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NETWORK TECHNOLOGY:
WHAT DOES IT MEAN TO EAST ASIAN LIBRARIES
IN NORTH AMERICA?*

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The 1990s have witnessed the rapid spread of network technology in North American research libraries—a phenomenon both stimulated and sustained by a number of technological advances. These advances include developments in telecommunication technology, increases in the processing power of microcomputers, the advent of distributed client-server network architecture, the emerging electronic publishing and delivery industry, and ever-expanding Internet resources. The implementation of network technology in research libraries has come at a time when American universities, after decades of intense growth and diversification, are experiencing a difficult period caused by reduced enrollments, insufficient tuition revenues, and eroding support from governmental and private funding, in the face of high expectations from society. Libraries endure financial stagnation or reduction, while the costs of library materials and services continue escalating, and demands for a broad spectrum of resources in various formats and concomitant expectations of enhanced services remain high. Thus this recent application of network technology can be seen as a strategic move that research libraries have undertaken in an effort to utilize the vast potential of information technologies to meet increasing demand, to improve the quality of services, to cope with financial crises, and to position themselves for future developments in the information industry.

Network infrastructure and developments in electronic publishing and delivery are making an impact on services in research libraries, bringing change to every area from collection development, cataloging, and preservation, to reference services and document delivery. Academic librarians, though differing in specialties and responsibilities, are all trying to understand what these changes may mean to them—how they might utilize the emerging technologies to improve and advance their work. East Asian libraries attached to research libraries are not immune to these changes, and therefore must also be concerned with these

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questions. This essay examines the issues from the East Asian librarian's perspective.

Changing Environment

Before engaging the issues, however, one needs to look further at the conditions in the current environment that apply particularly—and in some cases, uniquely—to East Asian libraries. By far the most important change in these conditions is the economic rise of East Asia, with Japan's economy attaining status as the second-largest, and China's emerging as the fastest-growing in the world. Additionally, South Korea, Taiwan, and Hong Kong represent three of the "Four Little Dragons" that engendered some of the most admirable economic miracles in the modern world. This state of economic affairs elevated the importance of East Asia in global matters, which led to growing interest in studying virtually every aspect of this region. In the past few decades, we have observed a gradual expansion of East Asian studies from the traditional fields within the humanities to include all areas of the social sciences and professional schools. This expansion of the field, with increasing numbers of East Asian studies programs and specialists nationwide, promoted the development of research resources and the improvement of library services for the discipline.

Another recent and very exciting change is the rapid development of information infrastructures and electronic publishing in East Asian countries. High-speed telecommunication networks linking them with the rest of the globe are now well-established in Japan, South Korea, Taiwan, and Hong Kong. Similar developments have also achieved significant progress in mainland China. Newly developed Chinese, Japanese, and Korean (CJK) software or programs are no longer confined to the hardware and operating systems of their countries of origin, but are now designed for the standard platforms--DOS, Windows, and Macintosh. Research aimed at implementing a standard language-coding system for CJK computing has achieved encouraging progress. Commercial electronic publishing, represented mainly by CD-ROM products at this stage, is gathering speed, while electronic resources available on the Internet in Asian languages and in English are flourishing. Created by many different organizations and individuals all over the world, these resources represent a wealth of information that is available largely free of charge. Most useful Internet resources include online newspapers, electronic journals, serials and monographs, classical texts and religious scriptures, table of contents for current periodicals, research guides and ready reference data. Other valuable electronic texts, such as the full-text database of the twenty-five dynastic histories, are also installed at limited sites in North America. In addition to these developments is the upgrading of dedicated lines and terminals for CJK cataloging to Windows-based networking configurations with CJK searching
capabilities by OCLC and RLIN. All of these developments have greatly changed the landscape of East Asian librarianship and brought East Asian librarians into the forefront of technological applications in libraries. For the first time, East Asian librarians do not have to wait to reap the benefits of an innovation in library automation until a long time after its application to mainstream librarianship.

