

Disorient Yourself for Science

Author: Beardsley, Timothy M.

Source: BioScience, 63(7) : 511

Published By: American Institute of Biological Sciences

URL: <https://doi.org/10.1525/bio.2013.63.7.1>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

PUBLISHER
Richard T. O'Grady

EDITOR IN CHIEF
Timothy M. Beardsley

MANAGING EDITOR
James M. Verdier

BOOK REVIEW EDITOR
PEER REVIEW / PRODUCTION COORDINATION
Jennifer A. Williams

MANUSCRIPT EDITOR
Nathan N. True

Editors: Eye on Education: Beth Baker (educationoffice@aibs.org); Feature articles: Beth Baker (features@aibs.org); Washington Watch: Robert E. Gropp (publicpolicy@aibs.org).

Editorial Board: Rick Bonney, Gordon Brown, Richard M. Burian, Catherine E. Carr, Joseph Cloud, Scott Collins, Rita R. Colwell, Charlene D'Avanzo, Kathleen Donohue, David L. Evans, Cassandra G. Extavour, Eric A. Fischer, Kirk Fitzhugh, Nick Haddad, Geoffrey M. Henebry, Cynthia S. Jones, Linda A. Joyce, Edna S. Kaneshiro, David M. Leslie Jr., Harvey B. Lillywhite, Alan C. Love, Paula Mabee, Marshall A. Martin, Janice Moore, Peter B. Moyle, Ben Pierce, Jason Podrabsky, J. Michael Scott, Daniel Simberloff, Martin Tracey, Monica Turner, Randy Wayne, Judith S. Weis, David S. Wilcove, Jean A. Wyld.

BioScience (ISSN 0006-3568; e-ISSN 1525-3244) is published 12 times a year by the American Institute of Biological Sciences, 1900 Campus Commons Dr., Suite 200, Reston, VA 20191, in collaboration with the University of California Press. Periodicals postage paid at Berkeley, CA, and additional mailing offices. **POSTMASTER:** Send address changes to *BioScience*, University of California Press, Journals and Digital Publishing, 2000 Center Street, Suite 303, Berkeley, CA 94704-1223, or e-mail customerservice@ucpressjournals.com.

Membership and subscription: Individual members, go to <https://aibs.site-ym.com/?page=IndMem> for benefits, services, and additional information. Subscription renewal month is shown in the four-digit year-month code in the upper right corner of the mailing label. Institutional subscribers, go to www.ucpressjournals.com or e-mail customer service@ucpressjournals.com. Out-of-print issues and volumes are available from Periodicals Service Company, 11 Main Street, Germantown, NY 12526-5635; telephone: 518-537-4700; fax: 518-537-5899; Web site: www.periodicals.com. **Advertising:** For information about display and online advertisements and deadlines, e-mail adsales@ucpressjournals.com. For information about classified placements and deadlines, contact Jennifer A. Williams, AIBS (jwilliams@aibs.org).

Copying and permissions notice: Authorization to copy article content beyond fair use (as specified in sections 107 and 108 of the US Copyright Law) for internal or personal use, or the internal or personal use of specific clients, is granted by the Regents of the University of California on behalf of AIBS for libraries and other users, provided that they are registered with and pay the specified fee through the Copyright Clearance Center (CCC), www.copyright.com. To reach the CCC's Customer Service Department, call 978-750-8400 or e-mail info@copyright.com. For permission to distribute electronically, republish, resell, or repurpose material, use the CCC's Rightslink service on JSTOR at <http://www.jstor.org/r/ucal/bio>. Submit all other permissions and licensing inquiries through the University of California Press's Rights and Permissions Web site, www.ucpressjournals.com/reprintInfo.asp, or e-mail journalspermissions@ucpress.edu.

Abstracting and indexing: For complete abstracting and indexing information, please visit www.ucpressjournals.com.
© 2013 American Institute of Biological Sciences.
All rights reserved. Printed by The Sheridan Press.

BioScience®

A Forum for Integrating the Life Sciences
American Institute of Biological Sciences

Disorient Yourself for Science

I was attracted to science because it offers insiders powerful rules that explain how things work. The rules' power was a source of fascination. It drove the urge to learn more and so to be able to solve problems and make surprising things happen: to build circuits, make liquids change color, control and outsmart animals and plants.

But when classes became more advanced and the playground grew, the rules' immediate power seemed to diminish. Science had to be read about, in books that were not always fascinating. And for a degree, you had to learn about the messy limitations and doubts and controversies surrounding the science as much as about its power. Understanding the different concepts deployed by people with different perspectives, and their disagreements, was a headache. It was (partly) achievable only in a narrow domain.

Later, however, doing research, I could for a while return to the fascination of solving specific problems to contrive experimental conditions—without worrying about others' concepts and interpretations. I suspect many others could tell a similar story.

The difficulty of communication between people educated in widely separated disciplines has been recognized at least since C. P. Snow spoke about the “two cultures” of scientists and literary intellectuals in 1959. Less well known are the gulfs dividing different scientific cultures: Virologists, for example, might find it challenging to discuss their work in detail with ecologists, and geochemists and epidemiologists will both face a learning curve before they can get serious about discussing each other's studies and understandings. So it should not be surprising that planning and performing interdisciplinary or transdisciplinary research strains communication bandwidth. It is much easier to work with people in your own specialty, who know what you're talking about. And that, of course, perpetuates the divisions.

It also limits the prospects for transformative research, Deana D. Pennington and her colleagues hypothesize in the article that begins on page 564. Ingrained concepts and accepted ways of doing things offer short-term satisfaction but stifle the imagination. The disorienting cognitive struggle needed to collaborate across disciplines stimulates transformative learning that pushes science forward, Pennington and her coauthors argue, citing “widespread anecdotal evidence.”

The idea of transformative learning, although not originally developed for understanding scientific collaboration, appears to be applicable to science. It forces participants in inter- and transdisciplinary research to become more aware of their assumptions and mental models.

Often, the disorienting effects of collaboration with people from different fields prove daunting: Researchers opt instead to stay within their narrow domain, in safe territory. Sometimes, though, a crisis can overcome the reluctance. It did so in 1993 in the US Southwest, where young adults started dying of a mysterious acute pulmonary syndrome now known to be caused by the Sin Nombre Virus. The scientists who impressively solved that mystery drew on their expertise in multiple fields to solve an urgent problem. They gained immensely from their experiences, and so did science.

We can hope that having more interdisciplinary and transdisciplinary research does not require more crises. Disorientation is good for you and for science. It might be uncomfortable at first, but with effort, it can bring into view new rules that make science more powerful—and fascinating.

TIMOTHY M. BEARDSLEY
Editor in Chief

doi:10.1525/bio.2013.63.7.1