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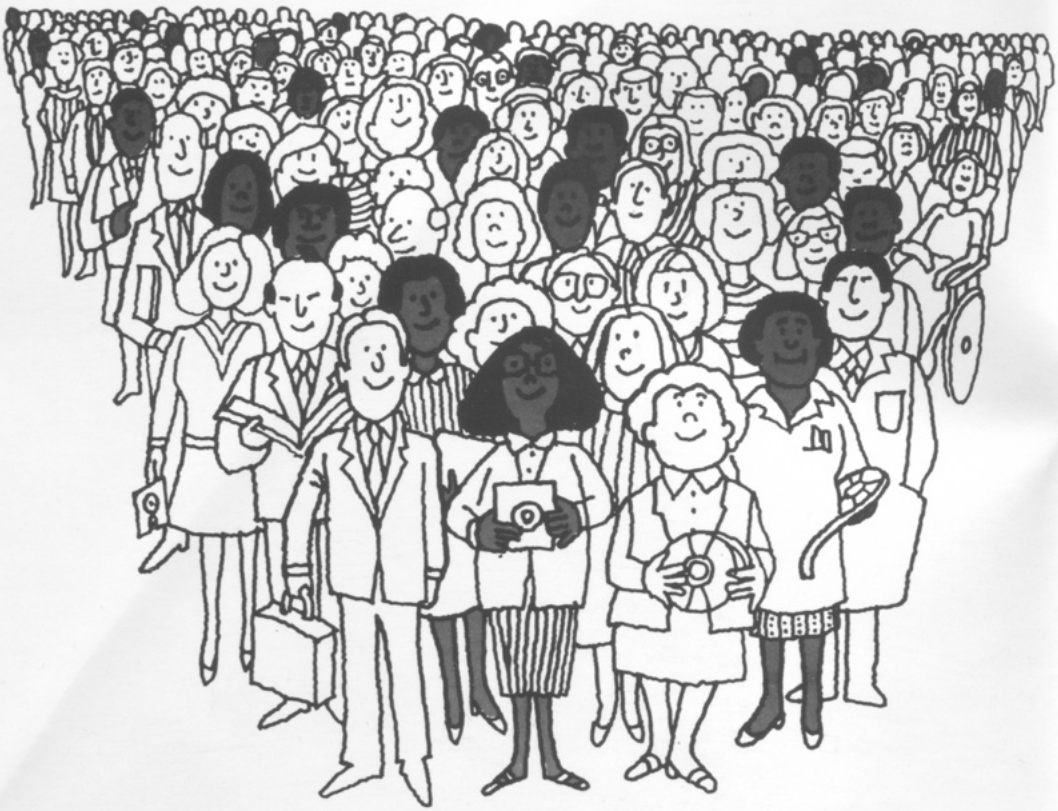

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Automatically Generated References in Minimal-Level Authority Records

Douglas Anderson

Minimal-level, or provisional, authority records are constructed from the headings contained in bibliographic records, usually as part of a computerized validation process. They typically contain little more information than the heading itself. Two types of references can be generated automatically for minimal-level name and title authority records: (1) those based on other data in the bibliographic record and (2) those derived from the heading itself through some form of manipulation. Online catalogs that make use of browsable indexes will likely find references such as these useful.

Minimal-level authority records, also called provisional authority records, are constructed automatically from the headings contained in bibliographic records. They are frequently generated at the time the heading is being validated in cases where the database or authority file into which a given heading is being entered lacks that heading. Minimal-level authority records typically contain little more data than the heading itself with default values in the control fields of the record.[1] They may also contain a citation for the source of the heading.

Vendors who perform the authority processing of databases often offer as one of their services the creation of minimal-level authority records for all headings that do not have matching Library of Congress (LC) authority records. Libraries with systems that do not make use of authority records without references usually forego the creation of minimal-level authority records as part of their authority processing.

Fully linked authority control systems are those that do not store the text of headings in the bibliographic records, but instead store pointers to authority records. Such systems require an authority record for every heading. When a bibliographic record is added to such a system, a minimal-level authority record is created automatically for every heading that lacks a preexisting authority record. Systems that function in this way include WLN, MELVYL, LCS, and VTLS.

For the purposes of the following discussion, it is assumed that the database in question is being validated against the Library of Congress Name (and title) Authority File. It is further assumed, except where noted otherwise, that the cataloging policies that governed the building of that database were compatible with those of LC. Local practices that vary from LC's should be evalu-

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ated carefully to determine the effect that they might have on the procedures described below. Evolving policies at LC could affect these procedures as well. Where possible, safeguards will be suggested to prevent these procedures from going awry.

AUTOMATIC REFERENCES

References can be generated automatically for minimal-level authority records in certain cases. These generally fall into two categories: (1) those in which the reference is based on other data in the bibliographic record and (2) those in which the reference is derived from the heading itself through some form of manipulation.

References of the first type would have to be generated at the stage of validating the headings of the database, when all the data of the bibliographic record are accessible. References of the second type could be generated at a later stage in the process. Regardless of the type, access to the entire authority file would be required for certain verification procedures.

Online catalogs that have a capability of keyword searching on name headings may have no need for the second type of reference, since there are no data in the reference that are not also in the heading itself.[2] Systems that make use of browsable indexes, though, will likely find these references useful.

REFERENCES BASED ON DATA IN THE BIBLIOGRAPHIC RECORD

Uniform Titles

When the heading in the minimal-level authority record is a name-title heading based on a combination of the 1xx and 240 fields from a bibliographic record, a reference can be constructed from a combination of the 1xx and 245 fields in that record. In the heading of the authority record, the data of the 240 would be appended to the 1xx with the subfield ǂa of the 240 converted to a subfield ǂt of the 1xx and other subfielding from the 240 maintained. Figure 1 illustrates this. The reference would include the "title proper" of the bibliographic record and is composed of subfields ǂa, ǂn, and ǂp of the 245 field.

It is possible that the subfield ǂa of the 245 may contain multiple individual titles that will be punctuated with a "blank-semicolon-blank." When the uniform title for such an item contains the expression "Selections," the entire ǂa can be used in the reference. Otherwise it would be appropriate to truncate such a title at the first "blank-semicolon-blank."

There are cases in which the reference constructed in this way might be equivalent to the heading itself. For example, some libraries add uniform titles contrary to *Library of Congress Rule Interpretations (LCRI)* 25.2A for certain classes of materials, such as music scores and sound recordings. This rule interpretation specifies that uniform titles are not to be added when "the complete uniform title that would be assigned is exactly the same as the title proper of the item."[3] This being the case, a test would have to be made to identify cases where references and headings are equivalent, so that such a reference can be deleted.

If one could be certain that the bibliographic record was for a single work, other references based on a combination of the 1xx and 740 fields would be possible. It is quite possible, however, that the title added entry might be based on another work contained in the same item. There is, unfortunately, no way to test for this condition. It is probably better to rule out all such references than to generate invalid references that are undetectable.

Variant Forms of Entry in the Bibliographic Record

MARC tags 870-873 were designed to "provide variant forms of entry for headings in other fields."[4] Although these fields were added to the serials format in 1976 and to all formats in 1979–1980, they were never implemented by the Library of Congress.[5] These fields were implemented by OCLC, however, and can be found in records of that database.

Most of the 87x fields in the OCLC database were introduced as part of the conversion to *AACR2* in December 1980. At that time, OCLC replaced pre-*AACR2* headings with *AACR2* forms based on the LC authority file.[6] "For other headings and uniform titles, the system constructed *AACR2* forms by manipulating data present in the fields."[7] In both cases, data in

Bibliographic record
100 00 Xenophon.
240 10 On horsemanship. ≠l French & Greek
245 10 De l'art équestre / ≠c . . .
Authority record
100 00 Xenophon. ≠t On horsemanship. ≠l French & Greek
400 00 Xenophon. ≠t De l'art équestre

Figure 1. Reference Based on Title Proper. Note: *Examples have been chosen without regard to whether or not an LC authority record exists for the given heading.*

---

a) Name heading
Bibliographic record
100 10 Rowse, A. L. ≠q (Alfred Leslie), ≠d 1903–. . .
870 19 ≠j 100/1 ≠a Rowse, Alfred Leslie, ≠d 1903–
Authority record
100 10 Rowse, A. L. ≠q (Alfred Leslie), ≠d 1903–
400 10 Rowse, Alfred Leslie, ≠d 1903–

b) Dependent uniform title heading
Bibliographic record
100 10 Joplin, Scott, ≠1868–1917.
240 10 Piano music
245 10 Collected piano works. ≠c . . .
. . .
870 09 ≠j 240/1 ≠a Works, ≠m piano
Authority record
100 10 Joplin, Scott, ≠d 1868–1917. ≠t Piano music
400 10 Joplin, Scott, ≠d 1868–1917. ≠t Works, ≠m piano
also
400 10 Joplin, Scott, ≠d 1868–1917. ≠t Collected piano works

Figure 2. Reference Based on Variant Form of Heading.

the former heading were transferred to a 87x field.[8] In those cases where the changes were based on the LC authority records, the 87x fields will presumably not be needed to generate a reference in a minimal-level authority record, since an LC authority record will already exist.

The generation of a minimal-level authority record with a reference derived from the 87x field is fairly straightforward. The subfield ≠j contains a pointer to the tag of the heading (presumably authorized) and the subfields ≠a and following contain the variant form of the heading. This variant form becomes the reference of the authority record (see figure 2).

Verification would have to be performed prior to this manipulation to confirm that the subfield ≠j is still a valid pointer to a heading in the record. Since the link between the fields must be maintained manually, it can be broken when the biblio-

graphic record is edited without regard to the relationship between the heading and its variant form.

REFERENCES BASED ON MANIPULATION OF DATA IN THE HEADING ITSELF

There are several cases in which references can be made based entirely on manipulation of data contained within the heading itself. Almost all of these depend crucially on the ability to determine precisely the different elements of the heading, some of which may not be delimited by subfields. An example of this is the necessity of determining what portion of a personal name comprises the surname or its equivalent and what comprises the given name. The several sections of *AACR2-88* 22.4B specify that the surname or equivalent is to be given as the entry element and that it is to be followed by a comma.[9]

Several other elements of a name heading are to be set off with commas. These include the dates, titles of nobility, terms of honor, and other words or phrases. But these other elements are always to be included in a subfield other than subfield ǂa. It can be concluded, therefore, that there should be at most one comma within the subfield ǂa of a name heading (other than a comma as the last character of the subfield), and that what precedes the comma is the surname or its equivalent and that what follows it is a given name. When there is no comma other than the final one in subfield ǂa, the entire subfield is the surname or its equivalent.

Personal Names with Fuller Forms

AACR2-88 22.18A prescribes that when a fuller form of the heading is known and is needed to distinguish between otherwise identical headings, the fuller form is to be added to the heading as a parenthetical qualifier. An option to the rule allows the addition to be made even when it is not required, except in a few well defined situations. The *LCRI* for rule 22.18A indicates that this optional provision is to be applied.

The rule also directs the cataloger to "refer from the fuller form of the name when appropriate." The criterion of appropriateness is addressed later, in the chapter of *AACR2-88* devoted to references (section 26.2A2): "Refer from a form of a name . . . if it differs significantly from the form used in the heading for that person." In particular, a reference is always required when the difference occurs in the first five letters of the entry element. The LC rule interpretation for rule 26.2 expands this to include "variations in all elements to the left of the comma and in the first element to the right of the comma." Either criterion could be used in routines for checking the acceptability of automatically generated references.

According to MARC tagging guidelines, the fuller form of a personal name is entered in a subfield ǂq of the x00 field. It should be noted, however, that the "fuller form" might be a variant of either the surname or the given names. The algorithm for constructing this sort of reference will have to include a test of similarity between the fuller form and both the surname and given-name portions of the heading to determine which the fuller form should substitute for.

Instructions are also given in *AACR2-88* 26.2A2 for a reference from a "full name to initials used as heading." Although the name should be inverted in most cases, it is not clear whether a test could be developed that would determine when inversion is *not* appropriate. Perhaps the best procedure would be to invert the full name before the final element and then validate the resulting (presumed) surname against a table of valid surnames.

Personal Names with Alternate Entry Elements

Section 26.2A3 of *AACR2-88* provides for references "from different elements of the heading for a person under which that name might reasonably be sought." There are several examples listed there, not all of which lend themselves to the automatic generation of references. Those that do not, fail because the reference depends on information not contained in the heading itself or because that information cannot be isolated from the heading.

Compound surnames are one instance of names with alternate entry elements for which a reference can be constructed auto-

a) Fuller form of given names
Bibliographic record
100 10 Atkins, G. Douglas ǂq (George Douglas), ǂd 1943–
Authority record
100 10 Atkins, G. Douglas ǂq (George Douglas), ǂd 1943–
400 10 Atkins, George Douglas, ǂd 1943–

b) Fuller form of surnames
Bibliographic record
100 20 Gonzales-Zúñiga G., Alberto ǂq (Gonzales-Zúñiga Guzmán)
Authority record
100 20 Gonzales-Zúñiga G., Alberto ǂq (Gonzales-Zúñiga Guzmán)
400 20 Gonzales-Zúñiga-Guzmán, Alberto
also
400 20 Zúñiga G., Alberto Gonzales ǂq (Zúñiga Guzmán)
also
400 10 Guzmán, Alberto Gonzales Zúñiga

Figure 3. Reference Based on Fuller Form of Name.

matically. A personal name heading with a first indicator of "2" contains a name with compound surname. According to *LCRI* 26.2, references are customarily made from the form of the name with "each possible entry element . . . including each separate particle or prefix" of the name in filing position. These elements would be determined first by locating the comma (in order to isolate the surname), and then by rotating the name at each separator (space or hyphen) in the surname. Notice in figure 4(a) that the rotation occurs entirely within the subfield ǂa and that other subfields, such as subfield ǂd, are not involved.

Some surnames are rather more complex than the one in figure 4(a), and contain elements that should not serve as entry elements. *LCRI* 26.2 specifies that connectives such as "y" and "und" should not serve as entry elements, nor should a definite article following a prefix in German, Dutch, and related languages. There are particles in other languages, such as "of" in English, that are customarily not placed in filing position as well. The test for invalid references for compound surnames would have to include a look-up in a table (or stoplist) of excluded words. Figure 4(b) illustrates a heading of somewhat greater complexity.

The restriction of this permutation to compound surnames (those with first indicator "2") turns out to be unnecessarily restrictive. Single surnames with separate prefixes (which will have a first indicator "1") and names consisting only of multiple given names (which will have a first indicator "0") are both candidates for this treatment. The factor common to all of these cases is the presence of multiple "words" (identifiable by the presence of separators) in the surname portion of the heading.

The presence of a subfield ǂc in a heading of this type is problematic. The elements contained in this subfield frequently must be involved in the rotation. In many other cases, however, these elements must not be involved in the rotation. It appears that there is no reliable method of determining which is the case. Because there is no way to test for invalid references of this type, it is necessary to rule out references based on the rotation of elements of the surname when a subfield ǂc is present.

Further insurance against the possibility of a reference with an invalid name form could be achieved by testing the result against a table of valid surnames. Such a table might be derived from the LC authority file itself.

One further reference of this sort described in *AACR2-88* 26.2A3 involves the rotation of an element from the end of the heading into filing position. This is a refer-

a) Simple case

Bibliographic record

100 20 Worthington-Roberts, Bonnie S., ǂd 1943–

Authority record

100 20 Worthington-Roberts, Bonnie S., ǂd 1943–

400 10 Roberts, Bonnie S. Worthington-, ǂd 1943–

b) Complex case

Bibliographic record

100 20 Rodríguez-Villasante y Prieto, Juan A. ǂq (Juan Antonio), ǂd 1943–

Authority record

100 20 Rodríguez-Villasante y Prieto, Juan A. ǂq (Juan Antonio), ǂd 1943–

400 20 Villasante y Prieto, Juan A. Rodríguez ǂq (Juan Antonio Rodríguez), ǂd 1943–

400 10 Prieto, Juan A. Rodríguez-Villasante y ǂq (Juan Antonio Rodríguez-Villasante), ǂd 1943–

NOT

400 10 Y Prieto, Juan A. Rodríguez Villasante ǂq (Juan Antonio Rodríguez Villasante), ǂd 1943–

c) Reference based on prefix

Bibliographic record

100 10 Molina, Tirso de, ǂd 1571?–1648

Authority record

100 10 Molina, Tirso de, ǂd 1571?–1648

400 10 De Molina, Tirso, ǂd 1571?–1648

Figure 4. Reference Based on Inversion of Compound Surname.

Bibliographic record

Leader/18 = blank

100 10 Perry, Elizabeth Frances (McCall) ǂc Mrs.

Authority record

008/10 = "a"

100 10 Perry, Elizabeth Frances (McCall) ǂc Mrs.

400 10 McCall, Elizabeth Frances

*Figure 5. Reference Based on Maiden Name in Pre-*AACR *Heading.*

Bibliographic record

610 20 Big Creek Baptist Church (Williamston, S.C.)

Authority record

110 20 Big Creek Baptist Church (Williamston, S.C.)

410 10 Williamston (S.C.). ǂb Big Creek Baptist Church

Figure 6. Reference Based on Geographic Qualifier in Corporate Name.

ence from a "prefix to surname used as entry element." A heading of this type can be identified by the presence of an uncapitalized word or words at the end of the name. Figure 4(c) illustrates this type of reference. As with other headings of this sort, the presence of a subfield ‡c presents such complications that references must be rejected when this subfield is present in the heading.

Pre-*AACR* Headings

Headings for married women constructed according to the cataloging rules in effect before the advent of the *Anglo-American Cataloging Rules* in 1967 included the maiden name of the individual.[10] This name was to be enclosed in parentheses. When encoded in MARC records, this element of the name was included in the subfield ‡a of the heading.

A reference for the maiden name of the woman can be constructed by the replacement of the surname with the parenthesized maiden name. Candidate fields for this treatment can be identified by the presence of the parenthesized element within the subfield ‡a of the personal name heading, in a record using pre-*AACR* rules for description (Leader/18 coded blank).

Note in figure 5 the presence of a subfield ‡c. The term of address *Mrs.* or its equivalent will have to be deleted in the formation of the reference.

With respect to this type of heading, the 1908 *Catalog Rules* includes an instruction in section 41 to "refer from the name not selected as entry word." The corresponding rule (section 46) of the 1949 *A.L.A. Cataloging Rules*, however, contains no such direction. Regardless of earlier cataloging rules, current cataloging rules would seem to favor constructing a reference in this way. According to *AACR2-88* 26.2A1, one should "refer from a name used by a person, or found in reference sources, that is different from the name used in the heading for that person. Typical instances are . . . Earlier name . . . Later name."

Uniform Titles for Music

Pre-*AACR2* uniform titles for music collections took the form "Works, piano." Normal authority processing could correct this to the *AACR2* form "Piano music" without a basis for the heading in an existing LC authority record.[11] The heading in the minimal-level authority record would be based on the corrected 100/240 combination. A reference could be constructed from the uncorrected 100/240 combination.

It is open to question whether references of this type would be desirable. What is the use of the reference, if all uniform titles of this type are corrected? If no headings of this type were to appear in the catalog, users would presumably not expect to find materials under such a heading. Only users who have some recollection of earlier cataloging rules might search the catalog under such a heading.

On the other hand, these references could be considered to provide a useful collocation of entries in a file. This was apparently recognized by those who designed *AACR1* and specified that the authorized form of such a heading was to be constructed in that way.[12]

If a reference of this type were to be deemed useful, then it would presumably be useful whether or not it were derived from a corrected heading. In this case, a reference of the type "Works, xxxx" could be generated from *all* headings of the type "xxxx music." It should be noted, however, that neither *AACR2-88* nor *LCRI* permit this sort of reference. According to *LCRI* 26 paragraph 3c, even when such a reference is included in an LC authority record because it represents a form of the heading established under earlier cataloging rules, the subfield ‡w is normally coded "nnaa," indicating that this reference is not to be traced.

Corporate Bodies with Geographic Qualifiers

A reference can be generated automatically for a 110 field with a first indicator value of "2" that also contains a parenthetical geographic qualifier (see figure 6). The reference would be tagged 410 and would have a first indicator value of "1." The geographic name from the parenthetical qualifier would form the basis of the subfield ‡a of the reference and the subfield ‡a of the heading (with the parenthetical qualifier deleted) would be transferred to a subfield ‡b of the 410.

This type of reference is made in an LC authority record only in certain cases. The relevant instruction in *LCRI* 26.3A7 is to "make a reference from the place in which the following bodies are located: (a) a local religious institution . . . (b) a U.S. chamber of commerce." Libraries whose policy is to follow LC's practices strictly may find it difficult to isolate headings of these types from all the headings that contain geographic qualifiers. Limiting the application of this technique to headings that contain text strings such as "Church," "Cathedral," "Temple," "Synagogue," or their equivalents in other languages, or "Chamber of Commerce" might be sufficient. However, this allows considerable room for error and numerous valid references would be omitted and some invalid ones may still be made. The algorithm should also include a procedure to delete the place name from the subfield ǂb when it is duplicated in the subfield ǂa.

LCRI 26.3A7 also specifies that a reference of this sort is to be made for headings for governmental bodies entered independently. Except for the likely absence of the terms listed above, such headings, when qualified by a geographic qualifier, will be structurally equivalent to headings for religious institutions and chambers of commerce. But there is no way to isolate these occurrences from the larger body of heading that contain geographic qualifiers. Many of the instances of geographic qualifiers in corporate names are in situations where *AACR2-88* and *LCRI* do not call for references constructed with the corporate body entered subordinately to the geographic name.

Ultimately the decision may come down to either (1) making a reference so constructed in all cases where a geographic qualifier appears, or (2) limiting such references severely as described above.

In all cases where a reference is made with the corporate body entered subordinately to the geographic name, other issues arise.

In order to prevent other types of parenthetical qualifiers, such as ecclesiastical jurisdictions, various general designations, or constants like "(Musical group)" or "(Firm)" from being manipulated in this way, the algorithm for constructing this type of reference would have to include a validation of the subfield ǂa of the 410 with a first indicator of "1" against the geographic headings (tagged 151) in the authority file.

There are, however, several differences in the form of these geographical qualifiers from the form of the heading for that geographic area. These include differences in which elements are parenthesized and differences in the use of abbreviations. (These differences are illustrated in figure 7.) Since geographic authority records contain no content designation to identify valid forms of names when used other than as headings, these permutations will have to be accounted for by such means as punctuation algorithms and a look-up table for abbreviations (based on *AACR2-88* Appendix B.14).[13]

Corporate Names for Governmental Bodies with Subheadings Beginning with Generic Terms

Headings for governmental bodies frequently contain subdivisions that begin with generic terms (see table 1). *LCRI* 26.3A3 specifies that, in such cases, a reference is to be constructed with the generic

a) Different element parenthesized

(Asheville, N.C.)	[parenthetical qualifier]
Asheville (N.C.)	[geographic heading]

b) Parenthetical qualifier abbreviated

(N.C.)	[parenthetical qualifier]
North Carolina	[geographic heading]

Figure 7. Differences between Parenthetical Geographic Qualifiers and Geographic Headings.

Bibliographic record

710 10 Ohio. ≠b Governor's Office of Advocacy for People with Disabilities.

Authority record

110 10 Ohio. ≠b Governor's Office of Advocacy for People with Disabilities
410 10 Ohio. ≠b Office of Advocacy for People with Disabilities, Governor's
410 10 Ohio. ≠b Advocacy for People with Disabilities, Governor's Office of

Figure 8. Reference Based on Inverted Name of Governmental Subdivision.

*Table 1. Look-up Table for Governmental Subdivisions**

Nonsignificant terms (the subdivision of the reference should not begin with one of these terms)

a	in
an	of
the	on
for	and

Generic terms (invert the subdivision of the heading so that any of these terms, as well as the first significant term following, serves as entry element)†

administration	group
administrative	joint
advisory	ministry
agency	national
authority	office
board	panel
branch	president's
bureau	royal
commission	secretariat
committee	section
council	service
department	state
dept.	subcommittee
division	task force
federal	work group
governor's	working group
	working party

Other possible generic terms

Names of states of the United States and provinces of Canada	
American	international
British	U.S.
Canada	U. S.
Canadian	United States
Great Britain	university

*This table provides only English-language terms. For completeness, tables of equivalent terms in several foreign languages would have to be developed. The problem of articles in one language being orthographically equivalent to significant words in other languages will arise here.

†This list of terms is derived from those suggested in *AACR2-88* 24.18 and from the list provided in *LCRI* 24.18 Type 2.

term for the type of agency and the first key word inverted within the governmental subdivision (see figure 8).

These headings can be identified as those tagged 110 with a first indicator of "1" in the authority record and whose subfield ≠a matches an authorized geographic heading tagged 151. The inversion occurs within the subfield ≠b of the heading and only when there is a single subfield ≠b. The relevant LC Rule Interpretation (section 26.3A3) instructs one to "make such inverted references only for headings entered directly under the jurisdiction."

As in the case of personal names with alternate entry elements discussed above, when a possible alternate entry element is identified, the text string of the subfield will have to be rotated so that the alternate entry element is in filing position. The resulting reference will then have to be tested for validity. Unlike personal names, however, potential permutations of the heading will have to be identified by matching terms in the heading against a look-up table of generic terms.

A search for the pattern " . . . *generic-term preposition . . . firstsignificantterm*" may be a preferable technique for locating certain types of potential references. This search key can isolate the two most essential inversions, including some that would not be identifiable otherwise. The presence of the preposition and the following significant term (with a possible intervening article) is crucial to ruling out other uses of the generic terms in noninitial positions.

There is nothing in *AACR2-88* 26.3A3 that precludes the application of this principle to nongovernmental corporate bodies and no apparent reason why it would not be equally useful. The *LCRI* for that section, however, makes no provision for such treatment. It should be noted that much of the rule relating to the question of deciding whether or not to enter the corporate body subordinately is the same for governmental and nongovernmental corporate bodies.[14] If it is desirable to open this treatment to nongovernmental corporate bodies, the matching of the subfield ǂa to an authorized geographic heading can be removed.

Conference Headings with Generic Terms in Filing Position

When a conference name begins with generic terms, a reference can be derived from rotating the heading so that any generic term preceding the distinctive portion of the heading is in filing position (see figure 9).

A list of generic conference terms, articles, and prepositions, such as that found in table 2, derived in part from OCLC's stop list for corporate and conference headings, could serve as the basis for such a manipulation. Similar lists could be constructed for the more common languages.

*Table 2. Look-up Table for Conference Headings**

Nonsignificant terms (no reference should begin with one of these terms)	
a	in
an	of
the	on
for	and

Generic terms (invert the heading so that any of these terms serves as entry element)

American	institute
annual	institutes
biennial	international
British	joint
Canada	national
Canadian	seminar
colloquia	seminars
colloquium	session
conference	symposia
conferences	symposium
congress	U.S.
congresses	U. S.
convocation	United States
forum	university
Great Britain	workshop
	workshops

Names of states of the United States and provinces of Canada

*This table provides only English-language terms. For completeness, tables of equivalent terms in several foreign languages would have to be developed. As with the table for governmental subdivisions, the problem of articles in one language being orthographically equivalent to significant words in other languages will arise here.

Bibliographic record

711 20 International Seminar Workshop on "Applied Agricultural Research and Development for Small Farms" ǂd (1985 : ǂc SEARCA)

Authority record

111 20 International Seminar Workshop on "Applied Agricultural Research and Development for Small Farms" ǂd (1985 : ǂc SEARCA)

411 20 Seminar Workshop on "Applied Agricultural Research and Development for Small Farms," International

411 20 Workshop on "Applied Agricultural Research and Development for Small Farms," International Seminar

Figure 9. Reference Based on Inversion of Generic Term in Conference Heading.

It is not clear why another inverted reference is not also normally made with the distinctive portion of the heading in filing position. As is the case with nongovernmental corporate bodies entered subordinately, there is nothing in the text of *AACR2-88* 26.3A3 that suggests that such a reference would be inappropriate. The *LCRI* for the same section merely does not call for it routinely. Perhaps the guideline provided elsewhere in *AACR2-88* (section 26.1A) is applicable here: "In case of doubt as to whether to make a reference, make it."

CONFLICTS

Whenever a reference is generated automatically by the methods described above, the reference may be in the same or very similar form as an existing heading or reference in the same or in a different authority record. The redundancy of such a reference may, in certain cases, be detrimental to the effectiveness of the catalog.

The guidance provided by *AACR2-88* 26.1H on this issue is "not [to] make a reference if the reference is so similar to a heading (name and/or title) or to another reference as to be unnecessary." It is up to the cataloger, then, to determine the degree of similarity that makes a reference unnecessary. The interpretation of rule 26.1 by the Library of Congress is somewhat more specific: "Do not trace a reference that would normalize to the same form as the heading on the same record or to the same form as the heading on another record." Note, in particular, that the problem of conflicts with other references is not addressed and is presumably not considered to be a problem.

The expression "normalize," which plays a crucial role in this interpretation, is not given a definition in *LCRI*. It can, however, be deduced from the examples and their comments. "Normalize" appears to be equivalent to "file the same." In particular, one reference is rejected because a hyphen in a compound surname is replaced with a space. Since both the space and the hyphen are separators in most computerized filing algorithms, the heading and the reference were indistinguishable for filing purposes.

In fact, there is one case of a conflict of a reference with the heading of a different authority record that is allowed. According to *LCRI* 26.2C, when there are no data available that resolve the conflict, the reference is retained as a "see also from" reference. This conflict would seem to happen most often with the undifferentiated headings formed according to *AACR2-88* 22.20.

CONCLUSION

The idea of automatically generated references in minimal-level authority records could be developed into several practical applications. Local systems might create minimal-level authority records with automatically generated references whenever new headings enter the database. These authority records would be considered provisional and would serve as a basis for more complete authority work to be done later by a cataloger. Vendors of tape processing for authority control frequently offer the creation of minimal-level authority records as one of their services. If these authority records were enhanced with automatically generated references, they would have significantly greater value.

It should be noted that procedures de-

scribed above for generating references automatically are not elegant. They are not based on only a few simple principles. Instead they are filled with exceptions, look-up tables, stop lists, and the like. Neither are these procedures flawless. When implemented conservatively, valid references may be excluded because of coincidences with terms on stop lists, etc. When implemented liberally, invalid references may be made. Nevertheless, a balance should be attainable that would provide useful access points to the headings of a bibliographic file.

REFERENCES AND NOTES

1. Minimal-level series authority records could conceivably contain other information deduced from the bibliographical record, such as: tracing practice, numbering example, and (possibly) classification practice. Conflicting evidence of past practice could be problematic, but methods could be established to make decisions in such cases. The criterion could be either predominance or latest practice in the use for the heading in the database.