Another important change is the proliferation of East Asian publications. A brief survey of foreign publications by the American Research Libraries (ARL) reported that between 1980 and 1990, China's total book production increased nearly 300 percent, making it the first among the countries surveyed. South Korea ranked second, with production nearly doubled during the period observed. Book production in Taiwan also increased substantially, particularly between 1985 and 1990. This rapid growth has continued into the 1990s. In 1994, China published 103,836 monographic titles and more than 7,300 periodical titles. Taiwan published 14,743 monographs in 1993, and about 5,000 periodicals in 1994. In 1994 Japan produced 53,890 monographs and 4,002 periodicals, while in South Korea, nearly 30,000 new monographic titles were published that year. These figures give a total annual production in 1994 for East Asia of nearly 200,000 monographic titles, and more than 16,000 periodical titles (without the South Korean figures). To put these data in perspective, one should note that the United States published 49,205 monographic titles, and Great Britain produced 88,718 titles for that year. This flourishing of the East Asian publishing industry made many research resources available for our collections, including large numbers of reprinted or microfilmed rare materials, many sets of monographic series, and retrospective issues of newspapers and journals that were once very difficult to obtain.

Of course, change is not always positive, and even positive change may have negative side-effects. Perhaps the most disturbing factor in the current environment of change is the stagnation or reduction of funds North American research libraries have suffered in recent years. Budgetary constraints, combined with other factors, have forced many libraries not only to reduce their acquisitions allocations and leave many vacant positions unfilled, but also to reformulate their organizational structures to reduce personnel costs and to improve organizational efficiency and collective productivity. Another negative factor is the increasing costs of East Asian publications. Skyrocketing prices are especially notable among books published in China. According to one report, the average price of a Chinese book increased more than 800 percent in the decade between 1983 and 1993. This staggering increase in book prices has greatly diminished the purchasing power of East Asian libraries. Combined with the explosion of publication, this increase has forced many East Asian libraries in North America to
change their collection development strategy for Chinese materials from one of comprehensive coverage of all relevant materials on the market, to far more selective coverage.\textsuperscript{14}

It is these changes and conditions---some positive, others negative---that have shaped the current environment for East Asian collections in North America. It is within this environment that we hope to gain some advantage from the emerging technology and the positive developments in the East Asian region and also in East Asian studies to help us build a better future. Clearly then, the basic objective for East Asian librarians is to attain growth and enhancement of collections and services in a period of shrinking resources. In pursuing this objective, technology serves as both a creator of change, and a means to manage change.

Moving Up to the Automation Front

In his vision statement for OCLC, K. Wayne Smith, President and Chief Executive Officer of that utility, cited John Diebold's analysis of innovation and change to conceptualize the critical stage at which library automation currently resides. Diebold divided change resulting from technological innovation into three phases. The first phase was described as mechanizing what was done yesterday. In second phase, technology changes the tasks themselves, not just how they are performed. The third phrase is the resultant change of society itself. Using this model, Smith states that libraries are rapidly moving into the second phase, though they are still largely in the first.\textsuperscript{15} This statement may well define the current status of North American libraries in general, though East Asian libraries have usually lagged behind in many aspects of automation. Thus, one important task is to move East Asian libraries to the automation front. This move is necessary not only to allow East Asian libraries to take full advantage of current technology, but also to assure they will benefit from network technology in the future. For example, as automation systems developers are hurriedly modifying their products to comply with the Z39.50 standard protocol, and several states are adopting centralized or linked models for their systems, patron-initiated inter-library loan (ILL) requests are already a reality in many libraries, and will become one in many others in near future. Due to limited resources, however, only a few East Asian collections have been able to complete conversion of their card catalogs. Without online records, searching for and retrieving items in remote locations is almost impossible. For this reason, it is very encouraging to note that several large East Asian collections are currently undertaking retrospective conversion projects, and more are planning to do so. Completion of such projects should be a high priority in every East Asian collection where it has not been accomplished. Not only are online records our claim to network "citizenship," but they are also an antidote to the card catalogs and unlinked circulation records that are rapidly becoming a disservice to our users. In
addition to our local systems, our records should be added to the national bibliographic utilities, because these utilities are the means for us to carry out many resource-sharing and access-oriented functions in a networked library environment. Brief records intended for local systems only may look like a cheap option in short term, but will certainly become a very costly one, when one realizes that they can not serve our needs sufficiently in the networked environment.

