mollusques - Gastropodes

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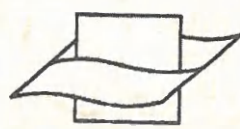
# COWRIES

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Photograph by D. P. Wilson

Devon Coast, near Wembury, England, an Ideal Collecting Ground for Cowries

## COWRIES

The Life History of This Little Marine Animal, Which for the First Time Has Been Induced To Lay Eggs in Captivity

By MARIE V. LEBOUR,

Naturalist at the Plymouth Marine Laboratory, England

COWRIES, sometimes called "black-amoor's teeth" and known by a variety of other names, are so common that a description is unnecessary. Almost everyone has collected them from our sandy and gravelly beaches and made them into necklaces or other ornaments. *Trivia europæa*, to give it its full scientific name, is the only British representative of those beautiful cowries, so beloved by collectors, conspicuous in museum collections by virtue of their brilliant colors and polished surfaces. Few have seen them alive, and perhaps not many know that these shells have such a high polish, because in life they are covered by part of the soft animal which lives inside.

A mollusc shell is only part of the animal itself. It is secreted by that animal as a protection for its soft parts and into this shell it can usually withdraw entirely. This is the case with the cowrie; when it is frightened or unhappy, only the shell

can be seen, and it looks exactly like the shell anyone may pick up on the shore. If searched for between tide-marks, however, on many of our coasts the live animal may be found lurking under rocks and stones or creeping on those colonial animals known as compound ascidians. Compound ascidians are sea squirts which live together in masses, often covering stones and sea weeds and varying enormously in their wonderfully brilliant colors.

Pretty as the little cowrie shell is as we usually see it, it is not to be compared for beauty with the living animal. In its natural home the cowrie looks a very different creature from the cowrie shell of the shore. The first thing to be seen is a brightly colored, soft animal, crawling along rather like a snail. It has two thin, pointed feelers, the tentacles, with dark eyes at their bases and, waiving in front, a tubular structure, the siphon, through which it breathes. It crawls along on a

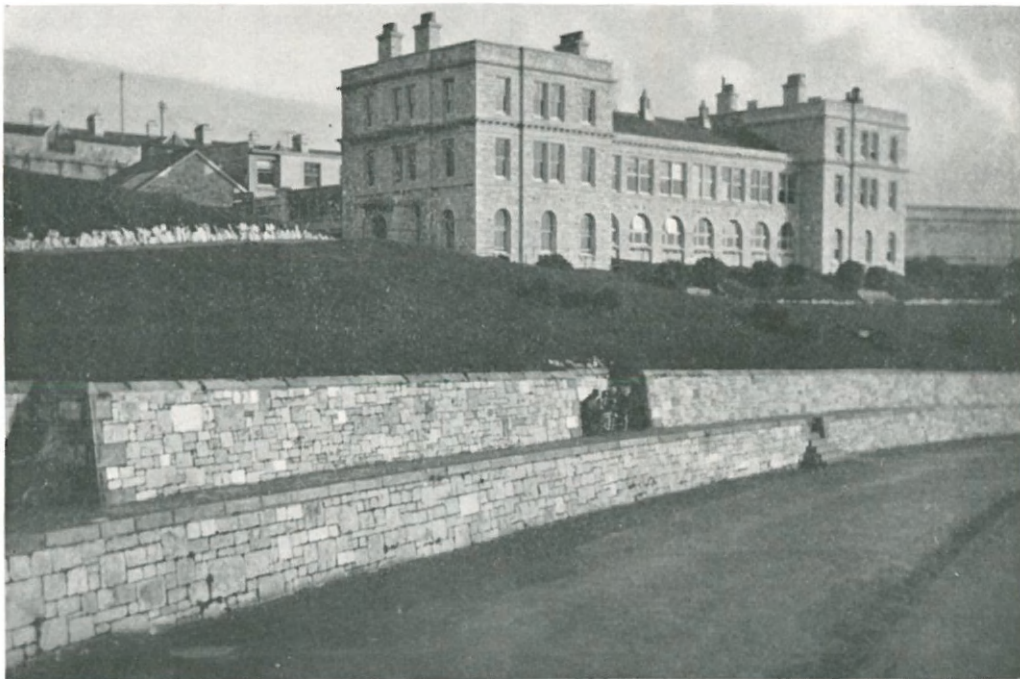
soft, broad foot, and above this is a fold of the body known as the mantle, which rises up on each side of the shell and covers it more or less completely.