   Minimal-level series authority records provided by Blackwell North America reportedly contain a 642 field with a numbering example.
2. In a study of the LC Authority File, it was found that 14.5 percent of the personal name authority records and 8.5 percent of the corporate name authority records had only references that were unneeded under such a system. See Mark R. Watson and Arlene G. Taylor, "Implications of Current Reference Structures for Authority Work in Online Environments," *Information Technology and Libraries* 6:10–19 (Mar. 1987).
3. *Library of Congress Rule Interpretations* [hereinafter cited as *LCRI*] (Washington, D.C.: Cataloging Distribution Service, Library of Congress, 1990).
4. *Books Format*, 3d ed. (Dublin, Ohio: OCLC, 1986), p.BKS8:11, rev. 8909.
5. Walt Crawford, *MARC for Library Use: Understanding Integrated USMARC*, 2d ed. (Boston: Hall, 1989), p.173.
6. Robert H. Burger, *Authority Work: The Creation, Use, Maintenance, and Evaluation of Authority Records and Files* (Littleton, Colo.: Libraries Unlimited, 1985), p.36.
7. *Bibliographic Input Standards*, 4th ed. (Dublin, Ohio: OCLC, 1990), p.22.
8. Georgia L. Brown, "AACR2: OCLC's Implementation and Database Conversion," *Journal of Library Automation* 14:166 (Sept. 1981).
9. *Anglo-American Cataloguing Rules* [hereinafter cited as *AACR2-88*], ed. Michael Gorman and Paul W. Winkler, 2d ed., 1988 rev. (Ottawa: Canadian Library Assn.; Chicago: American Library Assn., 1988). Section 22.5B also mentions an element of a name that "functions as a surname" which is also to be followed by a comma.
10. See Section 46 in *A.L.A. Cataloging Rules for Author and Title Entries*, 2d ed. (Chicago: American Library Assn., 1949) and Section 41 in *Catalog Rules, Author and Title Entries*, American ed. (Chicago: American Library Assn., Publishing Board, 1908).
11. This change was in fact made in the OCLC database when it changed to *AACR2* in December 1980. For an example of such a correction, see figure 2(b). For discussion of the types of changes made at that time, see Brown, "AACR2," p.166.
12. See Section 239 of *Anglo-American Cataloging Rules*, North American Text (Chicago: American Library Assn., 1967).
13. There appears to be a growing awareness that this is a deficiency in the MARC Authorities format. Discussion papers no.34 and no.38 for MARBI meetings in January and June 1990 both dealt with recording indirect geographic subject subdivision form information in authority records. See "MARC Update," *Library of Congress Information Bulletin* 49:182–83 (7 May 1990) and 49:194–95 (21 May 1990).
14. Compare *AACR2* 1-188 24.13 and 24.18 and the *LCRI* for those sections. ■■

Online Catalog Maintenance: The Role of Networks, Computers, and Local Institutions

Ingrid Mifflin and Jean Williams

This paper stresses the importance of maintaining the accuracy and currency of the information in an online catalog. The first section discusses aspects of online catalog maintenance that can be accomplished cooperatively, through cataloging networks, or automatically, by computer programs. The second section describes procedures followed at Washington State University, utilizing the Western Library Network, to maintain the local online catalog.

Catalog maintenance is, in many ways, easier in an online catalog than it was in the traditional card catalog. However, online it is more obvious when maintenance work is left undone, and the capabilities and restraints of an automated catalog require more accurate, thorough, and detailed maintenance as well as some new and different maintenance procedures. This is in part due to the fact that most online catalogs do not function solely as catalogs; they also serve as the basis for other linked functions such as circulation and serials control.

Maintenance of the card catalog included the following functions: filing cards, shifting cards, preparation and maintenance of authority files, maintenance of guide cards, replacement of worn and missing cards, withdrawals, added copies and added volumes, and maintenance of location stamps, cards, and sleeves.[1] The purpose of these activities was to maintain the currency and accuracy of the bibliographic, authority, and holdings information in the catalog. This was done so that users could locate as many of the appropriate items in a collection as they needed or wanted. Unfortunately, the intensive labor involved in many of the activities listed above made it too expensive and time-consuming for most libraries to undertake full-scale maintenance of their card catalogs.[2]

While the labor-intensive activities of card filing, pulling, and shifting can, mercifully, be relegated to the past, the move from a card catalog to an online catalog does not eliminate the need for catalog maintenance. In fact, it becomes even more necessary to maintain the currency and accuracy of the information in the catalog when it is online. Mistakes tend to be more noticeable on a computer screen, and typographical and other errors are more important because of the negative effect they have on keyword access and the computer's ability to sort data. A human can overlook errors and inconsistencies when filing cards, but a computer processes everything literally. This means that errors in data entered into the computer result in "misfiled" records, because the computer does not have the ability to recognize and compensate for such errors.

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Librarians and library patrons seem to expect more information, and more up-to-date and accurate information, from computer catalogs. To some degree such expectations are valid, because the fact that computer records are more flexible and easier to manipulate than cards makes much of online catalog maintenance easier than card catalog maintenance. More is also expected of online catalogs because they serve as the basis for other automated functions such as circulation, shelflists, and serials control. However, online catalog maintenance, although different, can still be labor intensive, especially if all of the work is done in-house.[3] Nevertheless, online catalog maintenance need not be an unmanageable task if librarians fully explore both the possibilities of shared catalog maintenance beyond the local level, via the cataloging networks, and maintenance procedures that the computer can be programmed to do automatically.

This paper explores some of these possibilities based on experiences and studies undertaken at Washington State University (WSU), utilizing the Western Library Network (WLN).

SHARED CATALOGING AND CATALOG MAINTENANCE

Shared Cataloging

The use of cataloging networks has prompted much discussion of the pros and cons of shared, cooperative cataloging. Libraries are now able to get 80 percent or more of their cataloging from a network such as WLN, OCLC, or RLIN, and they contribute the other 20 percent or so for other libraries to use as needed. The most obvious "pro" of this situation is that each library does not have to catalog originally every book it acquires; instead, each library catalogs some of its holdings, contributes these cataloging records to a network database, and then all libraries participating in the network use whichever cataloging records they need. This is a basic, simplified, and somewhat idealistic statement of the concept of shared cataloging. The resultant "con" has proven to be that not all contributed cataloging is of equal quality, which means that many libraries participating in a network cannot, or will not, accept shared cataloging records without extensive revision and editing, because the national cataloging standards are not universally applied.

In order for the idea of shared cataloging to work as efficiently as possible, contributing libraries must recognize that, while at times they may have to catalog at a higher standard than they believe meets their needs, the benefits of deriving the majority of cataloging from the networks outweigh this drawback, and, the networks in turn must mandate cataloging standards and enforce quality control for all contributed cataloging. For example, WLN requires its contributing members to follow national cataloging standards (*AACR2* revised, *LCRI*, and so on), and it enforces these standards with its staff of reviewers, who check contributed cataloging records and return them to the originating library, with explanations, if they do not meet national and network standards. The WLN input/edit system has a mechanism that permits communication between the WLN reviewers and the contributing library about each record that is input. The record is verified by the inputting library into a working file for the WLN reviewers, who communicate cataloging rules and standards, if necessary, by adding a note or message to the record and returning it to the working file of the inputting library. In this way, WLN can both monitor the quality of incoming records, and assist in training catalogers and informing them of new cataloging developments. This is especially helpful for small libraries that have only a few staff members that do not have the time to develop and maintain an in-depth expertise in cataloging.

Cataloging records that are loaded into WLN from external sources (LC MARC, Books-Canada, GPO, and so on) undergo a different type of review process. These records are assumed to meet national cataloging standards, so the review, which is for the most part done by the computer as part of the loading process, is concerned mainly with MARC tagging problems, outdated authorities, punctuation, and checking for duplicate records. This loading process is a form of both shared and automated maintenance, and will be described in more detail later.

WLN has a Bibliographic Standards Committee, which gives the contributing members a voice in the development of network policies and standards. The Committee is made up of elected representatives from each state that has contributing WLN members, and is charged to "define standards of quality . . . consistent with the fundamental premises of the WLN [and] to delineate policies and procedures required to meet those standards."[4]

When you add to the extensive review of contributed cataloging the role in setting network standards given to participating libraries through membership on the Bibliographic Standards Committee, you end up with a database of cataloging records that many participants can, and will, accept with minimal review.

Shared Maintenance

The same concepts that guide shared cataloging in a network environment—national standards and quality control—can also be applied to shared maintenance of local online catalogs. If all libraries share maintenance of cataloging and authority records, at the network level, the amount of work each library has to do at the local level to maintain its own online catalog will be reduced. As with shared cataloging, it is necessary for the contributing libraries to be able to trust the quality and integrity of the network database for shared maintenance to work. Just as most libraries derive the bulk of their cataloging records from LC, so too can much of local catalog maintenance be done through LC, either by having LC update tapes loaded directly into local catalogs, or by receiving all updates, including LC updates, from cataloging utilities.[5]

On WLN, all contributing members edit and/or upgrade bibliographic or authority records in the database, following national standards and adhering to WLN's published guidelines for changing and upgrading records.[6] To ensure this, the WLN reviewers check online changes made by members, just as they check inputs. The OCLC ENHANCE program is similar, except that only authorized libraries may change the records in the OCLC database. It may seem that the contribution of any given library is small, but, as librarians at one OCLC ENHANCE library put it, "the effect is immeasurable."[7]

Tape loads from LC-MARC and the like are another source of changes and upgrades to records in the WLN database; however, most of these changes are not reviewed by any individuals at the network, on the assumption that they already follow national cataloging standards.

This is where the WLN loading programs enter the maintenance process, assisting not only in the maintenance of bibliographic and authority information in the WLN database, but also in the maintenance of the online catalogs of WLN participants who load updates from WLN. These programs both clean up new records before they are loaded into the WLN database, and match the new records against the existing database to check for duplicates and updates to existing records.

The clean-up program checks each MARC record that is loaded from an external source for obsolete MARC codes and text, and either deletes the obsolete information, or converts it to the current value. Examples of this include: the subject subdivision "Addresses, essays, lectures" is deleted from all records being added to WLN which contain it; the subject term "Russia" is changed to "Soviet Union," whether it appears as the main subject or as a subdivision; brackets are added around the General Material Designation subfield "h" in the title; initial articles in uniform titles are deleted; and many other improvements to the incoming records that are automatically executed.

The matching program involves both machine review and human review. If the machine determines that an incoming record is unique, it is added to the database. If the machine determines that an incoming record is an update or duplicate of a record already in the WLN database, based on a complex matching process, it either automatically replaces the database record with the new record, or else routes the new record to a file for human review, depending on how close the match is. The fields that the machine uses to determine a match are first (record identification) RID, then title and main entry. If no match is found, the record is added to the database. If there is a match on either one of these, the machine

next compares record type/bibliographic level, DATE1 and CNTRY fixed fields, and the first twenty characters of the a and b subfields of the title. If they all match on this second comparison an automatic replacement takes place; if any one of the fields compared does not match, the record is submitted for human review.[8]

The clean-up and matching processes both occur before records are loaded into WLN, as a front-end type of maintenance. These programs are indicative of WLN's dedication to maintaining and improving the quality of records in the database. They make it possible to use WLN as a very effective cataloging tool and as a maintenance tool for local online catalogs.

The cataloging and authority records in WLN are in a constant state of change, reflecting corrections and updates from participants and external tapeloads. In 1988, WLN participants changed 42,708 bibliographic records, and WLN staff changed 24,892 bibliographic records, and this does not even take into account updates loaded from external sources or global updates to bibliographic records caused by authority changes.[9] If WLN members with local online catalogs load MARC tapes from WLN that include these updates, they can benefit from maintenance work performed by the national sources, by other contributing libraries, and by WLN staff.

With the LC Name Authority Cooperative Program (NACO), the National Coordinated Cataloging Program (NCCP), and the Linked Systems Project, the possibilities for shared cataloging and shared catalog maintenance move beyond the network level to a national, or even international, level. If all libraries and cataloging networks could contribute to, and derive their cataloging from, a single database, and assuming that we all adhere to the same standards, there would be less duplication of effort and more time to devote to cleaning up the problems that exist in even the best databases.

AUTOMATED MAINTENANCE

For the most part, maintenance of holdings information cannot be shared, but must be done locally by the individual institutions. The computer's sort routines can automatically "interfile" the records to create an online shelflist, author catalog, title catalog, and so on. Tape loading or downloading routines can automatically generate holdings records in the catalog, complete with call numbers, locations, and other detailed holdings information, depending on what is entered at the network level. Large-scale transfers of materials from one location to another, or changes of location designators, can be done globally. These are just a few examples of types of holdings maintenance, formerly requiring pulling, correcting, and/or filing of large numbers of cards, that now require very little human intervention. Projects that were too large even to be contemplated in a card file, such as updating branch library location designators to reflect a new name or a new branch, are completed easily and quickly in a computer file.

Some bibliographic and authority maintenance can also be accomplished by the computer. Global changing of authority data in bibliographic records is a good example of this, provided a link exists between the authority and bibliographic files so that authority changes will also change the headings in the linked bibliographic records. This type of work is best done at the network level, so that each library does not have to go through the same process. Thus, global authority updating is both shared and automated maintenance work. Tape-loading routines that identify possible duplicate records, replacements, and records lacking crucial fields are other types of automated bibliographic and authority maintenance, and should occur at both the network and the local levels.

The following is a description of local online catalog maintenance at Washington State University (WSU) that demonstrates how shared and automated catalog maintenance can work, discusses the pros and cons of the existing situation, and offers some suggestions for improvements.

THE WSU EXPERIENCE

At WSU cataloging online has been undertaken on WLN since 1977. The locally designed and programmed online catalog came up in 1981 and has been subject to more or less continuous review and development ever since. It currently consists of approximately 665,000 bibliographic rec-

ords and 1,100,000 holdings records. Because one of the components of the catalog that has yet to be developed is an authority file, there are presently no authority records in the local catalog.

The WSU online catalog is an integrated system, currently consisting of a bibliographic system, a holdings system, a serials control system, and a circulation system. Planning has been initiated for an acquisitions system and an authority control system, all of which will be linked together. The bibliographic records in the catalog are stripped-down MARC records (see figure 1), and the holdings records are derived from the WLN holdings record (see figure 2). The database is indexed by author, title, title keyword, series, series keyword, subject, subject keyword, publisher keyword, call number, ISBN, ISSN, and record identifier (RID). The system also supports Boolean searches, limiting searches by date or language, and browsing authors, subjects, series, and call numbers. Because a barcode number is included in the holdings record for each volume, the online catalog is able to interact with the circulation system to indicate if an item is checked out and when it is due back. However, the ability of the system to display, sort, and access this information depends on the data being entered and maintained in a timely and accurate manner.

Online catalog maintenance (also known as database maintenance, or DBM) at WSU includes the following functions: inputting of detailed holdings information; location transfers; withdrawals; added copies and volumes; replacements; reinstates; processing of items needing recataloging; checking new records entering the catalog for errors (quality control) and; correction of errors in bibliographic, authority, and holdings information identified by DBM staff or reported to DBM staff by anyone using the library system. DBM is a section of the Bibliographic Control Unit, is responsible for retrospective conversion as well as catalog maintenance, and is staffed by one professional cataloger, five high-level classified staff, and approximately sixty hours/week of temporary employees.

Every second week a bibliographic tape from WLN containing an average of eight thousand MARC records is loaded into the WSU local catalog. These tapeloads are fundamental to the maintenance of the online catalog. Each tape consists of two categories of records: WLN bib additions to WSU (33 percent) and WLN bib updates to WSU (67 percent). It costs $180 to run each tape, plus $.055 per record on the tape. The biweekly schedule is not always adequate;

```
LIBI7002                    WSU Detailed Display                15:22:31 03/25/91

 1. TITLE:  New Chinese 300 : a beginning language course / by the faculty of
            Beijing Language Institute.
PUB.HISTORY:  Boston : Cheng & Tsui, c1984.
DESCRIPTION:  351 p. ; 22 cm.
     SERIES:  C&T Asian languages series
   SUBJECTS:    1. CHINESE LANGUAGE GRAMMAR

LOCATION: HOLLAND                              CALL NUMBER: PL1109.N48x 1984

Checked Out.    Due Date-Time.    03/11/91    6:00p.
```

Figure 1. Example of a Bibliographic Record in the WSU Online Catalog.

```
LIDH7001                    WSU Local Holdings Display          15:26:17 03/25/91

New Chinese 300 : a beginning language course / by the faculty of Beijing Language
Institute.                                                      RID: 83073591
    1. PL1109$.N48x 1984                                        HOLLAND
       1.                    HOLLAND                    002-107128407 1MON
```

Figure 2. Example of a Local Holdings Record in the WSU Online Catalog.

there are times when a book gets to the stacks, and even into circulation, before a record for it appears in the catalog. Eventually, we hope to download our records from WLN on a more timely basis.

Bib adds are straightforward, consisting of WLN full MARC records plus holdings information for every WLN record to which WSU holdings have recently been attached. Each bib add on the tape automatically creates both a bibliographic and a holdings record in WSU's online catalog. The bibliographic display is derived from the WLN MARC record, but does not display or use all MARC fields. The local holdings record is created from the WLN holdings record, which contains the WSU call number and the name of the library branch holding the item.

Bib updates are changes to bibliographic and/or authority data in WLN bibliographic records to which WSU holdings already are attached, and which, therefore, are already in the catalog. The third date in the leader line of the WLN MARC record is updated each time any change is made, either by WSU, other WLN contributors, or through a tapeload from an external source. If that date falls within the two-week period of the tape, on a record on which WSU holdings already exist, that record will be included on the tape. A bib update replaces the bibliographic record in the online catalog with the current version of the WLN record.

Each tapeload generates the following reports, which are important to maintenance efforts:

1. A list of RIDs for all bib adds and bib updates. These are kept for future reference in case questions arise about whether a specific record, or updates for a specific record, were received from WLN. From time to time there is a glitch in the tape-generating routine at WLN, with the result that some bib adds and updates are missing from the MARC tape. In these cases, the lists of adds and updates provide evidence about which records actually were on the tape, and are a useful starting point in the search for a solution as to why the missing records were not on the tape.

2. A "Location Errors" report. WSU holdings statements are entered in WLN with the call number and the name of the branch library where the item is located (e.g., SB123.F5@Science). When the record is loaded into the local system, the location is checked against a table of location designators. If it does not match one of those locations exactly, the RID and the WLN holdings statements are printed onto a report, so that the problem can be corrected.

3. A list of MARC tags that are new to the online catalog. These tags are examined and decisions are made about whether that data should be displayed, indexed, or suppressed.

4. A report on records that had a bibliographic level change in WLN. Most common are changes from monographic to serial cataloging. These require consultation and coordination with the Cataloging Section.

5. Lists of records lacking certain specified MARC tags. For example, it is required that all records in the online catalog for newspapers have a 752 field (Hierarchical Place Name Access). The tape loading program checks all records that are coded "n" for newspaper in the fixed field for Type of Serial; any that lack the 752 field are printed out on a report.

6. A report on record replacements in WLN. If the 035 field (System Control Number) contains both subfields "a" (valid system control number) and "z" (invalid system control number), the tape loading program prints out both numbers and indicates whether the now invalid number already exists in the local catalog. If it does, a record replacement must take place. The local holdings records are automatically relinked from the old bibliographic record to the new one. However, both bibliographic records are left in the local catalog for human review. If it is determined that replacement is appropriate, a DBM staff member deletes the old, invalid bib record from the online catalog; if if is not appropriate, which happens on rare occasions, WLN is notified and the old record is re-input.

These reports help identify and correct some errors, keep other errors from happening, and solve problems. Other reports that are generated from the system for maintenance purposes, either on a regular

basis or on demand, will be discussed later.

Currently, the only way for library staff or patrons to notify DBM of errors identified in the catalog is to write them down and send them through the mail, which requires a special effort on their part. A better way to handle reporting of such problems, which has been implemented in other libraries, is by way of an "OOPS" command, which permits the staff member or user to send notification of errors through the computer, without interrupting their search.[10] These error messages could either be stored in a working file to which DBM would have access, or printed out as a regular report for DBM.

WSU Bibliographic Maintenance

From the very beginning, the philosophy of database maintenance at WSU has been to have as much work as possible done either automatically by the computer, or else cooperatively, through WLN. With this philosophy in mind, the catalog was designed and implemented without any local input or edit capabilities for bibliographic records. All new bibliographic records and updates are received from WLN. Any time a change is needed in a bibliographic record, whether to correct a typo, add a volume, trace a series, or add a note, it is done at the network level, through WLN. That is, the record is called into a WSU working file within WLN, where the change is made and sent to the WLN working file for review and verification by WLN staff, and then the changed record becomes the official WLN master record. Then, because WSU holdings already are attached to that record in WLN, the changed record will come on the next MARC tape from WLN as a bib update, and the record in the local catalog will be updated to reflect the current form of the record in WLN. Thus, at any given time, each bibliographic record in the WSU catalog should match the same record in WLN.

The main benefit of this arrangement is that any time a record gets corrected, upgraded, or replaced in WLN, by WSU, or by anyone else, it also gets corrected, upgraded, or replaced in the local catalog. In other words, not all maintenance of the WSU catalog is done locally and, at the same time, WSU contributes to the maintenance of both the WLN database and the online catalogs of other WLN members who receive bib updates from WLN MARC tapes.

If edit capabilities for bibliographic records were added to the local system, and if it were decided to make certain changes and upgrades in-house rather than through WLN, then WSU records would not match the WLN records. This would mean that bib updates from WLN could not be received by WSU in the same way as they are now, since a change made to a bibliographic record locally, without a corresponding change to that record in WLN, could be eliminated if some other library made a different change to that record in WLN that caused it to come on the WSU tape as a bib update and replace the change made locally in the WSU catalog.

Alternative procedures could be implemented to make it possible for some or all bibliographic maintenance to be done locally, but these are of questionable value since they would drastically increase the amount of work that must be undertaken locally. Some changes and updates could be done locally, and bib updates could continue to be received from WLN, if a tape loading routine could be programmed to dump the bib updates into a review file so that checks for inconsistencies could be made, and updates made only in the local catalog could be "merged" with the WLN updates. At first glance, this seems like a reasonable option. Making changes locally could be faster, since the delay before the change goes through WLN review (several days), and then before the next tape is loaded (several weeks), would be eliminated. However, given the average number of 5,400 bib updates received every two weeks, the review file would quickly develop into a unmanageable monstrosity, and the bib updates from the tapes would enter the system more slowly than is currently the case.

Alternatively, all bibliographic maintenance could be done locally, with no bib updates from WLN. This would allow for more local control over what happens to the records in the local catalog, would have the potential for more timely correction and update of records, would allow for

divergence from national standards if they conflict with local needs, and would eliminate the worry about local changes being wiped out by other network updates. Once again, this initially looks like an appealing option. However, setting aside for now the questions of whether national standards ought to be followed in local catalogs and how national standards can be merged with local practices and needs, this option still has many unappealing features. Not only would all maintenance have to be done locally, including updating of all bibliographic records that contain outdated or incorrect authority headings, but the benefit of maintenance work done by others would be lost.

Consider the figures: of the approximately 5,400 bib updates loaded into the WSU catalog every two weeks, at most some seven hundred are the direct result of changes made by WSU to bibliographic or authority records in WLN. The rest are the result of bibliographic and authority updates done by others, correcting problems and errors that had not been detected at WSU yet. The origin of the bib updates on an average tape is as follows: 50 percent from LC or other national sources; 37 percent from WLN or other WLN participants; and 13 percent from changes made by WSU.

An examination of bib updates from one tape revealed that 71 percent were updates to authority information, 20 percent were updates to descriptive information, and 9 percent were updates to a combination of authority and descriptive information. The most common authority updates resulted from a WLN participant or WLN staff correcting or upgrading a record in the WLN authority file, thereby globally changing all bibliographic records containing those authority headings. The most common descriptive updates included the addition of volumes to cataloging for multi-volume sets, and addition or correction of notes.

Approximately 4 percent of the updates actually "downgraded" the cataloging records in some way. Most of these were records that had been in WLN with up-to-date, *AACR2* authority headings, and then an update was loaded into WLN from LC with an outdated form of the heading, replacing the *AACR2* form. However, in the majority of these cases, when the WLN records were checked approximately one month after the tapeload, the outdated headings had already been corrected, almost always by WLN staff. This is possible because the WLN authority staff receives, on a regular basis, reports of all new headings in the WLN authority file, which they use for correcting problems and merging duplicates. The fact that approximately 216 out of every 5,400 bib updates loaded into the WSU catalog are inappropriate and unwanted is one of the disadvantages of the maintenance procedures followed at WSU; however, when considered in the context of the remaining 5,200 or so updates that enhance both the quality of the records in the local catalog and accessibility to those records, most of which are the result of work performed by other libraries, those 216 unwanted updates are acceptable.

As mentioned before, there can be a conflict between national cataloging standards and local practices and needs. If networks are to be used for sharing cataloging data and catalog maintenance, all network participants must follow the same standards. However, there are times when most institutions find it necessary to include information in local catalogs that does not follow national standards. WLN provides an option for adding institution-dependent, or local, fields to the WLN master record. Following the normal change procedures, a WLN participant adds a local note or local access point to a WLN record, and the change is reviewed by WLN staff and attached to the WLN record. The difference in this type of change is that only the institution inputting the local data would see those fields in the WLN database, and only that institution would receive that data on a MARC tape from WLN.

For instance, the WSU Archives has a large collection of items from Virginia Woolf's library, many of them inscribed either by Woolf or by other notable figures. Following national cataloging standards, this information cannot be added to the shared cataloging data, but it is important to the archivists. Therefore, WSU adds a lo-

cal note to the WLN record (e.g., WSU copy signed by Virginia Woolf). Because this goes through the WLN change protocol, if WSU holdings are already attached, the record will come on WSU's next WLN tape as a bib update. Some WLN participants also have a need to add nonstandard subject headings to their records, and although they cannot add them to the shared cataloging information that all WLN participants use, they can add them as institution-dependent headings, for their own use.

Institution-dependent data stay with the WLN record, no matter what other changes or updates are made to it. This flexibility allows WLN participants to take advantage of shared bibliographic maintenance work, follow national standards, and still meet the special needs of their local institutions.

WSU Authority Maintenance

As mentioned before, WSU does not currently have an authority system in its online catalog. Planning is underway to develop specifications for a local authority system, but in the meantime, WLN is utilized for authority control of the online catalog. This has been described in detail elsewhere.[11] Briefly, authority records in WLN are linked to the bibliographic records. This link makes global authority changes easy to perform. For example, if an LC subject term is changed, such as "Underdeveloped countries" to "Developing countries," WLN staff will update the affected headings in the authority file, and all bibliographic records linked to the authority records will automatically be changed. Then, each bibliographic record that was changed by the updated authority, and to which WSU has holdings attached, will be included on the next MARC tape received by WSU, as a bib update.

This means that, both in WLN and in the WSU catalog, all the bibliographic records using a given heading use the same current form of that heading. Thus, although the WSU online catalog lacks an authority file, there is a high degree of authority control over the bibliographic records in the catalog.

This has several implications for catalog maintenance. If a correction or update to an authority is needed, it is done through the WLN authority file, using the same procedures as for making a bibliographic change. Then all bibliographic records in the WSU catalog using the unauthorized heading will get updated with one simple change in WLN.

One feature of WSU's online catalog is the ability to browse subjects, authors, and series. The browse command pulls the authority information from the relevant indexed fields of the bibliographic records. The DBM section plans to browse each of the three types of headings from the beginning of the alphabet, looking for typos and duplicate or outdated forms. DBM staff will then determine the correct form and change the WLN authority records. This will not only clean up the WSU catalog, but also contribute to the ongoing efforts of the WLN staff and other WLN participants to keep the WLN authority file as correct and up-to-date as possible.

One way to automate some authority maintenance would be to install a spell-check feature for topical, and possibly geographic, subject headings. New records entering the database would have these subjects run through the spell-check, and problems would be printed out in a report.

All authority maintenance, be it shared or automated or both, should be bibliographic maintenance as well. In other words, correcting, merging, and updating of authorities should affect not only the authority records themselves, but also all bibliographic records that use those authorities. This eliminates the need to change the headings manually in each bibliographic record. As much of this work as possible should happen on a shared basis, at the network level.

WSU Holdings Maintenance

As mentioned before, a holdings record is automatically created for each bibliographic record that enters the database. At creation, the WSU holdings record includes the call number and branch library, or primary location (from the WLN holdings record), and the loan code (derived from the primary location). The remainder of the

detailed holdings information, including secondary locations, copy and volume information, barcode numbers, and so on, is keyed in by the DBM section, as appropriate to each item.

Having the call number and primary location entered automatically from the tape means that information only has to be typed once in WLN, thereby eliminating duplication of effort and its attendant errors and inconsistencies. The purpose of entering and maintaining summary holdings information in WLN is threefold: to trigger the records for inclusion on a tape, for interlibrary loan, and for technical services information needs. Summary holdings are relatively stable and require little maintenance.

The rest of the holdings information is entered in the local system because it is only useful locally, to indicate what is owned by WSU and exactly where it is located, and to link the circulation system to the online catalog. This detailed level of information changes frequently, so it is more logical and economically efficient to have it recorded only in the local catalog, and not at the network level.

If volumes or copies are added, or if books are transferred to a new secondary location, DBM updates the local holdings, but does not modify the WLN holdings records. A WLN holdings modification costs $.18, not for the actual transaction, but for the search of the holdings file necessary prior to a modification. Secondary location and copy/volume information are not recorded in the WLN holdings record, so the WLN holdings record does not need to be modified to add, change, or correct this type of detailed holdings data. This saves the time and expense of having to update WLN for information that is important only to WSU.

In addition to the automatic setup of the initial holdings record from the tape loading procedure, other aspects of holdings maintenance can be automated. For example, the WSU architecture library is currently housed in the science library, as a separate, intact collection. In the online catalog, these books have a primary location of Science, and a secondary location of Archt (for Architecture). Plans are being made for the architecture library to be moved to the building that houses the architecture department, at which point the online catalog must be updated to reflect this change. Rather than have the DBM staff manually change each record, a routine will be written whereby the system will automatically search for records with a secondary location of Archt, and move that to the primary location position.

DBM has requested a report, to be generated annually, that will compare the call number in the WSU catalog with the call number WSU has attached to the record in WLN, and print out all discrepancies. DBM staff will evaluate each problem, determine the correct call number, and fix the incorrect holdings, either in WLN or in the local catalog. This clean-up activity is necessary because the accuracy of the WLN holdings information is important for patrons who use WLN, for other libraries requesting interlibrary loans from WSU, and for the cataloging unit to be able to identify duplicates, added copies, and added volumes.

This call number comparison is also necessary because, unlike the bibliographic records, local holdings records have local input and edit capabilities, and holdings updates, unlike new holdings records, are not loaded from WLN. Therefore, even though at the time of creation of the holdings record in the local catalog the call number and primary location will be exactly the same as the call number and location entered in WLN, over time some inconsistencies can creep in. The reason holdings updates are not loaded from WLN tapes is, in part, due to the time lag involved in waiting for tapes. A change to a call number or location is important to a patron trying to physically locate a book.

The traditional function of holdings information is to make it possible to find a specific item by location and call number, and to know how many copies and volumes are in the library. The online holdings record fulfills this function, and also creates a link between the circulation system and the online catalog, via the barcode number, so that circulation information will display within the online catalog. It also creates an automatic shelflist. DBM staff enter a code for the type of call number in the holdings record, and then the call number sort routines in the sys-

tem make it possible to browse and access the catalog by call number.

The online holdings record can also link together two or more bibliographic records, in various ways. If two separately cataloged items are bound together, they will have only one barcode number, and this can be used to link them. In the holdings record for the first item, the barcode is entered in the normal field for barcode number; in the holdings for the second item, the same barcode number is entered in a special "bound with" field. The system then generates a note each time either of these records is displayed which tells that they are bound together, and if the volume is checked out, circulation information will appear on both records. Barcodes can be used in a similar manner to link a serial record to a monographic record for a single volume of that serial which has been analyzed.

Holdings information is library-specific, which means that maintenance of this information cannot be shared on the network level. Each library must decide how much information to provide at the network level, and how much detail is needed locally. For consistency, clarity, and ease of interlibrary loan, the holdings information in the network record must match that part of the holdings information in the local catalog.

NATIONAL IMPLICATIONS

As mentioned earlier, shared cataloging and shared authority work have well-established procedures and quality standards. The Library of Congress is the focal institution that oversees quality control of bibliographic and authority records. Although it may not be a national trend for institutions to share major bibliographic and authority maintenance work, it is worth investigating. For this sharing to be efficient and effective beyond the network level, such as WLN, the library community at large must implement the national standards for record transfers; develop and implement a plan for quality control of maintenance work performed; and come up with a fast and effective way to distribute updates of bibliographic and authority records back to subscribing institutions. This plan must minimize the amount of additional maintenance work to be done on the local level.

