BOOK REVIEWS

Limnol. Oceanogr., 43(5), 1998, 1017–1018

PEEK R. P., AND G. B. NEWBY [EDS.]. 1996. **Scholarly publishing: The electronic frontier.** The MIT Press, Cambridge, Massachusetts. ISBN 0262161575. 363 p. $35.00.

One of the promises of electronic publishing, as discussed in this uneven collection of essays, is that it will return us to the standards set by the 17th century. It was then that scholarly journals (*Journal des savants* in France, *Transactions of the Royal Society of London*, according to chapters 4 and 7 in this book) first appeared in response to the inadequacies of the usual scholarly communications in those days: letters. Scientific journals allowed a faster and broader exchange of ideas, which was as important an advance then as electronic publishing offers today. In chapter 4, Guedon suggests that because electronic storage costs are trivial, electronically published articles "may soon display a more leisurely approach to their subject, as they used to do in the nineteenth century" (p. 80). Guedon is not alone among the authors appearing in this collection who imply that electronic publishing will allow us to return to unfettered, rapid publishing—a golden age not seen in several centuries.

Just as the Luddites of the 17th century could not stop printed journals from spreading blasphemic ideas, there is no stopping the proliferation of electronic publishing. I picked up this book with the hope of learning what the future holds, but the lessons of the past seem clearer. Electronic publishing excites us simply because of its novelty, but many look for it to solve the problems facing the printed journal, which have been building over its recent and not so recent past.

Some forms of electronic publishing may return journals to 17th-century standards if they are able to report results at the same pace they are obtained, as discussed by Guedon, but probably not if papers are to be peer-reviewed and edited by mere humans. Odlyzco discusses in chapter 5 how e-mail has improved the business of getting out even traditional printed journals, and he goes on to point out that peer review is obviously possible in cyberspace. But the days or even weeks shaved off by sending papers, reviews, and the journal electronically are still insignificant compared with the often glacial pace of reviewers and editors (and authors returning revisions and proofs). If we keep peer-review, I do not think electronic publishing will get us back to 17th century standards.

In chapter 6, Harnad points out that attitudes toward peer review and thus electronic publishing vary in part because of differences in acceptance rates among journals from diverse disciplines. The typical rejection rate for physics is around 10%, whereas at the other extreme, authors run a gauntlet of 80–90% rejection rates in social sciences and humanities. Chemistry and biology (and *L&O*) are somewhere in between. Perhaps because of a "self-selection" process (as Harnad phrases it) in physics, informal electronic exchange of preprints has been very successful, as is evident from the popularity of the preprint service started and managed by Paul Ginsparg at Los Alamos. But quality is not the only issue. Aquatic scientists exchange preprints, of course, but I suspect only among the most devoted followers of a particular topic. These usually number so few that each of us can handle this exchange for our own research topics without the aid of a card-carrying electronic publisher.

A couple of chapters mention alternatives to the usual peer review system, which would be unique to an electronic world. In one of the more radical plans, Harnad suggests that submitted papers should be judged by the entire cyberspace community and only those papers attracting sufficient interest would be sanctified as being "published." Now I have noticed a correlation between a paper's quality and the ease of obtaining reviews, but I suspect that few of our papers would fare well in a popularity contest. More importantly, I wonder about the quality of the reviews and of the "final" version of the paper produced by such a reviewing contest. In another alternative publishing scheme, again only possible in cyberspace, Odlyzco suggests that papers would be continuously reviewed and updated by authors. (I shudder at the thought, although perhaps I am alone in saying "good riddance" when I finally see one of my papers published.) Surprisingly, only Hayes discusses, and just briefly, the more obviously attractive capacities of electronic publishing, such as being able to present models or simulations as movies, to give a video of a feeding copepod and not just a picture, to rotate a three-dimensional graph or a contour plot to really see all the data, or to click on a graph in order to use the data in other calculations or figures.

