Rebirth of the Type

Notes on A Recent Paper by Mark Riegner

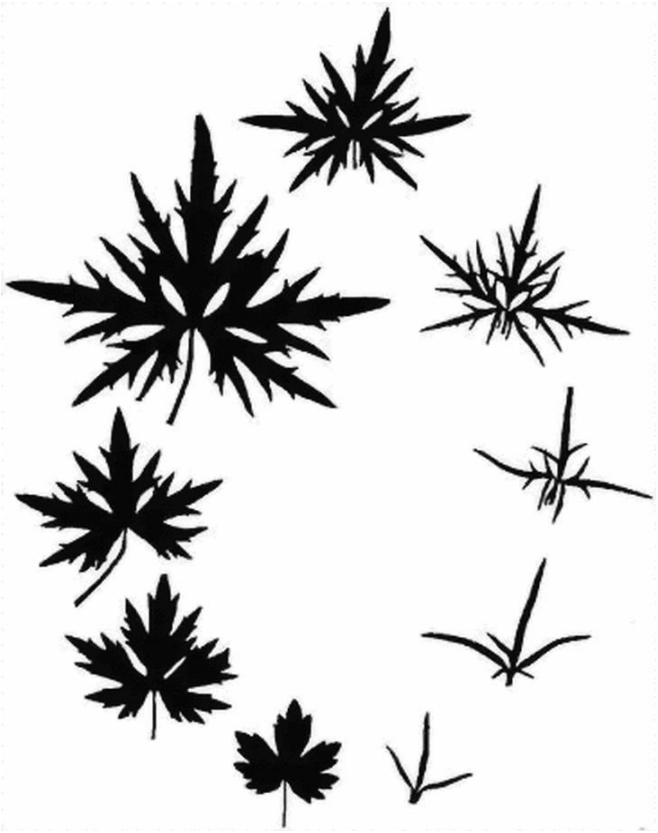
Typological thinking—for example, the idea that in each species we see an essential nature (*type or archetype*)—went out of style with the rise of evolutionary biology and Darwinism. If organisms, as Darwin's work suggested, go through more or less continuous change, with new species arising out of old ones, how could any species be thought to possess a fixed, given nature? Where, along the trajectory of change, would we find that nature?

As it happens, however, there is reason to think that the idea of the organismal *type* may be on the verge of renewal. And one sign of that renewal is the recent appearance of a paper by Mark Riegner in the journal, *Studies in History and Philosophy of Biological and Biomedical Sciences*. Riegner, who teaches in the Environmental Studies Program at Prescott College in Arizona, entitled his paper, "Ancestor of the New Archetypal Biology: Goethe's Dynamic typology as a Model for Contemporary Evolutionary Developmental Biology." The epigraph he chose for the paper is taken from Goethe:

> Form is a moving, a becoming, a passing thing. The doctrine of forms is the doctrine of transformation. The doctrine of metamorphosis is the key to all signs of nature. (Quoted in Richards 2002, p. 454)

Goethe died in 1832, well before the publication of Darwin's *Origin of Species* in 1859. His "doctrine of metamorphosis" was not conceived in the sense of Darwin's evolving species, but rather was his way of looking at the patterns of nature he could see in his own day. That doctrine, however, lends itself well to evolutionary thinking, and it is, according to Riegner, also key to the reconciliation of typology with evolution.

The type rejected by biologists, being a static essence, could not survive the onset of evolutionary thinking. Goethe's *type*, by contrast, was dynamic. Perhaps the most common way to illustrate it is with the sequence of leaves successively growing along the stem of an herbaceous plant, as shown in the accompanying figure. (The figure should be read from the lower left around the circle to the lower right, which is the order of leaves upward along the stem of a field buttercup (*Ranunculus acris*). No leaf will be exactly repeated on the stem of any two plants, and the leaves on the stem of a single plant differ greatly. Yet we can recognize a *movement* of a particular character in the sequence. Its character is objective; if one leaf is omitted from such a series and then handed to us later, we would be able to identify in exactly which gap it belonged. And if we were handed a leaf from a completely different kind of plant, we would probably be able to notice its dissonance with the kind of movement we see in the buttercup sequence. This recognizable movement, then, is one manifestation of what we might call the *type* of the buttercup.