CONCLUSION

Of course, not all maintenance work can be shared or automated, and even that part of it which is shared or automated does not always yield the expected results. Sharing bibliographic and authority maintenance within a network can mean that mistakes made by LC or other network participants can creep into local online catalogs. In WLN, updates loaded from a MARC tape from a national source replace the existing version of that record, regardless of whether any WLN participant has made changes or upgrades to that record, with the result that changes made by WLN members often get "bumped," or replaced, when an LC update is loaded into WLN. To compensate for this problem, it is often necessary for WLN participants to communicate with LC regarding the more significant changes they make to LC records in WLN (that is, changes that affect access to the records), requesting that LC correct the records at their end. This ensures that the records are correct at their source, and that future updates to those records that WLN loads from LC will be correct. In order to get the most out of local maintenance efforts in this area, cost-effectiveness studies should be done to determine which types of changes are most likely to be bumped, and when.

Automated maintenance procedures depend on the effectiveness of the programs and routines written for them. Librarians today must understand computers and must be both realistic and creative in their expectations of what computers can do for them. It is also important to have programmers and systems analysts who understand libraries and library procedures, and can design effective systems for them.

If online catalog maintenance is well planned and coordinated, the information in local online catalogs will be more current and error-free than could ever have been achieved or hoped for in a card catalog. In addition, if librarians continue to explore and define new maintenance activities in which they can assist each other, or be assisted by the computer, online catalogs will become ever more reliable and up-to-date.

REFERENCES AND NOTES

1. Donald L. Foster, *Managing the Catalog Department* (Metuchen, N.J.: Scarecrow, 1975), p.14–21.
2. "Catalog Maintenance Online in ARL Libraries." ARL SPEC Kit 119:72 (Nov.–Dec. 1985); and Sharon E. Clark and Winnie Chan, "Maintenance of an Online Catalog," *Information Technology and Libraries* 4, no.4:324–38 (Dec. 1985).
3. "Catalog Maintenance Online in ARL Libraries," ARL SPEC Kit 119:38 (Nov.–Dec. 1985).
4. Charge to the Bibliographic Standards Committee, from the Bibliographic Standards Committee Organization document approved by the WLN Computer Services Council, Aug. 11, 1984.
5. Greg Anderson, "Automating Tradition: Use of the Library of Congress MARC Tape Subscriptions for Local Maintenance of Cataloging Data," *Proceedings of the 5th National Conference of the Association of College and Research Libraries* (Chicago: ACRL, 1989), p.113–15.
6. WLN Technical Bulletins 151 (1987), "Guidelines for Changing Monographic Records"; 340 (1984), "Guidelines for Upgrading Data Base Records with an Encoding Level of R"; 275 (1985), "Guidelines for Changing Serial Records"; and 354 (1985), "Guidelines for Changing Authority Records."
7. Martha J. Hanscom, Carol J. White, and Carol C. Davis, "The OCLC Enhance Program: Some Practical Considerations," *Technical Services Quarterly* 4, no.2:24–28 (Winter 1986), p.28.
8. WLN Technical Bulletin 368 (1985), "Review of Bibliographic Records Added through Magnetic Tapes."
9. David Griffin, "Members Pull Together with Staff," *WLN Participant* 8, no.6:1–8 (Sept. 1989), p.6.
10. Suzanne Striedlieck, "Online Catalog Maintenance: The OOPS Command in LIAS," *Cataloging and Classification Quarterly* 6, no.1:21–32 (Fall 1985).
11. Fumiko Coyne and Ingrid Mifflin, "Shared Authority Control and Maintenance of the Bibliographic Database at WLN," *Library Resources & Technical Services* 34, no.4: 493–503 (Oct. 1990). ■■

ALEPH: Israel's Research Library Network: Background, Evolution, and Implications for Networking in a Small Country

Susan S. Lazinger

ALEPH, Israel's research library network, is described and analyzed with regard to the strengths and weaknesses of its highly decentralized structure. Part one discusses the history, structure, and format of ALEPH. The centralized versus the decentralized network is defined and discussed, and comparisons are made between RLIN and ALEPH. The evolution of the ALPEH network structure, along with the economic, technological, and administrative considerations that determined it, is discussed. Part two describes the format of ALEPH and its handling of non-Roman scripts, again with comparisons to the American approach, as exemplified by RLIN. Finally, implications with regard to the general applicability of ALEPH's decentralized, pragmatic approach to networking for small, resource-limited countries are presented.

PART 1: HISTORY, STRUCTURE, FORMAT

BEGINNINGS AND EVOLUTION OF NETWORKING IN ISRAEL

There are eight accredited universities in Israel. One of them is the Open University, which relies primarily on the collections of the other universities. Among the seven remaining universities the Hebrew University has a special historical role. It has, and always has had, the largest share of the budget for higher education in Israel and, consequently, the most political influence. In addition, until the summer of 1981, when the Social Sciences and Humanities split off from the central library of the University on the Givat Ram campus to a new location across town on the Mount Scopus campus, the central library of Hebrew University was also the Jewish National and University Library (JNUL). The JNUL no longer houses either the Sciences and Humanities collections or the Natural Sciences collections, which also moved in the early 1980s to a separate library on the Givat Ram campus. However, the JNUL is still owned by Hebrew University, is still the largest library in the country, and still fulfills certain national roles such as serving as the legal depository for all books published in Israel and collecting Judaica and Hebraica as well as rare books and manuscripts. While the JNUL receives national endowments for archival and manuscript collections, it is run by Hebrew University alone, with no national or public body to state its policy or define its national functions. Other university libraries, such as the Technion in Haifa —which has the major science and engineering collection in Israel—have collections of national

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importance, but no official national role.

In order to put the pattern of networking development in Israel into perspective, there are several circumstances peculiar to its situation that are worth noting. First, it bears mentioning that the entire acquisition budget of all Israel's university libraries is roughly equal to that of one major American university, a situation that came into being about 1968 and has not changed since.[1] Another peculiar Israeli circumstance is that, because of historical and cultural attitudes, university libraries have always had public library roles, along with roles in scientific research and industry. Thus they are, in general, the major information reservoir of the country. Although Israelis have always expected access to any library in Israel for any scholarly pursuit, historically the initiative for cooperation among the libraries has usually come from outside the library community. An early example of this phenomenon was the initiation during the 1950s of a union list of serials by the Israeli committee for UNESCO. Another was the cooperative project initiated by the Ministry of Finance in 1969 from which emerged a relatively active interlibrary loan service. In spite of the fact that Israel's university libraries are now linked in an automated bibliographic network, this ILL system is still intact and still handled manually, more or less as it was in 1969, although searches are conducted in the automated files whenever possible.

The first attempt at cooperative library automation in Israel came in the early 1970s when the JNUL received a grant from the government for the development of an automated cataloging system. After an investment of some half a million dollars, this project was declared nonviable and discontinued. The first successful attempt at automation and networking came, once again, from outside the library community. Aiming at developing a national cataloging center, the information division at one of Israel's defense establishments created MARCIS (MARC-ISrael), the Israeli version of MARC. The research stage of the MARCIS project was also partially funded (about 15 percent) by the Ben Gurion University of the Negev, in Beer Sheba, and when the project became operative in 1974, it provided services to the Ben Gurion University, and later to the University of Haifa and to Bar Ilan University in Ramat Gan.

MARCIS was an automated cataloging service based on the MARC database and the first significant Israeli attempt at networking in the modern sense. Although it was a batch system (at that time the only possible approach in Israel because of communication problems), MARCIS provided records for up to 75 percent of all new acquisitions in English, according to the findings of the University of Haifa. It also allowed for considerable flexibility and adjustment to specific needs of different libraries. Why it was discontinued is not entirely clear, although Israel's need for a bilingual system must certainly be one of the reasons. Shmuel Sever, director of the Library of the University of Haifa, and one of the first in the Israeli library profession to document Israel's networking development, claims with some bitterness that while official reasons presented for the nonparticipation of the four most veteran and prestigious universities in the project were the higher expense if compared with manual cataloging and a too-limited budget for this purpose, the real reason was "the reluctance of some of the library directors to take responsibility for the required changes."[2]

Whatever the reasons, the project ran for several years and then began to falter. Funding became increasingly difficult to obtain, since the failure of four of the country's universities to use the service threw the brunt of the expenses on the defense establishment, which housed the project without really needing it. Even if all Israel's academic and special libraries had agreed to use its services, MARCIS could not have been economically viable, but it could have then requested funding from the authorities as a project of national importance. Without the support of the four major universities, however, the defense establishment came to the decision to discontinue the project. It agreed, however, to postpone its termination until the end of 1980, when the University of Haifa promised to take the project over for its own use.

The next instance of direct support to libraries and encouragement of networking,

following the first abortive government attempt to foster cooperation, came with the establishment of the Library Subcommittee of the Grants Committee in 1976. The Grants Committee was established in 1975 on the pattern of the British Grants Committee in order to distribute equally government financing of universities. One of the major issues that the Library Subcommittee undertook to tackle was the establishment of a nationwide university library network based on a bibliographic center. To this end a working group representing four universities was formed in order to set up some preliminary guidelines for establishing a National Bibliographic Center. The working group reaffirmed the advisability of establishing such a center and concluded its recommendations by advocating the immediate preparation of an inclusive, detailed proposal by a person or agency outside and independent of the universities as a first stage in the establishment of a National Bibliographic Center.

Acting on the subcommittee's recommendations, the Grants Committee invited competitive bids for the preparation of a study and proposal for the establishment of a National Bibliographic Center for Israel. However, in spite of the subcommittee's recommendation that a foreign specialist be invited, the Grants Committee opted for the lowest bid and commissioned IBM Israel to prepare the proposal. The resulting study from IBM Israel proposed a highly centralized center that would utilize IBM's DOBIS software package. This software was developed by IBM in Europe and adapted for local needs by the National Library of Canada.[3]

Reactions to the IBM proposal in the Israeli library community were mixed. Guided by the criticisms of a significant proportion of the library profession in Israel, the chairman of the Library Subcommittee decided to send the IBM proposal to a panel of specialists abroad, who recommended its rejection. The experts held that the defects in the proposal were: (1) a computer firm made the study rather than a library computer expert; (2) little evidence of basic research into the present situation, the comparative costs of manual and automated systems, or the needs of the universities and requirements of the librarians was demonstrated. Furthermore, the proposal failed to specify that the staff of the center, while having parity with the librarians, must clearly understand that they are giving a service for the libraries in accordance with the librarians' collective views and were not in a position to dictate to the members.[4] In light of the experts' opinions, the Subcommittee on Libraries rejected the IBM proposal in June 1981, and Israeli libraries went back to the drawing board in their efforts to implement a network.

In the meantime, for economic reasons the Hebrew University had decided to merge twenty-three separate departmental libraries into a single humanities and social science library, to be located on the Mount Scopus campus. The target date for the move was to be 1980 (it was actually implemented in November 1981). This project involved unifying 220,000 bibliographic records on 400,000 volumes from twenty-three libraries with separate catalogs and different systems for subject access and shelving. The University soon realized that this enormous task could only be accomplished with an automated system and set about investigating the market for a ready-made package.

Up to this time several computerized systems for special tasks had been developed in other Israeli libraries. The most significant of these was the Haifa University system, which was used both in cataloging and circulation (an absence system, i.e., recording titles only of books that were circulating and deleting them when the titles returned), and which produced catalog cards and magnetic tapes for three other university libraries. The Technion used Haifa University computer services via telecommunications to build a machine-readable database of new and retrospective records, as well.

For its part, Hebrew University was looking for a more comprehensive solution and decided to develop an in-house system. The primary reason for this was that no existing package solved the problem of the dual character sets required for Israel, the language of which, Hebrew, has its own alphabet of twenty-seven characters written from right to left. Thus, the Administrative

Services Department of the Hebrew University was commissioned to adapt concepts of DOBIS, the German-designed system that IBM/Israel had earlier presented to Israeli libraries, to the dedicated mainframe CDC computer in use at Hebrew University. The library expertise was provided by a team of librarians, including the librarian who had worked on the JNUL's automation project which was discontinued in 1974. The system that resulted, called ALEPH (*A*utomated *L*ibrary *E*xpandable *P*rogram *H*ebrew University of Jerusalem), was an online, real-time library management system. It provided cataloging, creation and maintenance of authority files, circulation, and an online public access catalog with sophisticated search functions. ALEPH was originally intended to operate on the main university computer. When a pilot project was initiated in 1980, however, it became clear that a large, dedicated computer would be necessary even for a single library's use, and ALEPH was, from its inception, intended to be able to support a network of libraries with a shared catalog or separate catalogs.

ALEPH's first trial came during the academic year 1980–81 in the Kaplan Library of Social Sciences, the largest of the Hebrew University's departmental libraries (100,000 volumes). Three public access terminals were placed near the catalog, and the students began using the online system. In the summer of 1981 the twenty-three libraries moved to the new location and the new library opened the academic year 1981–82 with sixteen public access terminals. The catalogs of the twenty-three libraries had been converted to machine-readable form and the books had been assigned new shelf locations in the new library, making all the card catalogs of all the separate libraries obsolete. The new Humanities and Social Sciences Library thus opened without a card catalog, using only the new online ALEPH catalog and author/title printouts as backups.

Shortly after the unification of the social sciences and humanities into one library, the Hebrew University administration also decided to merge its departmental science libraries into one library, on the Givat Ram campus (where the JNUL is located). Some 70,000 titles were converted to machine-readable records, and like the new Humanities and Social Sciences Library before it, the new Science Library opened with an online ALEPH catalog only. In the meantime, the JNUL also decided to join the growing network. From January 1984 it began inputting its current cataloging into the automated system, while continuing to catalog manually (the manual and automated systems ran parallel for two years before the manual catalog was closed). Concurrently, the 70,000 titles of the Union List of Serials in Israeli Libraries began conversion to the ALEPH system, and the network was under way. The concept of a national bibliographic center was abandoned as too expensive and too problematic with regard to who, exactly, was qualified to dictate standards.

ALEPH itself was and remains under the ownership of the Hebrew University via a company called ALEPH-YISSUM (the full name is ALEPH-YISSUM Research Development Company of the Hebrew University of Jerusalem), which is wholly owned by the Hebrew University. In line with its recognition of ALEPH as the basis for the interuniversity network, the University Grants Committee set up the ALEPH Steering Committee to oversee the development of ALEPH and to recommend special grants for maintenance and development of the system. The committee is made up of directors of several university libraries and heads of university computer centers, and includes representatives of other libraries who attend meetings as observers. Detailed requests with regard to specific ALEPH modules are handled through a Software Subcommittee of the Standing Committee of the National and University Libraries (SCONUL). Questions regarding the cataloging or serials modules are usually routed first through the SCONUL Cataloging or Serials Subcommittees.[5]

In late 1982 and early 1983 several significant developments occurred with regard to the network situation in Israel. First, the Grants Committee decided to subsidize university libraries' participation in ALEPH, following a recommendation from SCONUL. Second, the Administrative Services Department of the Hebrew

University announced its decision to reprogram ALEPH on a VAX minicomputer. This would allow for the possibility of a distributed network in place of the centralized configuration on the dedicated mainframe CDC computer based at the Hebrew University. Finally, it was decided to maintain a separate file for each library of the Hebrew University that joined ALEPH, including the JNUL, with authority decisions left to the individual libraries. This last decision permanently determined that Israel's bibliographic research network would be a highly decentralized one, which would in turn determine both the primary weakness and the most attractive strength of ALEPH. On one hand, all possibility for a national union (monograph) database, unified and controlled, was lost forever. On the other hand, ALEPH's impressive flexibility, enabling each participating library an autonomy of design and degree of control not available in any other bibliographic utility, was inculcated as a dominant principle for all time.

THE STRUCTURE OF ALEPH

The Centralized vs. the Decentralized Network: Issues and Considerations

Definitions of a centralized versus a decentralized network abound both in articles and dictionaries of information technology. The following definitions, from the Network Development Office's 1978 *A Glossary for Library Networking* are, in this author's opinion, still among the most elegant and inclusive:

centralized (computer) network: a computer network configuration in which one computer or a group of centrally located computers provides computing power and maintains control of application level programs and telecommunications.[6]

decentralized (computer) network: a computer network configuration in which computing power and/or control functions are shared among several network nodes.[7]

The key words in these definitions are "application level programs" and "control functions," the primary determining elements in the most essential difference between the structures of a research library network like RLIN and the structure of ALEPH. While RLIN application-level programs and control functions are all controlled at the center—at RLG—in ALEPH they are determined and controlled, to an unusually large extent for a nationwide network, by the individual participants in the network.

The centralization/decentralization issue, with regard to bibliographic networks, has been exhaustively discussed in the literature. JoAn Segal, writing on the growing trend toward network decentralization, notes that there are several ways to create a decentralized network: (1) by distributing the database, (2) by distributing the processing, (3) by distributing the telecommunications network, and (4) by decentralizing the governance.[8] With regard to structure, the most important of these decentralizing features is the first, distributing the database, although in ALEPH, all four ways of decentralizing come into play. For example, while the general management of the network is centralized, there is so much flexibility allowed in the format and authority control of each library's file, that for all intents and purposes, the governance, in the sense that it determines the standards, is also decentralized. Computer networks may also be centralized in some aspects and decentralized in others, as in a network with a centralized database and decentralized processing of housekeeping functions such as circulation and acquisitions. This situation is in fact becoming more and more common among the major bibliographic utilities in North America.

It is not the "how" of decentralization, however, but rather the "why" that has occupied a central place in the networking literature of the late eighties. Segal summarizes the forces driving toward centralization as:

1. the desire to build large databases to provide "global" electronic catalogs;
2. the perceived need for national or international holdings data for interlibrary loan purposes;
3. the need to impose and maintain standards;
4. the availability of inexpensive telecommunications and advanced technology;
5. the proliferation of machine-readable records; and

6. the reduction in costs resulting from a reduction in duplicate cataloging efforts.[9]

At the same time, there are considerable forces pulling away from centralization and even against cooperation among libraries:

1. the fear of loss of autonomy and control;
2. increases in telecommunication costs;
3. technological advances in distributed processing (powerful mini- and microcomputers); and
4. increasing costs of acquiring and supporting network services.[10]

As early as 1983, DeGennaro saw these opposing forces as responsible for the existence of two parallel and sometimes conflicting developmental lines in library automation. The first line focused on local systems, while the other focused on network systems. He predicted that in the 1980s these two lines of development would merge, with the local systems acquiring the capability to link to one another and the bibliographic utilities in order to share cataloging and ILL.[11] His prediction matches rather closely a description of the structural development of ALEPH.

The Decentralized Database

In initiating networking in a small country, there are three basic approaches: (1) to adopt technologies developed elsewhere, making only minor changes to adapt to local conditions; (2) to develop a local system based on foreign technologies but with local implementation; or (3) to create a system for the small country specifically tailored to its information needs and technological resources. An example of the first alternative would be linking up with an American network. While this might have been theoretically possible for Israel, in practice, because of the need for satellite communications and local telephone expenses, it would have been economically unfeasible.

An example of the second approach would have been to develop a MARC-based system, with an "electronic union database," on the model of RLIN, but with adaptations to allow for local cataloging peculiarities. There are two major problems with this approach. A network based on the principle of RLIN, for instance, is expensive even for the largest U.S. research libraries. It requires a large, centralized infrastructure to monitor fees, authority control, and a host of other details. It requires a large telecommunications overhead in a country in which telecommunications are, and probably always will be, both more expensive and less dependable than in the United States. Finally, it imposes the use of the MARC format on a country in which a very large proportion of the library materials are not only not in English, but also in another character set. By the time of this writing, the character set and MARC tags for Hebrew exist in RLIN, although even today, Hebrew vernacular fields are parallel, nonrequired fields in the American system. But in the early 1980s, when Israel was developing its nationwide research bibliographic network, even partial Hebrew cataloging in a MARC-based system was unavailable.

Having disposed of the first two approaches to initiating networking in Israel as being fraught with insuperable problems, we are left with the third approach: to develop a local system, more or less from scratch. As Shmuel Sever points out, "Here, too, there are some dangers. Foremost, there is a tendency to 'reinvent the wheel,' i.e., to struggle with local cataloging of foreign material, without benefitting from the experience of larger networks and from their past mistakes."[12] In developing a national system, delay and increased costs are likely to result from re-solving problems already solved elsewhere. Additionally, bibliographic output already in existence in other networks is ignored, resulting in costly duplication.

These problems notwithstanding, it was decided to develop a local system—ALEPH—to build and maintain the Israeli national catalog. The details of the original plan and how it evolved into something quite different (one of the many instances of serendipity in ALEPH's development) explain the structure of ALEPH in its present form.

As mentioned above, the original plan was to build and maintain the national catalog on a central CDC computer located at the Hebrew University of Jerusalem. This

was to be the hub of a centralized network, tying in the nation's research libraries via ISRANET, the Israeli version of Telenet. According to this plan, not only would the libraries connect their terminals by telecommunication, but also local library functions would be handled on this same central computer. Prospective libraries were encouraged to use the Hebrew University database as their own, adding their holdings to Hebrew University records and adding new records as needed. Although it was technically possible for libraries to maintain independent data and authority files, it was discouraged. Government financial support was promised to libraries adopting the system, with an ultimate goal of creating a single national database that would serve as a national union catalog, as well as provide housekeeping services.

By 1983, it became apparent that this situation was proving impractical. First, there were too many professional, technical, and administrative problems in handling local library functions on a remote computer using a common database. As Elhanan Adler, one of Israel's leading figures in library automation, notes: "A network is only as good as the physical link between its units and, unfortunately, the Israeli telecommunications infrastructure is still woefully inadequate."[13] Furthermore, the various libraries of Hebrew University itself were unable to reach agreement on forms of bibliographic and subject access as well as responsibility for authority and quality control.

The system was completely rewritten for VAX computers—the full VAX 700 supermini series—to operate under the standard VMS operating system and standard file organization. The VAX was chosen because of its widespread use, its machine and operating system reliability, its range of size and capabilities, and its performance for the ALEPH application.[14] In addition, the VAX computers have the advantage of being within the financial capabilities of individual libraries, an important consideration for a small country with limited resources.

Sever, discussing the decision to distribute the processing within ALEPH, points out several advantages of distributed processing for small countries in general: (1) it allows testing in realistic conditions of the various components of the program without disrupting the information flow existing before experimentation with networking; (2) it allows development of the efficiency of the program without undue strain on the system by a gradual, voluntary hookup of the participants, while incorporating feedback from the partners in the network who often have difficulty defining their goals, needs, and specifications; and (3) it assures that this feedback from the partners will become part of the list of specifications without which no independent program can be created.[15] Thus, technically it is feasible to connect more than one VAX computer to the same database in order to widen gradually the scope of computerization in large or decentralized institutions, while from the point of view of the user, the combined machines work as one computer. From the administrative point of view, distributing the processing allows large institutions to spread the cost over several years.[16]

By 1984, for all of the reasons discussed above, it was decided to distribute the processing and decentralize the database, allowing each library to maintain its own bibliographic data and authority files. The unified master file was broken up into individual library files. The new and final structure of ALEPH permitted users at any library to access the catalog of another library, but eliminated the possibility of a networkwide search with a single command. The Government Planning and Grants Committee for Higher Education Institutions reconsidered its previous decision and decided to support the creation of a national decentralized catalog, to be carried out through coordinated computerization in Israel's university libraries. Financial support was to be given to participating universities under two conditions: (1) university libraries were to implement only one software program—the ALEPH integrated system—on uniform equipment in order to ensure maximum coordination, and (2) the software was to be developed and maintained centrally, by ALEPH Yissum.[17] In return they would be able to acquire the ALEPH software at a reduced

price as one package deal for all the university libraries in Israel.

Special funds were to be allocated to university libraries on a matching basis for purchasing equipment, with a planned link between the libraries' computers via special telecommunications lines. This link, to be used for cataloging, searching, and copying catalog records, was to be the basis of the national catalog. The fact that each library's database would be stored in a local VAX computer on its own campus eliminated, if not the need for telecommunications, then at least the need for long-distance telecommunications to a remote computer when working with its own file or other files on its own campus. Cataloging rules were to be coordinated between the university libraries. The national serials catalog, which was already computerized, was to remain a union database and combined in this project together with the book catalog. There was also to be access to a database of MARC records for downloading, although the cataloging was to be non-MARC, with mnemonic field code names (a program was written to convert the MARC field codes to the mnemonic ALEPH codes during the downloading process).

Thus, the decision was made to lend national support to a network of local systems, which would free housekeeping operations from dependence on long-distance telecommunications. Because each library maintained separate bibliographic and authority files, a great deal of flexibility of format was permitted. The price of this flexibility was that the union catalog function was lost forever.

A partial solution to this problem would be a "quick and dirty" national union catalog of monographs. The idea currently under consideration is to take all ALEPH catalogs and merge them into one catalog accessible by main entry and title only. A recent attempt to implement this idea, however, showed that, because of the decentralized authority control in ALEPH, a program matching identical main entry and title fields (essentially a clustering program, similar to RLIN's) produced so many duplicate entries that the project was temporarily abandoned. The union catalog simply grew to unwieldy proportions too quickly. The union list of monographs has not been permanently abandoned, however, and plans are underway to implement a revised check-match program, designed to allow more flexibility in clustering near-matches, as soon as funding and new computing equipment are available (hopefully, in 1991).

At the beginning of 1990, Israel's nationwide research library network included twenty-six separate files. These comprise all the current cataloging of all the university libraries, with retrospective conversion continuing among the libraries, as mentioned above, at a rate of over 100,000 records a year. At this point Haifa University, the Social Science/Humanities and Science libraries of the Hebrew University, and several of its small departmental libraries, have completed full conversion. At present, there is also one public library accessible through the network, the Tel-Aviv Central Public Library, Beit Ariella-Sha'ar Tsion.

In addition to cataloging data, the ALEPH network includes several other "libraries" of Judaica bibliographic data: the *Israel Union List of Serials*, the *Index to Hebrew Periodicals*, and the *Eretz Israel Data Base*, as well as the database of the Hebrew University's Institute for Contemporary Jewry. Current cataloging of the Jewish National and University Library's (JNUL) Sound Archives, Department of Manuscripts and Archives, and the Institute of Microfilmed Hebrew Manuscripts is also being entered into ALEPH, along with data of the *Index of Articles on Jewish Studies* [RAMBI]. These files are not yet accessible through the network, however.

In order to understand the composition of the twenty-six files themselves, some explanation of the peculiar Israeli situation, with regard to physical centralization/decentralization versus logical centralization/decentralization is necessary. As a result of the considerable autonomy granted to each university with regard to format, authority control, and administration of its conversion program, each university decided whether to develop a single database for all its departmental libraries or to allow each individual library to create and administer its own file. To further complicate matters,

the idiosyncratic result was that the centralization or decentralization of the database within each university is altogether unrelated to the physical centralization or decentralization of its libraries. For example, while the Technion is physically decentralized, with a series of departmental libraries functioning independently of the central library, a decision was made there to centralize the Technion's database. Thus, all cataloging and even holdings updates are done centrally at the Technion, and the terminals in the departmental libraries do not even permit a cataloging function. At the Hebrew University, which also has two central libraries (Science and Humanities/Social Sciences) as well as the JNUL and a number of departmental libraries, each physically separate library maintains a separate file, with full autonomy over authority, cataloging, and format decisions. Naturally, this somewhat complicates a nationwide search in ALEPH.

THE FORMAT OF ALEPH

ALEPH, and consequently Israeli university libraries, opted for a non–MARC solution to Hebrew cataloging problems rather than to design a local MARC format. In addition, ALEPH adopted a relatively simple local solution to cataloging in a Hebrew character set (originally, by substituting the Hebrew character set for lowercase Roman letters). Thus, where format was concerned, as in other critical decisions—such as decentralizing the database and the authority control—a conscious decision was made in Israel to sacrifice conformity to international standards to national priorities, which were to find a quick and easily implemented solution to automating Israel's multiscript university catalogs, and then to implement it.

It was clear both at the outset and in retrospect that trying to solve the problems of Hebrew cataloging within the MARC format would have set the automation of Israeli's university libraries back a number of years and required long-term participation in international committees, which Israel could ill afford either financially or practically. There is no question that these goals, as stated, have been carried out. However, it is clear to all involved that the cost to Israel with regard to international exchange of data, as Elhanan Adler regretfully states, was high: "There is no question that ultimately the Israeli library community will wish to align itself with international bibliographic standards. . . . In view of the difficult financial situation in Israel in general (and particularly in Israeli universities), it is highly doubtful whether this worthy goal will be achieved in the near future."[18]

Nonetheless, in spite of the decision to implement a non–MARC format, ALEPH is able to convert MARC format records to ALEPH structure. Furthermore, today full MARC tagging can be used in ALEPH (although Israeli libraries have opted not to use it), and the Hebrew character set can be held separately, in addition to a full Roman character set (see the next section, on non-Roman scripts). The system makes available, as one of the network files, a large database of MARC records that can be downloaded into a library's file with its codes automatically converted to ALEPH field codes. The system is parametric, allowing the user to determine the fields, their codes, how they are displayed and edited. The system provides a default format option that the user library can adopt in toto or in part, adding, subtracting, and altering fields according to its own local needs. Determining the parameters is a user task, requiring no programming. The user library defines the descriptive information required in the library's cataloging records, determining the tag and name for each field and the order in which the fields will appear in the display format (again, there is a default option for libraries that want a standard format). Most important for flexibility, the user library determines how the system handles the field, e.g., whether the field opens an authority record and, if so, in which file (i.e., whether all authority records are to be held in one dictionary file or whether there are to be separate files for authors, titles, subjects, series, etc.). The library also determines whether the field is an information field for display only or an index field and, if so, which index.

Nevertheless, while ALEPH in theory allows almost infinite flexibility in defining fields, in practice Israeli libraries have

agreed upon a standard set of field codes in order to facilitate exchanging cataloging data among them and searching in different, separate catalogs. A cataloging record of an Israeli university library using LC classification and subject headings (not all university libraries use LC classification: Tel Aviv University, for example, uses DDC classification and LC subject headings) would contain most of the following fields:

MAIN ENTRY
UNIFORM TITLE
TITLE, PARALLEL TITLE, SUBTITLE, AUTHOR STATEMENT
EDITION STATEMENT
PLACE
PUBLISHER
DATE
COLLATION
SERIES TRACED
SERIES UNTRACED
NOTE
ADDED ENTRY
ADDED TITLE
ADDED SERIES
PERSONAL SUBJECT
TOPICAL SUBJECT
CLASSIFICATION

Many libraries have a field for LC card number, which is virtually nonexistent in Israeli publications, and for ISBN, which is becoming more frequent in Israeli publications. There are often fields for local data as well. In addition, the UNIFORM TITLE field has a special use in Hebrew cataloging in Israel in that Hebrew spelling varies according to whether it is written in the full or brief form (a problem which will be discussed at greater length in the section on ALEPH's treatment of nonRoman scripts). The university libraries, for consistency, normalize title-page full-form spellings of the title into a uniform title spelled in the brief form.

Field codes are mnemonic and fairly standardized throughout the network, e.g. (for Roman-script records), author main entry = AU, title = TL, edition = ED, place of publication = PL, publisher = PB, date of publication = YR, subject heading = SH. There are slight variations, such as differences in the designation of the call number field (sometimes CN and sometimes LC). Thus, records can be copied from one library's file to another's and used generally with minimal editing.

