Journals: Fearing the Electronic Future

Traditional journals, increasingly specialized and expensive, soon will be challenged by electronic rivals that speed scientific reports via computer

The editors of biomedical journals have seen the electronic future, and they do not like it.

"What you're intending to produce, sir, is an electronic garbage heap," snapped one editor during a recent talk at the annual meeting of the Council of Biology Editors (CBE). The remark was greeted by a round of applause.

The object of the editors' scorn stood unshaken at the podium. A bearded academician, Frederick Plotkin left university teaching in 1980 to found a Manhattan-based company now known as Comtex Scientific. This fall Comtex will offer the first of what Plotkin, its president, hopes will become a line of some 22 electronic journals.

Despite the editors' disdain, the Comtex experiment, according to Plotkin, has already attracted $17 million in advance orders.

His methods are anything but traditional. Submissions to the Comtex journals will be refereed and on-line in the incredibly short span of 6 to 8 weeks, the process being further sweetened by a $100 honorarium to the author. Stored in a central computer, reports can then be picked up via the phone lines by scientists all over North America who are equipped with mini- or microcomputers, or have access to such devices at their libraries.

The ire of the CBE members centered on the issue of how Plotkin plans to referee the reports, yet beneath the displeasure of the editors seemed to lurk a darker emotion—an almost palpable feeling of apprehension over a technology that is creating new promises, problems, and economics for a profession that put out its first journals during the 19th century.

The challenge is perhaps most graphically seen in terms of speed. At traditional biomedical journals, a submission sometimes waits more than a year before breaking into print. Comtex will change all that, and, in the process, perhaps win the confidence of those hungry for new information or pushing for scientific priority.

The challenge comes, moreover, at a time when traditional journals are facing increasingly hard times on their own turf. Medical librarians, the chief buyers of biomedical journals and historically a docile group of consumers, of late have started to vigorously fight rising prices, overspecialization, and what they see as a steady stream of increasingly shoddy journals.

Pioneering the movement away from the traditional is Plotkin and his electronic journals. In part to fend off fears, Plotkin at his recent CBE talk emphasized that Comtex poses no direct threat to traditional journals since the major source of his materials will be progress reports that scientists file periodically with government funding agencies. In an interview after the talk, however, Plotkin warmed to the subject of wider possibilities. "There are 1.9 million scientists out there in North America, and about 70 percent of them have access to a micro- or a minicomputer," he said with a smile. "The amount of money we've attracted is not surprising. We propose to offer the marketplace a window on research that's being done right now. It's a window for which people are willing to pay. The alternative is sometimes a 15-month wait from the time of submission to publication."

The "alternative" represents quite a large operation. In biology and medicine alone, publishers around the world put out some 8000 journals.

Plotkin's challenge to the existing order has already attracted some high-powered support. Among the scientists on Comtex's editorial advisory board are William Baker, a past president of Bell Laboratories, Francis Crick, a Nobel laureate at the Salk Institute for Biological Studies, and Charles Townes, a Nobel laureate at the University of California, Berkeley. Before founding Comtex, Plotkin himself worked in academia, teaching at Columbia University and the State University of New York at Buffalo, and writing books on the history and philosophy of science. In 1980, while looking for something different, he was chairman of the English Department at New York's Yeshiva University.

Comtex went public last June at $6.25 a share, and the stock soared to $26 a share before splitting 2 for 1 in November. It is now selling for a comfortable $8 a share. The process of going public brought $4.1 million into the company's coffers. In addition, Comtex recently bought controlling interest in the Electronic Mail Corporation of America, an acquisition that will furnish the company with a ready-made conduit for its electronic journals.

Comtex is also getting ready to offer an additional service, a computer system that statistically predicts the toxicity of chemicals. The service fills something of a void, since little toxicological information has been compiled for the 5.7 million chemicals listed by the American Chemical Society's registry service.

Until its products go on-line this fall, Comtex is offering some of them on microfiche. A subscriber this fall will still be able to order microfiche copies, or, if desired, print out reports at a computer terminal. The cost of hooking up to Plotkin's computers will be on the order of $90 an hour. "It is not the most expensive," he told the CBE audience, "but it's not cheap either. This is not a bibliographic database, which is still a step removed from the primary material. This is the work itself."