The color may be yellow or orange; the body pale or dark; often with bright spots. If crawling on a bright orange ascidian, the body is frequently of the same color with dark spots; if living on lighter colored ascidians, it may be pale yellow with orange and purple spots. On the under surface there are soft processes sticking out, probably sensory.

Between the eyes and below the siphon is the mouth, which is difficult to see. Connected with it is a long trunk which is withdrawn unless the animal is feeding. When feeding, however, this long trunk is very conspicuous and the food can be seen passing along into the animal. The mouth with the trunk withdrawn is shown in the upper right of the drawing at the bottom of page 191, which represents

a young animal from the lower surface. Sometimes the cowrie lives in deeper water and can be taken in a dredge. In these cases, also, it is feeding on compound ascidians.

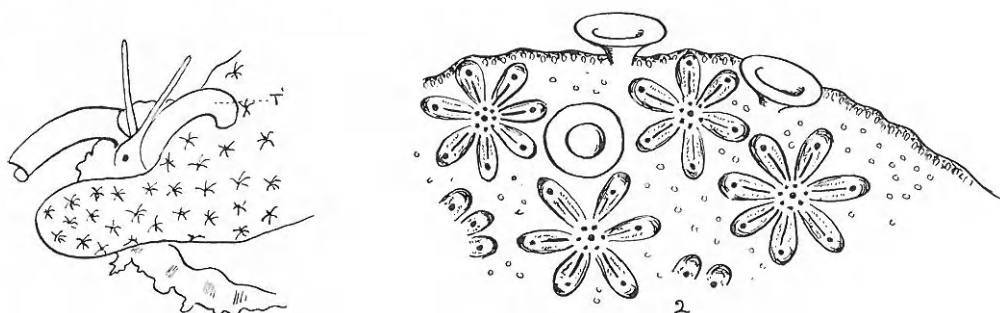
If one touches a live cowrie it immediately withdraws into its shell, and then we can see the shell just as if we had picked it up on the beach. There is no sign of any live animal at all. If we examine the shell, we see that it is oval in shape, rounded above, flat below, narrowing at each end, the slit, aperture, or shell mouth on the under side. There is no coiled part visible in this shell, as there is in an ordinary snail or whelk. This part, known as the spire, is entirely hidden in the adult cowrie. In the young, however, this is not the case. The young shell has a distinctly spiral shell, and it is found that the outer margin of the shell gradually grows up and surrounds it, so that, when the thickened lips which bound



*Photograph by D. P. Wilson*

THE MARINE LABORATORY AT PLYMOUTH, ENGLAND  
Where the life history of the cowrie was worked out by Doctor LeBour





THE COWRIE LAYS ITS EGGS IN A COMPOUND ASCIDIAN

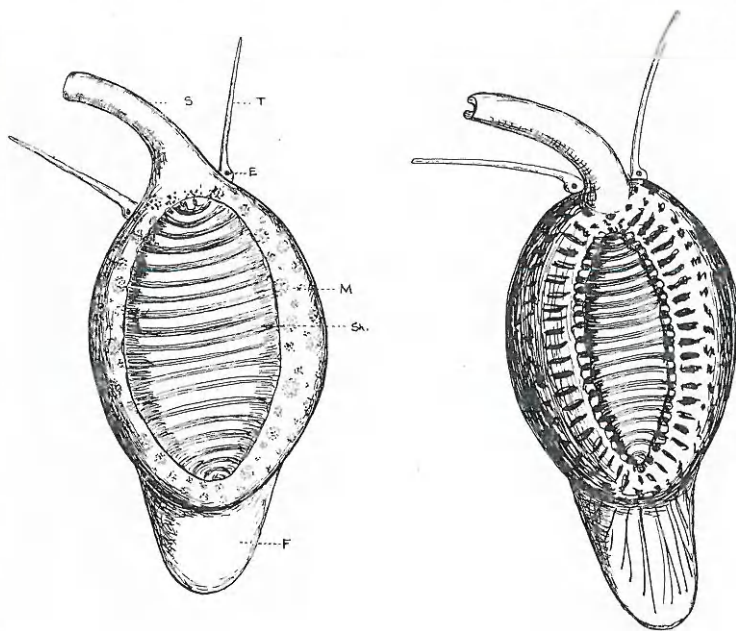
At the left is shown the front part of a cowrie as seen from underneath. It is eating a compound ascidian. A dotted line drawn from the letter T indicates the trunk. The drawing at the right shows several egg capsules laid by a cowrie in a mass of *Botryllus*, a compound ascidian

the shell mouth are complete, they entirely hide the spire.

