CONCLUSIONS

Several lessons from the BCIN project are worth noting. First, no database is so inconsistent that a procedure cannot be designed to improve it, such as the correction of 2.1 million fields in BCIN.

In addition to the errors corrected by the programs, 59,373 records had type 2 errors (those the computer could detect but not correct); these records were flagged for later correction. In addition, there were of course type 3 errors the computer could not even detect. Thus another lesson is that programs are clearly not a complete solution to the problems of cleaning up databases.

Third, an inconsistent database requires human editors to determine which records are duplicates. Although this is costly, this project bore out Onorato and Bianchi’s contention that automatic duplicate removal would be so complex as to be even more costly than human review. 10

The addition to each BCIN record of its pool number and date of processing provided an audit trail of great value when programming errors or additional cleanup requirements were noted. Furthermore, each duplicate record merged was noted in its master record by number and date. Both these ideas are recommended.

Finally, never underestimate the time it takes for a project of this kind. Although at the end one pool per week was being processed, the first pool took months, and several were processed before smoothness was obtained.

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Network-Based Electronic Serials

Charles W. Bailey, Jr.

New forms of scholarly communication are evolving on international computer networks such as BITNET and Internet. Scholars are exchanging information on a daily basis via computer conferences, personal e-mail, and file transfers. Electronic serials are being distributed on networks, often at no charge to the subscriber. Electronic newsletters provide timely information about current topics of interest. Electronic journals, which are often refereed, provide scholarly articles, columns, and reviews. Utilizing computer networks, scholars have become electronic publishers, creating an alternative publication system. Electronic serials hold great promise, but a variety of problems currently limit their effectiveness. Given the serials pricing crisis, librarians should encourage the development of network-based electronic serials.

Librarians have been hearing about electronic serials for a long time. There are a growing number of full-text serials on database vendor systems like Dialog; however, they are usually derived from print serials, and they are available on a pay-per-use basis. These full-text databases provide improved access to all serial information, but libraries cannot purchase and own them. Some full-text serials databases are available on CD-ROM. These databases are typically licensed at a flat annual fee. Outright ownership of these databases is usually not a purchase option.

As a result, commercial firms own the information in these full-text electronic serials, and, one way or another, we rent it. Is access versus ownership a problem? It depends on several factors. If we pay as we go, how frequently must the information be used? How much will it cost? How will it increase or decrease the cost of accessing serial information? How rapidly will these costs rise over time? How easily can we obtain the print equivalents of these electronic serials if the vendor discontinues the electronic version or we can no longer afford it? How are we that information that is solely in electronic form will be preserved?

As we ask ourselves these questions, we must remember that no library will be able to provide these materials to us via interlibrary loan. If we are lucky, there may be a few alternative commercial suppliers for full-text electronic serials, but we will usually be in an information monopoly situation. We will have rapid access to selected serial information using powerful searching techniques, but we will have paid for this improved access by sacrificing ownership.

Given these issues, it is fair to ask the question: Where is the promised revolution in scholarly communication that electronic serials publishing was supposed to bring?

THE NET

To find the answer to this question, we must turn our attention from commercial electronic information systems to noncommercial international computer networks.

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THE EMERGENCE OF NETWORK-BASED ELECTRONIC SERIALS

During the last few years, a small group of pioneering publishers on the Net has been distributing electronic journals, magazines, and newsletters that are not derived from print serials. Publishers send these electronic serials to subscribers via e-mail messages or file transfers. Usually, they are free of charge, and there are typically no license agreements.

When this small group of pioneering publishers looked at the Net, they saw an opportunity to accelerate the evolution of scholarly electronic communication. Often using software designed to support computer conferences, they set themselves up as electronic publishers. Some of these electronic publishers are producing serials that are similar to familiar print publications; others are inventing new forms of serials.

ARE COMPUTER CONFERENCES SERIALS?

Before we discuss the efforts of these electronic serial publishers, I'd like to pose a question: Are computer conferences serials? AACR2 defines a serial as "a publication in any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely." This definition does not mention the type of information contained in serials, nor does it specify that serials must be edited works.

Each e-mail message sent out on a computer conference is identified as originating from that conference, and it could be viewed as being a "successive part" of the conference. All messages are indexed by date and time, and, thus, have a "chronological designation." Many computer conferences are intended to be continued indefinitely.

Let's look beyond basic compliance with the definition of a serial. Messages have identified authors. Although many messages are short, some can be quite lengthy, at times exceeding five hundred lines. Some computer conferences are moderated by a conference moderator. At a basic level, this means that the moderator screens all incoming messages and sends out only those that are relevant to the conference. At a more advanced level, the moderator may assemble messages into formal "digests" and send these composite messages to conference participants. Some moderated conferences, like the Humanist, issue messages that have volume and number designations.

Computer conferences on BITNET and other networks are increasingly vital channels of scholarly communication. Are they serials? Quite possibly.