Whether the work itself will be meritorious was much debated at the CBE meeting. The point of contention was the way Comtex plans to referee submissions. Members of a Comtex editorial board, the referees for a paper, will either accept or reject a manuscript—without the more traditional and time-consuming process of revision, in which an author's English and oftentimes his ideas, methods, and conclusions are improved and clarified. The Comtex method drew a sharp remark at the CBE meeting from Robert A. Day, who works at the Philadelphia-based Institute for Scientific Information: "All of us as journal editors would like to have a speedier process, but those who feel we are professionals are involved in a process that takes time, because what is of utmost importance to us is the publication of *valid* scientific knowledge, not unevaluated, if you pardon me, garbage. Because that's what scientific data are until they have been through some kind of evaluation."

Unruffled, Plotkin replied in sonorous tones: "I will compound my errors by saying we are also interested in publishing work in progress, which will throw you into even greater consternation. I am committed to the idea that, in areas where research is superseded rapidly,

0036-8075/82/0528-0964$01.00/0

fresh information is required out in the marketplace. Even research in progress with *no* conclusions is useful to the active professional scientist."

In any event, says Plotkin, the quality of the work submitted to individual journals is judged by the editorial boards. So far, for the microfiche series, the rate of rejection has been about 60 percent, an indication that not everything coming under the transom is rushed into print. "This is our first year of publication," he said during the interview. "We can't afford to come out with junk, otherwise the distinguished people who have agreed to work with us could not afford to associate their names with these journals."

The editors of Plotkin's journals have a variety of views on the subject of quality control. According to Frank D. Drake, an astronomer at Cornell University who is the announced editor of the Comtex series on astronomy and astrophysics, the nontraditional process of review harbors some dangers. "Comtex is the wave of the future," he says. "But there is going to be a great burden on them to keep high standards or their potential will nose-dive. Since there is no iterative process, there is a great burden on the editors." In fact, this winter when Drake realized the extent of his teaching load at Cornell, he resigned as a Comtex series editor because of the time-consuming nature of the job.

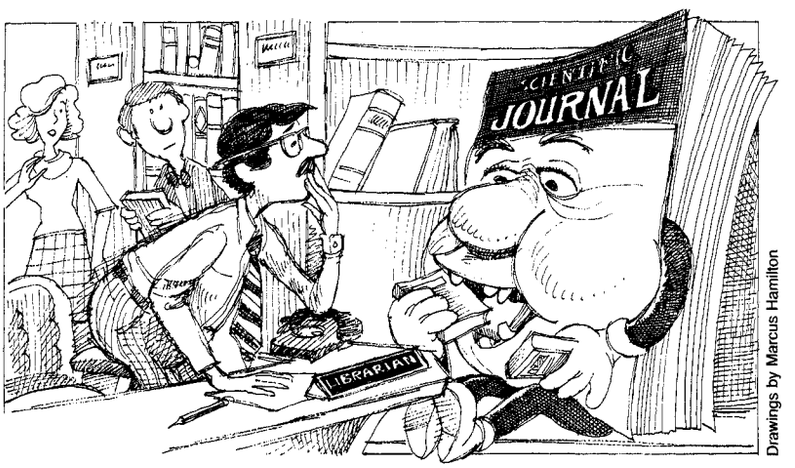
A Comtex editor who sees different potentials and problems is Bruce A. Bolt, of the Department of Geology and Geophysics at the University of California, Berkeley. "When you go through the labs now you see video displays everywhere. At the same time we have enormous numbers of reports. My room here is full of them. They're difficult to classify in libraries. Some are not suitable for publication, although people are always interested in the raw data, or geotechnical studies of certain sites, critical facilities, earthquake studies, and so on. The technology to utilize this information is there. Whether it will be Comtex that puts it over the phone lines or somebody else I don't know. But I feel certain something like this will take off."

The style and content of the Comtex journals no doubt have yet to be established. Whether they be for quick priority-conscious publication, or for more leisurely work with massive amounts of hard-to-get data, or for bulky government reports, or for some future combination of services that differ from field to field, the concept of Comtex itself has engendered much interest.