Another area worthy of pursuit is providing our patrons with better searching tools. As a result of the complexity of CJK computing, and its limited market, the need for CJK-compatible online public automated catalog systems was long ignored by system vendors. Fortunately some vendors—such as Innovative Interfaces, Inc.—have at last recognized this need not only for the domestic market, but for the Asian as well, and have developed systems with CJK capabilities. Where such a system is installed, it is the library's good fortune and the good fortune of the patrons of its East Asian collection as well. For the rest of us, however, it is not sufficient merely to hope and wait for the installation of such a system, making excuses for our circumscribed services. We must actively influence our library administrations on our patrons' behalf whenever decisions are made to upgrade or replace current systems. We must also consider other options, for example making RLIN or OCLC CJK terminals available for public use—an alternative several East Asian libraries have employed for years. Nevertheless, the original design of these terminals required dedicated lines, special hardware, modems, keyboards, and exacting input methods suitable really only for trained professionals. Added to these drawbacks is the high price for the equipment and its maintenance, making such terminals not only unlikely to become popular with our patrons, but indeed difficult to justify financially as well. Happily, this situation has been remedied recently by development of Windows-based, network protocol CJK software from OCLC and RLIN that is designed for standard microcomputers and keyboards with multiple input methods. Making one of these systems available for the public to use will provide a powerful searching tool with CJK languages capability. The tool can be used in searching local holdings—for records that have been input or retrospectively converted into the utility—as well as remote East Asian collections owned by other participants of the utility. Additionally, the Windows base allows multiple applications, so that one can shift between the utility and the local system easily to check local holdings, including detailed holdings of a serial, since such information is not normally provided by the utilities. To enhance the usefulness of this powerful tool, we must provide training not only to faculty and students in East Asian studies through formal bibliographic instruction, but to other patrons as well, through open training sessions, on-site help, and printed instructions and hand-outs.
Automated acquisitions of East Asian materials remains a problem, since most systems were never designed for multiple languages. Understandably, East Asian vendors and publishers often consider orders with romanized information only unacceptable, or highly undesirable. As a result, the acquisitions process for East Asian materials in many libraries is only "half-automated" at the best; that is, the romanized information is input into the centralized acquisitions system for acquisitions control such as claiming, receiving, invoice and payment tracking, and fund monitoring. The other half, including duplicate checking and providing order slips with vernacular information, is often handled manually. Sometimes CJK word processors may be used to generate order slips, and the local online catalog may be used to facilitate checking for duplication, to a certain degree. In any case, the procedure is not automated fully. Several East Asian collections within RLIN-member libraries use the RLIN CJK system to generate their acquisitions records. The University of Minnesota East Asian Library is one of them. This method allows one to create acquisitions records in CJK vernacular, and print slips (in LCC format) with the information vendors prefer. These records are then sent to the local automated acquisitions system, where they are modified with additional information for acquisitions control. The CJK vernacular slips are mailed to vendors and publishers along with the standard order forms generated by the centralized system. From November 1993, when the method was implemented, to date, the University of Minnesota's East Asian Library has not received a single complaint from any vendor regarding inadequate ordering information. There are several other benefits associated with this method. First, the information in an acquisitions record can be used later to aid in cataloging the item, especially in cases where original cataloging is required. Second, if retrospective cataloging records have been converted to RLIN, one can increasingly rely on that utility for duplicate checking, eventually eliminating the need to check paper files. The new Windows-based RLIN CJK software could facilitate generating records further by providing "cut and paste" capabilities among multiple records, making this method even more attractive.