If computer conferences are serials, librarians need to ponder the issue of how important these conferences are and whether their proceedings should be preserved. We cannot assume that computer centers will treat these information resources as libraries would. The selection, acquisition, organization, provision, and preservation of knowledge is the domain of libraries, not computer centers.

EXAMPLES OF NETWORK-BASED ELECTRONIC SERIALS

What electronic serials are available on the Net? I'll provide a few representative examples of scholarly electronic newsletters and journals. There are also network equivalents of popular and special-interest magazines. Currently, the task of identifying network-based electronic serials is burdensome. However, in the near future, the OFFICE OF INFORMATION TECHNOLOGY, the OFFICE OF TECHNOLOGY, and the OFFICE OF INFORMATION TECHNOLOGY will publish an authoritative list of network-based electronic serials and computer conferences.

Many electronic serials on the Net make use of the晚餐 LISTSERV software, which was written by Eric Thomas. The LISTSERV software is usually referred to as the "list server."

ELECTRONIC NEWSLETTERS

There are a number of electronic newsletters on the Net. These publications usually have small editorial staffs. In addition to short articles, news items, and editorial commentary, electronic newsletters typically contain a variety of reader-submitted material, such as brief comments on current issues, conference announcements, job listings, and other short information items. Issues are usually sent out as e-mail messages. These newsletters are typically issued on an irregular basis. Back issues may be stored as files on a network computer where users can retrieve them directly; however, in some cases, back issues must be requested from editorial staff. Normally, there are no subscription fees.

• ALCTS Network News, a publication of the ALA's Association for Library Collections and Technical Services division, keeps subscribers informed about the activities of that organization.
• CCNEWS, an information resource for academic computing newsletter editors that is published by EDUCOM, comes in two separate sections: (1) a newsletter and (2) a collection of abstracts for article files that have recently been added to the CCNEWS list server.
• Health Info-Com Network Newsletter is about medical topics. In addition to typical newsletter material, scholarly articles appear in this publication.

The Newsletter on Serials Pricing Issues is about the serials' pricing crisis and related serials issues.

• The Online Journal of Distance Education and Communication is about distance education and communications, telecommunication in education, and electronic cross-cultural communication.
• Public-Access Computer Systems News, a publication of the University of Illinois, examines the use of computer systems that libraries make available to their patrons.

ELECTRONIC JOURNALS

There are a growing number of electronic journals on BITNET, most of them founded in 1990-91. These journals typically have several people on the editorial staff and a formal editorial board. Many of these journals are refereed. They often mirror print journals, containing editorials, scholarly articles, columns, and reviews. Issues can be composed of a single article or multiple articles. Single-article issues are often sent as e-mail messages. Multiple-article issues may be announced via an e-mail message, with users retrieving article files of interest based on this message. Or, if the journal has relatively short issues, it may be distributed as an e-mail message. Some attempt regular publication cycles; many are irregular. Issue or article files may be archived on a network computer so...
that users can retrieve them as needed, or they may be available from editorial staff on request. Usually, the journal is not indexed in conventional sources. There is normally no subscription charge for issues distributed through the Net. A subscription fee may be charged for an alternative distribution format, such as floppy disk.

- *E-journal* is about electronic texts and computer networks.11 It is anticipated that this journal will experiment with archived reader responses to articles, author revisions of articles, and article retractions.

- The Electronic Journal of Communication/La Revue Electronique de Communication is a bilingual journal about the study of communication theory, research, practice, and policy.12 The journal is distributed via Conserver at Rensselaer Polytechnic Institute.

- The Journal of the International Academy of Hospitality Research is about hospitality tourism issues.13 It is published by the Scholarly Communications Project of Virginia Polytechnic Institute and State University. Unlike other BITNET electronic serials, this journal charges users for subscriptions, with prices ranging from $10 to $30.

- New Horizons in Adult Education is a publication of the Syracuse University College of Education.14 Published in 1987, it is the oldest BITNET journal that I know of.

- *Postmodern Culture* is about contemporary literature, theory, and culture.15 There is a related computer conference, which is called PMC-Talk. For a small subscription fee ($15–$30), the journal is available in floppy disk or microfiche format.

- PSYCOLOQUY contains peer-reviewed “scholarly skywriting”—brief statements of new ideas or findings about psychology and related fields.16 It also functions as an electronic newsletter. *PSYCOLOQUY* is sponsored by the Science Directorate of the American Psychological Association.

- The Public-Access Computer Systems Review, a publication of the University of Houston Libraries, is on the same topic as Public-Access Computer Systems News.17 Both publications are associated with a computer conference known as PACS-L.18

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**THE FUTURE OF ELECTRONIC SERIALS**

How will network-based electronic journals fare in the future?19 I do not anticipate that electronic serials will displace print serials in the next ten years; however, they will become an increasingly important parallel form of scholarly communication. It is possible that a significant nonprofit serial publication system will emerge from the efforts of network-based electronic serials publishers. This system is likely to be characterized by low or no subscription fees and the retention of intellectual property rights by authors. Given the grim realities of the current serials pricing crisis and the apparent dearth of viable solutions to this crisis, librarians have a vested interest in trying to make this vision a reality.