The cataloging process can be free-form or set form, depending on the individual library's preference, and no minimum information is required. Help screens are available at each stage in the cataloging process, and essential commands for each stage of the cataloging process are resident at the bottom of each screen. The librarian is responsible for correctly entering and tagging information, although the order of data entry is immaterial. Records can be copied either from the same file or from the file of another library. In the midst of the cataloging process, and without exiting from the record, the cataloger can search the authority files and copy information from them to the record being cataloged.

Search formats, like display formats, can be determined by the user libraries. In addition to the standard right-truncating author, title, call number, and subject searches, the system allows Boolean searches and automatically indexes every significant word in any index field the library designates. Thus, a library can allow its readers a search by keywords in titles or by names/titles or by names/titles/subjects, or whatever other index field it chooses. In addition, searching is now possible in the European Common Command Language, using the "Find" key on standard ALEPH terminals.

PART 2: AUTHORITY CONTROL, NON-ROMAN SCRIPTS, CONCLUSION

AUTHORITY CONTROL IN ALEPH

In discussing authority control in the ALEPH network, one cannot help thinking of the opening line to the series of jokes that start, "I've got good news and bad news." The good news is that ALEPH can claim a feature that its American counterpart, RLIN—that paradigm of authority control—cannot: authority files fully linked to its cataloging records. The bad news is that, on a networkwide level, there is no authority control. The result is a system that, on the one hand, enables cross-references in an authority file to provide foolproof bibliographic control by automatically switching all cross-referenced headings to the preferred term when the

nonpreferred term is input. It is a system that globally changes any heading in all of a library's cataloging records with a single stroke. It is a system that even allows linking of headings in two different character sets. At the same time, it is a system that, due to its decentralized goverance and database structure, lacks any coherent authority control beyond that which each individual library sees fit to implement. Access points for the same bibliographic record can and often do differ significantly both in choice and form from library to library, making the use of records copied from another library a tricky business. If access points are not carefully checked, the copying library may well find itself with multiple forms of the same heading in its authority files. In short, the software is state-of-the-art, capable of providing automated bibliographic control that remains only a dream in many much larger bibliographic networks, while the authority control in the network as a whole is totally discretionary.

The arguments concerning the necessity or lack of necessity for traditional authority control in an online environment have been raging in the literature for at least a decade. Arlene G. Taylor, who has carried out extensive research in authority control, concluded that "about 65 percent of the name authority file would not be necessary for searching purposes in an online, keyword-searchable, right-hand truncation environment,"[19] an environment that ALEPH provides. Jean Dickson and Patricia Zadner, summarizing the results of studies by Taylor, Mark Watson, and others, found that "a logical conclusion that can be drawn from these studies is that much of the work which has gone into the Library of Congress authority file has been unnecessary or redundant for certain online environments,"[20] and further, that "the LCNAF [Library of Congress Name Authority File] could be reduced to less than 35% of its current size with no loss of information, assuming the availability of keyword searching and automatic right truncation."[21]

In Israel, quality control of the type found in RLIN or, perhaps most impressively, in WLN was rejected not so much on the theoretical basis advanced by the more radical theorists of authority control practice but rather, as with most of its major networking decisions, for purely practical reasons:

> WLN has quality control. While this is desirable, it also raises questions about who is qualified to control quality for the entire network, and also causes delays and bottlenecks in the availability of cataloged data. For Israel, apart from the problems which could arise from bottlenecks—and even more, from doubts about anyone's qualifications to set standards—adopting WLN [style quality control] would mean an initial investment of . . . much more than is economically feasible in relation to overall acquisition and national resources.[22]

Another circumstance worth mentioning with regard to the decision to decentralize authority control in the ALEPH network is that Israeli libraries, which claim to adhere to AACR2, actually follow different local practices, especially in Hebraica and Judaica cataloging. These local practices are deeply entrenched, and until the mid–1980s no attempt had ever been made to standardize them. In 1984, as a first step toward unifying Israeli cataloging practice, the Standing Committee of the National and University Libraries set up a subcommittee that included representatives of all university central libraries and some large departmental libraries. The committee has had some success—one of the most notable of which is the complication of an authority list for classic Judaica uniform title headings, regularly updated in the form of computer printouts. Nevertheless, the existence of these widespread local cataloging practices had to be taken into account when the decision for centralized or decentralized authority control in the national research library network was under consideration.

As for the authority file software itself, in ALEPH authority files can be created for any type of field. These files provide for global change of a heading in all linked catalog records and, as mentioned above, a cross reference structure that automatically switches nonpreferred term to the preferred term. Relationships between entries can be expressed as *see* references or *see also* references, or broader or narrower terms. Entries can be linked regardless of the character set of each entry, for example, referring a user from the Hebrew form of an en-

try to the English form, or vice-versa. During the free-form cataloging process, the cataloger can access and search the authority files, copy the correct entry into the record being cataloged, and then continue cataloging the record with one key-stroke. All new entries in access fields are automatically entered into the authority file linked to that field as soon as a record is saved. The authority file maintenance function allows catalogers (with high-level access) to enter the authority files and combine, correct, or delete existing headings, activating a global change of all instances of these headings in existing catalog records in the file. Authority records can be opened either in the cataloging process, as described above, or by entering a new heading in the authority maintenance function.

The primary advantage of ALEPH's fully linked authority file function, particularly for a country like Israel with its wild proliferation of letter-sets and cataloging practices, is that the ease of updating and the ability to combine or correct headings through the authority files eliminate the need for fully verifying information prior to input. Thus, for example, a library which had "Eliot, Thomas Stearns" and "Eliot, T.S." interfiled in a card catalog, and that consequently created separate headings in the online catalog, can combine and correct these headings in one operation. In short, ALEPH'S linked authority file function has been instrumental in keeping a database that grew like Topsy from absolute chaos while allowing it to develop into something which, with a little kindness, can be characterized as decentralized diversity. Sheila Intner, comparing quality control between OCLC and RLIN, explains the differences in terms that describe very well the difference in approach between America's research library network, RLIN, and Israel's, if "ALEPH" is substituted for "OCLC":

> The two networks took different approaches to quality control. They had different objectives, pricing structures, cataloging needs and capabilities, and historic developments. At the risk of oversimplifying, it is not unfair to say that OCLC emphasized building its database, encouraging members to contribute new cataloging without applying strict controls on its accuracy and fullness, while RLIN assigned a high priority to cataloging quality, encouraging accuracy and fullness in records even if fewer of them were contributed as a result.[23]

NON-ROMAN SCRIPTS IN ALEPH

The Original Approach

Before computerization of their catalogs, Israel's libraries all maintained separate catalogs for Hebrew-language items and Roman-letter items. Until it closed its card catalog at the end of 1985, the Jewish National and University Library maintained five separate catalogs: Roman alphabet, Hebrew, Arabic, Cyrillic, and Yiddish. This meant that a reader had to search in two separate catalogs for the works of an author who wrote in Hebrew but was also published in translation. This bulky system was tolerated because the alternative romanization was not considered viable in a Hebrew-speaking country, just as romanization of Arabic collections was not considered viable among Israel's Arabic-speaking population. Therefore, it was clear from the inception of plans to automate and connect Israel's research libraries into a network that the software to do this would have to be capable of handling full cataloging records in at least Hebrew and Latin character sets from the outset and, as soon as possible, in Arabic. Cyrillic collections, also traditionally cataloged in Israel in Cyrillic characters, were the third priority, but could not be ignored, since considerable collections in Russian also existed in Israel's research libraries.

Another major Israeli deviation from international cataloging practice had to be taken into consideration when ALEPH's non-Roman capability was being designed. As mentioned earlier, for reasons of consistency in Hebrew spelling, access points are "normalized" to a single orthographic form in cataloging. There are two officially recognized forms of writing non-vocalized Hebrew (i.e., standard written modern Hebrew, which includes only consonants, without markings to indicate the vowel sounds). The first is *ketiv haser*—minimal form—and the second is *ketiv male*—full form. The difference between these two forms is that in the full form certain vowels are represented with their adjoining consonants, while in the minimal

form they are not. While the tendency in contemporary Israel is to use the full form in writing, the university libraries have always normalized access points to the minimal form. This choice of the minimal form for cataloging in university libraries (for further complicated matters, public libraries have traditionally cataloged in the full form, or a mixture or both) was made in the 1920s, when the National Library opened, and continues to date. The decision was reaffirmed in the 1980s by the Inter-University Subcommittee on Cataloging for two pragmatic reasons: (1) it is much easier to normalize to the minimal form than to the full form, and (2) a large body of cataloging already existed in this form.[24] Material in Yiddish, which complicates the situation even further since it has its own full form, was, as mentioned above, kept in a separate card file. With the advent of automation, and in the planning of ALEPH, however, it was decided to merge Yiddish with Hebrew, normalizing personal names to Hebrew minimal forms but leaving titles in Yiddish in the full forms.[25]

The most popular character set in use today worldwide is probably the 128 character ASCII. While this seems like a lot of characters, it was in fact not considered sufficient for the characters in the Western European languages, and so an expanded character set with 256 possible characters was developed by the Library of Congress as part of the MARC standard. It allowed for letters unique to individual languages (such as the Scandinavian "O" with a slash), as well as accents and other language-specific signs. Standard computer equipment is designed to handle only 128 characters, so it was necessary to design special terminals to handle the MARC character set. The major American cataloging utilities, OCLC and RLIN, required special terminals in any event, so the extended character set was included as an enhancement in these terminals. Thus, when RLG commissioned Bella Weinberg to compile a Hebrew character set for RLIN, with the aim of adding parallel fields to romanized access points in RLIN Hebraica records, she was able to compile a character set for terminals that had been designed to support a number of non-Roman scripts and were equipped with an extended character set. RLIN decided that the Israeli standard for the encoding of Hebrew characters, limited to modern, unpointed Hebrew, did not meet RLG's needs. They felt that the character set to be used for RLIN's Hebrew cataloging would have to be adequate for all Hebraic languages, including those in which diacritics, vowel points, and diagraphs are significant components of the orthography. Thus they set up two character sets: a "basic set" consisting of the Hebrew alphabet, the vowel points and semivowel (*sheva*), and certain other diacritical marks, and a "supplementary set" of ancient Tiberian, Babylonian, Palestinian, and Samaritan vowel points.[26]

In Israel, the problem of how to add a Hebrew character set to the standard computer's character set was handled entirely differently. It requires twenty-seven different characters to represent the Hebrew alphabet, twenty-two letters and five final forms, used at the end of words for certain letters. This omits vocalization (the marking of vowel sounds, called *nikud*) and stress marks, called *dagesh*. Since manual Hebrew cataloging in Israel had made do with these twenty-seven characters, it was decided that they were sufficient for automated Hebrew cataloging as well. As Elhanan Adler explains:

> In the United States, a computerized Hebrew capability was a matter of importance only to the relatively small group of Judaica librarians and scholars. In Israel, on the other hand, Hebrew was a basic need of the entire data processing community which could not afford to wait for the technological developments which have now made multi-font display a reality.[27]

The Israeli approach substituted the Hebrew alphabet for lowercase Roman, sacrificing one additional character of the standard typewriter character set—the grave accent—since the Roman alphabet contains only twenty-six letters. With this character set, Roman characters should be input only in uppercase, requiring the substitution of only a single chip for the alternate character set. This simple approach has since been modified, so that in today's ALEPH system the terminals used in most Israeli university libraries—aside from libraries that require more than these two characters sets (see section on Soft Fonts)—contain both sets, permitting the user to

move back and forth between them to display either upper/lowercase Roman or uppercase Roman and Hebrew. It is now possible, in a single cataloging record, to enter upper/lower Roman text and Hebrew text in separate fields. However, Roman text that appears in a field that contains Hebrew must be in uppercase.

The original decision to implement uppercase Roman/lowercase Hebrew in ALEPH, an approach that was considerably simpler than the RLIN approach to a Hebrew character set, was reached, as were most other major policy decisions in ALEPH, primarily for pragmatic reasons—in this case, the major one being that this was what was available and the Israeli library market was too small to justify major hardware adaptations.[28] At the time this approach was decided upon, it was felt that it was viable because Hebrew was the only additional alphabet with which they had to cope, at least for the foreseeable future. The view was then that other alphabets could either be Romanized (e.g., Cyrillic) or Hebraized (e.g., Arabic). The first reversal of this decision came when, a few years later, an Arabic-script capability was added to the standard ALEPH Visual Terminals by using a microcomputer-based terminal with graphics capability.

Simplicity notwithstanding, the result was, for ALEPH, a system that from its inception allowed for full cataloging records in Hebrew or Roman scripts, or a mix of both. The content of any field could be in Hebrew, or in Hebrew and uppercase Latin characters, or in upper- and lowercase Latin characters.

The State of the Art: Non-Roman Capabilities Today in ALEPH and a comparison to RLIN's Non-Roman Capabilities

In both the Israeli research library network (ALEPH) and the American research library network (RLIN), the capabilities for handling non-Roman script are constantly evolving. In the Winter 1990 issue of *Judaica Librarianship*, Joan Aliprand gives an update on Hebrew on RLIN, describing a new version of RLIN PC software released in late 1988. This version was designed to run on both off-the-shelf personal computers and on the RLIN MultiScript Workstation (MSW), a PC-based replacement for the dedicated RLIN CJK terminal. In designing a new CJK keyboard for the MSW, the opportunity was taken to bring as much uniformity as possible to RLIN keyboard operation, resulting in a number of changes to RLIN Hebrew. All non-Roman scripts are now invoked by depressing the Control (Ctrl) key together with one of the following letters:

C to invoke Chinese characters;
H to invoke Hebrew script;
J to invoke Japanese kana;
K to invoke Korean hangul;
R to invoke Roman script;
S to invoke Cyrillic script.

For example, Ctrl + H invokes Hebrew. The letters C, J, and K invoke the appropriate scripts only on an MSW configured as a CJK terminal, and on these terminals H and S have no effect except for an error message. Conversely, on an ordinary personal computer or on an MSW configured for Cyrillic-Hebrew input, H invokes Hebrew, S invokes Cyrillic, and C, J, and K invoke only error messages.[29]

With regard to mixing of scripts in a single record, the MSW can be configured to operate *either* as an RLIN CJK terminal *or* as a Cyrillic-Hebrew terminal, but not yet as both. However, RLG has plans to integrate all non-Roman scripts, so that the MSW is fully "multiscript." Such a change will require modification of the programs that run on the RLG mainframe and careful coordination with any enhancements for other non-Roman scripts, such as Arabic, which is currently a development project.[30]

In ALEPH, the latest development in non-Roman script capabilities is the use of soft fonts, i.e., character sets that are resident in the VAX computer. ALEPH supports the use of soft fonts on all VT 320 or compatible terminals (e.g., VISUAL 603), which *have not* had the Hebrew added instead of the multinational character set. Soft fonts are available for multinational Latin (L), Hebrew (H), Arabic (A), and Cyrillic (S).

Each font is defined in a file, with a utility for "drawing" the characters. The user "calls up" a font (character) set by inputting a "change fonts" command. The system itself calls up a font when displaying

data that has been entered in a character set. Each data field is prefixed by a character that indicates the character set of the field. At present, any two fonts, or characters sets, can be displayed together on any one display screen.

The Latin character set includes the DEC multinational characters and the American Library Association set. The other character sets include, in addition to the special character set, the standard Latin ASCII characters and the ALA set. Each "language of conversation" (i.e., the language in which instructions to the users appears on the screens) is defined as belonging to a particular set (e.g., French, German, and English are Latin; Hebrew and Yiddish are Hebrew). A user chooses a language of conversation or requests a change of character set with the command "ALPHA/X," where "X" is the code of the character set. This command loads the relevant font. The user can "toggle" into and out of the Latin character set by pressing F11.

The Latin character set also allows special characters that are not on the keyboard to be input using triple stroking—F12, then the diacritic or the first character of a double character, then the character. For example, [F12 + \ + e] produces "e" with a grave accent.[31]

In addition to Latin, Hebrew, Arabic, and Cyrillic character sets, Greek (G) is now in the final stages of preparation and will shortly be added to the soft fonts available in ALEPH.

CONCLUSION

ALEPH, Israel's research library network, is a system that has, at all critical junctures, chosen flexibility over control. Like Israel itself, a country always long on problems and short on financial resources, both the designers of ALEPH and the decision-makers governing the network structure have been influenced every step of the way by the constraints of stark pragmatism. Whenever short-term efficacy had to be weighed against long-term possibilities, the short-term won out. The approach was, necessarily, better to get it done than to get it perfect.

The system that has resulted is a fascinating combination of highly sophisticated software and relatively unsophisticated network coordination. The database is decentralized, the authority control is decentralized, the governance is decentralized. On the other hand, and included in the price of membership, users can custom design their record structure and can easily copy one file into another. They can build authority files that are fully linked to cataloging records, and five character sets are available to them.

In spite of the resultant inability to search all libraries in the ALEPH network with a single search command, the decentralized structure has proved advantageous for Israel. It has allowed the country's university libraries to automate their catalogs without getting bogged down by bureaucratic procedures. Insistence on a tightly controlled, centralized database might eventually have produced a more elegant network, but there is a better-than-even chance that it would have prevented Israel from implementing a network within a reasonable time. Even so finely honed a network as RLIN is not free from the results of "fear of inputting." Cataloging backlogs result from original cataloging that proceeds at a snail's pace because of catalogers who choose to "get it right," even if the cost is that it takes forever to "get it online."

The decision to implement a non–MARC format in Israel was also a decision with far-reaching consequences, both positive and negative. On the positive side, Israel's universities were allowed great flexibility in designing formats appropriate to their specific needs. At the Graduate School of Library and Archive Studies, for example, a special location field (coded "LO") was designed to indicate the location of publications that are not shelved by their LC number. When a book is reserved for a course or found in the Bibliography Room, for example, the LO field is displayed as the first field (otherwise the LC field appears first), specifying the actual location.

On the negative side, the non–MARC format of the bibliographic records of Israel's universities has isolated the Israeli research network from other networks, with regard to international exchange of bibliographic records. This problem is not insuperable, but as Elchanan Adler correctly states, "downloading Israeli cataloging data into foreign automated systems is a

. . . complicated task, involving both character and format conversion."[32]

The decentralized network that Israel has built is not free from problems even aside from the limitations on international exchange of information. On one hand, a catalog user at one library can, with one command, shift to another library's catalog and continue searching with virtually the same commands, data format, etc., even if the other catalog is physically found on a distant computer. Additionally, a cataloger can locate an item in another collection and then copy the bibliographic record to his own catalog, editing as needed. True, these procedures may require a few more keystrokes than would be required in a system like RLIN, yet when compared with the necessity of traveling physically from library to library to search their collections—the alternative for the foreseeable future if Israel had insisted on perfection—the price is perhaps not so high. Because of spotty communications, ALEPH's linking capabilities do not always function as smoothly as might be desired. In addition, other factors, such as the work load on the computers involved, affect network response time. Within the libraries of the Hebrew University itself, there is a noticeable difference when searching on another computer, even when it is on the same campus and uses a dedicated communication line. Nonetheless, these problems are being worked on and, hopefully, will be resolved or at least minimized in the near future. In the meantime, according to unofficial statistics quoted to the author by the cataloging department of the Jewish National and University Library (official statistics have not been compiled), cataloging productivity has increased by some 20 percent on average.

There is a cost attached to the flexibility of a highly decentralized network. The thus-far unsuccessful attempt to implement an after-the-fact union database for ALEPH demonstrates what happens in a network in which authority control is voluntary and left to the discretion of individual members. On the other hand, the undeniable fact that a small, resource-limited country like Israel did succeed in joining all of its research libraries in a functioning network within a few years may indicate the viability of such a decentralized approach for other small countries. The decision lies between control, which produces a network like RLIN, and flexibility, which results in a network like ALEPH. Ultimately each country, according to its resources, pays its money and takes its choice.

REFERENCES

1. Shmuel Sever, "Networking and Automation in a Small Country: Uncertain Steps Toward Networking by Israel's Universities," *Library & Information Research* 5:253 (Fall 1983).
2. Shmuel Sever, "Israel," in *ALA World Encyclopedia of Library and Information Services*, 2d ed. (Chicago: American Library Assn., 1986), p.396.
3. Sever, "Networking and Automation," p.258.
4. Ibid., p.259.
5. Elhanan Adler, "The Library Automation Scene in Israel—1986," *Judaica Librarianship* 3:22 (1986–1987).
6. *A Glossary for Library Networking*. Network Planning Paper no.2 (Washington, D.C.: Dataflow Systems for the Network Development Office, Library of Congress, 1978), p.9.
7. Ibid., p.13.
8. JoAn S. Segal, "Networking and Decentralization," *Annual Review of Information Science* 20:217 (1985).
9. Ibid., p.225.
10. Ibid.
11. Richard DeGennaro, "Library Automation & Networking: Perspectives on Three Decades," *Library Journal* 109:630 (April 1, 1983).
12. Sever, "Networking and Automation," p.246.
13. Adler, "The Library Automation Scene in Israel—1986," p.22.
14. Judith Levi, "ALEPH: An Online Real-Time Integrated Library System," *Judaica Librarianship* 1:58 (Spring 1984).
15. Sever, "Networking and Automation," p.248.
16. Nurit Roitberg, "Resource Sharing and Coordinated Automation in University Libraries in Israel," in *The Future of Information Resources for Science and Technology: and Role of Libraries: Proceedings of the*

11th Meeting of IATUL, Oxford, England, April 15–19, 1985, ed. Nancy Fjallbrant (Goteborg: IATUL, 1985), p.110.
17. Ibid.
18. Elhanan Adler, "The Use of Israeli Machine-Readable Cataloging by American Libraries: A Proposal," *Judaica Librarianship* 4:24 (Winter 1988).
19. Arlene G. Taylor, "Research and Theoretical Considerations in Authority Control," *Cataloging & Classification Quarterly* 9, no. 3:41 (1989).
20. Jean Dickson and Patricia Zadner, "Authority Control and the Authority File: A Functional Evaluation of LCNAF on RLIN," *Cataloging & Classification Quarterly* 9, no. 3:59 (1989).
21. Ibid.
22. Shmuel Sever, "Networking and Automation in a Small Country: Uncertain Steps Toward Networking by Israel's Universities," *Library & Information Research* 5:252 (Fall 1983).
23. Sheila S. Intner, "Much Ado about Nothing: OCLC and RLIN Cataloging Quality," *Library Journal* 114:38 (Feb. 1, 1987).
24. Elhanan Adler, "Judaica Librarianship: The View from Israel," *Judaica Librarianship* 4:134 (Spring 1988–Winter 1989).
25. Ibid.
26. Joan M. Aliprand, "Alef Bit: Hebrew on RLIN," *Judaica Librarianship* 3, no. 1–2:6 (1986–1987).
27. Elhanan Adler, "The State of the Art in Hebraica Library Automation: American and Israeli Standards and Practices" (unpublished paper, 1990), p.4.
28. Ibid., p.5.
29. Joan M. Aliprand, "Hebrew on RLIN—An Update," *Judaica Librarianship* 5:13–14 (Spring 1989–Winter 1990).
30. Ibid., p.14,16.
31. "Soft Fonts," *ALEPH - Version 2.3* (User manual) (Aug. 1990), p. 10.
32. Elhanan Adler, "Judaica Librarianship," p.137. ■■

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Communications

A Report on the Loading of MARC Format Bibliographic Records into HyperCard

Jason B. Rosenberg and Christine L. Borgman

This paper outlines a process for downloading MARC format bibliographic data into a form readable for an Apple Macintosh computer running HyperCard software. Loading procedures for two data sources, an OCLC format tape and records captured from UCLA's ORION public-access catalog, are discussed. The method described involves translation to an intermediate file format, which is then loaded into a HyperCard stack.

As the proliferation of computers in modern libraries continues, it becomes a priority to be able to move freely among the many computing environments and formats currently being used for storing and manipulating online catalog information. While converting data from one format to another is a computationally uninteresting problem, the work reported here is intended to assist those who have a need for readily accessible MARC record information in the relatively manageable domain of the personal computer.

The need to solve this problem was encountered as part of the Science Library Catalog (SLC) research project. SLC is an effort to develop online systems for use in children's libraries.[1-3] The rich graphical interface made possible with HyperCard software running on the Macintosh computer has been central to the success of the project, as it is a necessary improvement over the primitive terminals attached to the mainframe computers that normally house large databases.[4-7]

To date, two electronic catalogs have been downloaded for use in SLC. Although in both cases the source file is specified in MARC record format, each situation required a unique procedure for carrying out the conversion.[8]

LOADING DATA FROM ORION

The first implementation of the SLC was at the University Elementary School (UES), a laboratory school on the UCLA campus. MARC records for UES's library are available online, via UCLA's ORION public-access catalog.

ORION allows remote access by modem. Using terminal emulation software, such as the FreeTerm communications program for the Macintosh, it is possible to connect to ORION, retrieve bibliographic records, and save the incoming stream to an ASCII text file within the Macintosh operating system. Approximately fifteen hundred records were downloaded in this way. They were selected science and technology records (Dewey 500s and 600s). Figure 1 shows a typical record in the ORION MARC display format.

Further processing was needed to extract the useful information from these records and to generate an intermediate file manageable for loading by the SLC HyperCard stacks. The intermediate format is described in a later section.

LOADING DATA FROM AN OCLC FORMAT TAPE

The next installation for SLC will be at the Los Angeles Public Library (LAPL). LAPL's electronic catalog data are main-

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```
 Current Search: DISPLAY OF SAVED RECORDS IN BIBLIOGRAPHY  ORION/UCLA
Libraries
 COMMAND->
    Record D4 of 78          Screen  1 of  2
 ------------------------------------------------------------------------
--------

                                                                  (4805932
M1:MC1)

 <00>001-0 ocm18134684
 <00>005-0 19900529134620.0
 <00>008-0
LN/ENG,CT/NYU,DAT/1989,B/M,CFP0,D/A,E/880607,ELV_,GP/_,M/_,R/_,RSP,S/
_,T/A,DT2/____,DTP/S,ILL/A___,INT/J,CNT/____,FES/0,IND/1,MEBE1,FIC/0,BIO
/_
 <00>010-0 __$a   88020470 /AC
 <00>040-0 __$aDLC$cDLC$dCLU
 <00>049-1 __$aCLYK$n621.3813 A
 <00>050-1 0_$aTK7876$b.A85 1989
 <00>100-0 10$aAsimov, Isaac,$d1920-
 <00>245-0 10$aHow did we find out about microwaves? /$c{By} Isaac
Asimov ; illu
strated by Erika Kors.
 <00>260-0 0_$aNew York :$bWalker,$c1989.
 <00>300-1 __$a63 p. :$bill. ;$c22 cm.
 <00>490-1 0_$aHow did we find out about--? series
 <00>500-1 __$aIncludes index.

 Current Search: DISPLAY OF SAVED RECORDS IN BIBLIOGRAPHY  ORION/UCLA
Libraries
 COMMAND->
    Record D4 of 78          Screen  2 of  2
 ------------------------------------------------------------------------
--------

                                                                  (4805932
M1:MC1)

 <00>520-1 __$aDescribes the discovery of microwaves and explains how
they funct
ion and their many uses.
 <00>650-1 _1$aMicrowaves.
 <00>700-1 10$aKors, Erika W.,$eill.
 <00>891-0 __$ajsa 052990/2
```

Figure 1. A Sample Record, as Captured from ORION, in MARC Display Format.

tained by Brodart Company, of Williamsport, Pennsylvania. A standard OCLC format tape was obtained from Brodart containing the more than 8,200 records of science and technology books in LAPL's juvenile collection.

The tape was downloaded onto a Sun 4/380 minicomputer running UNIX. Due to the large size of the file, we decided to preprocess the data as much as possible on the UNIX machine before downloading the intermediate format into the Macintosh. It is not essential to have access to a large minicomputer environment, however, as will be addressed later.

Our first step was to parse the "raw records" on the tape into a more familiar form (see figures 2a–b). The string of numbers near the beginning of each raw record contains a list of MARC tags for each field. Meaningful tag information begins following the initial sequence "4500." Each twelve-digit substring represents one MARC field. The first three digits of each substring are the MARC tag (the remaining nine digits were ignored). The field data

```
00983cam  2200277   450000100130000000500170001300600130003000800410004301000200
0840200039001040400024001430490009001670690015001760990022001911000043002132450 0
990025625000130035526000310036830000270039935000100042644000270043652001880046 36
5100100065165100100066170000340067 1  31814425 19860103132739.0  a06/05/87720811
s1972    nyua           00110 eng    a   76146279 /AC  a069055415Xa0690554168 (li
b. bdg.)  aDLCcDLCdm.c.dOCL  aLPUAocam00410425   ax 523 B821-3azCD10aBranley, Fr
anklyn Mansfield,d1915-   14aThe moon, Earth's natural satellite,cby Franklyn M.
 Branley. Illustrated by Helmut K. Wimmer.  aRev. ed.0 aNew York,bCrowellcc1972.
  a117 p.billus.c23 cm.  a$4.500 aExploring our universe  aDiscusses scientific
findings about the moon's mass, density, gravity, temperatures, lack of atmosphe
re, eclipses, orbit, surface, and effect on tides with a section on superstition
s. 0aMoon. 1aMoon.11aWimmer, Helmut K.,eillus.
```

Figure 2a. A Sample Record from the LAPL Brodart OCLC Format Tape.

```
001
00519
006  $a06/05/87
00872
010  $a   76146279 /AC
020  $a069055415X $a0690554168 (lib. bdg.)
040  $aDLC $cDLC $dm.c. $dOCL
049  $aLPUA
069oc$am00410425
099  $ax 523 B821-3a $zCD
10010$aBranley, Franklyn Mansfield, $d1915-
24514$aThe moon, Earth's natural satellite, $cby Franklyn M. Branley.
Illustrated by Helmut K. Wimmer.
250  $aRev. ed.
2600 $aNew York, $bCrowell $cc1972.
300  $a117 p. $billus. $c23 cm.
350  $a$4.50
4400 $aExploring our universe
520  $aDiscusses scientific findings about the moon's mass, density,
gravity, temperatures, lack of atmosphere, eclipses, orbit, surface, and
effect on tides with a section on superstitions.
651 0$aMoon.
651 1$aMoon.
70011$aWimmer, Helmut K., $eillus.
```

Figure 2b. A Parsed Representation of the Raw Record Shown in Figure 2a.