Recently, Hong Xue Tang Bookseller in Hong Kong offered an online ordering system for publications from mainland China. Using Netscape as an interface with searching capability on various access points, Chinese publications data bank provides an interactive, instantaneous book ordering service. If updated in a timely manner with information on new publications, this system could reduce the time between the announcement of a new publication and an East Asian library placing an order for it. How well this service and a specific library's acquisitions control system can accommodate each other remains to be seen, however.
Total Collection Development

Network technology, electronic publishing, and budgetary constraints on American institutions of higher education have led to many discussions in the library literature of recent years about the role of academic libraries in collecting electronic publications, and about balancing this new role with the traditional one of collecting printed materials. The consensus seems to have been reached within these discussions that the future will see more electronic publications, and that they will play an increasingly important role in scholarly communication. Furthermore, most writers seem to agree that at least in the foreseeable future, electronic publishing will not replace paper-based publishing, but rather the two forms will supplement each other. Based upon this assessment, it has been suggested that academic libraries need to take the approach of total collection development to build their resources, in that libraries must integrate collecting electronic publications with traditional formats. This suggestion is also applicable to East Asian libraries.

There are, however, reasons to believe that East Asian collections will continue to rely more on printed materials than general collections will. These reasons include the nature of East Asian studies, the degree of maturity of electronic publishing in Asia, and the affordability of electronic products for East Asian libraries. Current trends in electronic publishing indicate that substantial growth of such publications will be seen first in the sciences and engineering, rather than the social sciences and humanities. The interests of faculties and students of East Asian studies faculty generally focus upon the humanities or social sciences, where research materials will likely remain in print format for a long time. Additionally, we collect publications produced by East Asian countries. The growth of electronic publishing in these nations depends on their economic, industrial, and technological bases, as well as their domestic markets for such products, and the technological infrastructure they develop for delivering online products. Although rapid growth in all these aspects can be seen in nearly the entire East Asian region, the degree of advancement differs from country to country. Another factor that prevents East Asian libraries from taking full advantage of available electronic publications is the high price of such products. For instance, a recent catalog from a company in Hong Kong listed a CD-ROM version of the Peoples' Daily 1946-1992 for $19,800 and the Central Daily News 1928-1949 for $18,500. Even compared to similar American publications, these prices are very high, and for many East Asian libraries they are prohibitive. In addition, given the highly specialized nature of their contents, such CD-ROM products will never attain high usage statistics. This basic paradox of high price associated with low use makes the decision of whether to purchase these materials a very difficult
one. Since low use is a natural assumption, East Asian libraries will be very selective in purchasing these materials, except perhaps at a few large institutions, where the importance of preserving these valuable resources for the nation, a somewhat higher rate of use, and the potential for external financial resources may outweigh the cost factor. Of course, this situation might change if the price for such products were to decline substantially.

None of these statements is meant to suggest that we need not pay attention to relevant electronic publications. On the contrary, we should not only monitor this rapidly developing industry, but also actively collect useful items we can afford. As mentioned earlier, through the Internet we can now obtain access to a variety of electronic resources at various Web sites largely without cost. Many sites provide useful reference data that can assist patrons directly, or indirectly through our assisting them in their reference inquires. Other sites offer full-text newspapers, journals, classical texts, creative writings, and Buddhist and Taoist canons. The information found at these sites can supplement a library's printed resources—sometimes even substituting for a text the library does not own. Nevertheless, because the quality of the sites is so uneven, and useful information is often mired in the irrelevant mass, East Asian librarians have a significant role to play in filtering out the irrelevant while facilitating access to the useful. This role can be realized to a degree through our own Web pages by linking to useful sites in a logical way. Two good examples are the sites of the Council for East Asian Libraries (CEAL), and the University of Michigan's Asian Library. Close monitoring of the linked sites, and timely updating of your own page to reflect the latest developments are the keys to making this resource a viable part of a library's extended collection.

