

Epilogue: Pattern Cladistics From Goethe to Brady

Most, if not all, ideas in science are recycled, rediscovered, or rehashed, either surreptitiously, through rereading and rediscovering old works, or simply (commonly?) through lack of knowledge of past achievements. The idea of transformation—that things might change, transform, convert into other things—for instance, has been proposed many times, by both evolutionists and non-evolutionists alike. Yet the notion of transformation is really a myth, a story which many scientists embrace, a story that tells of living things transforming into other living things, with their role to interpret its meaning and mechanism: The fall of Paradise to the untamed wild, the tamed landscape to the Biblical flood, the reigns of monarchs, a kingdom to a republic and the pastoral to the industrial—of transformations there are plenty. A deep desire to uncover what mechanism(s) lie behind these transformations has provided many explanations, from the acquisition of sin after the fall from grace, to God's will, to progress, however construed. The belief that every transformation neatly fits a law or model by which nature abides has shaped our way of thinking. Yet concomitant with such thoughts is the recognition that Nature is complex, and that Nature's complexity obeys no single law or theory that places it neatly into a box. For every law and theory, we are told, there are exceptions, which are given ad hoc explanations. Man may have toiled the soil to shape nature into his or her image of Eden, but complexity does not fit any man-made law. Complexity is in itself a law; all we can do is interact with it and discover its relationships—this is the essence of knowledge.

As Hennigian cladistics gained acceptance by many more systematists between 1981–1990, Ron H. Brady (1937–2003¹), a historian and philosopher, became interested in the studies of Gareth Nelson, Norm Platnick, and Donn Rosen, all then at the American Museum of Natural History. The connection between Brady's work and that of Nelson is complex (see Brady 1979, 1982, 1985, 1987, 1989, 1994a, 1994b and Ebach 2005).

After meeting the cladists in the early to mid-1980s, Brady wrote a paper entitled "Form and Cause in Goethe's Morphology" (Brady 1987), a work that discussed the development of Goethe's archetype through to modern day. In his article, Brady concluded:

¹ It remains a surprise that no obituary has yet appeared of Brady.

The argument that a cladogram is a purely descriptive device has been clearly set forth by Nelson and Platnick, 1981. . . . Obviously, on this level we can find no opposition to Goethe's approach. The next interpretive level, that of the tree, does produce such opposition, not because a historical element is introduced, but because the other half—i.e. the a-historical, is not. (Brady 1987: 298)

The dichotomy between tree and cladogram leads back to Goethe and his archetype. Brady may have been the first person to realise the historical significance of Nelson's work: the connection between Goethe's *Morphology* and pattern cladism. Earlier Brady (1982) had defended the position of non-mechanistic explanations in systematics:

Beatty seems to defend cladists who are willing to interpret their results according to "evolutionary perspectives", but if the strategy of defining characters contradicts those perspectives—and my reading of his [Beatty's] argument suggests this result—any attempt to combine this research strategy with those interpretations would build in a contradiction . . . the pattern cladists, by discarding all such explanations, may have the only cladistic position which remains free from internal contradiction. (Brady 1982: 290)

Brady realised the importance of finding patterns first and interpreting them later in the light of known or hypothesised processes. The pattern cladistic interpretation gave cladistics (and systematics in general) a chance to discover processes, thus highlighting the importance of uncovering patterns prior to invoking processes (see Brady 1987). The link between Goethe's archetype and pattern cladism that Brady made is significant for one other reason: homology.

Nelson rarely spoke of homology in terms of archetypes. Homology, in Hennigian terms, is understood to be the transformation of character-states that unite two taxa. The synapomorphy is the homology that contains the homologues and lies in a great chain of being, namely that of the optimisation of character-states on a cladogram. Nelson never accepted this, as can be appreciated by his conversion of nodes to components. If the nodes represent transformational parts that unify two taxa, then components are junctions between two areas that represent a statement of relationship to a third thing. The dismissal of transformations and synapomorphies was revolutionary, something many systematists and biogeographers still fail to accept but was understood as a return to Goethe's way of science for Brady.

A unique aspect of Nelson's approach was to reform palaeontology by resurrecting and modifying Agassiz's threefold parallelism and, as a consequence, reform biogeography. The revolution today is no longer solely about palaeontology but of reforming its legacy—transformation and origins in molecular genetics. The tradition of seeing the world through mechanisms in order to discover patterns has hampered comparative biology since its inception in the 18th century. The revolution for 21st-century systematic biology lies in the work of Nelson and in precise methods, such as three-item analysis. Patterns can only be discovered if we consider it to be the primary aim of biology—*science as a pattern* and not *science as a process*.

The role of pattern cladistics today is to realise Nelson's legacy and learn from biogeography, the revolution that changed palaeontology, and reform molecular biology:

Palaeontology of the past is revived in molecular systematics of the present, in its search for ancestors and centers or origin. (Nelson 2004: 127)

That search—“for ancestors and centers of origin”—was made possible only by assuming that the phylogenetics of today had moved away from the phenetics of yesterday. That seems not to be the case.

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