```
CNF  x 523 B821¶SAF Franklyn Mansfield Branley¶TIF  The moon, Earth's
natural satellite¶RNA  moon. Earth's natural satellite331A¶EIF  Rev. ed.
¶PUF  New York, Crowell c1972. ¶SEF Exploring our universe ¶FAF
Branley, Franklyn Mansfield, 1915-    ¶RNB  moon. Earth's natural
satellite331B¶PGF  117 p. illus. 23 cm.¶DEF  Discusses scientific
findings about the moon's mass, density, gravity, temperatures, lack of
atmosphere, eclipses, orbit, surface, and effect on tides with a section
on superstitions. ¶TOF  Moon. ¶OAF  Wimmer, Helmut K., illus. ¶§
```

Figure 3a. The Intermediate Format Readable by the SLC HyperCard Stacks.

Field Descriptor	Explanation	corresponding MARC tags
CNF	Call Number	049(a) in UES, 099(a) in LAPL
FAF	Full Author	100
SAF	Short Author	100(a), reformatted
TIF	Title	245(a,b)
RNA,RNB	Record Name	245(a,b) + unique char sequence
EIF	Edition Info	250
PUF	Publisher	260(a,b,c)
PGF	Pagination/Collation	300(a,b,c)
SEF	Series	400-499
MIF	Miscellaneous	500-519
DEF	Description	520-599
TOF	Topics	600-699 screened for duplicates
OAF	Other Authors	700

Figure 3b. Explanation of Symbols Appearing in the Intermediate Format.

portion of each record follows the initial tag string. Hidden control characters are embedded to delimit the beginning of new records (ASCII 29), new fields (ASCII 30), and new subfields (ASCII 31). A two-digit indicator field always follows the new field marker, although it is sometimes empty (two blanks).

We wrote a generalized parsing routine in C for reading in records of this file format, allowing for specific processing tasks such as generating the intermediate file format readable by SLC's HyperCard stacks.

An intermediate file was created and transferred to floppy disks using a Macintosh networked to the UNIX machine. The LAPL database of more than 8,200 required five double-density disks (3.8Mb).

THE INTERMEDIATE FILE FORMAT

In each of the above cases, the data were translated to a common intermediate format appropriate for uploading by SLC's HyperCard stacks. The intermediate stage enables SLC to understand only one kind of input format, irrespective of the original data source. Only a subset of the data contained in a full MARC record is translated.

As shown in figure 3a, each record has been transformed into a sequence of fields headed by a three-letter field descriptor. Each field is terminated by a field marker (¶), and each record is separated by a record marker (§). These intermediate fields contain information from one or more MARC fields. A table defining the field descriptors and their corresponding MARC tags is given in figure 3b. A mnemonic descriptor, instead of a numerical tag, was necessary since use of MARC fields varies over different databases. For instance, the call number field (CNF) corresponds to MARC tag 049 in the UES ORION database, while tag 099 carries the call number data for the LAPL catalog.

UPLOADING DATA TO HYPERCARD

Once the intermediate format has been generated, it is quite simple to write a HyperCard script for uploading data. In the current implementation of SLC, there are two HyperCard screens (backgrounds) for each holding in the catalog. A completed record is shown in figures 4a–b. There are eleven fields of information displayed for each record. For each field entry, the script sequentially scans characters up to the next field marker (¶). The field descriptor is then decoded and the remaining string is placed in the appropriate HyperCard field.

PREPROCESSING WITHOUT A LARGE MAINFRAME

If a minicomputing system is not available, the entire process could be reasonably performed within the Macintosh. Although it is not recommended that any preprocessing be attempted from within HyperCard itself, a parser like the one described above for the OCLC tape could then be per-

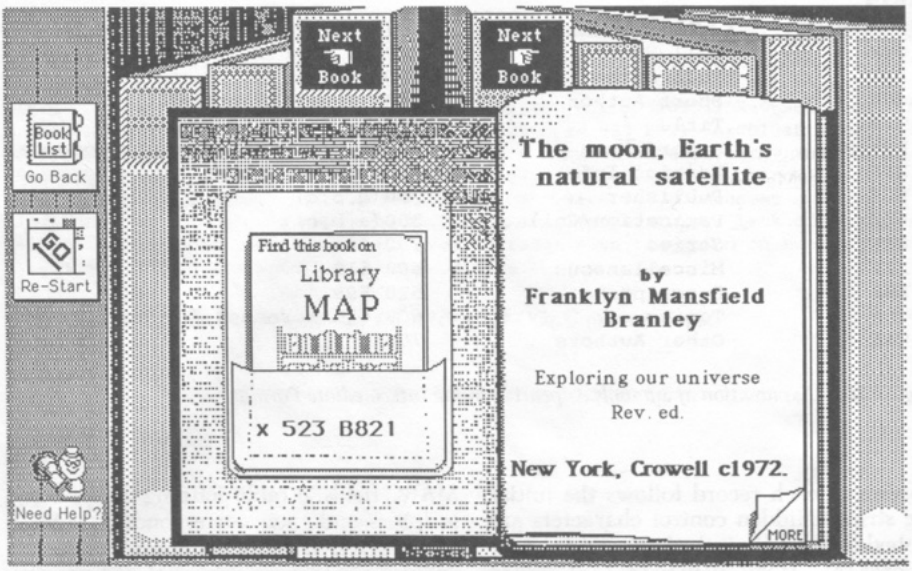

Figure 4a. Screen 1 of Completed Record.

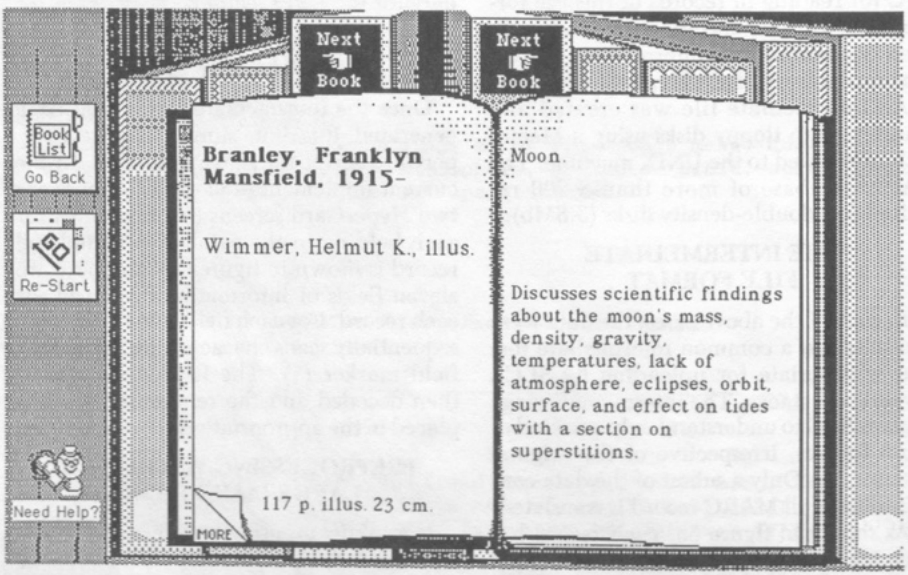

Figure 4b. Screen 2 of Completed Record.

formed as before, but with a noticeable increase in execution time (taking hours instead of minutes).

However, one potential problem could arise from an incompatibility in storage media. It may be difficult to obtain large database files in a Macintosh-readable medium without the aid of the large tape drives normally connected to minicomputers and computer workstations.

CONCLUSIONS

It took HyperCard running on a Macintosh IIcx approximately four hours to load in the intermediate data for LAPL's 8,200+ records. It took not more than ten minutes to parse the OCLC file and generate the intermediate file on the UNIX machine. It is clear that as much preprocessing as is possible should be performed before moving into the HyperCard environment.

Once the complete database has been created, however, HyperCard offers an excellent graphical interface for displaying bibliographic information.

ACKNOWLEDGMENTS

David Krieger designed and implemented the first programs to convert data from the UES database on ORION into HyperCard, as well as the foundation work on the Science Library Catalog. Dee Michel provided technical advice in decoding data on the OCLC Brodart tape. Staff at ORION User Services (UCLA), Brodart, and the Los Angeles Public Library provided some additional technical support regarding the data formats. We are grateful to them for these contributions to the SLC project. This work has been made possible by a research grant from the Alfred P. Sloan Foundation.

REFERENCES

1. Christine L. Borgman and others, "From Hands-on Science to Hands-on Information Retrieval," in *ASIS 89: Proceedings of the American Society for Information Science Annual Meeting, October 30–November 2*, ed. J. Katzer and G. Newby (Washington, D.C.: Oct. 29–Nov. 2, 1989).
2. Christine L. Borgman, Mark C. Chignell and Felix Valdez, "Designing an Information Retrieval Interface Based on Children's Categorization of Knowledge: A Pilot Study," in *ASIS 89: Proceedings of the American Society for Information Science Annual Meeting*, ed. J. Katzer and G. Newby (Washington, D.C.: Oct. 29–Nov., 1989).
3. Christine L. Borgman and others, "Children's Use of and Interactive Catalog of Science Materials," in *ASIS '90: Proceedings of the 53rd ASIS Annual Meeting*, ed. Diane Henderson (Toronto, Canada: Nov. 4–8, 1990) p.55–68.
4. *Macintosh HyperCard Script Language Guide: The HyperTalk Language* (New York: Addison-Wesley, 1988).
5. Tay Vaughan, *Using HyperCard: From Home to HyperTalk* (Carmel, Ind.: Que Corporation, 1988).
6. Dan Winkler and Scot Kamins, *HyperTalk 2.0: The Book* (New York: Bantam, 1990).
7. *Online Systems Books Format*, 3d ed. (Dublin, Ohio: Online Computer Library Center, 1986).
8. James Fayollat and Elizabeth Coles, "Database Management Principles of the UCLA Library's Orion System," *Information Technology and Libraries* 6, no. 2:102–15 (June 1987). ■■

Multimedia Visualizer: An Animated, Object-based OPAC

Newton S. Lee

This paper describes the Multimedia Visualizer, an animated, object-based OPAC (Online Public Access Catalog) for library automation. Using the Multimedia Visualizer, library patrons can access an electronic library through a collection of 2-D and 3-D interactive objects such as card catalog drawers, librarian desks, bookshelves, and cassette tapes. Users can "open" and "close" a card catalog drawer, "put" a tape into a cassette player, or "push" a button on a tape recorder. These and other animated visualizations are designed to make the OPAC more user-friendly and more intuitive than the conventional human-machine interface. Library patrons of all ages and expertise will find the object-based OPAC easy to use. Moreover, the Multimedia Visualizer

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provides users access not only to bibliographic records but also to multimedia information linked to a special MARC (MAchine-Readable Catalog) tag.

Online bibliographic search systems were first demonstrated in the early 1960s. Today there are a few dozen commercial library automation systems available on a variety of computer platforms ranging from a PC to a mainframe. However, these systems are text-based and only provide access to "information about information" (that is, bibliographic records, indexes, or abstracts) but not to the information itself.[1]

Computer technology has evolved tremendously over the past decade. A $3,000 workstation allows us to store, transmit, and display high-resolution images and CD-quality sound at an acceptable speed and resolution.[2] This technology not only opens the door to multimedia access but also promotes a more graphical and intuitive user interface.

In an earlier paper, the author introduced the VTLS InfoStation OPAC—a multimedia access system for library automation.[3] This paper, the Multimedia Visualizer, a new front-end to the VTLS InfoStation OPAC, will be described. Using the animated, object-based Multimedia Visualizer, library patrons can access an electronic library through a collection of 2-D and 3-D interactive objects such as card catalog drawers, librarian desks, bookshelves, and cassette tapes. Users can "open" and "close" a card catalog drawer, "put" a tape into a cassette player, or "push" a button on a tape recorder. These and other animated visualizations are designed to make the OPAC more user-friendly and more intuitive than the conventional human-machine interface. Library patrons of all ages and expertise will find the object-based OPAC easy to use. Moreover, the Multimedia Visualizer provides user access not only to bibliographic records but also to multimedia information linked to a special MARC (MAchine-Readable Catalog) tag.

Since a few pictures speak louder than a thousand words, the Multimedia Visualizer will be depicted in the following sections by walking the reader through a real-life session on a NeXT computer. The NeXT computer was chosen to implement the Multimedia Visualizer for many compelling reasons that will become apparent in the upcoming discussion.

LIBRARY ACTIONS AND OBJECTS

"Entering" the Electronic Library

In real life the very first thing a library patron does when in search of information is to enter a library. Likewise, the very first action a user of the Multimedia Visualizer performs is to open the door, metaphorically speaking, to an electronic library. In figure 1, the picture of a library door is located at the center of the screen.

When the user clicks on the door, it swings open (animated image) while the computer connects to an electronic database and displays an action panel of library objects. Figure 2 shows four objects at the top of the screen. The first object, a frontal view of card catalog drawers, allows for item searches on author, title, subject, call number, and ISBN. The second object, a side view of card catalog drawers, allows for keyword searches. The third object, a librarian desk, allows users to obtain helpful hints from an "electronic librarian" on duty. The fourth object, a study desk, allows users to view, listen to, or edit multimedia information retrieved from the electronic library.

Author/Title/Subject Search

When users click on the Author/Title/Subject Search picture, one of the card catalog drawers "slides open" (animated image). The new screen looks like figure 3. Library patrons can key in a search item such as author *smith* and then initiate a database search by clicking on one of the appropriate item search buttons. By default, pressing the <Return> key initiates an author search. The default can be changed easily by clicking an appropriate radio button below the item search buttons. The right hand side of the panel shows the articles (a, an, the) that are automatically filtered out of a user's input. For example, the system will search on "smith" even if the user enters "the smith." A librarian can add to or delete from the built-in list of articles.

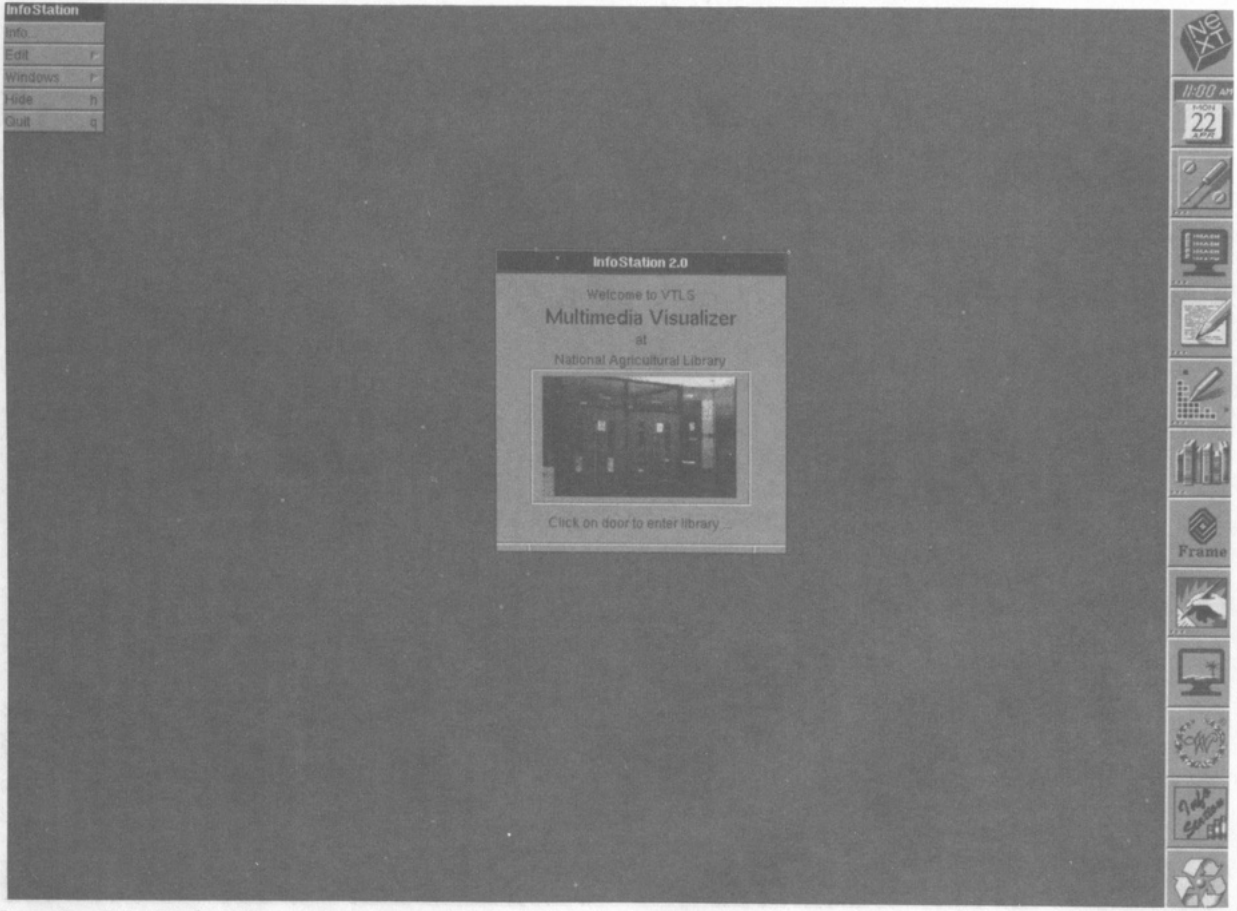

Figure 1. Entering the Library.

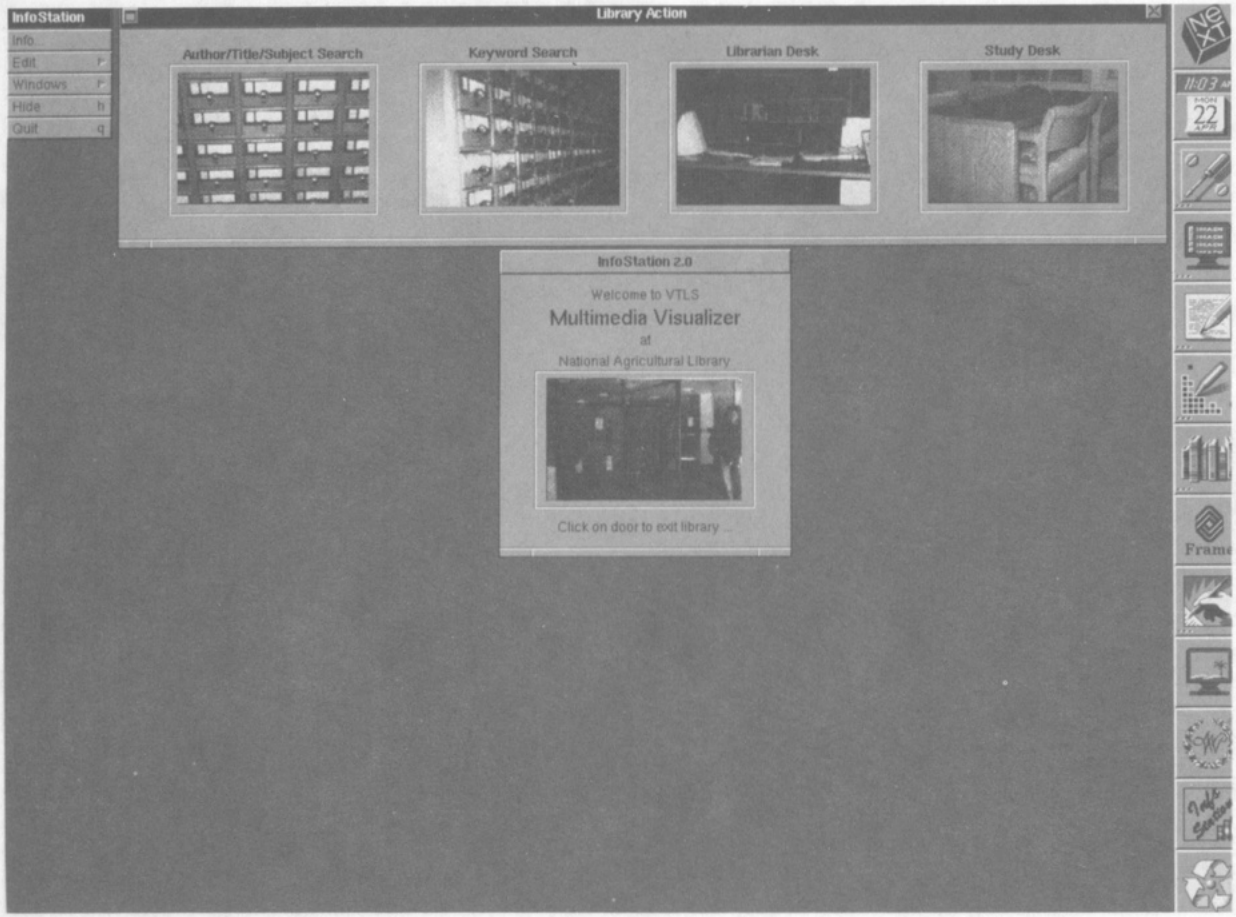

Figure 2. Library Action Options.

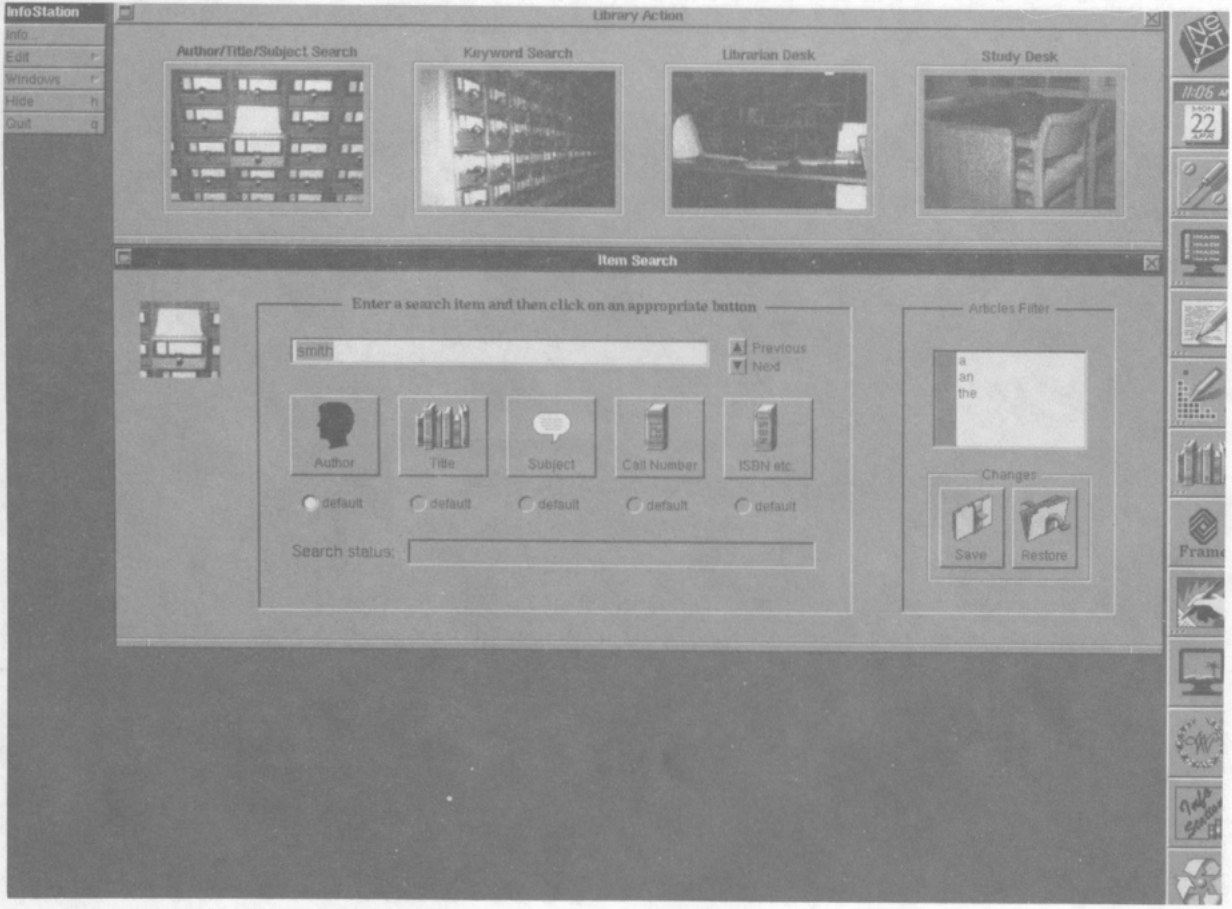

Figure 3. An Author/Title/Subject Search.

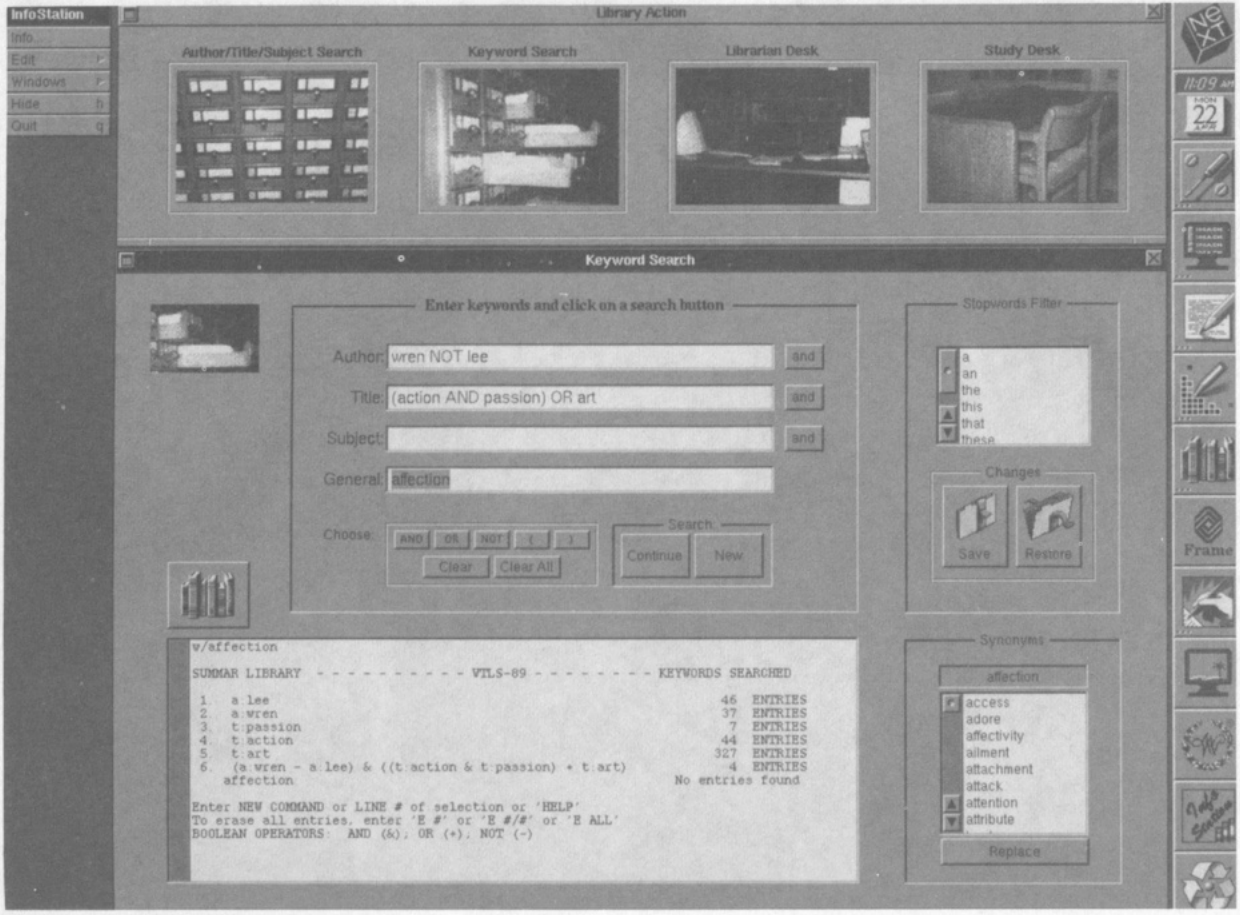

Figure 4. A Keyword Search.

Keyword Search

When users click on the Keyword Search picture, a few of the drawers "slide open" (animated image). The new screen is shown in figure 4. Library patrons can type in keywords pertaining to authors, titles, subjects, or any item in a MARC record. The default logical connective between any two keywords is AND, but a user can type in or select other connectives such as OR and NOT. Parentheses are used to change the precedence of connectives. The three "and" buttons to the right of the keyword fields change to "or" and "not" buttons when the user presses them. These buttons determine the connectives among the four groups of author, title, subject, and general keywords. Furthermore, "stopwords" are automatically filtered out from user-supplied keywords. A librarian can add to or delete from the built-in list of stopwords.

If a keyword cannot be found in the database, the Multimedia Visualizer automatically suggests alternatives to the keyword based on the electronic *Webster's Collegiate Thesaurus* bundled with every NeXT computer. For example, in figure 4 the word "affection" generates the database search error "No entries found," which instantaneously triggers the question to display a list of synonyms for the word "affection." A user can then select a word from the list and click on the Replace button to replace all occurrences of "affection" with the chosen synonym in the keyword search fields.

Natural Language Queries

When users click on the Librarian Desk picture, a librarian on duty responds (animated image). Figure 5 illustrates the new screen. Library patrons can type in queries in English. Each time a query is entered, an answer appears in the answer box. The help buttons on the right-hand side of the natural language panel provide users with the basic syntax of a small subset of English that the system understands.

Some of the common queries and requests are:

- How do I go about finding the books written by an author?
- What is a keyword search?
- Can you find me the book action and passion written by christopher wren?
- Are there any books authored by john wild on the subject of philosophy?

The system also has a learning ability that allows a user to extend its vocabulary. Once the system is told that "magazine" means "serial," for instance, the new word "magazine" is meaningful to the system. Furthermore, it learns common phrases. For example:

- "Where on earth is" means find me the book.
- Where on earth is action and passion written by christopher wren?

The first sentence above teaches the system a new phrase: "where on earth." The second sentence demonstrates an immediate use of the new phrase.

The "Bookshelves"

After a database search has been successfully performed from an item, a keyword, or a natural language search, the "bookshelves" appear (see figure 6). The current shelf displays a list of candidates, and the Next and Previous Shelf pictures contain more listings of available items. Clicking on an item on the current bookshelf retrieves the selected item from the electronic database, opens a study desk window, and places it on the electronic Study Desk. (At any time, users can click on the Study Desk picture, a library action object, to look at the contents of the Study Desk.)

The Electronic Study Desk

All library items selected from the bookshelves are placed on the electronic Study Desk. Figure 7 shows a desk filled with three items—a globe, a cassette tape, and a book—each with its own bibliographic information. The Study Desk has a book table, a tape recorder, and a VCR for reading, listening, and viewing multimedia data. It also allows users to create customized multimedia documents using a writer, painter, scanner, and composer program. The following sections describe the globe, cassette tape, and book objects. (Since full-motion video is not yet implemented, a VHS object is not shown on the Study Desk, and it will not be discussed in this paper.)

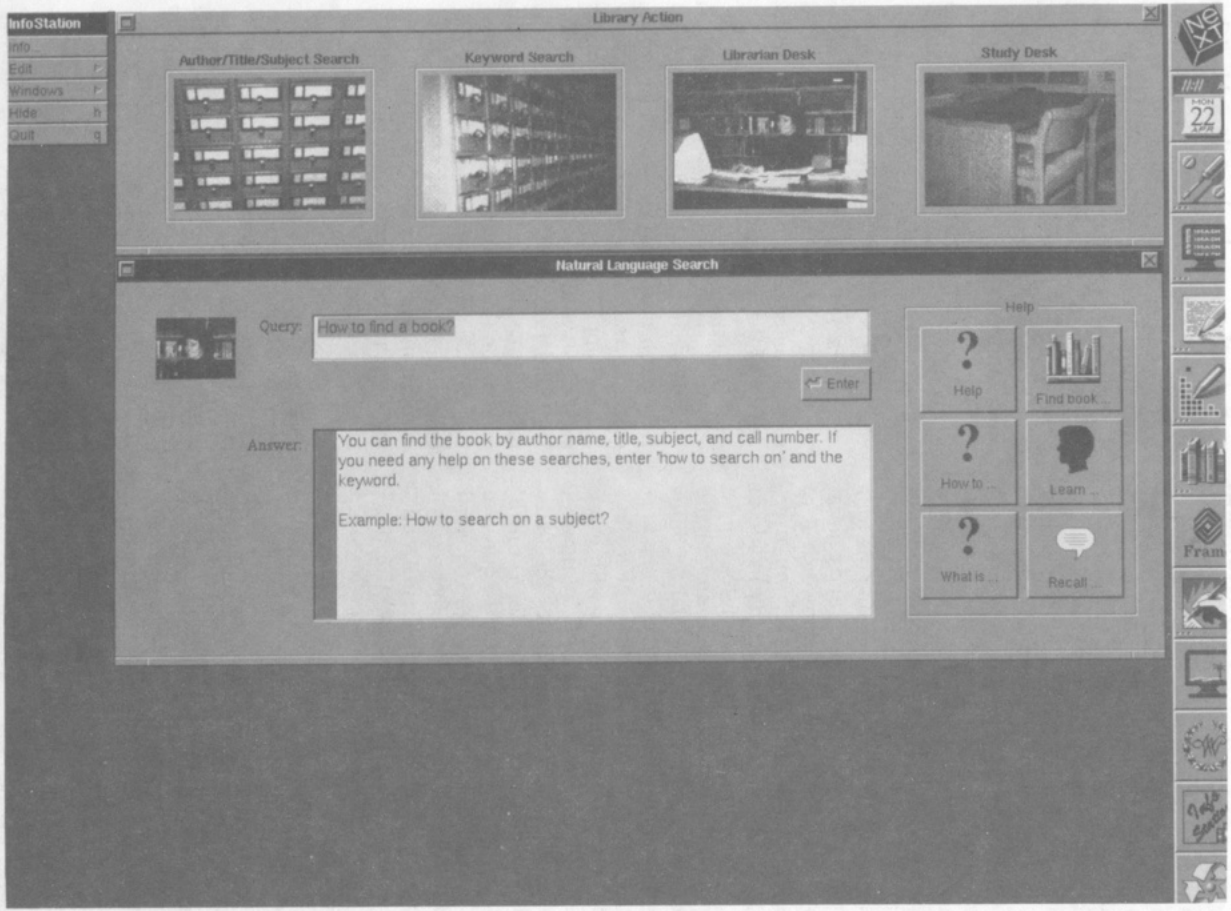

Figure 5. A Natural Language Query.

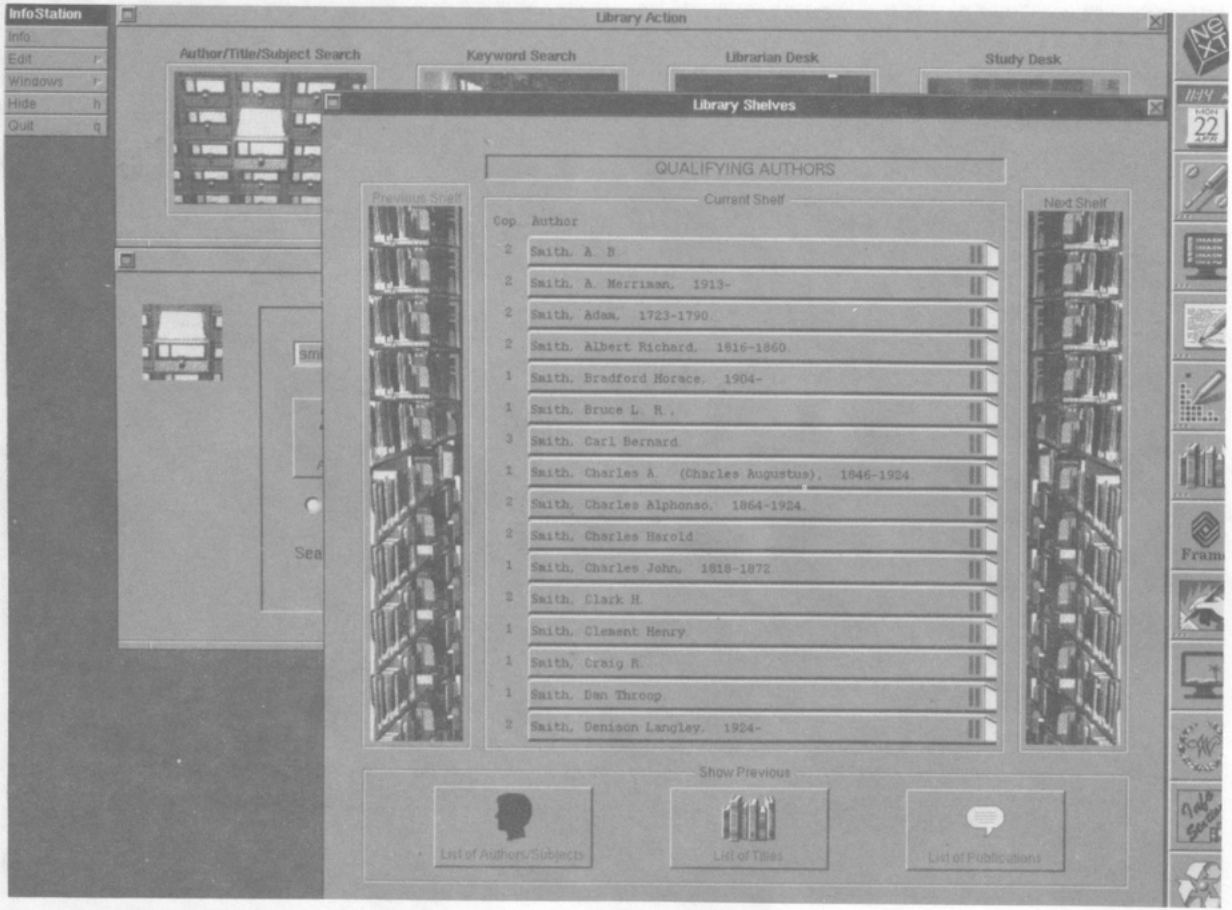

Figure 6. Viewing the "Bookshelves."

Figure 7. At the Electronic Study Desk.

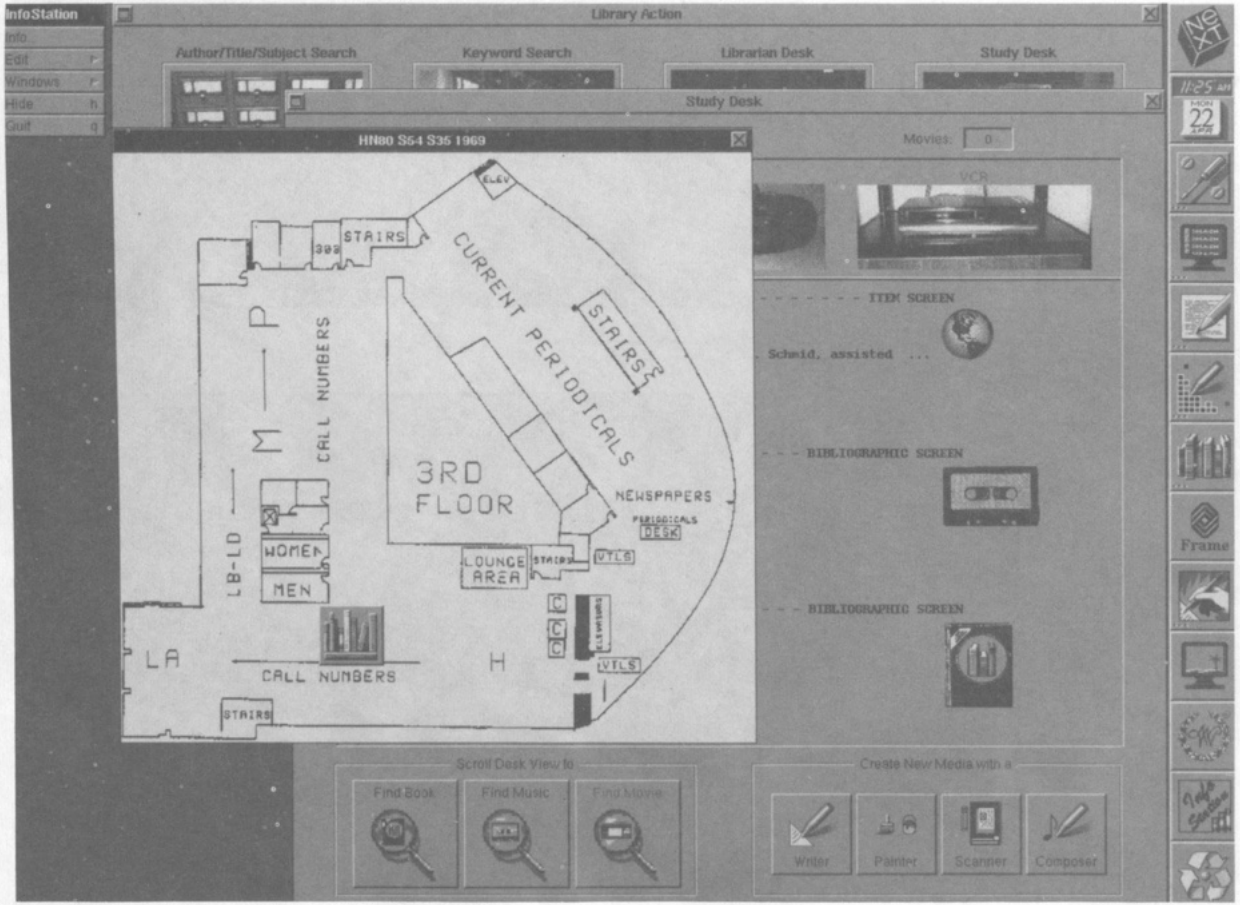

Figure 8. Finding the Library Item.

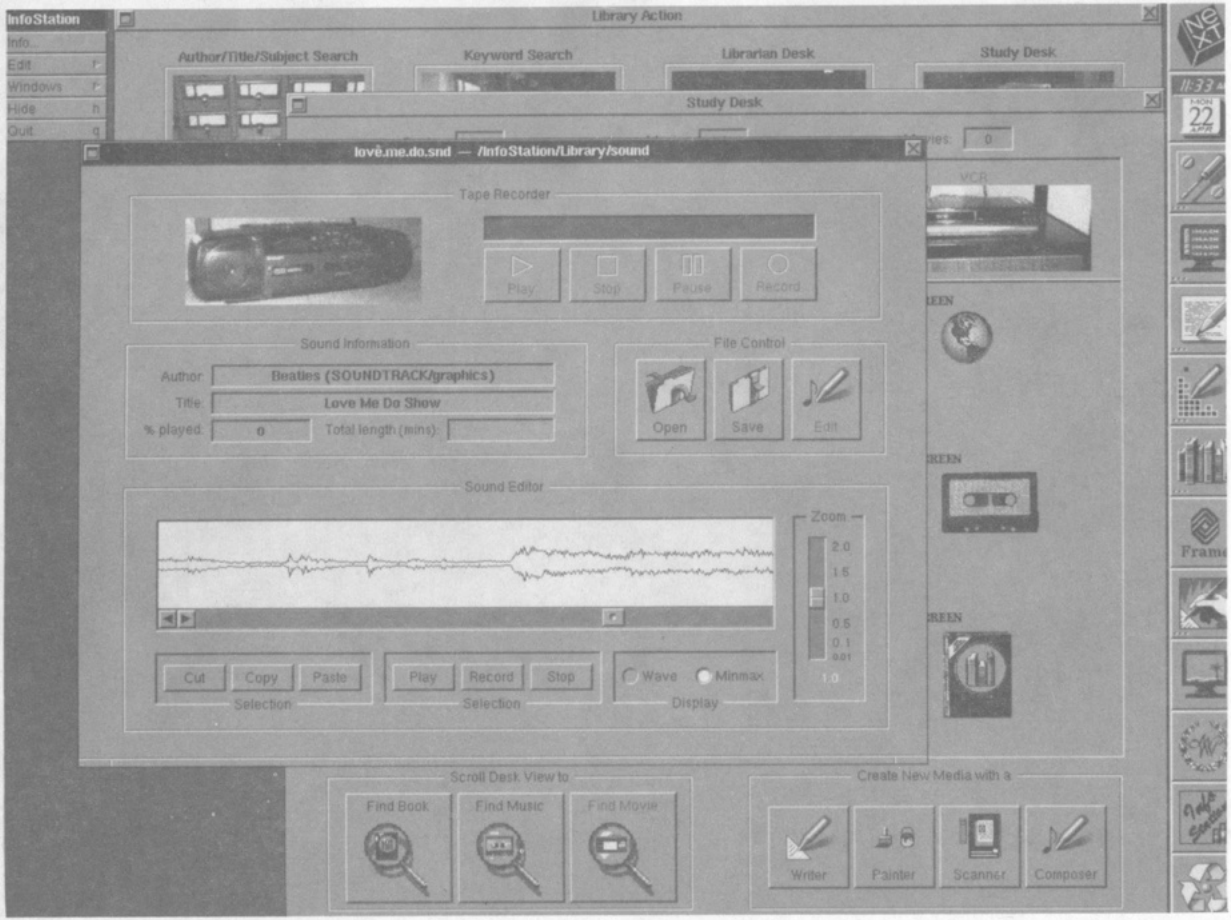

Figure 9. Playing a Sound Recording.

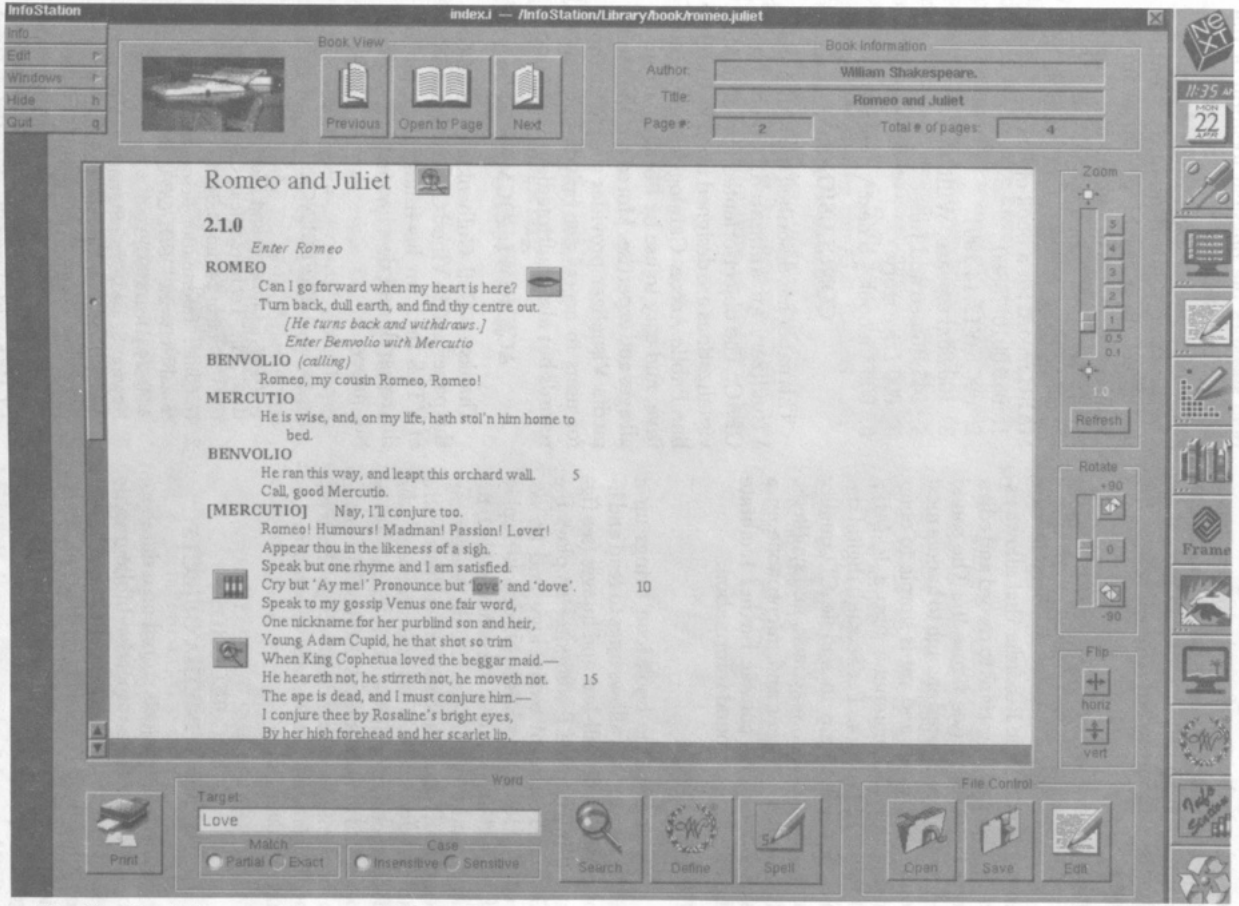

Figure 10. Viewing Full-text and Images.

The Globe Object

Clicking on the globe icon produces a map that indicates where the library item is located physically (see figure 8). A user can print the map on an attached printer by simply clicking on the bookshelf icon on the map.

The Cassette Tape Object

Clicking on the cassette tape icon invokes an electronic Tape Recorder that allows users to play and librarians to record and edit a sound recording (see figure 9). The sound editor is sophisticated enough to handle most sound recordings and yet is simple to operate. The NeXT computer uses a 10-MIPS (Million Instructions Per Second) digital signal processing chip to handle CD-quality music digitization, playback, and synthesis. The built-in speaker and microphone on a NeXT computer console further facilitate the handling of sound information.

The Book Object

Clicking on the book icon brings up a Book Viewer that allows users to read and librarians to edit full-text and images (see figure 10). The NeXT computer employs the Display Postscript technology and an acceptable screen resolution (92 dpi) to display sharp text and images that can be scaled, rotated, and flipped. In addition, readers can search on, define, and spell-check words in a full text document. The icons attached to the document text in figure 10 are known as hypermedia annotations. A detailed discussion of hypermedia is beyond the scope of this paper; interested readers are referred to Lee and Yankelovich.[4,5]

MARC RECORDS AND MULTIMEDIA OBJECTS

Multimedia objects stored on a database are linked to their respective bibliographic MARC records. A new MARC tag, the 909 local tag, is used to specify the type, location, and ID of a multimedia object. The general syntax is

909 \ a <object type> \ b <machine> \ c <filename> \ d <creation date>

The object type subfield is "sound" for audio objects, "book" for text and/or graphic objects, and "movie" for full-motion video objects. The machine subfield specifies the physical location of the object. For instance, "next" means the object resides on the local NeXT computer. The filename subfield uniquely identifies the object on a machine. For example, "beatles.snd" refers to a sound file. Finally, the creation date is an optional subfield for record keeping. Below is an example of a MARC record for a book object:

1. 035 0010-75860
2. 090 SW12.14 1991
3. 100 Shakespeare, William.
4. 245 Romeo and Juliet
5. 600 Love story.
6. 909 \ a book \ b next \ c romeo.juliet

CONCLUSIONS

This paper has described the Multimedia Visualizer, an animated, object-based OPAC. The object-oriented and animated visualizations are designed to make the Online Public Access Catalog friendly, intuitive, and easy to use by library patrons of all ages and expertise. Moreover, the Multimedia Visualizer provides simple methods for users to access not only bibliographic records but also multimedia information.

ACKNOWLEDGMENTS

Thanks to Gail Gulbenkian for editing this paper and to Vinod Chachra, president of VTLS Inc., for his financial support of the research and development reported in this paper.

REFERENCES

1. C. Arms, "Libraries and Electronic Information: The Technological Context," *EDUCOM Review* 24, no. 3:34–43 (1989).
2. N. Cline, "Information Resources and the National Network," *EDUCOM Review* 25, no. 2:30–34 (Dec. 1990).
3. Newton S. Lee, "InfoStation: A Multimedia Access System for Library Automation," *The Electronic Library* 8, no. 6:415–21 (1990).
4. Newton S. Lee, "Multimedia Information Access and Annotation," *Proceedings of CUMREC '91* (Louisville, Ky.: University of Louisville, Apr. 28–May 1, 1991).
5. N. Yankelovich and others, "Intermedia: The Concept and the Construction of a Seamless Information Environment," *IEEE Computer* 21, no. 1:81–96 (Jan. 1988). ■■

Tutorial

Editor's Note: We are pleased to present *ITAL*'s first tutorial, an idea suggested some time ago by Carol Parkhurst, a past president of LITA. We have not had a suitable piece because we were initially looking for someone to edit what we hope will be a series. The membership of LITA has, in the meantime, acted as an acquisitions editor by strongly suggesting that Walt Crawford's presentation during the ALA Annual Conference in Atlanta be published.

It is fitting to begin this series with something from Walt, a frequent contributor to *ITAL* and the literature in general. His topic, "Desktop Publishing Choices: Making an Appropriate Decision," offers the reader sound advice in a lively, readable style.

We make several requests of the reader: please let us know what you think of such a series; please suggest topics that you would like to see covered; please submit tutorials if you have something to share; and please let us know if you are interested in editing the series, that is, soliciting manuscripts and ensuring that they meet *ITAL* standards for accuracy and scope. Thank you. ■■

Desktop Publishing Choices: Making an Appropriate Decision

Walt Crawford

My title is "Desktop Publishing Choices: Making an Appropriate Decision." For many of you, the choices are obvious. If you want to make pretty pages, buy Aldus PageMaker—for the PC or the Mac. If you want to produce effective publications, particularly ones that are long, complex, or recurring, buy Ventura Publisher or QuarkXPress. Give yourself a week or two—or more—to learn them. You'll need other software to create most illustrations.

Walt Crawford is a Senior Analyst at the Research Libraries Group, Inc. This tutorial was originally the keynote presentation for "The World of Desktop Publishing: Low End to High End," a LITA Desktop Publishing Interest Group program at the ALA Annual Conference in Atlanta, June 1991.

If that's too complicated, pick up Publish-It at $125 or QuarkStyle for the Mac. And if that sounds like too much, well, you can buy Publish-It Lite for $35.

The funny thing is that the advice I just offered is right for most of you, particularly if, on the one hand, you're serious about using desktop publishing to make your library more effective or, on the other hand, you're on a really tight budget and cannot spend much time learning. But let us go into a little more detail.

VARIETIES OF SOFTWARE

You can break the desktop publishing and page layout market down into four rough categories of software. Let's go through them, noting a couple of examples in each category and adding a fifth category, programs to complete your desktop publishing toolbox.

Advanced Word Processing

First comes the software you may already have: advanced word processing programs with document-preparation and graphics-import capabilities. These pro-

grams will work fairly well for many of the documents you need to prepare, particularly if you learn to think in terms of effective document design. Most top programs cost $210 to $310.

The obvious choices here are Microsoft Word (for DOS, Mac, or Windows) and WordPerfect, the best-selling DOS program. I prefer Word, but you cannot go wrong with either one. Both offer considerable typographic sophistication, reasonable layout features and graphics-handling, and good document-support features; both will give you some sense of what the pages will look like before you print them.

The best word processing programs provide flexible type handling, style sheets so that you can define elements of a document in a standard manner, graphics import and some degree of manipulation, and document-processing features such as footnotes, index generation, and widow and orphan control. You can generally assume that advanced word processing will provide better long-document and typographic control than low-end desktop publishing or page layout programs.

You need a good word processor for desktop publishing anyway—but you can work more effectively when you have a separate desktop publishing program. Anything more complicated than a single-column design will be much easier with desktop publishing. Some complex designs—such as multicolumn newsletters where stories are continued to pages other than the next one—are nearly impossible to do without true desktop publishing.

With true desktop publishing, you will be able to design documents more effectively because you can see what you are doing. You can save complex designs for reuse. You will have better control of typography and graphics. You can expect justified text to look better with the best desktop publishing programs, since they provide more precise control over text. In general, you will waste a lot less paper and time getting things to look just the way you want them to.