In order to make our homepages valuable resources, we must enrich their content. We must not stop with brochure-like introductory level formats, or simply borrowed information, but infuse them with substantial features of local value.\(^{17}\) Locally produced bibliographies, research guides, tables of contents for current periodicals, or digitized images of unique archival materials are only some of the possibilities one may consider. Just as any good collection has unique strengths and features, a high-quality library homepage should be a one with useful contents and special characteristics.

Cooperate, and We Will All Thrive

Technological changes and harsh economic realities have led to significant progress in resource sharing among research libraries. A shift in emphasis from ownership to access is no longer merely a philosophical discussion in the library literature, but is reflected in numerous interinstitutional
cooperative library projects, library consortia, and in many individual research libraries' strategic goals. Institutions of higher education in North America are often highly competitive, and every institution strives to establish its own distinctive niche within the academic community. Similar values also exist in research libraries. These values have validity nonetheless, even in today's environment in which interinstitutional cooperation and collaboration are stressed. Thus, successful and lasting cooperation and collaboration are often those in which reciprocity is warranted and reinforced. For their part, East Asian libraries in North America have a long history of cooperation, largely through their own professional organizations, as Eugene W. Wu vividly recounted in his paper "Organizing for East Asian Studies in the United States." With regard to resource sharing, most, if not all, East Asian collections could never afford a view of total self-reliance to guide their practices in collection development and document services. With triple blows from the publication explosion, skyrocketing prices, and budget constraints, such a mentality—if it ever existed—becomes absurd in today's environment. Even before online cataloging began, interlibrary borrowing was a common practice among many East Asian collections. Librarians used tools such as the National Union Catalog and published card catalogs that existed for a number of large East Asian collections to identify items and file requests for interlibrary borrowing on their patrons' behalf. In those days, however, interlibrary loan requests were mainly one-way, from many smaller collections to a few large ones. Two-way transactions generally existed between those larger few whose holdings were disseminated through their published, multiple-volume book catalogs. The establishment of the CJK bibliographic utilities changed this situation for the better. Smaller collections, especially those that converted their records to the utilities, could contribute to the two-way flow, making cooperation reciprocal. Under the current conditions, East Asian collections in North America will become more interdependent. Every collection, large or small, is a valuable part of the collective whole. Network technology could further ease interlibrary lending through electronic mail inquiry, accessibility to the OPACs of remote institutions to check for holding and circulation status before filing a request, and faster delivery.

Network technology offers a powerful tool for broader collaboration among East Asian collections. One example is the Committee on Institutional Cooperation's (CIC) cooperative project intended to put to use advanced technology in supporting resource sharing for East Asian studies. Initiated by Ohio State University, and funded by a one-year Federal government grant, it is a joint project of the East Asian libraries or collections at the University of Illinois, Indiana University, University of Iowa, University of Minnesota, Ohio State University, and University of Wisconsin. The project tests the feasibility of
using the Internet to develop proactive user services and to facilitate remote access to East Asian research materials. The project has had certain success in establishing homepages for the participating collections, and in making some useful resources available at these sites, such as catalogs of special collections, bibliographies, and scanned images of tables of contents from selected CJK periodicals.

A major problem in sharing CJK serials resources is the lack of detailed holdings information in the CJK bibliographic utilities. Without knowing the holdings of a serial title, requests for document delivery of journal articles from a remote location go unfilled much too often. The network offers some good possibilities to alleviate this problem such as centralized statewide systems like OhioLink, shared systems like the University of California's MELVYL system, or other models of open systems based on the Z39.50 standard protocol. However, currently these systems are all confined to a region or a consortia, while interlibrary borrowing for East Asian serials often needs to cross these geographical or organizational boundaries. Even within those systems, the function of serials sharing ultimately relies on the quality of database maintenance for serials holding records from member libraries, which varies greatly from one institution to another. Telneting seems to be an option for searching serial holdings in remote and cross-boundary locations (assuming such information is provided in the system of the institution in question), but only sophisticated net users may be able to take advantage of it. Considering the complexity of searching protocols from one local system to another, even sophisticated searchers may have to rely mainly on luck to find what they want. In an attempt to provide another aid to alleviate the problem, the University of Minnesota's East Asian Library is compiling lists of its Chinese and Japanese periodical collections with detailed holding information, and making them available through its homepage (http://ealib.lib.umn.edu). These lists—in vernacular languages—can be viewed with or without a special language browser. Until a better solution becomes available to us, this effort is an effective way to ease frustration in accessing remote East Asian periodical collections. If more East Asian collections in North America join this effort, collectively we could surely make a difference.