My university's head librarian likes electronic publishing, not for its unique capacities for displaying data, but because she believes it will stop the spiraling costs of journal subscriptions, which are discussed by Okerson in chapter 11. Electronic publishing promises to save 70–80% (chapter 6) of the money now spent on printed journals. Purely electronic journals could be totally free only if we do away with copy, managing, and the small honorarium given to scientific editors.

But the main force driving up journal subscription prices is not the cost of ink, paper, and editors, but rather the profits taken by commercial publishers. Okerson discusses the huge price increases for those journals produced by a couple of commercial publishers in Europe. Kling and Lamb (chapter 2) hope that e-journals will allow universities to reduce their dependency on commercial publishers. (They go on to say that electronic publishing will return intellectual property, in our case, scientific articles, "to its rightful owner, the university" (p. 33), which strikes this professor as curious.) In contrast, journals published by societies (like *L&O*) are still a bargain. Harnad traces out the beginnings of commercial publishing and the start of its stranglehold on scientific journals. Hurtado points out in chapter 12 that practicing scholars have been isolated and know little about this problem. In considering where to submit a paper, who thinks about if the targeted journal and its publisher charge outrageous subscription fees?

Like many universities, mine has been forced to cancel subscriptions to some of these pricey journals. When faced with protests from the faculty, my librarian offered the option of obtaining electronically (or otherwise) only those articles the faculty require, not the entire journal. I suspect that commercial publishers will figure out a way to make money from this "article-on-demand" system. My librarian may save money for her budget but I believe the costs will be borne more by practicing scientists. Regardless, what is more interesting to consider is the effect an on-demand system would have on how we do science.

One possible effect is that we become more insular. Electronically produced articles would extend the power, which is now possible even with printed journals, to search for those articles in our particular discipline. Conceivably, smart computers could compose a personally designed electronic "journal" of articles taken from several sources. Even now, for example, few subscribers probably read *L&O* articles outside their fields. But when you hold the entire jour-

nal in your hand, it is hard to avoid at least scanning titles and maybe an abstract or two outside your research area. On the other hand, the great search engines of cyberspace allow us to unearth gems buried in some obscure journal. Rothman (chapter 19) argues for a "virtual central database" so that history does not repeat itself and overlook important papers. If we had this electronic database in the late 19th century, perhaps Mendel's work would not have been lost for a generation, although I wonder if his work would have been read and understood any faster.

My short review cannot do justice to the many other issues discussed in this book, many of which are quite removed from the everyday concerns of *L&O* readers. Lynch (chapter 8) points out that electronic publishing without any paper trail raises certain ethical and integrity questions. Kahin (chapter 17) discusses copyright issues, although I found a clearer explanation in Okerson (1996). Glancing through this book even superficially may give you a better feel for this and other issues facing publishers, not just readers. (Another collection of articles [Shaw and Moore 1996] is more focused on electronic publishing in science than Peek and Newby.) As a member of the society that publishes this journal, you should be concerned with all sides of issues in electronic publishing. A couple of authors in this collection predict the demise of the printed journal by 2025. Perhaps so. I suspect, however, we will have printed journals for some time to come, just as I occasionally get a letter or two on a scientific issue. Just like the 17th century.

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Limnol. Oceanogr., 43(5), 1998, 1018–1019

JØRGENSEN, B. B., AND K. RICHARDSON [EDS.]. 1996. **Eutrophication in coastal marine ecosystems.** American Geophysical Union, Coastal and Estuarine Studies 52, Washington, D.C. ISBN 0-87590-266-9. 273 p.

In the past three decades we have observed disturbing signs of change in the coastal waters of all the continents. One set of changes, including regional losses of seagrasses, expanded occurrences of hypoxia/anoxia, persistent blooms of harmful algae, and disruption of pelagic and benthic communities, is related to the anthropogenic enrichment of coastal waters that began to accelerate in the 1950s. Enrichment of the coastal zone with nitrogen and phosphorus is now a well-established fact and presents a compelling rationale for new scientific programs to assess global changes at the land–sea margin. Examples in the United States include the Land Margin Ecosystem Research program (of NSF), Coastal Ocean Processes program (NSF, NOAA, ONR), and the Ecology and Oceanography of Harmful Algal Blooms program (NSF, NOAA, USEPA, ONR). Multinational programs include LOICZ (Land–Ocean Interactions in the Coastal Zone, a core project of IGBP) and the proposed coastal module of GOOS (Global Ocean Observing System).