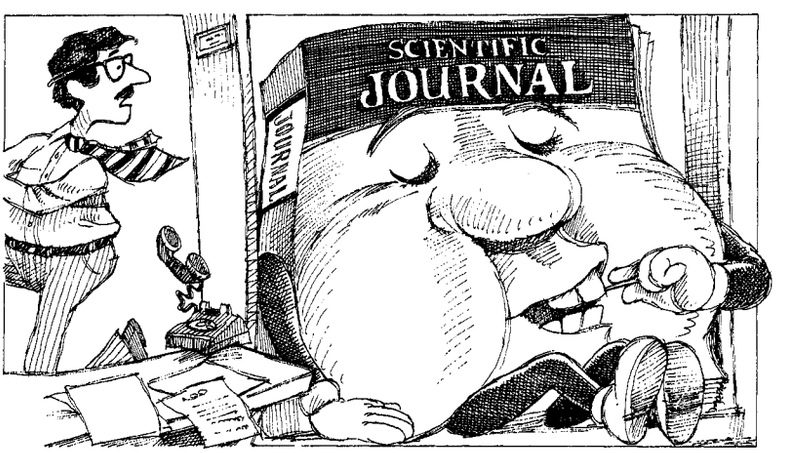
It has also attracted a fair amount of capital—an interesting development since the main thing Plotkin currently offers are promises and a flair for promoting his own ideas.

A factor that may influence Plotkin's success is the current health of the competition, the traditional journals. The field is large and seemingly sound, but underneath the workings of this industry are signs of strain.

The most immediate indication is that librarians, traditionally seen by journal publishers as captive consumers, are fighting the escalation of journal prices and during the past few years have not only limited new purchases but also taken the unprecedented step of discontinuing journals in droves and performing user surveys to find out where to cut the fat. Librarians complain that journal prices for a decade have been climbing at a rate sometimes as high as 40 percent annually, a phenomenon especially seen in the area of biomedicine. The cost of many scientific journals is now several hundred dollars a year and some exceed a thousand. In 1975 the journal *Molecular and Cellular Biochemistry* cost $169



Drawings by Marcus Hamilton



annually, whereas by 1980 the figure had risen to $430 and in 1981 it skyrocketed to $720. The rate of inflation has far exceeded rising production costs. As journal prices have climbed, library budgets have been strained to the breaking point.

The overall problem, according to Richard De Gennaro, the director of the University of Pennsylvania libraries and a knowledgeable critic who has written widely on the subject of pricing policies, stems from the psychological makeup of librarians and the greed of publishers. "Librarians have a weakness for journals and numbered series of all kinds," he says. "Once they get volume 1, number 1 of a series, they are hooked until the end." Seeing a golden opportunity, a handful of large publishers over the course of almost two decades created literally thousands of new scientific journals.

The multiplying journals provide a handy outlet for the steady stream of "publish or perish" articles that scientists sometimes feel obligated to pen. De Gennaro quotes the verdict of two economists who studied the problem: "The fact is that a growing proportion of scientific journals have virtually no individual subscribers, but are sold almost exclusively to libraries, and that a very high proportion of those journals are rarely, if ever, requested by readers. This suggests that many journals provide services primarily not to readers but to the authors of the articles for whom publication brings professional certification, career advancement, and personal gratification."

It is here, in the economics of publication, that Plotkin feels his electronic journals will have the edge. His methods, he says, can more easily respond to the market forces of supply and demand. Rather than a researcher paying page charges (which are sometimes used by traditional journals to subsidize publication and are written off against government grants), Plotkin pays the researcher an honorarium if the work is judged worthwhile. Further, Plotkin's journals will succeed only if readers are interested in paying for access to the information. "Scientific publishers," he says, "operate many of their journals as vanity presses, but under the cloak of supreme respectability."

What perhaps makes the attack on vanity operations and rising prices significant is that it is starting to come not just from entrepreneurs such as Plotkin but from librarians and even from scientists. An example of the librarians' onslaught was recently seen at a medical collection

(Continued on page 968)

Poland, United States Exchange Expulsions

In response to the expulsion from Poland of the U.S. science attaché and another American diplomat, the State Department on 13 May ordered two Polish diplomats to leave the United States and suspended a Polish-U.S. program of scientific cooperation.