The life history of the cowrie is very interesting and very little of it was known before this research was made at Plymouth. Before 1926 nothing was known at all as to its eggs and larvæ. In that year Professor Pelseneer discovered on the French coast that the cowrie lays its eggs in compound ascidians. He found

small vase-shaped capsules full of eggs embedded in holes in the ascidians, and these were the eggs of the cowrie which had eaten holes in the ascidian and laid its eggs in it. Professor Pelseneer was not able to persuade the cowrie to lay eggs in captivity, but he hatched out some of the eggs and kept the larvæ for a few days. These larvæ were peculiar in having an accessory shell round the true shell.

Now, most marine molluscs have planktonic larvæ which float in the surface layers of the sea. They are then provided with a winglike structure called the velum or veil, bordered by small hairs, the cilia, by means of which they move and feed. A few cases are known in which this free-swimming larva is provided with an accessory shell which forms a float and which disappears after larval life. This is the case in our cowrie.



LIVING COWRIES SEEN FROM ABOVE

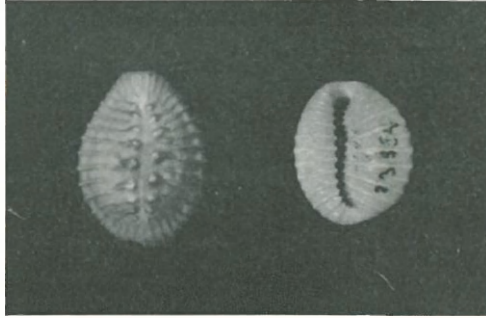
The letter E indicates the eye; F, the foot; M, the mantle; Sh, the shell; S, the siphon; and T, the tentacle. A fold of the spotted, gayly-colored mantle of the cowrie is shown partly covering the shell. At the right the shell is nearly concealed. Secretions of the mantle give a high polish to the shells of all species of cowries

Attempts were made in the Plymouth Laboratory to induce

probably a month or more, and then the little animal, only about 1.25 mm. across the shell, is ready to change into the crawling stage. All the time it is free-swimming the cowrie has a little door to its shell, the so-called operculum, similar to the little door in the common periwinkle, by means of which it can shut itself into the shell. When the crawling stage is reached, this door is cast off, the velum disappears, and the mantle which so far has been

has grown larger and it is now used for crawling.

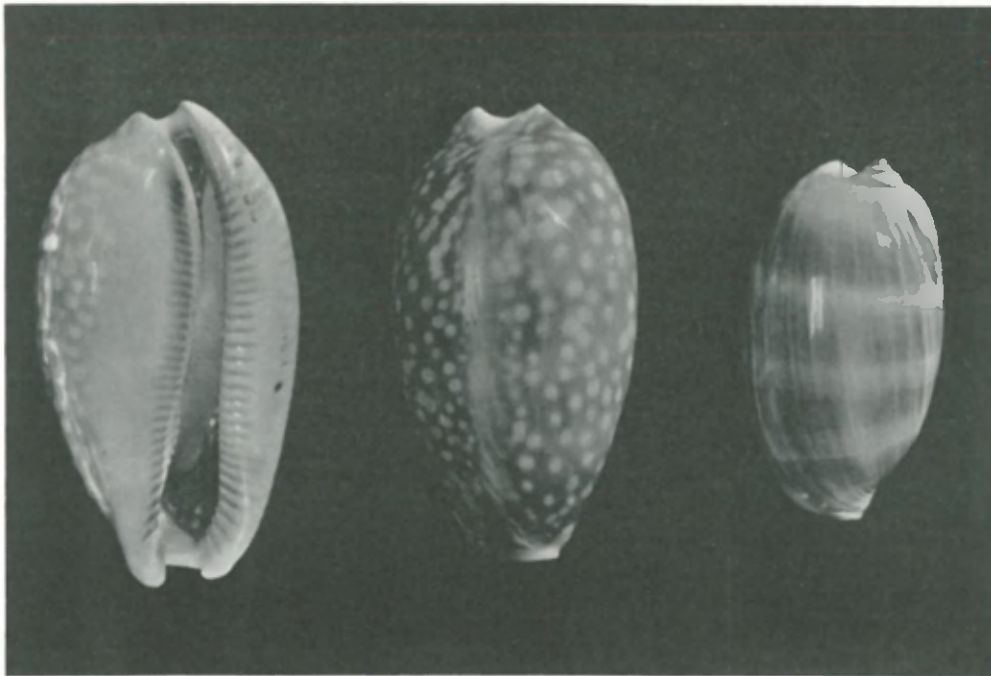
The accessory shell is now absorbed and only the true shell remains. This shell is spiral, smooth and white with a large aperture. It is gradually covered by the mantle and the cowrie looks like a miniature adult except for the exposed spire. It now changes its mode of feeding and begins to eat compound