Numerous problems need to be overcome; however, many of these problems appear solvable with the dedication of adequate resources to this task. I will now discuss some key problems related to network-based electronic serials.

First, electronic serials are often distributed as ASCII text files. This distribution strategy enables users to manipulate files easily, and it minimizes data-transmission overhead, but it significantly limits the kind of information that can be represented (e.g., no color, foreign characters, illustrations, or mathematical notation). PostScript, TeX, and other software tools provide limited solutions to this problem, but no easy-to-use, ubiquitous solution currently exists.

Second, many network users have fairly limited storage capacity in their computer accounts. Last year, one new electronic journal overwhelmed many of its subscribers’ accounts by sending them more than two hundred pages of information at one time.

Third, users may not understand the mechanics of network e-mail and file transfers, the operation of useful mainframe software, or downloading procedures.

Fourth, existing tools for creating, distributing, and utilizing network-based electronic serials are in an early stage of development, and they lack many desirable technical capabilities.

Fifth, as electronic serials proliferate, lengthy file transfers will become more common, potentially creating network performance problems. Bottlenecks may occur on network links that operate at relatively low speeds. This will become particularly problematic as electronic serials transcend the ASCII format and their files become significantly larger.

Sixth, access to networks such as BITNET and Internet is mainly limited to academic institutions. The electronic highway is there, but not everyone can get on it. The linkage of commercial networks like CompuServe and the Well to Internet has helped solve this problem. However, users of commercial networks must pay to use these services, while many users of BITNET and Internet have subsidized access to network services. Many potential foreign readers, especially those in the Third World, may not have access to U.S.-based networks at all.

Seventh, getting information about network-based electronic serials is currently a daunting task. If one knows where to look, there are a few directory files; however, they may not be up-to-date. The Association of Research Libraries (ARL) directory will make a major contribution to solving this problem.20 The problem is made worse by the fact that few electronic serials are included in conventional printed indexes and abstracts. Once you find an electronic serial, determining the contents and availability of back issues can be problematic.

Eighth, the publication of electronic serials is still a somewhat tenuous activity. Mostly, they are published by academics, but this effort may not be recognized as an official university activity. Electronic serials are mainly the work of a few dedicated, volunteer editors, not well-staffed institutionalized “electronic presses.” This lack of institutional structure and support has made it difficult to associate it with it.

Ninth, although electronic serial files are currently being archived at specific network nodes, there is no guarantee that computer centers will indefinitely preserve these files, especially when no high-level institutional commitment has been made to do so.

Tenth, the application of existing intellectual property laws to the subtleties of electronic publishing is not all that straightforward.21 The U.S. Register of Copyrights is granting network permissions of electronic serials publishers; however, until there are more legal precedents, this area of the law remains somewhat hazy.

Eleventh, there is the issue of acceptance of electronic serials. Will tenure committees accept publication of an article in an electronic journal as being equivalent to publication in a similar print journal, even if the journal is referenced? Will the majority of scholars want to publish in journals that are neither indexed in conventional sources nor collected by libraries?

Finally, existing network-based electronic serials have been able to develop because a large number of users have subsidized access to networks like BITNET and Internet. If the proposed National Research and Education Network (NREN) that may replace these networks is operated by commercial firms, network economies may change, and this may adversely affect user access to both electronic serials and computer conferences.

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**CONCLUSION**

Despite these problems, a growing number of useful journals, magazines, and newsletters are being produced for and distributed to network users. With a minimum investment of resources, professional societies, university presses, individual scholars, and librarians can utilize existing software to establish network-based electronic serials.

As I indicated earlier, network-based electronic serials are unlikely to replace printed serials from conventional publishers in the foreseeable future; however, they can provide an alternative source of scholarly information. Although there is nothing inherent in network-based publishing that mandates that electronic serials be replaced with it, it is possible to do so given the radically different economies of these publications and printed serials. With future improvements in printing technology and information standards, there could be a dramatic leap in the reproduction quality of locally printed electronic serials.22 For practical purposes, printed copies of electronic seri-
als made in the future may be indistinguishable from their conventional counterparts. Librarians can play an important role in determining the future of network-based electronic serials. We can construct, print, or computer-based tools that will help us to identify and access network-based electronic serials. We can collect, provide local access to, and preserve these electronic serials. We can help our campuses establish units to publish high-quality electronic serials or do so on our own. We can promote the development of new standards that will improve the storage, distribution, display, and printing of network-based electronic serials. We can lobby for the establishment of a high-performance, government-subsidized National Research and Education Network.

If we do these things, network-based electronic serials may become a significant alternative source of low-cost scholarly information by the end of this decade. If not, network-based electronic serials are likely to evolve more slowly, and the serial pricing crisis is likely to continue unabated.

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