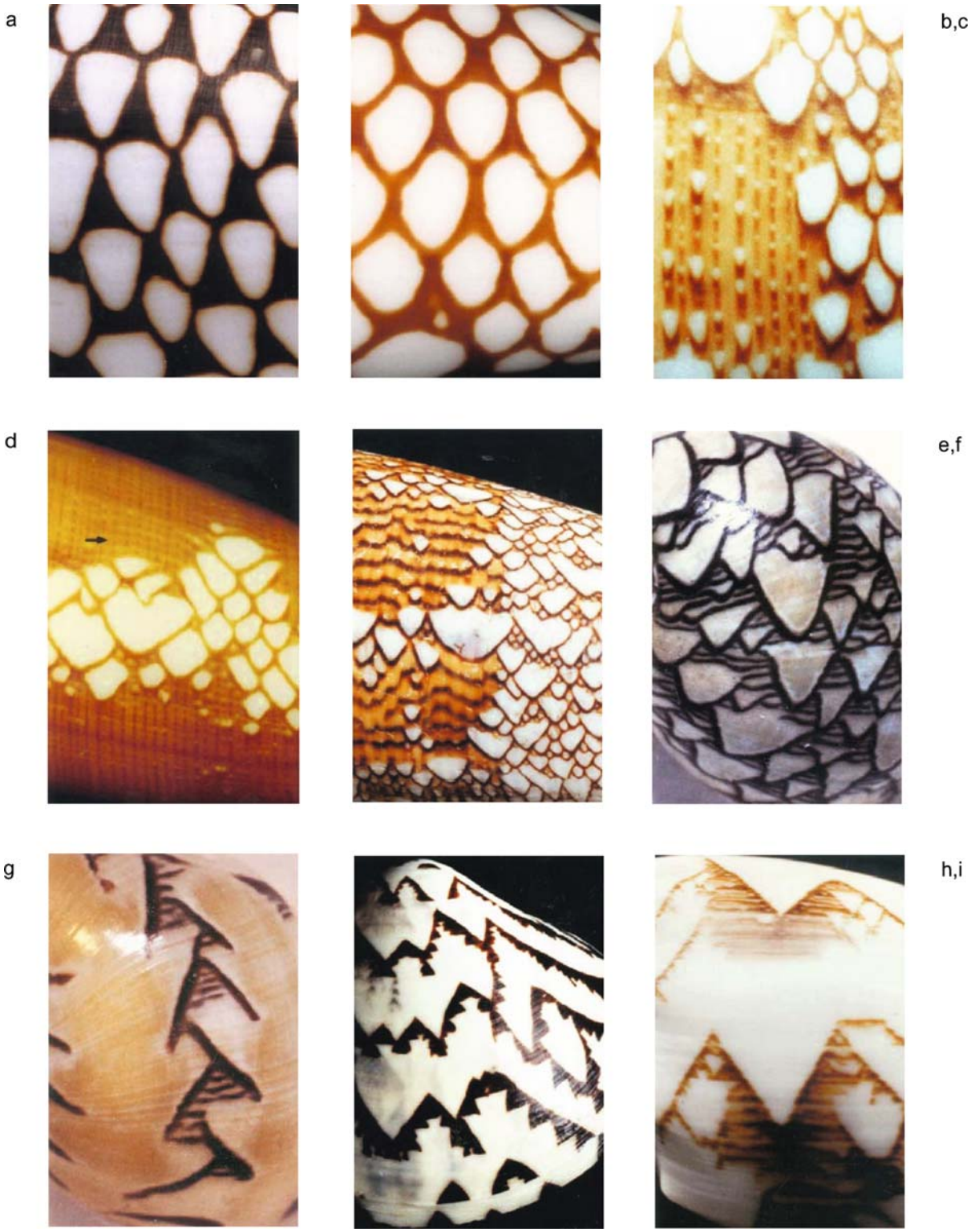

Figure 7.1. Inherent similarities in complex patterns. A collection of shells arranged such that each subsequent pattern contains elements of the preceding pattern

Chapter 7

The big problem: two or more time-dependent patterns that interfere with each other

7.1 Inherent similarities in complex patterns

Many shells show patterns far more complex than those simulated so far. Figure 7.1 contains a collection of typical complex shell patterns. To show their inherent similarities, they are arranged such that each subsequent pattern contains elements of the preceding pattern as well as new features. *Conus marmoreus* (Figure 7.1a) shows white drop-like regions on a dark pigmented background. In *Conus marchionatus* (Figure 7.1b) the white drops are enlarged at the expense of the pigmented regions. The pattern is reminiscent of staggered wine glasses. *Conus pennaceus* (Figure 7.1c) shows, in addition, dark lines on a pigmented background, occasionally interrupted by small white drops. In *Conus auratus* (Figure 7.1d) the dark lines are maintained without the white drops. Instead, a periodic large-scale transition to oblique lines with crossings occurs. Shortly before this transition takes place the continuous background becomes modulated towards narrow lines parallel to the growing edge (arrow). Such axially oriented parallel lines on top of a pigmented background are a characteristic pattern element in *Conus textile* (Figure 7.1e). Non-pigmented regions with a drop-like shape occasionally appear. Their lower borders are formed by a dark pigmented line. In regions without a pigmented background the pattern consists of a fine meshwork including lines with the shape of a wine glass as mentioned above. Similar parallel lines with occasional loops (tongues) are characteristic of *Clithon* (or *Neritina*) *oualaniensis* (Figure 7.1f). Here, however, the regions with fine lines are missing. In the specimen of *Clithon* shown in Figure 7.1g narrow-spaced parallel lines are framed by oblique lines, causing the overall impression of connected triangles, a pattern that is characteristic of the bivalved mussel *Lioconcha castrensis* (Figure 7.1h). Similarly, in the shell of the snail *Cymbiola vespertilio* (Figure 7.1i) very fine but short parallel lines give the impression of oblique lines. The triangles that are occasionally formed may become starting points for branches.

The hidden similarities in these patterns that overtly look very different suggest that only a few basic mechanisms are at work. The diversity must result from

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