U.S. science attaché John W. Zerolis and cultural affairs officer James D. Davis were expelled after being charged with receiving documents "harmful to Poland" on 9 May from a Polish scientist. The scientist, Ryszard Herczynski, was arrested and is believed to still be in custody. Zerolis and Davis were given until 15 May to leave the country.

The State Department made clear that its 13 May actions were in direct retaliation to the Polish government's handling of the case; the U.S. statement repeated a complaint made by the American ambassador in Warsaw to Polish officials that the U.S. diplomats had been "manhandled" in "clear violation of diplomatic practice." The statement also took issue with comments by Polish authorities accusing visiting American scientists of "promoting destabilizing acts."

Embassy sources in Warsaw said that Zerolis and Davis were roughly treated by men who burst into Herczynski's apartment as the two were leaving. According to an embassy spokesman, the papers taken from the Americans at the time of the incident were "three standard Solidarity pamphlets"—Solidarity is the independent Polish trade union—and two copies of proposals for scientific exchanges. U.S. officials say Zerolis and Davis were visiting Herczynski to make arrangements for the visit of an official of the National Science Foundation, which administers the Polish-U.S. scientific programs.

The NSF official in question is Deborah Wince, program officer for Eastern European programs in the NSF Directorate for Scientific, Technological, and International Affairs, who was planning a routine visit to Eastern European countries that have cooperative science programs with the United States. NSF currently has 35 active research projects in effect in Poland. These projects are financed with Polish currency derived from the sale of American agricultural commodities to Poland; the funds are not convertible to foreign currency.

The Polish-U.S. program for cooperation in science dates from 1974. The agreement was allowed to expire on 1 January 1982 after the declaration of martial law in Poland 3 weeks previously caused the United States to suspend the talks in which both sides had earlier indicated they favored extension of the science program. A clause of the agreement provides that projects approved under the agreement be completed even if it expires. The State Department action, however, appears to prohibit travel by scientists in either direction to work on the projects. The order applies only to government-to-government programs and not to the private exchanges administered for this country by the U.S. National Academy of Sciences.

NSF officials say that Herczynski is co-principal investigator in a Polish-U.S. study of particle motion in viscous fluids. Herczynski works at the Polish Academy of Science's Institute for Basic Problems of Technology. He is well known professionally in the West as an expert on fluid dynamics.

According to a *New York Times* story, Herczynski was arrested at the time martial law was declared but released after signing a "loyalty" statement. Other U.S. sources say that Herczynski has been a controversial figure because he adopted a dissenting position on some issues, but that he has retained some influence in Polish science affairs. Recently, he had been identified with efforts to restructure the Polish academy to shift authority from its scientific secretary, a government appointee, to its president, who is elected by the members.

Also visiting Herczynski's apartment when he was arrested was a well-known Polish senior scientist, Professor Waldyslaw Fiszdon, a former deputy rector of Warsaw University, who was not arrested.

Zerolis is believed to be the first U.S. science attaché to be involved in an incident leading to expulsion such as this one. Zerolis, 38, is a regular foreign service officer serving his first assignment as a science attaché. Of the 25 science attachés currently assigned to U.S. embassies around the world, five are foreign service officers;

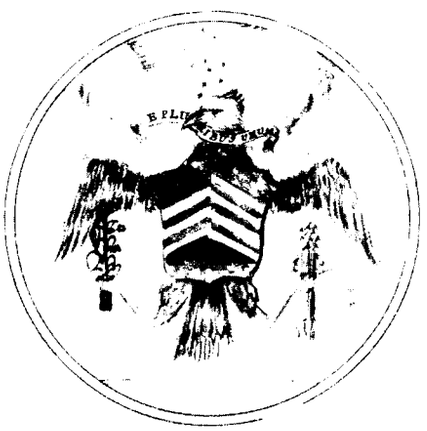
0036-8075/82/0528-0966$01.00/0

Bald Eagles on the Rise

This year as the bald eagle marks its 200th year as the emblem of the United States, the majestic raptor is showing encouraging signs of making a comeback from its endangered status.

Bald eagles once made their nests in tall trees and crags throughout all North America, but by the 1960's the population had come close to extinction. The main culprit was habitat destruction, but DDT was also implicated; its consumption through contaminated fish was dooming eagles' eggs by making their shells dangerously thin. DDT was banned in 1972. There are now about 5000 bald eagles resident in the United States, including 1400 nesting pairs. In the winter, the population swells to almost 14,000 when the birds migrate down from Canada and Alaska.

