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ACS OMEGA

Editorial

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Guest Editorial: Open Access: Principles, Practice, and Potential

"Open Access is simply a way to express the cross-fertilization of the very culture of science with new technologies to create the optimal communication system science needs," wrote Jean-Claude Guédon in a recent and fascinating article[1] that surveyed the origins and future of open access. But as the length of Guédon's 38-page essay implies, and as anyone familiar with the debates on the topic will attest, open access is anything but simple.

To many it represents a beguiling and natural fusion of digital technology with the long-standing amateur ethos of scholarly communication.[2] However, the erratic and often fractious progress toward a fully open-access world over the past two decades also bears witness to the collision of its ideals with the economic realities of 21st century academic publishing and with the tides of metricization that have swept through the processes of research evaluation.[3] The arguments are as much about values as about value and are not merely for academic consumption. Openness is about facing outward. At a time when political populists have succeeded beyond many people's imagination in the US and the UK, at least in part through a reckless disregard for expertise and evidence, researchers need to reconsider whether we are doing enough to communicate the importance of discovering and verifying truths about the world.

By this point you may be wondering what all this has got to do with *ACS Omega*, an open-access journal that aims to publish high quality and technically sound research from chemistry and closely related disciplines. For many chemists, the heavy demands of research, teaching, administration, and all the other obligations of a life in research are more than sufficient to load up the working week. But I make no apology for calling attention to the fundamentals. In a fast-changing world, is it important for us to keep hold of the principles that first brought us to a life in science.

For researchers, I see those principles operating at three different but interacting levels: the personal, the academic (or scientific), and the public. On a personal level, it is pure curiosity, often allied with a desire to understand the world so as to make it a better place, that inspires many people to launch a career in research. "We have purposes greater than ourselves," as surgeon and public health researcher Atul Gawande observed in his book, *Being Mortal*.

As working scientists, many of us become imbued (by processes of which few are conscious) with the principles articulated by Robert Merton that hold science to be a collective and cumulative activity in which the core responsibility is to communicate knowledge—even if it is distorted by career incentives that focus less on the substance of our accomplishments than where they are published. The duty of communication is primarily to other scholars, but from the formation of the very first learned societies the scientific community has a sense of its public obligations.

That sense of duty has been sharpened by the arrival of open access and extended by governments seeking better returns on public investment in research. The Finch report's statement in 2012 that "The principle that the results of research that has been publicly funded should be freely accessible in the public domain is a compelling one, and fundamentally unanswerable" captured the zeitgeist and was accepted without demur by the UK government.[4] Similar proclamations have been made by administrations in the United States, Europe, and elsewhere.

Of course, words are cheaper than actions, and open access has yet to deliver fully on the promise of providing faster, fairer, and cheaper access to research information. In part this is due to historical baggage. The entanglement of the principles of scholarly communication with increased commercialism in publishing and with rising managerialism in university governance has intensified our preoccupation with journal-based measures of prestige. That has retarded the dissemination of knowledge as authors chase impact factors and locked in the market advantages of the largest publishers.[2]

The transformation to open access is also complicated—in many cases for good reason—by differing perspectives between disciplines, disagreements over the balance between academic freedom and responsibility, concerns about cost and quality raised by author-pays business models of publishing, and broader debates about how to empower researchers in the global south. The process is evolutionary and revolutionary—too slow for some, but too radical for others.

We should not be surprised by such turbulence. To me it is a healthy sign because it means these are matters that people care about. These issues need to be addressed, but we should be in no doubt about the direction of travel. The past 20 years have brought a slew of innovations in practice that have been very positive. I include here the invention of open-access mega-journals, of which *ACS Omega* is the latest incarnation, where soundness matters more than predicted impact, and the recent growth in preprint servers[5] and journals with open peer-review processes,[6] which are both now enjoying strong support from funding agencies. These developments, which focus attention on the content of research papers, have helped to spark necessary discussions on how to reconfigure our processes of research evaluation and how to address growing concerns about the reliability and reproducibility of science, a matter that impacts on public trust.[7]

Open access is just one part of the digital tapestry that is transforming access and attitudes to the processes of creation and dissemination of information by stakeholders within and without the research community. On the fringes, initiatives such as the Open Access Button, Unpaywall, and even the illegal and controversial Sci-Hub, are offering options to those wanting access from outside well-funded universities. Increasingly, those on the outside include the enthusiastic participants in citizen science in fields as diverse as astronomy, environmental science, genetics, and structural biology.[8] In the mainstream, recent moves such as the opening-up of innovation in the pharmaceutical industry and the announcement of a National Open Science Plan in The Netherlands are all clear

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signs that while the landscape of research communication is still far from settled it is stretching further into the distance—and into the public domain—than many had imagined.

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Notes

This is a guest editorial by invitation by the journal's Editors. Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

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