

HISTORICAL CONTEXT FOR THE QUESTION: WHAT IS “INTERDISCIPLINARY” RESEARCH?

William J. Brazelton^{1,2} and W. T. Sullivan III^{1,3}, ¹Center for Astrobiology and Early Evolution, ²School of Oceanography, and ³Department of Astronomy, University of Washington, Seattle, WA 98195. braz@uw.edu

Astrobiology's goal of promoting interdisciplinary research is an attempt to reverse a trend that began two centuries ago with the formation of the first specialized scientific disciplines. We have examined this era of discipline formation in order to make a comparison with the situation today in astrobiology. Will astrobiology remain interdisciplinary or is it becoming yet another specialty?

As a case study, we investigated effects on the scientific literature when a specialized community is formed by analyzing the citations within papers published during 1802-1856 in *Philosophical Transactions of the Royal Society*, the most important “generalist” journal of its day, and *Transactions of the Geological Society of London*, the first important disciplinary journal in the sciences. A similar citation analysis was applied to papers published over the period 2001-2008 in the contemporary journals *Astrobiology* and the *International Journal of Astrobiology* to test the hypothesis that astrobiologists are in the early stages of creating their own specialized community.

Our results [1] provide historical context on the question of what it means to be “interdisciplinary.” The interdisciplinary nature of astrobiology is not unique to astrobiology; indeed, it can be argued that all scientific disciplines originated as interdisciplinary research programs. Whether astrobiology remains a collection of specialists, as in oceanography, or becomes a new specialty like molecular biology, its interdisciplinary nature alone does not make it fundamentally different than these programs except perhaps in combining a wider range of disciplines that address a wider range of scientific questions.

It is possible that astrobiologists are striving for a way of doing science that is more radical than mere collaboration among scientists from different disciplines. Many astrobiologists are trained to be fluent, if not experts, in multiple disciplines, and they seek true transdisciplinary research that is oblivious of disciplinary boundaries. It is not clear that such lofty goals are attainable. Astrobiologists may succeed in communicating with each other, but in the process become incomprehensible to non-astrobiologists. In this case, astrobiology will have become only yet another specialized discipline. We will discuss possible “warning signs” that astrobiology is embarking on the same path of specialization that other new fields have completed before.

If disciplinary boundaries can be largely breached to create a discipline-free science, however, then a fundamental component of modern science will

have been profoundly altered. It will be no less than a new scientific revolution.

References:

[1] Brazelton W. J. and Sullivan W. T. (2009) *Int. J. Astrobiol.*, 8(4), 257-266.