The growing concern about coastal eutrophication is analogous to the intense effort directed at the problem of lake eutrophication in the 1960s and 1970s. This explosive growth is characteristic of a young scientific discipline. Scott Nixon (1995) reminds us that the concept of marine eutrophication "was unheard of until about 20 years ago." We are still in the early stages of intense observation, mostly as region-specific assessments, and are far from working through the complete puzzle of how coastal eutrophication works on a global scale. This book reflects the state of the science because it presents a comprehensive, region-specific assessment. The region of interest here is the Kattegat, the transition zone between the Baltic Sea and North Sea, one of "the best studied marine regions in the world and certainly one for some of the longest time series for biological data." This book is a product of the Marine Science Program, sponsored by the Danish Ministry of Environment and Energy from 1988 to 1994 following recurrent events of oxygen depletion in the Kattegat. The program was funded by the Danish Parliament to stimulate research on the ecological effects of eutrophication at a time when measures were adopted to reduce nitrogen and phosphorus inputs by 50 and 80%, respectively. The book was "designed as a general text," and the editors' goal was a synthesis of "how coastal marine ecosystems respond to eutrophication."

The 12 chapters address many key elements of the problem, including atmospheric processes of nitrogen delivery, basic features of coastal hydrography and circulation, material fluxes in the water column and sediments, responses of the microbial, plant, and benthic macrofaunal communities, and the use of models as tools to integrate these elements. Individual chapters vary greatly in their quality and scope, ranging from mini-tutorials to detailed case studies. For me, the highlight of this book is the pair of chapters written by Bo Barker Jørgensen. The first is a superb review of the current state of knowledge about the structure and biogeochemical function of marine sediments, including microbial processes of element cycling (C, N, P, S, Mn, Fe, O), and a description of how these processes change with nutrient enrichment and hypoxia. Jørgensen's second chapter is an ideal companion, illustrating the general principles with results from an intensive study of Aarhus Bay in which the important processes and fluxes were measured over a 1.5-year period. The result of this study was a detailed dataset from which Jørgensen calculated annual budgets for the major elements. These chapters are excellent reviews for students and researchers who want to learn the fundamentals of marine sediment biogeochemistry.

This book is also valuable for the many general hypotheses about coastal eutrophication that are developed from observations in the Kattegat region. Examples include (1) There is no simple empirical rule that relates primary production to nutrient (N) loading across the spectrum of coastal ecosystem types (Borum), (2) Nutrient enrichment may not stimulate total system primary production. Its most important effect is to shift the autotrophic production from dominance by perennial macroalgae and seagrasses toward dominance by ephemeral macroalgae and phytoplankton (Borum), (3) Oxygen depletion is not related in a simple linear way to nutrient delivery. For example, the timing of nutrient inputs (pulsed vs. continuous) plays a critical role in the dynamics of mineralization processes and oxygen consumption (Kiørboe), (4) There is no simple empirical rule that relates macrobenthos production to primary production. Enhanced production of organic matter stimulates production of macrobenthos in deep waters, but it disrupts macrobenthos production in shallower stratified waters where eutrophication leads to oxygen depletion (Hagerman et al.), (5) Eutrophication preferentially stimulates sulfate reduction, which may become more important than oxygen for direct respiration of organic matter. Enrichment causes a shift toward anaerobic processes of mineralization (Jørgensen), (6) Coastal ecosystems have inherent large interannual variability, so management actions that reduce N and P loadings might not lead to immediate recovery toward the unenriched state (Riisgard et al.).