It is certainly possible to produce major documents using advanced word processing. For example, my 1988 book *Current Technologies in the Library: An Informal Overview* (G.K. Hall, 1988) was produced with nothing but Microsoft Word and an HP LaserJet with "F" cartridge. But it is not the best, fastest, or most convenient way to work; I would not do it again.

Graphics Software

Next comes graphics software, most of which now includes some support for text. You can use graphics programs to prepare one-page publications—and for posters or signs that are mostly graphic that is a pretty good way to proceed. And that is about as far as it goes.

Generally, there are drawing programs and paint programs, although some Mac programs combine the two. There are lots of other varieties of graphics software, which I won't get into. High-end drawing programs for DOS, such as CorelDRAW! and Micrografx Designer (around $380–$450), will most assuredly do fine single-page layouts, text and all; most DOS paint programs (such as PC Paintbrush IV Plus, $100; and Paintshow Plus, $12) are not really designed for textual work.

Drawing programs create editable objects; paint programs just paint the screen with light, dark, or colors. There is a lot more to say, most of it irrelevant to this discussion.

You can use a high-end drawing package to produce first-rate single-page signs, even if they include a significant amount of text. You can conceivably use a paint program to produce single-page documents, but with considerably more difficulty—and the text would be crude, since it would usually be defined at screen resolution rather than printer resolution.

Graphics programs are not desktop publishing programs; they do not work well (or, usually, at all) for multiple pages and they do not really offer much typographic control, in general. If you expect to use graphics extensively in desktop publishing, you may need some graphics programs—but they are supplements, not substitutes. You will definitely need a paint program if you use a scanner, but it should come with your scanner. You may not need $400 drawing programs or $130 paint programs.

Low-End Desktop Publishing

Pfs:First Publisher is probably the best-known example of the most infuriating category, low-end desktop publishing programs. Several different low-end desktop publishing programs have emerged for the PC and Macintosh, most costing between $90 and $160. Different programs appear to offer different strengths and weaknesses, although every low-end product gives up some major functionality of the high-end programs.

For example, Pfs:First Publisher is incredibly clumsy in terms of text handling, but it is not bad for one-page posters and comes with lots of clip art and odd typefaces. Express Publisher wraps text around irregular graphics, has style sheets, kerning, drawing tools, and pixel editing—but limits a document to thirty-two pages and handles graphics clumsily. Finesse offers a great user interface and good text handling, but limits you to ninety-nine pages and has no graphics annotation tools. And so it goes.

Publish It seems to be the highest-rated low-end PC desktop publisher. There is also Publish It Easy for the Macintosh with similar features—and Springboard Publisher II, also for the Macintosh.

The Macintosh appears to have a clear winner in the low-priced area: QuarkStyle, a limited version of the high-end QuarkXPress that can import and use page layouts generated using the higher-priced version. I have not used it, but the reviews suggest that it is a winner.

Low-end programs are good for very casual users and for such things as signs, one-page announcements, and the like. Volunteers and groups using the library will love them. They are usually easy to learn; for very short projects, they are also easy to use.

But if you expect to do more ambitious projects, you will find them incredibly frustrating in general. Most low-end programs will not handle large documents well or at all; many of them won't generate pages automatically to handle text overflow, and some of them do not even generate page numbers. In the past, some low-end programs could not even provide high-quality typography—and, while almost every program can now use good typefaces, most low-end programs do not provide good typographic control. I do not know of any low-end program that can handle something even as relatively simple as the *LITA Newsletter* with the speed, ease, and quality of Ventura Publisher. Once you get over the initial learning curve, you are better off making partial use of a high-end system than trying to squeeze extra capacity out of a low-end system.

Mainstream Desktop Publishing

Finally, there are the mainstream high-end desktop publishing programs: Aldus PageMaker, Ventura Publisher, QuarkXPress, and Ready-Set-Go, all selling for $500 or so.

Historically—in the vast six-year history of desktop publishing—you could break the high-end programs down into page-oriented systems and publication-oriented systems. Aldus PageMaker is the classic page-oriented system, with the largest user community of any advanced desktop publishing program. It works from the pasteboard metaphor, in which you place possible elements of a page on the screen, then move them into pages as you desire. It includes decent drawing tools, strong control of imported images, and good facilities for wrapping text around the actual outline of a figure, rather than around a rectangular frame. It is regarded as a great program for playing with a page layout; it is also an effective program for doing serious publications, to be sure. Ready-Set-Go appears to be a direct competitor, but only on the Mac.

Ventura Publisher is the first major publication-oriented desktop publishing program for PCs. Ventura is the program I use—and its unique strength in defining and automating all aspects of complex documents literally saves me hours or days on every major project. Ventura still provides considerably more support for document automation and production than PageMaker; for example, PageMaker still doesn't handle footnotes, big first letters, or automatic bullets. QuarkXPress is probably the major competitor. However, Ven-

tura is the only DOS high-end program that does not need Windows—and it is the only high-end program that does not need high-end equipment.

Just for a change, let's start out with the bad points—since it is obvious that I think these are the programs of choice for serious desktop publishing. High-end desktop publishing programs do take longer to learn than the low-end programs: you need to plan for a week or so of serious practice, manual-reading, and experimentation. They cost around $400 more than the low-end programs and are less likely to include much clip art. They require more powerful computers than advanced word processing programs and, except for Ventura, than most low-end programs.

On the other hand, high-end programs typically do not bog down when your projects get big or complicated. I would argue that they are actually easier to use once you have learned them, and that is certainly true for complex, lengthy, or repetitive projects. If you plan to do a series of similar publications—newsletters for Friends of the Libraries, formatted new book lists, library event calendars, subject bibliographies—the automated support available in Ventura and QuarkXPress and, to a lesser degree, in PageMaker will pay for the learning curve and initial price very rapidly.

Completing the Toolkit

A complete desktop publishing toolkit includes a good word processing program to create and revise your text; possibly—although not always—some form of painting and/or drawing program to create and manipulate graphics; and a desktop publishing program to put it all together.

You may also want scanning hardware and software, and capture and conversion software. Scanning is the cheapest and most versatile way to get clip art and other illustrations for your publications—and, thanks to Dover Publications (and all those books and magazines published before 1906), there is a huge supply of art that you can use without any fear of violating copyrights. A good hand scanner for PCs typically costs less than $200 including paint or editing software; figure on paying somewhat more for a Macintosh or PS/2 scanner, and closer to $320 for a top-of-the-line gray-scale scanner like the Logitech ScanMan 256. Full-page scanners cost $1,000 to $2,000. Of course, you can also buy any number of machine-readable clip-art packages at all sorts of prices.

Capture and conversion programs allow you to capture screen images from most (although never all) applications, including both text screens and graphic screens. Several word processors include capture utilities, but those utilities usually only capture graphic screens, and sometimes you really need to capture a screen of text, including highlights, to use as an image, such as in a brochure about searching your online catalog. Conversion programs make it possible to convert graphics from one form to another, widening your choices for graphics import. Some capture and conversion programs also offer editing and touch-up tools. Well-regarded programs for the PC include HiJaak at around $100 and HotShot Graphics for around $160.

APPROPRIATE PLATFORMS

Just a few words about the hardware platform you need for desktop publishing. Six years ago, it would have been fair to say that you needed a Macintosh to do serious desktop publishing. That is nonsense today, of course. You need a big hard disk, a mouse, and a screen with lots of resolution—but that can be either a Mac II or a PC. You may get more for your money with PC clones; you get a consistent graphics-oriented interface with the Mac. Either one will work fine.

For either platform, you need balance and a reasonable amount of power. Balance means that your hard disk, display resolution and speed, memory, and CPU speed are all appropriate. You should have lots of high-speed hard disk space for desktop publishing, particularly when you start using lots of graphics; you should also have a high-resolution display; and you also need lots of memory. Most high-end programs require fast CPUs in any case—and with the rest of the equipment needs, it only makes sense to use a powerful CPU. For Macs, that means looking at the Mac II line; you will want an external monitor and you will want a big hard disk.

Today's typical modest PCs will work pretty well for Ventura. CompuAdd—a very large and well-established direct vendor—sells a 12MHz AT-class computer with 40MB hard disk, monochrome monitor, and 1MB memory for less than $1,400. That is enough power to use Ventura quite effectively; I speak from experience, having used a slightly less powerful system to produce two books and three years' worth of newsletters.

If you can afford a little more, you should do so—and if you want to use Aldus Pagemaker (or run Ventura under Windows 3), try to get at least a 386SX-based computer, and preferably a full 386 (with cache) with a VGA monitor, 80–100 megabyte hard disk, and 4 megabytes of RAM. Don't buy a CGA monitor, period: there's no excuse for these hard-to-read monitors on 1991 systems. If you cannot afford VGA, buy a Hercules clone and save up for the future.

What will you pay for such a system? Well, buying from the five best-known direct-order vendors, and including Windows, DOS, a mouse, and a year's on-site service, you can pay as little as $2,400 or as much as $3,900; you can probably get by for less than $2,000 if you're willing to deal with an unknown brand.

Let your budget be your guide, but do not save money at the expense of your future. The newer, bigger, faster hard disks should also last much longer, since they're newer and better designed; memory cannot get too much cheaper than it is now (it is currently as low as $50/megabyte); and high-resolution screens with fast adapters just make your work faster and more pleasant.

SELECTION GUIDELINES

Now, we've gone lightly through the marketplace and discussed appropriate platforms. You know my general preferences, so you can discount my bias. The question that remains is, which system will meet *your own* needs best?

Obviously, I cannot answer that question for you; I do not know how isolated your library is, your working environment, or any other aspects of your particular situation. I can suggest what you need to think about in making up your own mind, however. There are four general areas to consider: your publishing needs, current and future; your current hardware and software environment; your direct resources (in terms of time, money, and existing skills); and indirect resources (other users, users' groups, and reading materials).

Current and Future Publishing Needs

First, what do you plan to produce over one to three years? If your plans include complex multipage newsletters that might incorporate graphics, a series of subject bibliographies that need to attract readers but also provide lots of information without using too much paper, effective procedural manuals incorporating illustrations, directories of community services, or guides to local history, then you should focus on the high-end programs like Ventura Publisher, Pagemaker, or QuarkXPress.

If you want better-looking signs, simple library event calendars, and other products that are only one or two pages long—and if most or all of your longer productions don't require anything more than a single column of text with headings—then you might do well with a low-end page-layout program and an advanced word processing program.

If all you want are better-looking textual documents, you might do well to study the principles of desktop publishing, invest in a good printer and typefaces, and stick with an advanced word processing program; you can always buy a high-end desktop publishing program later.

One word of caution: before you decide on a low-end program, make sure you aren't underestimating what you'll do with desktop publishing. I have a strong sense, based on some experience, that most good libraries will find many more uses for desktop publishing than they might first have anticipated—and once you're doing a lot of it, you will appreciate the power of high-end programs.

Current Hardware Environment

What computers does your library currently use, and what do you plan to buy in the future? If the staff is comfortable with MS-DOS machines (PC compatibles), stick with them. If you have Macs and like them, then use a Macintosh for desktop publish-

ing. If you have both, then it really depends on the preferences of the staff member(s) most likely to do desktop publishing—the one (or, with luck, more than one) with a taste for design and the patience to solve problems. If your computers are Apple IIs, buy new computers.

Direct Resources: Money and Time

Now we come to the issue of resources. First, direct resources: money and time. Can you afford to have someone take a week's worth of time, probably some of it at night or on weekends and probably spread out over a month or so, to become well-versed in your desktop publishing system? Will you be able to deal with an apparent lack of productivity for that first week? If not, you may not be ready for high-end desktop publishing; perhaps the low end is all you are prepared to support.

Effective desktop publishing takes time to learn regardless of the program. I do not believe that most of that week's worth of effort will be spent learning the program, even the supposedly difficult Ventura Publisher. Most of the time will be devoted to gaining familiarity with the concepts of publication design and learning to apply the concepts effectively—and, if anything, that's actually more difficult with the low-end programs, since they don't offer as much support.

Money is an issue, of course. Just as a first cut, I'll say that if you can't afford a laser printer (about $1,200–$2,000 with PostScript support) or an adequate computer platform (figure $2,000–$3,000), then you're wasting your money on a $500 desktop publishing program. Yes, they will work with dot-matrix printers, but nowhere nearly as effectively. If you are on an Epson-and-XT budget, go for a low-end program.

You should consider indirect resources: other users, users' groups, and books. If your choice comes down to two or three different programs and you know people who use one of them—and like it—that should settle the issue for you, unless the program clearly won't meet your needs. Buy whatever your friends use: always good advice, and particularly good advice for desktop publishing.

THE LIMITS OF DESKTOP PUBLISHING

If it isn't already obvious, I think good document-oriented desktop publishing is great stuff. Good desktop publishing software will encourage you to design styles for your publications. It will enforce those styles and make them easy to use. It will handle most of the nuts and bolts of typography and text layout, including crucial details such as widow and orphan control, keeping headings with the following text, handling page numbers and running heads, and so on. The best programs will even control the relationship of graphics to text—so that, for example, if you wind up moving big chunks of your text around or adding a lot of new text, the graphics will automatically move to the appropriate place.

But to paraphrase Tom Lehrer, desktop publishing is like a sewer: what you get out of it depends on what you put into it. Which is to say: desktop publishing won't make you a graphic designer, and it can be used just as easily to produce unattractive, confusing, difficult-to-read documents as to produce pleasing, clear, communicative publications. Indeed, the sheer power and flexibility of desktop publishing almost assures that you'll produce some documents that should never be distributed—LaserCrud, to put it gently. ■■

Special Section: OCLC Users' Council Presentations, June 3, 1991, Dublin, Ohio

Public Libraries in 2001

Kenneth E. Dowlin

In thirty minutes I am supposed to tell you everything I know and think about the library of the future. In that amount of time the best I can really do is skip the rock across the pond and hit some high points that I think are relevant to what you are doing or what you want to do. The task of defining what libraries may or may not be in the year 2001 or 2020 is rather daunting.

In San Francisco it is no theoretical task—we are creating a new main library, we are renovating twenty branches, and we will be implementing a new-generation automated system in the next twelve months. We have not been sitting around thinking about what libraries will be like; we have been designing a new one.

First, will there be libraries in the year 2001? I think there will be because the public wants them. A recent survey shows that people like libraries, they use libraries, and they will continue to do so.[1] The public likes libraries, and buildings, and books, and all those traditional services. The next piece of significant evidence is some research that we conducted in 1988 in San Francisco. I was hired in 1987 to build the new main San Francisco library and create state-of-the-art technology. One of the first things we needed to find out was if the public would pay for it. So we commissioned a benchmark survey by a professional firm which basically found that the people of San Francisco like libraries, want libraries, and will pay for them. The survey asked respondents if they could think of a better use of their tax dollars than spending it on the public library. Ninety percent could not think of a better use. That told me that they want a good library.

Second, will libraries be the same as they are today? My contention, again, relying on the surveys, is that libraries will change. They will change because the public wants them to. Again, I think the public attitude and their willingness to pay for these libraries will be a primary determinant of change.

But how are libraries going to change? That is subject to a good deal of interpretation. Obviously the economic environment we are in, which is now a global environment, needs to be considered. Another factor is technology, in which a number of things are indicative of what is coming in the near future. I am sure most of you have heard about the full-text Diskman from Sony. In its first year Sony sold more Diskmans than they did Walkmans in Japan. It is only a question of time before they start showing up in the United States. We all assume that television is here forever. But we do not know that. Tandy has recently released the Multi-Media PC-ROM. Tandy, Radio Shack if you will, is the Montgomery Ward of the electronic world. When it starts distributing multimedia PCs through all its stores, it is a significant indicator of the future.

Basically, it is the librarians who are debating whether it is libraries or books or computers. The public wants them all. They want buildings, books, and computers—they want everything we have

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always given them and they want all the new things too. So in San Francisco, we are spending $140 million dollars on a new main library. It has to conform with San Francisco Civic Center architecture; it will be quite large—more than fifty thousand square feet per floor, on six floors. The building itself becomes a metaphor for the library: the past, the present, and the future.

The key element that will drive library development over the next decade and beyond will be the public's need for information. It is time for libraries to simplify their message. We used to say that ignorance is not nice, but we will live with it. We did not do much about it. Then we got into the cycle that says ignorance costs. We are now at that stage in our society where we must finally come to terms with the fact that *ignorance kills*. To me the mission of the public library is to eliminate ignorance.

Remember Maslow's hierarchy of human needs, which says you have biological needs, physiological needs, security needs, social needs, ego needs, and self-actualization? (To me self-actualization is to be the library director in Tahiti, with a CD player, a satellite receiver, a lap-top, and a bunch of books on the beach.) Woody Horton translated Maslow's concept into a hierarchy of information needs. He contends that people have information needs ranging from coping, helping, enlightenment, to enrichment.

The key point is that we have built traditional libraries to focus our operations and resources at the top of Horton's hierarchy of information needs. Libraries today need to use technology to give us the capability of being principal actors in our communities and in our society for providing coping information. In San Francisco our mission is to serve as the focal institution in the city for publicly supported access to information and knowledge.

How else will libraries change in the next ten years? First, we need to change our concept of the library as an institution of the graphic record; this is Alan Pratt's concept. Alan Pratt came up with a wonderful definition of the library, which is the collection, preservation, organization, and dissemination of graphic records. I contend, however, that Pratt did not go quite far enough in terms of technology, and I have expanded the concept to include the *neographic* record era. Essentially, the technology and skills that we have to develop to manage our historic mission allow us to move into new functions. We now have the ability to create information. The computer that is the online catalog can also create local databases. The computer that has the capability of storing text can deliver it to the home. While Pratt talks about the dissemination of information, I talk about delivery. It is a fine point, but basically dissemination has meant come to the library and get the information. I am talking about delivery of information to your desktop or your home—instantaneous delivery.

This gets us into a whole new area, that of transformation, We may transform text or context from one format into another to increase its utility. The entire cost of the San Francisco Public Library's new generation catalog system will be justified the day it talks to a blind person. We have that capability. We can move things from printed text. We all see the decrease in the number of handbooks and reference books that deal with statistics. Those things will become artifacts. But libraries must undertake the responsibility to manage the new technologies to accomplish their mission.

A second key point in the future is that we have to think in terms of access, which can be broken down into four dimensions:

1. Self-access: I have convinced the architects of the new San Francisco Public Library to design the entrance to our new building so that people can check their own books in and out. The architects and I have also discussed signage. They wanted the signs to blend in. I want the signs to stand out. I want entrances so patrons flow through. Come in, put your book in the slide, the scanner checks it in. If there's a problem, see the attendant. When they are ready to check out, use ATM (automatic teller machine) technology: put in your card, it checks the item out, you walk out. But not everybody will want to use the ATM model and so people will be present to help some of the patrons. I think the ATM is great. We are building a focus on self-access.