Bald eagles are the most protected species—animal or plant—in the country according to Daniel James of the Department of the Interior's Office of Endangered Species. They are protected by three laws—the Bald Eagle Act of 1940, the Migratory Bird Treaty Act, and the Endangered Species Act. Five recovery teams around the country now monitor the progress of bald eagles. They oversee several translocation projects in which young birds are taken from nests and put in other areas to aid relic populations, and pioneering eagle couples are established in suitable but unused habitats. Eagle movements are monitored by a radio tagging program.



Six years after efforts to create a national seal began, Charles Thomson, secretary to the Congress, came up with this design. The shield was subsequently revised to contain vertical stripes, and a blue rectangle to denote Congress.
(National Archives)

Despite strict laws—shooting an eagle may draw a 1-year prison sentence and a $5000 fine—eagles are still jeopardized by, in addition to habitat loss, traps and poisons laid out for predators, and by trigger-happy gun toters. Some farmers also see them as a threat to sheep although eagles generally prey only on carrion, small mammals, disabled waterfowl, and fish.

Anyone who finds a dead eagle is legally required to turn it over to the government which ships the bodies to a Fish and Wildlife Service laboratory in Madison, Wisconsin, to be autopsied. The remains then go to museums to be stuffed or are shipped to a national repository in Pocatello, Idaho.

Having virtually disappeared from the Great Lakes area and the eastern United States by the late 1960's, bald eagles can now be found in significant concentrations in the Northwest, the Great Lakes region, the Chesapeake Bay, Maine, and Florida. During the winter thousands find congenial habitat below dams on the Mississippi River where fish and waterfowl are plentiful.

Science's cover eagle was photographed at Lower McDonald Creek in Glacier National Park, Montana, which is the preeminent spa for bald eagles south of Canada. It seems that in the 1920's, wildlife managers established a major eagle support system when they stocked Flathead Lake with kokanee salmon. In the fall, the salmon migrate 60 miles up to shallow, slow-running McDonald Creek to spawn. Over the past 50 years practically every bald eagle in North America has found out about it, and during October through December thousands of migrating eagles pass through the area to wolf up salmon.—CONSTANCE HOLDEN

(Continued from page 966)

in Washington, D.C., where the librarian drew up a "hit list" of 75 biomedical journals whose prices had risen more than $50 between annual subscriptions. She is now in the process of interviewing faculty and students to see which ones might get the ax.

The indignation of scientists also may be growing, at least according to one, who, as an editor, has witnessed the growth of the literature over the years. "Our library," says James E. Heath, a physiologist at the University of Illinois at Urbana-Champaign, "recently came up with a fund-raising scheme whereby alums, faculty, and students would donate dollars to help maintain the journal subscriptions. It seems a sign that this thing has gone too far." Heath, as editor of *Ecology*, *Physiological Zoology*, and a number of other journals, has had not a little experience in the area of publication. "Do we really need all these journals?" he asks. "I think there has been a dilution of quality, and that's inevitable when there are more outlets than quality work."

Another concern, touched off by traditional journals and possibly open to solution by computerized retrieval, is the question of omitting tabular data. Traditional publishers, pressed for space and often with an eye to profit, leave long tables of data out of articles and keep them on file, where individuals must write for them and pay charges. Because of the lengthy process and the cost, not a few scientists decide not to take the time, with the effect that the data are lost to the scientific community. Computerized journals, with their ability to store vast amounts of information until it is called for over the phone lines, might be a solution.

The stage is set for an interesting competition between publishers of paper journals and the entrepreneurs of the electronic future. Not a few paper journals have fallen into the trap of obeying the dictates of publishers and authors, rather than trying to serve the needs of the reader. Librarians, who often pay for the dislocation out of increasingly tight budgets, are starting to vigorously fight the trend. The electronic rivals, meanwhile, promise to obey market forces, to pamper the reader, and to offer a wide range of new services. All this will be accomplished, they say, while dramatically reducing the time it takes to get a manuscript into print—not an insignificant promise in a profession where discovery without priority is almost as bad as no discovery at all.

—WILLIAM J. BROAD

0036-8075/82/0528-0968$01.00/0