The leaf series illustration may be very familiar to some of our readers, but is probably something of a novelty for the readership of the journal where Riegner's article appeared. Riegner uses it, along with other material, to drive home the relevance of Goethe's typological thinking for contemporary biology. Stated very briefly, here are some of the issues he addresses:

• Transformation, metamorphosis, and movement are themes inviting a consideration of the individual organism's development ("ontogeny"). Riegner quotes Goethe

to the effect that "Reason takes pleasure in development; practical understanding tries to hold things fast so that it can use them." As it happens, the emphasis on development has come front and center in today's biological thinking. Many believe that attention to development has been a critical missing element in evolutionary theory for the past century. Where embryologists and morphologists have interested themselves in the *explanation of the origin of form,* writes Riegner, "Darwin's goal was the *explanation of change,* with little interest in understanding how form arises." But now, especially in the field known as "evo-devo" (evolutionary developmental biology), the reality of the organism's development is being brought into connection with evolution. Many believe that we can understand evolutionary change only as a transformation of the individual organism's developmental process.

• The plasticity and dynamism of the Goethean *type* are well suited to the relationships we see between groups of organisms. For example, when we look at the cat family (Felidae), we recognize in each of the thirty seven living species "the lawful integration of organic features that constitute the expression of the dynamic type ... As disparate as are a tiger, a mountain lion, and an ocelot, for example, they are but variations on a theme, the *One* form expressed in the many." And that form in turn can be seen as one of many forms in the group, Carnivora (wolves, badgers, bears, and so on), which has its own recognizable *type*, of which cats are a *subtype*. Similarly again with the Carnivora in relation to the still larger group, Mammalia … until one reaches the Goethean notion of the *ur*-animal, or single type that comes to expression in all animal forms. Reverting to the plant leaf series: just as the unity of the series along the stem of one plant is just one manifestation of the larger unity of the species (a unity that comes to expression differently in different habitats), so, too, the species is one dynamic manifestation of a broader *type*—and the nesting of *subtypes* within higher *types* can in this way continue indefinitely.

• The dynamic, interpenetrating relationships among Goethean *types* also helps to make sense of what usually goes under the heading, "convergent evolution." The so-called "camera eye" common to cephalopods (such as the octopus) and vertebrates (including mammals) is often cited as one of the more dramatic examples of convergent evolution. This eye evolved independently—and in stunningly similar detail—in the different groups, and is radically unlike, say, the compound eye of insects. On the other hand, the process by which eyes are formed at the molecular level in mammals and insects has remarkable commonalities. Given the emphasis by conventional evolutionary theorists on contingency and random mutation, it is hard to understand how such extraordinary similarities could have come about. But the way in which *types* are nested within each other and derive ultimately from a single overarching *ur-type* suggests that the similarity may not be so surprising after all. "From a Goethean typological perspective, these discoveries of profound relatedness among markedly diverse animals are consistent with the notion of the *One ideal organism*—at the most inclusive hierarchical level of the animal archetype."

Riegner suggests that, while the organizing principle we glimpse in the *type* "remains elusive," it is also "central to the biological sciences." He cites Henri Bortoft (1996, pp. 240-1) to the effect that, when we think the *type*, "what is experienced is not a representation of the organizing principle, a copy of it 'in the mind,' but the organizing principle itself acting in thinking."

This reminds me of Samuel Taylor Coleridge's understanding of idea and physical law, as summarized by the British semantic historian, Owen Barfield: "A true law of nature is not a rule generalized from particular observations of natural behaviour; it is nature behaving." We can, of course, think such laws in a superficial and abstract way. But when we think their idea profoundly enough, "the very law [idea] itself is also the power" (1971, p. 126). Much the same could be the said of the Goethean *type*. The main obstacle to recognition of the truth Goethe and Coleridge saw remains our modern difficulty in (1) experiencing with sufficient vividness the dynamism of ideas, and (2) in perceiving the world as an outward expression of this dynamism. SLT

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