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### Abstract

The shells of about two hundred and thirty species of pelecypods representing thirty-five families have been examined. Many were studied in thin section or by reflected light, others were examined only from their external aspect.

These studies indicate that pelecypod shells are composed of two types of deposits, one secreted by the general surface of the mantle and here termed palliostracum, while the other is secreted over the muscle attachment areas and is here termed myostracum.

The palliostracum is composed, in addition to the periostracum, of three major layers, to which the terms ectostracum, mesostracum, and endostracum are here given. The ectostracum forms the outer surface of the calcareous portion of the shell, including the margin, the mesostracum lies on the inner surface outside the pallial line and includes the hinge, the endostracum comprises the inner surface within the pallial line. A seemingly twolayered shell may result from the combination of the outer two layers (mesectostracum) or the inner two layers (mesendostracum).

The myostracum is divisible into several components, the most important of which are: the pallial myostracum, a thin deposit secreted at the pallial line, and the adductor myostraca, similar deposits secreted in the scars of the adductor muscles. Additional myostracal deposits are formed in the scars of lesser muscles, such as the pedal retractor.

The three calcareous palliostracal layers and occasionally the myostracum have also been observed in the other classes of Mollusca.

The pelecypods examined may be arranged into three major groups according to shell structure. These groups are:

1. The nacro-prismatic group. Primitive pelecypods typically with a nacreous mesendostracum and a prismatic ectostracum. The nacro-prismatic structure also occurs in cephalopods and in primitive gastropods.
2. The foliated group. Pelecypods typically with one or more foliated layers.
3. The complex-lamellar group. Pelecypods typically with a complex endostracum and a crossed-lamellar mesectostracum.

The shells of certain Pelecypoda are markedly tubulate. The general aspect of the tubules, their distribution in the shell, and their density vary greatly between families or superfamilies but are generally relatively constant within such groups.

The tubules may result from either resorption or non-deposition of calcium carbonate about tubular projections of the mantle epithelium, and, perhaps of pallial muscles. Tubules produced by non-deposition are generally about perpendicular to the growth planes throughout the layers in which they occur. When they result from resorption, they are about perpendicular to the growth planes only at the very bottom of the layer

or combination of layers into which they are intruded, and not to the prolongations of these growth planes further out in these layers.

The classification of ribbing and related structures used here is based mainly on morphology, in part also on deduced genesis, and is as follows:

1. Non-additive ribbing, with the shell margin deformed into plications, lobations, or both.
2. Additive ribbing, with structures that appear added onto the shell surface.
3. Composite ribbing, with components of both previous types, comprising a non-additive framework on which are secreted additive structures, whose position is directly related to and in most cases apparently determined by that of the non-additive components.

## Introduction

This paper is essentially a condensed version of a thesis written for the University of California nine years ago<sup>1</sup>. It concerns the various layers found in pelecypod shells, their classification, arrangement, and hence the distribution of the various microstructures contained in these layers, including tubules; an attempted classification of pelecypods based on structure; and the various types of ribbing, together with the modifications they bring about in the structural arrangements within the pelecypod shell. Most of the species observed came from the collection of the University of California and originated from the West Coast of the United States. Some specimens were obtained from the Collection of the Museum of Natural History in Berne and were of European and Asiatic origin.

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<sup>1</sup> A short abstract of the thesis was published at that time by the author (OBERLING, 1955).