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EDITORIAL

The Evolution of Chicago

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In this issue, Marion Blute discusses questions related to the evolution of anisogamy (sexual reproduction by the fusion of gametes that are dissimilar in size or form), a topic that is thought to be the foundation of the theory of gender differences and relations. Current attempts to bridge between geometric morphometrics (GMM) and finite element analyses (FEA) of CT-derived data from bones of living animals and fossils appear to lack a sound biotheoretical foundation. Fred Bookstein appeals to "a new rhetoric of quantitative inference" across the GMM–FEA bridge, linking form to function. Pondering the origins of life, Isaac Salazar-Ciudad argues that evolution can happen without anything being copied and that, in fact, RNA copying is too complex to arise spontaneously as the first pre-biotic system. He suggests how RNA replication could have arisen *after* evolvable systems had come into being, and how this crucial innovation could have spread over existing evolutionary systems to become a major driver of subsequent evolution. Sober has objected that Felsenstein's method of independent contrasts (FIC), one of the most widely used approaches to the study of correlated evolution, is methodologically flawed as it seemingly rests on the assumption that the traits it studies evolved by drift, ruling out selective hypotheses from the start. Armin Schulz shows that the assumptions behind the FIC do not in fact preclude it from investigating selective hypotheses. Michael Trestman argues that behavior played a crucial role in driving at least some of the major transitions in evolution. Because behavioral interactions can become stably organized in novel ways on time scales faster than the lifetime of an organism, behavior can lead the way into a transition—becoming organized at the new level prior to inheritance and development. Moreover, he shows that *novel forms of behavioral organization* (distributed or hierarchical control that produces functional coherence) can emerge, binding the evolutionary fates of a group of previously independent organisms, and leading the way to an aggregative or "higher-level" mode of reproduction.

The issue also contains two historical essays. The first one, by Frederic Tremblay, documents how tenets of Nicolai Hartmann's ontology—including "what is real is what is temporal," and "the criterion of individuality is to have duration"—influenced the entomologist Willi Hennig when he was developing his phylogenetic systematics. In his *Grundzüge einer Theorie der phylogenetischen Systematik*, Hennig argued as far back as 1950 that biological species are best construed as individuals. In a short paper on "Science and Language," David Hull recalled that a reviewer of a book that reached conclusions similar to Hennig's, Rolf Löther's *Die Beherrschung der Mannigfaltigkeit* (1972), had remarked that logicians "should take note" of Löther's conclusion that "in the light of the Darwinian theory all taxa must be considered individuals, and all taxa names proper names." Hull, who together with Michael Ghiselin introduced the thesis that species are individuals in the Anglo-American biological world in the mid-1970s, comments: "I for one look back at this literature with considerable frustration. Why did I have to start from scratch? Why did Ghiselin and I have to rediscover the wheel?" (Hull 2010, p. 36; see also Ghiselin 2010). "One answer is that so few English-speaking systematists are fluent in German."

The second historical essay in this issue discusses Robert E. Park's contribution to Darwinian thinking in early American sociology. As the leading figure of the Human Ecology Approach established in the 1920s and

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1930s at the University of Chicago, Park drew heavily on evolutionary concepts, which Hendrik Wortmann presents and discusses systematically.

An essay review on James Shapiro's *Evolution: A View from the 21st Century* (2011) by Davide Vecchi rounds off this issue. As discussed by Vecchi, Shapiro's "informatic" view with its emphasis on "sensing, cognitive, and active cell processes" is at odds with the mechanistic and reductionist philosophy that dominates molecular biology. Shapiro considers cells as "agents of change" employing their natural genetic engineering capacities in order to engineer adaptive change. His "cognitive view of life" (Vecchi) is reminiscent of the "equivalence postulate" that was integral to the evolutionary epistemologies of both Konrad Lorenz and Donald T. Campbell, and in fact provided their logical basis (Wagner 1981). As would become clear later, the equation "life = cognition" is not a very useful heuristic (Wilson 1990). Campbell (1997) recanted his original basic selectionist "dogma" by no longer considering adaptive organic form as "knowledge," and reserving the term "knowledge" for the products of "vicarious selection processes" such as perception and trial-and-error learning, which "short-cut selection by the life and death of genetic variants." It will be interesting to figure out whether at the level of the organism, Shapiro's "cellular cognition" is "vicarious" in Campbell's sense as well.

What unites Robert Park, Don Campbell, David Hull, and Jim Shapiro, in addition to a broad interest in evolution, is their relation to Chicago. The University of Chicago organized the Darwin Centennial Celebration in 1959. "Chicago boys" among free market economists, including Milton Friedman and Gary Becker, made frequent excursions on evolutionary terrain. For evolutionary thinking, broadly and interdisciplinarily conceived, the Windy City has long been, and remains, a "Tierra del Fuego of the mind" (Robert J. Richards).

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