2. Assisted access: This is the traditional role of libraries. If you cannot find what you are looking for, ask the librarian or a staff person.

3. Mediated access: Mediated access is based on the assumption that libraries will be the information wholesalers, not retailers, to their users. I have a nightmare about our new library. I can see us spending seven years of my life and hundreds of millions of dollars building this thing and it opens with homeless people on the steps. I cannot solve the homeless problem. They are not my department—I do not have the skills, knowledge, or resources. What I can do, however, is build information and knowledge systems and connectivity so that the people who have that responsibility—the social workers and other professionals—can tackle that problem. Ultimately we can talk about the NREN. I think the NREN is a great pipeline. We need it. We need the pipeline to solve problems. And that gets into the next level of access.

4. Collaborative access: Collaborative access occurs when a researcher here is working on a problem in collaboration with someone over there working on another problem. Collaborative access is a system that connects these human resources. One of the things we are trying to develop is the capability to take high-speed input digitized images, index them briefly, and store them. A basic problem I have right now is that we are acquiring 500,000 pieces of music; they are in a warehouse. We have one music cataloger, who with great effort catalogued 6,500 pieces of music last year. This is a tremendous collection. How am I going to deal with it? We are trying to work through high-speed scanning to digitize and quickly index these music records. We want to involve the music scholars in the community in our Distinguished Scholar Program, in which they come in and become acquainted with our special collections. For example, a music scholar might spend a couple of hours a day or a weekend going through the music stored on the optical disk, but may concentrate on 1930s vocal arrangements. In the area of San Francisco history—someone might come in and say, "I know only about historic firetrucks." That's great. Bring up all images of firetrucks, tell us what kind of firetruck that is, and we will connect you with our online catalog. This is collaborative access: working together, not just within the profession, but within our communities.

A third area in which we will see major changes is in technology. We need a lot of work on unitary workstations in which audio and visual capabilities are built into a flat-screen panel or on a lap-top. One of the concepts that we may actually use in our building is wireless technology. When you come in, you might be issued a lap-top. You can take that lap-top anywhere in the building and connect it—sit down and push the connect button—and you are into the OPAC or whatever.

- Metacatalog: The metacatalog is one of our biggest challenges and one of our biggest opportunities. The metacatalog is the catalog of catalogs, and needs to be multilingual, to deal with images, to provide content access and remote access, and to be multiplexed, that is, so that it can talk to you while it is showing you things. It needs to be user driven. The user needs to have the ability to control the system to the extent that he or she can operate it. And it needs to be user friendly, that is, a system that recognizes that the person on the keyboard is in the third grade or is a newly arrived immigrant who knows only Mandarin Chinese.

Additional technologies that could be developed include self-assistance devices. Again, a talking catalog might allow a patron to walk up and ask, "Where is *Gone with the Wind*?" and receive the reply, "Upstairs to the left." We need intelligent devices that can make some decisions for people.

- Network management: Once we have a metacatalog and we are connected all over the globe, someone has to manage those pieces. We have to be able to validate the users. Right now the economics of database access are based on the assumption that the library pays for access. It is conceivable we could flip the economics the same way as broadcast television and I could say to OCLC, "I'll give you 400,000 validated users." The key role in all of this is the built-in network development of users. Another technology is smart remote cards

for library cards. Patrons could simply have one in their pockets when they walk through the building and a video screen would say "hello" and bring them up to date.

- 3-D simulators: The concept of virtual reality is very rudimentary now but very interesting. In fact, we can get very close to a lot of these simulations on video games. For example, I play Flight Simulator on airplanes. I had a stewardess convinced once that I was flying the plane. I was in the fifteenth row. I had a lap-top. She said, "What are you doing?" I said, "Flying the plane." She said, "What?" I said, "I get tired of sitting up in the front." She came back three times. Fortunately, I didn't have to land.
- Mass capture and preservation: The whole concept of mass capture and preservation machines has made an ironic confluence here of the preservationists and the technologists. One of the reasons more and more information will be digitized is that people are in love with fax machines. Once you have run information through a fax, it is digitized. So you can do lots of things with it.

Mass capture is essential. We not only have 400,000 pieces of music that we have to get into my collection, we have a total of eighteen million items. About 1.4 million have machine-readable catalog records. There are 17.6 million left to go; that's the rest of my life. How do we get this information into the system? We have to come up with systems and trained professionals that can do it.

Actually the real question we librarians should be asking ourselves is not, Will there be libraries? Yes, there will be libraries. The question is, Will there be librarians? The fact that library schools are closing is a bad sign. So, when we talk about librarians, we have to talk about change again. Look at the things we learned in library school in the 1960s: book- and periodical-related selection, cataloging, processing, reference planning, reader's advisory, and so on. What do our new librarians need? They need electronic library skills: system design, system integration, content and format selection, database creation. In acquisitions, people will be negotiating licenses instead of ordering books. We are already running into that. Librarians need a major shift in skills. I am less concerned about the people coming out of library school today than I am about the people who have been out for decades. We will have to realize that we work in a profession where lifelong learning is essential for us as well as for our users.

Librarians also need to make some changes in terms of our own perceptions of staff. We will have to move from being pointers and retrievers to facilitators and organizers. What that means in management terms is that we will have to shift our human capital investment from the end of the stream, which helps the patron find books, to the front line, which will organize information so that patrons can find it themselves. In fact, in some ways it runs counter to some of the trends, which hold that technical services disappear and everyone will be on the public service desk. I predict it will be the other way around. We will have more investment in the acquisition and organization of library information than we will in service. Call me in 2010; we will see how we are doing. We have to move from the concept of the library as a fortress to the concept of the library as a pipeline. As Paul Peters says, "The public is trying to drink from the firehose of information." It is the job of libraries to put faucets on it.

Libraries need to move from the concept of unitary acquisition and processing to mass acquisition and processing. The San Francisco Public Library added 160,000 items to its collection last year, not counting the 400,000 pieces of music. We added them essentially one at a time. We selected them one at a time, we ordered them one at a time, we processed them one at a time, we stuck them on the shelves one at a time. We cannot afford to do that anymore.

We need to move from the concept of banking to connectedness. Some in the education field are already trying to do this by moving away from the tradition of stuffing information into the kids' heads and assuming that when they go out the door they know everything they need to know. These

educators are moving toward the concept of connectedness, in which you don't need the information if you know where and how to get it. Essentially, this is moving from the just-in-case collection syndrome to just-in-time information delivery.

My basic challenge to OCLC is that I think there are only three agencies or institutions in existence that have the capability to provide the strategic leadership that libraries need to move to the year 2001 and beyond. Those three entities are ALA, the Library of Congress, and OCLC. They will not move us forward individually. It will take all of them working together. Therefore, I urge OCLC to step up to create the connectivity, the technology, and the metacatalog, so that we can create the global village library. There will be libraries in the twenty-first century. Of that, I am convinced.

REFERENCE

1. Alan F. Westin and Anne L. Finger, *Using the Public Library in the Computer Age: Present Patterns, Future Possibilities* (Chicago: American Library Assn., 1991). ■■

Delivering on Promises: The Intersection of Print and Electronic Information Systems in Libraries

Joseph J. Branin

Being asked to discuss electronic information control and delivery issues and how they might affect the library of 2001 is a little bit like being asked to discuss the meaning of life. It is a big, complicated, and confusing topic. I have heard that Woody Allen likes to think about such profound questions, and when once asked about the meaning of life, Woody replied that certain important experiences define the meaning and quality of existence for him. Woody Allen's list of important life experiences includes watching Groucho Marx or Willie Mays perform, listening to the second movement of the *Jupiter Symphony* or to Louis Armstrong's "Potato Head Blues," or looking at Cezanne's drawings of pears. Just recently, in April of 1991, Susan Allen Toth, a Minnesota writer, and John Coughlan, a St. Paul Public Library trustee, published a book with Doubleday entitled *Reading Rooms*. *Reading Rooms* is an anthology of poems, short stories, sections of novels, and memoirs about libraries written by some of America's most noted writers: Eudora Welty, Edith Wharton, James Baldwin, Sinclair Lewis, Nikki Giovanni, Amy Tan, and many others. Like Woody Allen, these writers define libraries and librarians with very concrete reflections of experience. Susan Toth, for example, in her novel *Blooming: A Small-Town Girlhood*, writes about the Ames, Iowa, Public Library in these terms:

> Whenever I hear the words *inner sanctum* I think of the Ames Public Library. It was a massive stone temple, with imposing front steps that spread on either side into two flat ledges, overhung by evergreens. Waiting for my mother to pick me up, I could sit almost hidden on the cool stone blocks, surveying passing cars with a removed superiority. Safely perched on my pedestal, surrounded by my stacks of new books, I always felt unusually serene, bolstered by the security of the library behind me and the anticipation of the books beside me. Even to the moment of leaving it, any visits to the library were high occasions.[1]

Whether the reflections of the writers anthologized in *Reading Rooms* are of high occasions or low comedy, they describe libraries in terms that are familiar to most of our users. They write about buildings and books and people; the sights, the sounds, the smells, and the feel of marble, stone, wood, paper, print; and the imperious, timid, or even ordinary behavior of librarians. There is nothing about electronic information access, networking, bits and bytes, or optical storage media in these pages. The only thing I can find in the anthology that deals with electronic information is a piece of light verse by Pkye

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Johnson, Jr., called "From the Librarian." It is two lines long and reads, "Annual report to the heads of the town: / Circulation is up. Computer is down."[2]

My point here is that we cannot deal with electronic information in isolation from our more traditional library resources and services. About five years ago at a White House Conference on productivity an executive from General Electric stated that American industry could make one of three choices: automate, emigrate, or evaporate.[3] We are certainly automating in American libraries. Our technical services and circulation operations are highly automated. We are introducing new information technology to reference services as well, but our buildings and our massive print collections have yet to evaporate. The rallying cries of the electronic revolution in libraries—"the paperless society," "the library without walls," "the wired scholar," and "access over ownership"—all have useful rhetorical purposes, but they greatly oversimplify the nature of our current information environment. Electronic delivery and control of information is not causing our library buildings, our massive print collections, or our personal reference services to evaporate. It is not an either/or situation.

I think the best way to describe our situation now—and for at least the next ten years—is that of an intersection of two information systems, one print and one electronic. How these two systems for storing and retrieving information will integrate, conflict, dominate, or even lead to the eventual evaporation of one of them will be the major story line of the next edition of *Reading Rooms*.

ELECTRONIC ACCESS MEETS PRINT SUPPLY: A PARADISE OF TOOLS

In 1983, an academic book publisher, critical of librarians' cooperative efforts, made the blunt statement, "It's a paradise of tools, where instead of buying books, librarians press buttons. All you have to do is locate one stupid librarian who is interested in buying a book, and everyone can have it."[4] If resource sharing were only that simple, publishers might have to worry about their livelihoods. But resource sharing, as manifested most often in interlibrary loan activity, has three essential components: bibliographic access, provision of resources, and document delivery. There may be a paradise of electronic tools available for bibliographic access, but provision of resources and their delivery are still part of what Richard Boss and Judy McQueen have called the "horse and buggy" era.[5]

With resource sharing, we are witnessing the meeting of the electronic and print information systems in a very strained relationship. Electronic bibliographic control and access to information have far outstripped the ability of libraries to provide physical access to the content information, which is still most often in print form.

In 1989, OCLC celebrated the tenth anniversary of its interlibrary loan subsystem. The many librarians who contributed bibliographic and holdings records to OCLC, and who willingly shared the resources these records point to, can take just pride in the impressive statistics released by OCLC during its anniversary celebration: a database with 300 million location listings attached to bibliographic records, and eighty union lists online for some 7,300 libraries.[6] In February of this year, Michigan State University Libraries recorded the 30 millionth ILL transaction on OCLC for a book appropriately entitled *A Woman Run Mad*.[7]

GROWTH OF INTERLIBRARY LOAN ACTIVITY

A look at the growth of interlibrary loan activity on the OCLC system during the last decade is impressive, with requests growing from less than one million a year in 1980 to 4.5 million annually by 1990 (see figure 1).[8] Closer to home, ILL activity among the MINITEX libraries, one of the most successful multitype library networks in the country, has been increasing, particularly during the last three years. In 1989, MINITEX received more than 225,000 requests, an increase of 13 percent over the previous year (see figure 2).[9] The University of Minnesota supplies anywhere from 60 to 70 percent of MINITEX requests, making it the single largest interlibrary loan lender in the country.

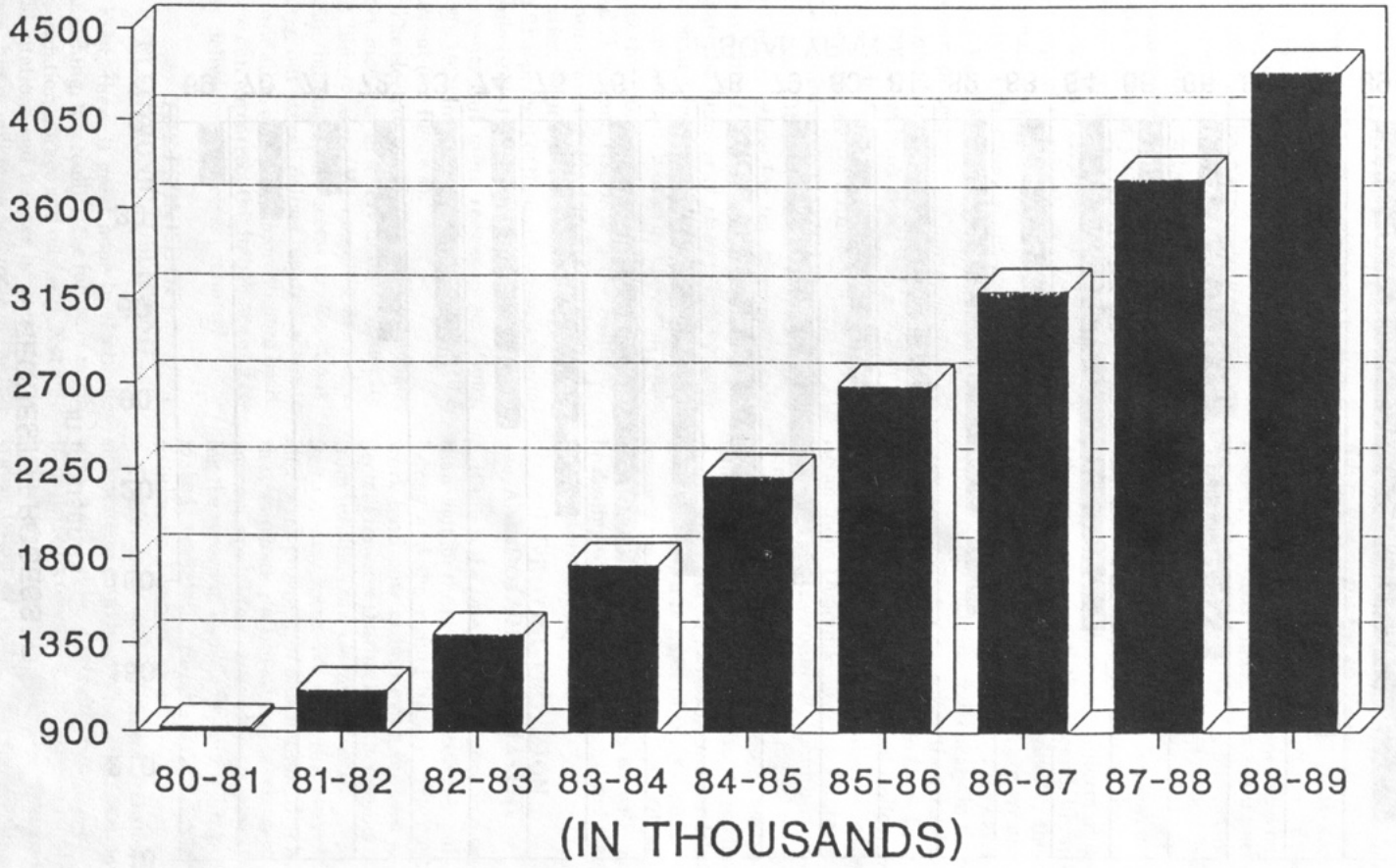

Figure 1. Total ILL Requests, FY 80–81 to FY 88–89.

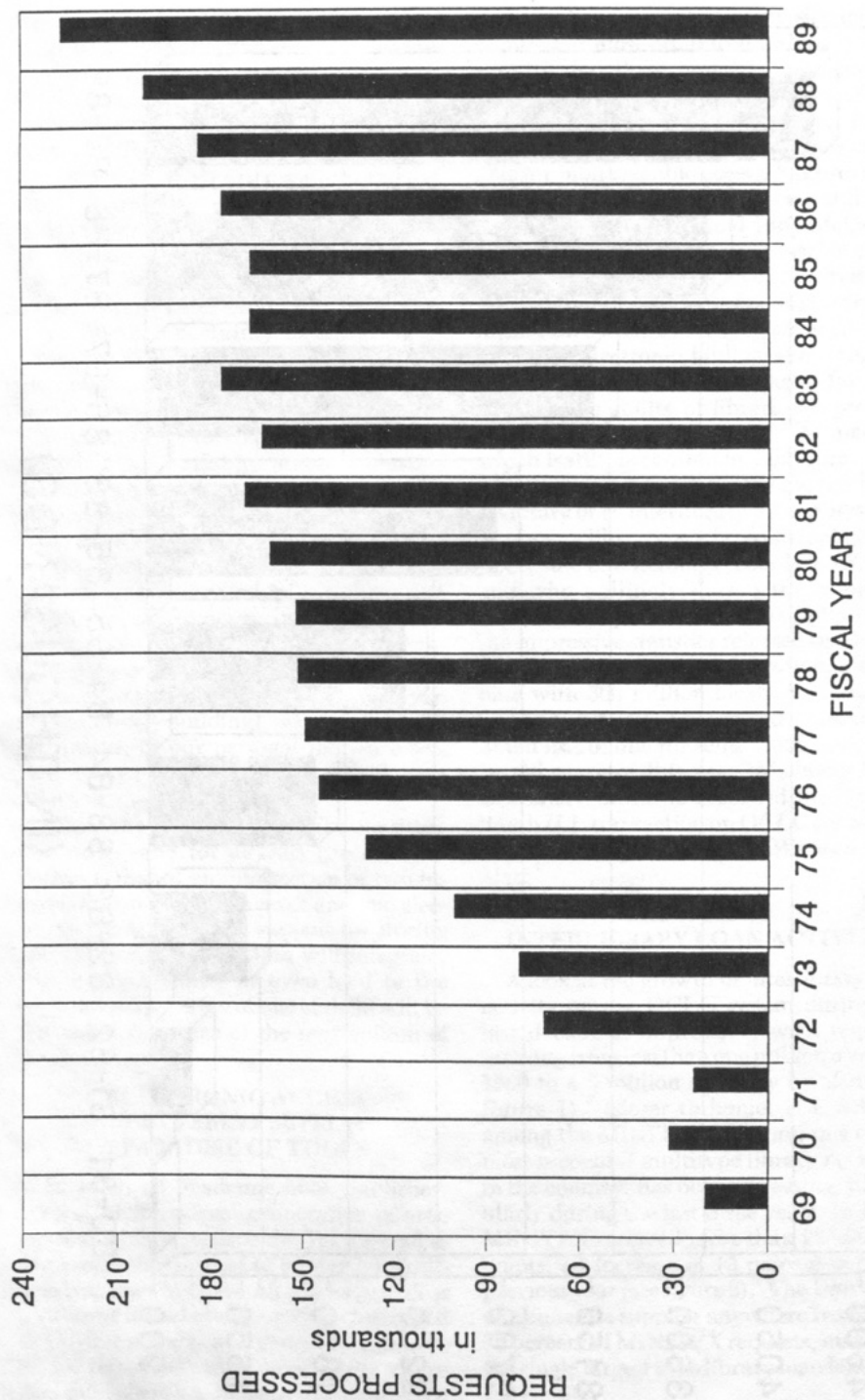

Figure 2. Requests for Document Delivery Received by Minitex, 1969–1988/89.

PROVISION DIFFICULTIES IN THE PRINT SYSTEM

Compare, however, this stunning success in electronic bibliographic access and the growth of interlibrary loan it has created with the severe acquisitions difficulties libraries have been experiencing during the past decade. I need say little about this difficulty in our print system, for it is well documented and I am sure experienced firsthand by all of you. Library acquisitions budgets are declining, and the cost of print materials is increasing. At the same time the explosive growth of new books and journals continues. Where is the paperless society? Librarians are confronted with what Paul Mosher has described as an "ocean of seventy million or more titles published in the past," and waves of 700,000 new book titles being produced worldwide each year.[10]

Two examples of the difficulties in provision of print resources can be seen in statistics from ARL libraries and from an age of collections study for the Minnesota State University Libraries. Between 1986 and 1990, the number of monograph volumes purchased by ARL Libraries declined 16 percent and serials titles by 1 percent, while prices for monographs and serials rose by 41 and 51 percent, respectively (see figure 3).[11] Among Minnesota State University Libraries, imprints from 1960 to 1969 make up 21.6 percent of their collection universe, while 1970–1979 imprints account for 27.5 percent. But more recent acquisitions, 1980–1989 imprints, account for only 19.5 percent (see figure 4).[12]

The electronic and the print technologies have met, but in a very unfair manner for our library users. We can offer them electronic bibliographic access to almost anything, but we can deliver physical access to information on a much more limited basis. How can we correct this imbalance and really deliver on our access promises?

THE PROMISE OF ELECTRONIC PUBLISHING

First, there is great hope in electronic publishing; this really is the future of much information storage and retrieval. Not only will citations and indexes be in electronic form, but so will more and more of the full texts they point to. Sharon Rogers and Charlene Hurt in *The Chronicle of Higher Education* argue for an electronic "Scholarly Communication System" to replace our print journal structure. They say "Five years from now, the new system could be a reality."[13] Eldred Smith, from my university, has also argued forcefully and persuasively for electronic storage and retrieval of the entire record of scholarship. In his recent book, *The Librarian, the Scholar, and the Future of the Research Library*, he concludes, "In this (electronic) information-delivery environment, the research librarians will be able to resolve, finally, their long-standing conflict between preservation and use of the scholarly record."[14] However, I think Smith may be more realistic than Rogers and Hurt about when the record of scholarship will be in electronic form. In an article in the most recent issue of *College & Research Libraries*, entitled, "Resolving the Acquisitions Dilemma: Into the Electronic Information Environment," Smith maintains that the process of moving scholarly publishing from the print to electronic system will take some time. He says, "Even if a major effort were undertaken immediately, it would take a number of years—perhaps two or three decades, at best."[15] In 2001, as I said before, I am pretty certain we will still be dealing with a mixture of print and electronic information systems.

IMPROVING PROVISION AND DOCUMENT DELIVERY

If this is the case, then we must do more than wait for the promise of electronic publishing and the virtual library. We must work hard now at improving the two aspects of resource sharing that are keeping us from fulfilling our electronic access promise to library users. We must find ways to ensure the provision of information, that is, that someone—a library, a government agency, a publisher, or vendor—is preserving the record of knowledge and willing to make it available. And we must find ways to improve document delivery.

Telefacsimile and document transmission systems combined with a national, or even worldwide, electronic communications network offer us great improvements in document delivery. The conversion and transmission of print information into

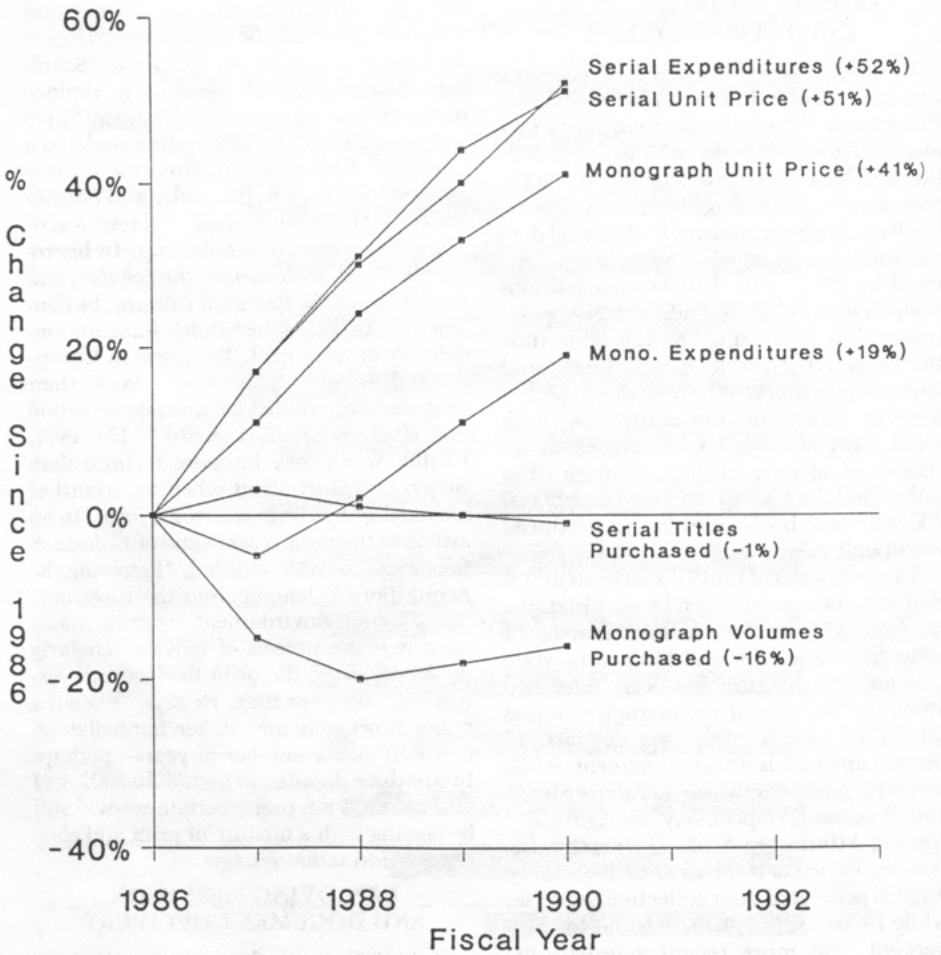

Figure 3. Monograph and Serial Costs in ARL Libraries, 1985/86–1989/90.

electronic form are essential at this intersection of the two systems. OCLC could help by evaluating these new document delivery systems and taking a leadership role in setting standards. At the University of Minnesota we are faced with several choices: a CIC Internet fax project using Group 3 fax and IBM-compatible equipment; an NAL fax project using Apple equipment; the RLG Document Transmission Workstation called "Ariel," which claims to "outfax the fax"; and now on campus in our Telecommunications Center, some experimentation with Group 4 fax technology (see figure 5). Typical of a developing technology, the field of document transmission is fluid to say the least. However, until we settle on some standards, we will not develop the network of equipment and operations necessary to make electronic document transmission an important part of resource sharing.

STRENGTHENING INTERLIBRARY LOAN

A technological fix is only part of the solution to making our print and electronic systems work better together. Interlibrary loan operations in this country are in trou-

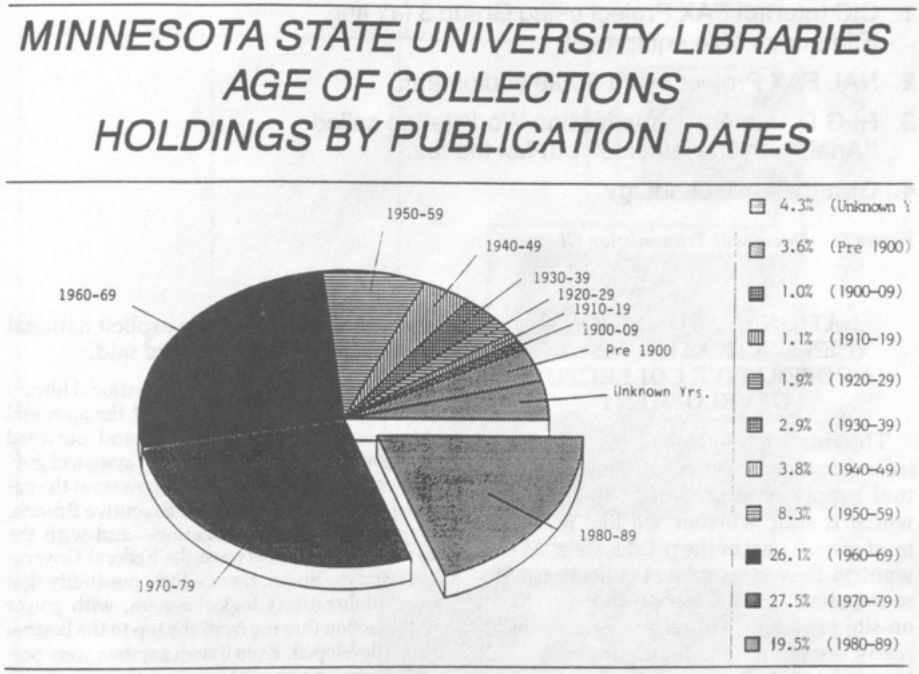

Figure 4. Minnesota State University Libraries: Age of Collections Holdings by Publication Dates.

ble. On the surface they may look successful, but the increases in ILL activity we have seen during the last decade have put serious strains on our local ILL operations.

Across the country I hear my colleagues saying, "Enough! We are at the breaking point with ILL requests." From my point of view, the problem is not so much with the volume of interlibrary loan activity as with the very low priority we give to resource sharing in our libraries. Even with the increases of the last decade, interlibrary loan activity is still a relatively small activity compared to overall circulation traffic. Boss and McQueen in 1983 found that interlibrary loan traffic accounted for "only some one percent of most library's circulation statistics."[16] In 1985, Thomas Ballard said he looked in vain for any library system with more than 2 percent of its total circulation in interlibrary loan transactions. However, in that same year Bernard Sloan reported measuring an 8.3 percent share of interlibrary loan traffic among the member libraries of the Illinois Statewide Library Computer System.[17] At the University of Minnesota, I calculate that last year our interlibrary loan share was 15 percent of our total library circulation, most of that lending, not borrowing. But I would speculate that only a few research libraries like Minnesota, Illinois, Washington, and Wisconsin, have ILL traffic of this relative size. Most libraries' share of ILL transactions would fall within the single-digit range even today. Reports from the OCLC ILL system indicate that growth rates are declining, from highs of over 25 percent in the mid–1980s to under 15 percent in 1989 (see figure 6).[18] The real problem is understaffed and inefficient local interlibrary loan operations. Unless we make more of a commitment to resource sharing and strengthen the operation and visibility of our ILL units and service, we will see more strain on this system. Rather than increasing ILL traffic, we will see more and more libraries and even consortia restricting interlibrary loan through quotas, high fees, or simply deteriorating service.

1. CIC Internet FAX Project using Group 3 fax and IBM-compatible equipment.
2. NAL FAX Project using Apple equipment.
3. RLG Document Transmission Workstation called "Ariel," which claims to "out-fax the fax."
4. Group 4 fax technology.

Figure 5. Document Transmission Choices.

NATIONAL AND REGIONAL CENTERS FOR PROVISION: COOPERATIVE COLLECTION DEVELOPMENT

The final component in the delivery of information services is, of course, the actual supply or provision of information, which is still, whether we like it or not, most often a part of the print system. We all want to have strong local collections. Resource sharing is the second choice to local, on-site provision. However, for reasons already discussed, it is increasingly difficult for individual libraries to meet user needs with only local collections. Cooperative collection development makes a lot of sense at this critical intersection of the electronic and print information systems.

