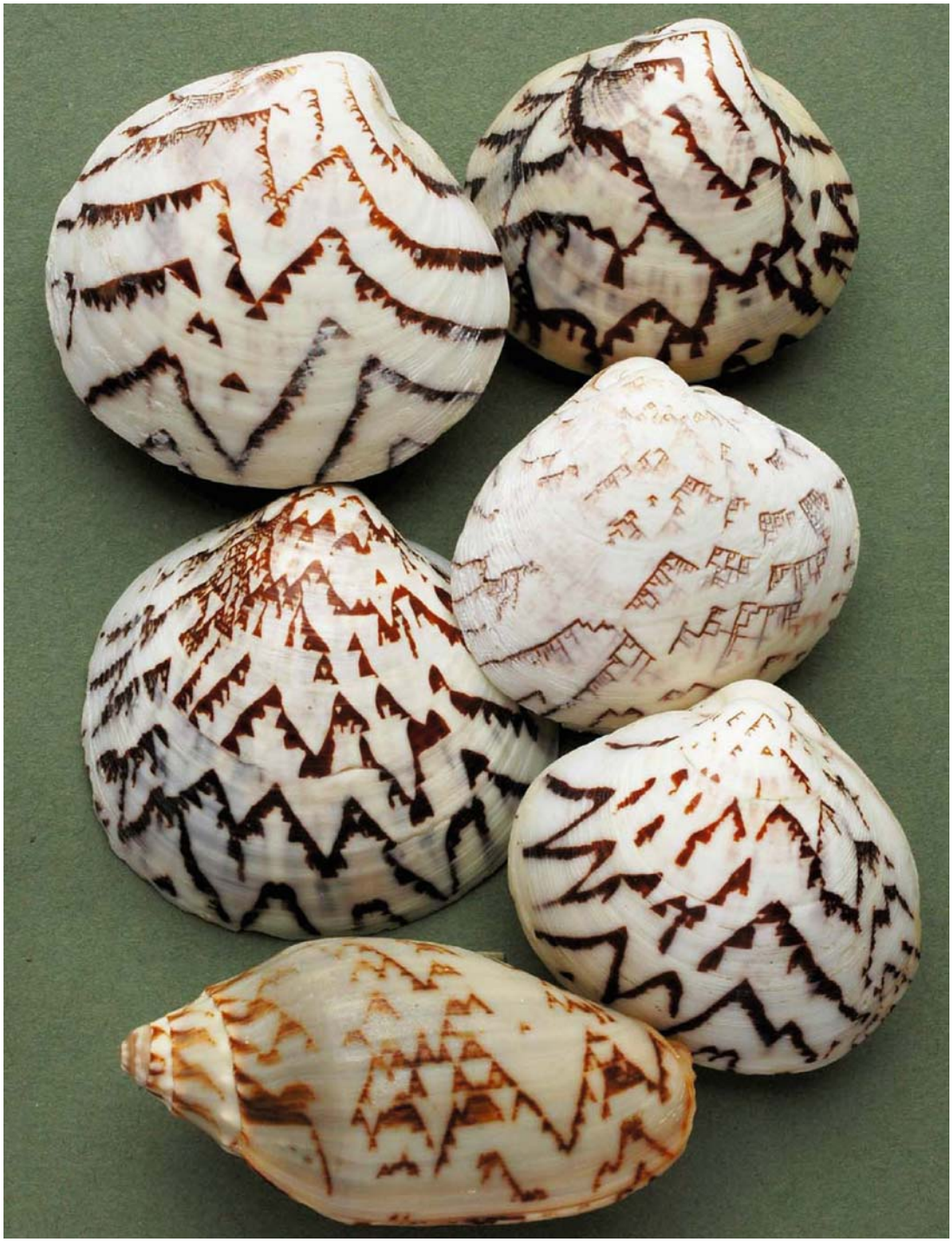

Figure 8.1. Different shells bearing triangles as their basic pattern element

Chapter 8

Triangles

Several mollusks display triangles as their basic pattern element. The triangles may be connected to each other to form oblique lines with a triangular substructure. If both corners of the lower edge give rise to new triangles, the white regions in between also have a triangular shape although with opposite orientation. The triangles may cover different portions of the shell. If they are densely packed, it appears as if white triangles are arranged on a black background. The triangles can also be of very different sizes. On some shells they are a prominent pattern element, on others they appear more as a roughness in the oblique lines but are clearly visible on closer inspection. The triangles themselves may have a fine structure of lines parallel to the growing edge or they may resolve into bundles of lines parallel to the direction of growth. On some shells an almost continuous transition from triangle to branch formation can be recognized. The occurrence of triangles on very different mollusks, on bivalved mussels and on snails, indicates that the possibility of forming triangles is a basic feature of shell patterning. Figure 8.1 gives some examples. In this chapter, an attempt will be made to find a unified explanation for this diversity. I will begin with the basic features and how they can be modelled within the framework of the theory. Discrepancies with natural patterns will be used as guides to develop more complex models.

As mentioned in chapter 7, formation of triangles requires a bistable system. From a small activated point, activation spreads in both directions and the cells remain in an activated state. While in the patterns discussed in the previous chapter termination of pigmentation spreads more rapidly than the onset of pigmentation (Figures 7.2 and 7.3), the sharply straight lower edge of triangles indicates that termination occurs strictly simultaneously. This excludes the possibility of a signal being initiated at a particular position spreading by diffusion. Therefore, it is assumed that the signal for pigment termination in triangle formation does not result from a metabolic product of the pigment producing system but from an independent central oscillating system. The substances responsible for the extinguishing reaction can be distributed within the animal in hormone-like fashion. In this way concentrations of the oscillating system are constant along the growing edge of the shell. More or less synchronous oscillations as shown in Figure 3.4 (page 45) are conceivable as well.

H. Meinhardt, *The Algorithmic Beauty of Sea Shells,* 4th ed. The Virtual Laboratory,
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