Defending a mathematical sense of biological information

Oliver Lean*[1]

[1]University of Bristol, Department of Philosophy – 9 Woodland Rd, Bristol BS8 1TB, UK, United Kingdom

Abstract

Teleosemantic accounts of biological information are often motivated by the belief that the mathematical account of information, developed by Claude Shannon, is inadequate for biological purposes. Typical reasons given include the theory's lack of reference to content or correctness, and the implied parity of informational status between all causal factors in a biological process. It is therefore concluded that a richer sense of information is required to make the kinds of distinctions often made by biologists when using informational language, such as assigning a privileged status to genes in development, or in explaining "incorrect" outcomes thereof. I argue that these assumptions are mistaken, and that Shannon information can and should be considered a biologically relevant property with explanatory value. The teleosemantic view seeks to explain biological information as a product of natural selection, and which therefore only exists given a certain selective history. However, in doing so they are really just describing a certain kind of informational *function*, not information itself. Once the distinction between "information" and "having an informational function" is recognised, it is seen that the property on which selection is acting to produce such functions is that of natural, correlational information. In short, a Shannon-based account of biological information can avoid parity, and preserve correctness, by reference to function rather than by incorporating function into the definition of information itself. This approach is more inclusive of legitimately informational processes in biology which nevertheless lack the requisite selective history for teleosemantic definitions.

*Speaker