If East Asian countries maintain their current pace in developing electronic publishing industries and network infrastructures, we will soon see more commercial databases—bibliographical or full-text—available online. Online databases have some features that are advantages over CD-ROM products, such as greater coverage, contents that are updated in a timely manner, and reduced dependence on special devices and locations. As more online databases develop, we may need to negotiate with producers or vendors to make them available to each of our libraries. In fact, East Asian librarians are already thinking ahead in this
direction, as is demonstrated by the discussion on "content and use of RLIN as a centralized database" that was held at the RLIN East Asian Libraries User Forum in conjunction with the CEAL annual meetings at Honolulu in April 1996. We may also need to negotiate with database providers on prices and price structure. For instance, per-search charges, rather than a flat fee, might be an affordable way to overcome our tendency toward low use, particularly in smaller libraries. If such needs indeed emerge, we must work together because a collective voice is the best way—perhaps the only way—to present our needs and concerns effectively. The collaborative spirit we showed in negotiating the Chinese export book price structure (led by the CEAL Committee on Chinese Materials) and in negotiations with the National Diet Library on maintaining an affordable format of Zashi Kiji Sakuin for East Asian collections outside of Japan (led by the National Coordinating Committee on Japanese Library Resources and the CEAL Subcommittee on Japanese Materials) needs to be continued.

Last, but not least, is the need for cooperation in staff training. The need for continuing education in new knowledge, skills, and attitudes to adopt new technologies and changes has never been greater for East Asian librarians. New responsibilities and service demands naturally require that East Asian librarians renew their competencies. While the local resources available to individual librarians at their institutions serve perhaps as the primary sources for our needs in general continuing education—such as short courses and training sessions on microcomputer basics, popular software, network browsers, HTML tags or workshops and seminars on topics of general trends in librarianship or management theories and practice—our needs for renewing knowledge or skills that apply exclusively to East Asian librarianship must be met by our own organized effort. Successful examples of the effort include the "Japanese Studies Librarians Workshop"—funded by the Japan Foundation, and organized by the CEAL Subcommittee on Japanese Materials in 1993, in conjunction with the CEAL annual meetings at Los Angeles—and the pre-conference workshop on "Handling Vernacular on PC and Over the Internet"—organized by the CEAL Subcommittee on Technology in conjunction with 1994 CEAL annual meetings at Boston. The need for a continuation of similar efforts is obvious, and must be supported by the entire community of East Asian librarians in North America.

Conclusion

East Asian librarianship in North America has entered a new period of development. This period is perhaps best characterized by the many changes in research libraries—both internal and external—that affect East Asian librarianship directly. These multiple changes have brought both challenges as well as opportunities—perhaps a cliche, but nevertheless an accurate
description of the situation. Technology, especially network technology, serves as a major agent of change in this time.

Change is rarely easy, but remaining unchanged will likely be a worse choice, or may indeed no longer be a valid option. In order to meet the challenges, and seize the opportunities to prosper, East Asian librarians must have a clear vision, determination, good strategies, and a spirit of cooperation.
NOTES


5. The database was produced by Yuan-Tse Institute, Academia Sinica in Taiwan. Gift copies were presented to East Asian libraries at Harvard University, the University of California at Berkeley, and the University of Washington at Seattle by the producer. A detailed summary of recent developments in electronic publishing relating to Sinology worldwide can be found in Thomas H. Hahn's article "The Year 1995: Questions about the Development of Automation in Sinological Librarianship," JEAL 108:2.


17. Hahn, 3.

18. Frye, 35.
