

21

International Transfer of Information in the Physical Sciences

R. Stephen Berry

University of Chicago, United States

INTRODUCTION

Open access and the ready exchange of data and other information are at the heart of the normal processes of science. This is perhaps even truer in the physical sciences than in other disciplines because they may offer fewer direct pathways to profitable applications. Obvious symptoms revealing this tradition are the longstanding practice of circulating preprints and other early-stage information among colleagues and the practice of presenting results in symposia and other conferences well before the work has been submitted for publication. Electronic media have made such access steadily easier and cheaper, and consequently have made it possible for science to progress faster and at a higher level of scholarship.¹ We are in a period of adaptation and learning; this discussion starts with the perspective that we are trying to find effective ways to maintain procedures and values we know and trust while making optimal use of the powerful tools of electronic media and open access.

The following discussion will describe the kinds of information that physical scientists share, how they go about sharing that information, how the modes of sharing are changing, what the larger context is in which this sharing takes place, and then to the central point of this discussion, what challenges and problems face the scientific community and the infrastructure that supports it. Finally, I will introduce a proposal for one approach that may be a useful way of adapting to the evolving world of scientific communication.

WHAT PHYSICAL SCIENTISTS COMMUNICATE AND HOW THEY DO IT

The most obvious material that all scientists communicate is the substance contained in their formal publications. These papers in traditional journals go through a screening in the form of anonymous peer review that has set the standard threshold for acceptable distribution. There is a sort of tacit certification that goes with publication in these journals. However it must be understood that the threshold for acceptance is a relatively low (although sometimes capricious) one. The normal journal review process is certainly not capable of uncovering deliberate fraud, and very rarely can reveal subtle errors or inconsistencies that would require extensive work to discover.

¹The author is not aware of any documentation to show the extent to which scientific progress has accelerated or current publications refer more extensively to relevant prior work than before electronic communication became widespread. The term "have made it possible" is used quite deliberately.