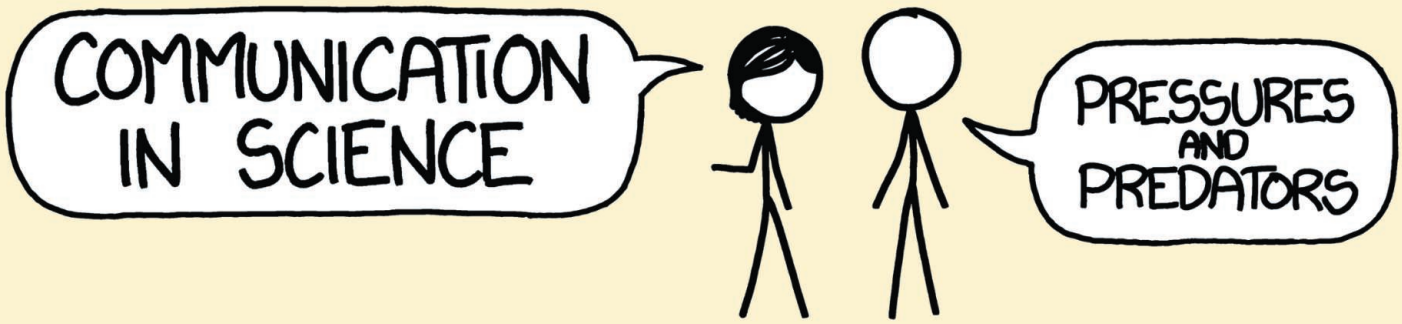

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INTRODUCTION

Scientific Discourse: Buckling at the Seams

THOMAS EDISON BUILT AN EMPIRE ON HIS 1093 PATENTS. BUT ONE INNOVATION he considered a failure has had a lasting impact on how scientists communicate. He bankrolled the startup of *Science*, among the first general science journals, which debuted on 3 July 1880 with a bland description of the U.S. Naval Observatory and a cover plastered with classified ads. *Science* faltered at first, but in the end it thrived, and so did scientific discourse.

The mid-20th century saw a key innovation, the anonymous referee. This mechanism depends on trust, in both the integrity of submissions and in peer reviewers. That trust is being tested by a disruptive change in scientific communication: open access. Unlike "traditional" journals, which rely largely on subscription revenue, many open-access publications earn their daily bread through publication fees from authors. Profit is linked to volume, seemingly boundless on the Internet.

Although the open-access world includes many legitimate journals, abuse is prevalent, as a *Science* investigation has found. Over the past 10 months, contributing correspondent John Bohannon submitted faux papers with blatant scientific flaws to 304 open-access journals (p. 60). More than half accepted the paper.

Granted, some "traditional" print publications might have fallen for our hoax, too. But with open-access journals proliferating, debate is needed about how to ensure the credibility of scientific literature. Open-access pioneer Vitek Tracz believes that anonymous peer review is "sick and collapsing under its own weight." As a remedy, Tracz has launched a new open-access journal in which reports—including all supporting data—are reviewed after they are posted online (p. 66). The findings and ex post facto reviews become a living document that proponents say will offer a more nimble forum for revising knowledge as it accumulates.

As the number of published papers (and the cost of doing research) grows, there is an increasing need to predict impact; for a novel approach, see the Report by Wang *et al*. (p. 127) and an accompanying Commentary (Evans, p. 44).

The ability to publish papers and their underlying data in full on the Internet opens new possibilities to showcase the neglected stepchild of scientific publishing: negative results. In the past, data revealing that a drug has not lived up to its promise, for example, often failed to see the light of day (p. 68). But now they may find a niche in the limitless library of the Internet.

On the other hand, disseminating certain scientific information could pose a threat to safety and security. The recent debate over whether to publish influenza gain-of-function studies illustrates the conundrum (p. 70). Scientists in industry, too, are struggling to define the limits of openness when communicating proprietary research, and whether some kinds of patents may actually squelch innovation (p. 72).

In the face of changes driven by the Internet, one form of communication is surprisingly resilient. By and large, scientists are unwilling to forgo the rite of annual meetings, where they gather to argue about new research, network, and gossip (p. 74) and to draw inspiration from top presenters (p. 78). The vitality of the scientific meeting has given rise to a troubling cottage industry: meetings held more for profit than enlightenment (p. 76).

How the dramatic shifts in scientific communication will affect the culture of research and processes for academic advancement and funding is far from clear (Harley, p. 80). In the Commentary section, Könneker and Lugger (p. 49) notes that we have come full circle: Once again, science is becoming more of a public activity. Kahan (p. 53) describes how to use evidence effectively and what pitfalls should be avoided in communicating vaccine information to a wary public.

– RICHARD STONE AND BARBARA JASNY

CONTENTS

See also Editorial p. 13; Perspectives pp. 44, 49, and 53; Report p. 127; Science *Careers; and Podcast at www.sciencemag.org/special/scicomm*

Please Take Our Survey!

We're eager for your thoughts on open-access publishing and invite you to participate in an online survey: http://scim.ag/OA-Poll. Results will appear next month in *Science*.

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