A SMALL WEST INDIAN COWRIE

Shown from above and beneath. This cowrie is closely related to the British cowrie described in this article and belongs to the same genus. It is known scientifically as *Trivia pediculus*

ascidians in the usual way. As it grows, the shell becomes ridged and the aperture thickened, the spire gradually being cov-



THREE SPECIMENS OF THE LARGE WEST INDIAN COWRIE

Of the species *Cypræa exanthema*. The left figure shows the shell opening as seen from below. The central and right hand figures illustrate two stages of color variation. Usually the color pattern exhibits light dots on a dark background. (Compare with *Cypræa exanthema* on page 192)

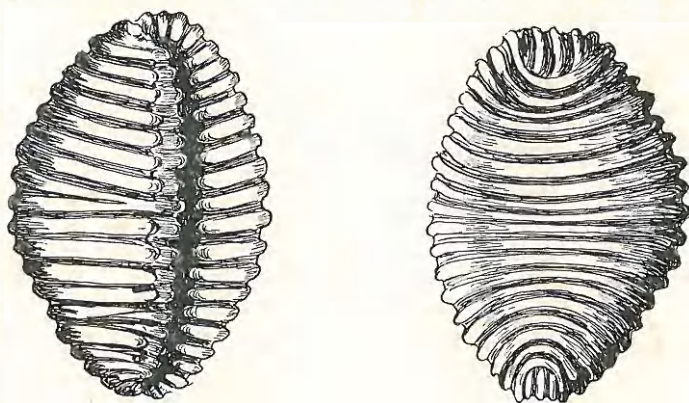
ered up. The cowrie is now fully developed.

The whole process can be watched and a series of growth forms collected. First, the adult cowrie laying her eggs; then the eggs hatching and producing the free-swimming larvæ; its growth in the plankton when possessing a velum; its metamorphosis to the crawling stages; and finally, the change of the form of the shell. A beautiful and complicated life history.

Perhaps one wonders why there are such elaborate changes. It is very usual for animals living on the sea floor to have free-swimming young which float near the surface in the plankton. The advantage is obvious. It takes away the young from their birthplace. If all were to hatch in one small area, the food would probably be insufficient for them, and it is an effective means of dispersal, because all planktonic life is carried about in the sea

by waves, currents, and winds, and is in constant movement. Those larvæ which survive, and they have innumerable enemies always ready to eat them, may settle on the bottom very far away from the parent home. The cowrie has a wide distribution. Knowing its life history, we can understand why this is so.

It is interesting to find in the few cases that are known of the young of some of the larger foreign cowries that these do not possess an accessory shell, their eggs and larvæ being in many ways unlike those of our little British shell. There is also evidence in the internal anatomy of our cowrie that it is not very closely related to those large and handsome foreigners and its life history bears this out. It is to be hoped that further work may be done on this interesting subject in those countries where different kinds of cowries are to be found in profusion.



BRITISH COWRIE SHELL AS IT IS USUALLY FOUND WITHOUT THE LIVING ANIMAL, SHOWN FROM ABOVE AND BENEATH. THIS PARTICULAR SPECIMEN MEASURED 10 MM. IN LENGTH