Unfortunately, cooperative collection development has a poor track record in this country. The Farmington Plan, PL 480, The National Periodicals Center, The Research Libraries Group, and ARL's North American Collections Inventory Project all point to the difficulty of sustaining large-scale cooperative collecting endeavors and achieving any measurable results. The politics of local library autonomy in this country make centralized or even coordinated collection development a very tough task. Mary Biggs, who has written an excellent summary of the National Periodicals Center story, concluded in 1984, "In the case of the National Periodicals Center proposal, the American library community revealed itself to be a collection of clashing Indians without any chief."[19] L. Quincy Mumford, Library of Congress from 1954 to 1974, gave an accurate description of our decentralized, free-market approach to information services in this country, when in 1962 he responded to a request for the Library of Congress to assume a more explicit national leadership mission. Mumford said,

> In the United States there is no national library system, with a directing agency at the apex and branches spreading downward and outward throughout the country. Given our system of government, with the separation of powers at the national level—and, within the Executive Branch, departmentalized organization—and with the division of powers between the Federal Government and the States, there is little possibility that an administratively logical system, with power and direction flowing from the top to the bottom can be developed. Even if such a system were possible, there is a very real question as to whether it would be desirable in a country as large as ours and with as many diverse interests to serve.[20]

But I would not give up on cooperative collection development even given the decentralized, locally autonomous library environment we operate in. The demand from our users for an expanding range of information resources—a demand that we have created with our electronic bibliographic tools—will be frustrated if we attempt to provide without cooperation. We need to strengthen national and regional centers that can serve as our collective agencies for highly specialized, expensive, infrequently used print materials, as well as backup collections for current, high-use material. These centers, of course, must have effective interlibrary loan units, provide good electronic bibliographic access to their collections, and employ the best document delivery technologies available. Drawing on the resources of these centers, as well as on commercial document delivery sources, all types of libraries can really begin to move from an ownership to an access orientation in their services.

Michael Gorman and I are in agreement on many aspects of the academic library of

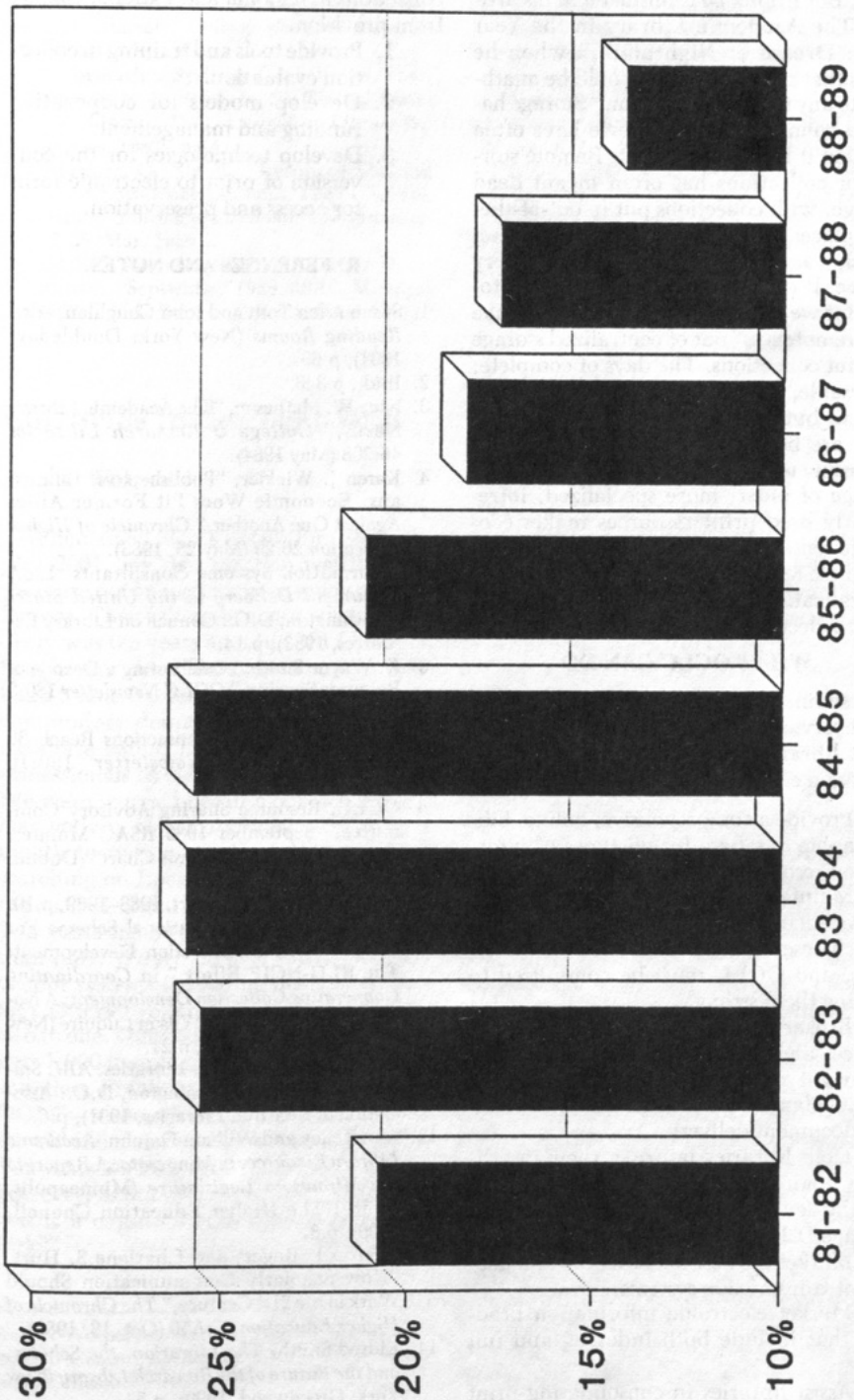

Figure 6. Annual ILL Request Growth Rates, FY 81–82 to FY 88–89.

2001. But I think he is mistaken in his article "The Academic Library in the Year 2001: Dream or Nightmare," when he states that remote storage should be anathema to any thinking librarian.[21] Storage has a bad connotation because we have often handled it badly in the past. Remote storage of collections has often meant dead storage, with collections put in out-of-the-way places with poor bibliographic access and slow or nonexistent document delivery service. It does not have to be that way today, for we have the electronic tools to take the "remoteness" out of centralized storage of print collections. The days of complete, browsable, on-site collections never really existed, but the limitations of local collections are becoming more obvious in our electronic age. Regional consolidation and storage of older, more specialized, infrequently used print resources makes economic sense as well as service sense today. For these reasons, I think we will see more centralization and more consolidation of print collections in the next ten years.

WHAT OCLC CAN DO

In summary let me just quickly list some of the services I think OCLC can provide to assist libraries at the intersection of the print and electronic information systems:

- Provide a comprehensive, online, bibliographic database for all types of information resources.
- Maintain an effective interlibrary loan subsystem linked to the bibliographic database. These first two are OCLC's core services, and OCLC must be committed to keeping them strong.
- Broker commercial document delivery services and serve as a clearing house for copyright payments. I am pleased that OCLC plans to move aggressively into full text document delivery.
- Help libraries improve their interlibrary loan operations, through training and the development of automated tools to manage ILL operations.
- Market the best telefacsimile and document transmission systems.
- Market electronic information products that include both indexing and full text.
- Assist libraries in consolidating print collections in regional and national centers from provision.
  1. Provide tools and training in collection evaluation.
  2. Develop models for cooperative funding and management.
  3. Develop technologies for the conversion of print to electronic form for access and preservation.

REFERENCES AND NOTES

1. Susan Allen Toth and John Coughlan, eds., *Reading Rooms* (New York: Doubleday, 1991), p.60.
2. Ibid., p.348.
3. Nina W. Matheson, "The Academic Library Nexus," *College & Research Libraries* 45:208 (May 1984).
4. Karen J. Winkler, "Publishers vs. Librarians: Economic Woes Pit Former Allies Against One Another," *Chronicle of Higher Education* 26:29 (May 25, 1983).
5. Information Systems Consultants, Inc., *Document Delivery in the United States* (Washington, D.C.: Council on Library Resources, 1983), p.14.
6. K. Wayne Smith, "Celebrating a Decade of Resource Sharing," *OCLC Newsletter* 180:3 (July/Aug. 1989).
7. "Interlibrary Loan Transactions Reach 30 Million," *OCLC Newsletter* 190:10 (Mar./Apr. 1991).
8. OCLC, Resource Sharing Advisory Committee, "September 1989 RSAC Minutes: OCLC Total ILL Requests Chart" (Dublin, Ohio: OCLC, 1990).
9. MINITEX *Annual Report*, 1988–1989, p.10.
10. Paul H. Mosher, "A National Scheme For Collaboration in Collection Development: The RLG-NCIP Effort," in *Coordinating Cooperative Collection Development: A National Perspective*, ed. Wilson Luquire (New York: Haworth, 1986), p.21.
11. Association of Research Libraries, *ARL Statistics 1989–1990* (Washington, D.C.: Association of Research Libraries, 1991), p.6.
12. Ann Kelley and William DeJohn, *Academic Library Resources in Minnesota: A Report to the Minnesota Legislature* (Minneapolis, Minn.: The Higher Education Council, 1990), p.8.
13. Sharon J. Rogers and Charlene S. Hurt, "How Scholarly Communication Should Work in the 21st Century," *The Chronicle of Higher Education* 35:A56 (Oct. 18, 1989).
14. Eldred Smith, *The Librarian, the Scholar, and the Future of the Research Library* (New York: Greenwood, 1990), p.84.

15. Eldred Smith, "Resolving the Acquisitions Dilemma: Into the Electronic Information Environment," *College Research Libraries* 52:239 (May 1991).
16. Information Systems Consultants, Inc., *Document Delivery in the United States* (Washington, D.C.: Council on Library Resources, 1983), p.14.
17. Bernard G. Sloan, "Resource Sharing Among Academic Libraries: The LCS Experience," *Journal of Academic Librarianship* 12:28 (Mar. 1986).
18. OCLC, Resource Sharing Advisory Committee, "September 1989 RSAC Minutes: OCLC ILL Request Growth Rates Chart" (Dublin, Ohio: OCLC, 1990).
19. Mary Biggs, "The Proposed National Periodicals Center, 1987–1987: Study, Dissension, and Retreat," in *Library Lit.—155: The Best of 1984*, ed. Bill Katz (Metuchen, N.J.: Scarecrow, 1985), p.114.
20. L. Quincy Mumford, "Report of the Librarian of Congress on the Bryant Memorandum," in *LC Annual Report for 1962* (Washington, D.C.: U.S. Government Printing Office, 1963), p.94–96.
21. Michael Gorman, "The Academic Library in the Year 2001: Dream or Nightmare or Something in Between?" *The Journal of Academic Librarianship* 17:6 (Mar. 1991). ■■

Libraries in the Year 2001

Ann J. Wolpert

When asked to talk about libraries in the year 2001, my first reaction was that ten years are not enough to make much of a difference. Then I thought about where my library was ten years ago. In 1981 I had just bought my third Texas Instruments 300-baud Silent 700 teleprinter terminal to accommodate demand for searching on a database called Lockheed. Our ratio of professionals to clericals was one to three. We were worried because our interlibrary loan activity had skyrocketed from thirty a month to sixty a month since we started searching on Lockheed. We were cataloging on OCLC and behind in our card filing. Ten years later we have more computers than staff. We search over thirty database vendor systems (including one called Dialog). Our ratio of professionals to clericals is two to one. Our document delivery desk orders 1,000 items a month from commercial suppliers. Finally, we are still cataloging on OCLC—although we are no longer behind in card filing since we now have an OPAC. Ten years is a long time. You may well ask, however, as Stanislaw Lee did, "Is it progress if a cannibal eats with a knife and fork?"

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MANAGERIAL AND PROFESSIONAL BUSINESS COMMUNITY IS LARGE AND POORLY SERVED

The arena of library services that I know best is library service to the professional and managerial business community. This community of existing and potential library patrons works in sales and marketing departments, research departments, law offices, company headquarters, consulting firms, and engineering and design departments, to name a few.

If you work in an academic or public library you may wonder if you should read further. This is why you should: The professional and managerial business community is a large, influential, underserved market for library services. By way of illustration, academic libraries provide service to fourteen million students and faculty. At twenty-eight million people, excluding teachers and librarians, the market for library services to managers and professionals is twice that size.

The people who work in this sector are important to the library "industry" in many ways. They are most apt to support and use public libraries in their communities. Government officials solicit testimony from this sector on funding matters. Trustees of library boards are drawn from this sector. College administrators are recruited from this sector.

Most important to this discussion of the future of library service, however, is the fact that libraries in the professional and managerial business community have di-

rect competition in a way few other libraries have. This is a sector in which patrons pay dearly and sometimes directly for library services. This last aspect makes these libraries the "canary in the coal mine" of our industry. If business and industrial libraries are not around in ten years, it does not bode well for all of library service because it means the professional and managerial community has decided it can do without libraries and librarians.

Existing library service to the business and professional community is highly uneven and is provided by a variety of suppliers. Some academic and public libraries have had success providing library service to the business community on either a fee or free basis. In Boston, for example, MIT has an Industrial Liaison Program. The Boston Public Library has the Kirstein Business Branch in downtown Boston. Professional associations fund libraries, such as the Engineering Societies Library in New York. However, most library services to this community are provided by the businesses themselves, either through in-house staff and resources or via contract information brokers.

ATTITUDES REFLECT BUSINESS CULTURE AND PRIOR LIBRARY EXPERIENCE

There are a number of documented reasons why managers and professionals do not take better advantage of library services. Their attitudes about libraries in general, together with the prevailing business culture, often relegate formal information sources to a minor role.

These are people who typically prefer the resources of their offices, the advice of their colleagues, or the opinion of their boss over an encounter with formal information sources. These are people who arrive on the job scene, after four or more years of college, with serious attitude problems about libraries, ill prepared to conduct research in an environment in which time is money and consequences are real. Regrettably, somewhere along the line, most of these people have developed very low expectations of library service. Their level of understanding about the costs and complexity of information service is equally low. On the other hand, many of them are victims of information anxiety. They believe that everything is now or soon will be available online and they worry about the information gaps in their lives. There is a perception that it is all out there somewhere, in digital form, and that if they only had enough time they could find it.

The environment in which these professionals and managers work has characteristics that shape the form and amount of library services available to them. Many vendors of electronic services have targeted this market. As a result, most of these people have some familiarity with online database searching, if only from browsing in news wires on their electronic-mail services. Where librarians are available, professionals and managers have been the beneficiaries of mediated online literature searching, sometimes for many years. When I first started working in business libraries, the standard question at the reference desk was "I need a book about." Now they say, "I need a search about."

BUSINESS ENVIRONMENT REQUIRES DIFFERENT SERVICES

Business and professional people work in an electronic environment. They have PCs, voice mail, electronic mail, fax, mobile phones, mobile faxes. Their budgets come on spreadsheet templates, their reports are written on word processing software, their timecards and expense reports are prepared on screen and transmitted electronically to their accounting departments. They are learning what technology they absolutely must master and they are looking for someone else to do the rest. When they use formal information sources, they are less and less interested in peer review. Because they value personal contacts over formal sources, they rely heavily on meetings, conferences, proceedings, and other timely, people-oriented means of communication. They are increasingly interested in information about activities, people, companies, and events outside the United States.

Business and professional workers are acutely attuned to how much money is being used to support library services because it will come directly out of profit or contribution to equity. They expect the investment

in library services to pay a good return, just as they expect advertising to return more in sales than the cost of the ad campaign.

Library service to the professional and managerial community is already significantly different from other forms of library service. When I went to work in the business community some years ago, the only difference between the activities and services in my library and the activities and services at the Harvard Libraries or the Boston Public Library was one of scale. Today you would hardly know we are in the same industry.

Libraries in the professional and managerial community keep less and less paper. When you pay for the space you occupy, you value it differently than space that costs nothing. In this community, there is always the hope, but rarely the expectation, that information will be free. The prospect of denying or rationing service simply because it is expensive is beyond the pale in this environment. Managers and professionals may choose not to pay the price, but the option is always there, and the choice is the patron's to make.

After ten years of online, and now CD-ROM, searching, people care less and less whether the item they want is a chapter in a book, a conference paper, an article in a journal, down-loaded CD-ROM text, or a chart from a trade publication. More and more, they use books only if they know exactly what they want, or can browse a manageable-sized collection. More and more, librarians are asked to access and provide access to numeric databases. The ability to locate non-text information and format it in a spreadsheet is increasingly part of answering a patron's question. Materials and resources no longer fall neatly into book, series, journal, and other traditional forms. How do you put CD-ROM versions of online databases, or ten thousand public company annual reports on an image system, or online databases, or Lotus OneSource, or videos with workbooks, on your OPAC, in MARC format, in any meaningful way? If you cancel a print index to provide better service via an online database, how do you show that in a system designed to describe physical, on-site items?

Because library service to the professional and managerial community cannot be sustained if it is not providing a reasonable return for the resources invested, an understanding of the needs, attitudes, and working style of these library customers is important. Just as an airline must know and satisfy the needs of its customers, so too must the library know and satisfy its customers.

In fact, the most dramatic difference between this community and other communities of library patrons is the degree to which the library interacts to enhance the productivity of its customers: reducing risk by providing timely, accurate information; providing information that shortens the time between concept and market; adding value by supplying substance rather than pointers. The proactive obligation of these libraries makes them worth watching as harbingers of future directions for the entire library and information industry.

TOMORROW'S MANAGERS BEING SHAPED TODAY

The expectations of tomorrow's managers and professionals are key to the survival and future shape of business libraries. In addition, for better or for worse, those attitudes are taking form even as we speak. Somewhere in a public library a teenager is being encouraged or belittled. Somewhere an undergraduate is searching ERIC on a campus network, not paying anything but not finding anything, because he wants groundwater studies. Somewhere a graduate student is on the Internet looking through sixty OPACs to find one book.

These future customers are also being influenced by a culture that is more video oriented, more telecommunications oriented, and faster paced than the culture of the 1970s and 1980s. This expectation of immediacy and electronic delivery puts tremendous time demands on the delivery of information service.

If academic institutions do not do a better job of teaching students to conduct research (as opposed to writing papers), managerial and professional employers will continue to have to train employees to conduct business research, and libraries in this sector will continue to spend significant effort on such programs.

TECHNOLOGY, MARKET FORCES WILL DRIVE ADDITIONAL SERVICE CHANGE

Technology and market forces will play an even greater role in shaping library services in the future. I am not a technologist, but I have it on impeccable authority that digital broadband global connectivity will be a reality by the end of the decade. By the year 2001 digitization will be a piece of cake. Scanning will be as accurate and ordinary as photocopy machines and camcorders are today. Hardware will be powerful enough, storage will be large enough, and semiconductors will be fast enough to handle the bandwidths needed for video, imaging, voice, and text. Telecommunications, radio, and cable will be locked in combat over your home and your office (and your money). You will have been issued a telephone number for life. No longer will communications be location dependent. You will travel everywhere with a combination phone, fax, video, and keyboard. Calls will reach you anywhere. You will know who is calling, and you will pay whatever it costs to have a voice-mail system answer your phone when you don't want to. Standards for Electronic Data Interchange will be real and all systems will be able to connect with other systems.

Fair use and royalties provided for under copyright law will give way to the control of electronically formatted intellectual property through leasing, licensing, and contract law. Acquisitions departments will spend half their time on contract negotiation and hardware and software management will be more critical than book and journal management. Commercial vendors will respond to this all-electronic, distributed environment by aggressively promoting fixed price, menu-driven, end-user searching. Publishers will offer subscriptions to customized electronic publications that will be delivered automatically to the fax or PC connected to your phone number. Mainframe and network managers everywhere will be looking for value-added services to mount on their systems to increase traffic and lower their per-unit costs.

DESTABILIZATION CREATES OPPORTUNITY

You may say, as Ogden Nash did, that progress might have been all right once, but it's gone on too long. Fortunately, on the human factors side, there are several trends that will serve to improve the market for library services. The first of these trends is Total Quality Management (TQM). TQM and its variations have had a tremendous impact on American manufacturing productivity. It is a simple concept that says that understanding and meeting customer requirements is a business's only business, and that if a business's employees are empowered to improve the way they do their jobs, a business can increase quality, lower costs, and raise employee satisfaction.

Riding on enormous success on the factory floor, TQM has rolled into white-collar service and professional businesses everywhere. It is even making its way into libraries. Three specific aspects of TQM will combine with technological changes to influence the way library services are provided to the managerial and professional community in the year 2001.

Traditional models of library service are based on the notion that the physical nature of information resources meant that they could be in only one place. Therefore, the resources themselves and the tools to access the resources should be collected in one place, so the value of the collected resources would be sufficiently great that a patron would make the effort to get to them. If technology makes all three elements of the model, that is, the patron, the access points, and the resources themselves, independent of physical location, the model must become a service model, not an inventory management and control model. If we orient toward patron or customer requirements rather than toward the requirements of collection management, we turn library service on its ear.

A second element of TQM mandates that every function within an organization must understand what its internal customers do and how the work of functional areas ultimately serves the external customer. When libraries, or engineering departments, or

accounting departments, or public relations departments undertake this exercise, it raises fundamental questions about the purpose and nature of tasks that were cast in concrete years before automation: cataloging and collection management, to name a few.

A third aspect of TQM holds great promise for librarians. Once it has been demonstrated that employees know their jobs better than upper management and truly want to improve the way they work, it becomes quite clear that a major obstacle to productivity improvement is middle managers. As unnecessary layers of management disappear, the professionals in library service have fewer bureaucratic layers to deal with and are more closely aligned with their actual customers.

VALUE BECOMES VISIBLE WITH INCREASED COMPETITION

The need to compete globally will result in continuous pressure for productivity on professional and managerial workers. Perhaps for the first time ever, groups other than librarians are becoming profoundly interested in developing a better understanding of the value of information.

Many CEOs believe that their ability to leverage information into marketing advantage will spell the difference between success and failure. As a result, business school professors have become interested in the problem. Professor Gary W. Loveman of the Harvard Business School has written: "What makes information technology unique is that, instead of producing something tangible, it has value only when integrated with a structure that is capable of exploiting it effectively."

Worth noting here is the fact that when nonprofit libraries were the exclusive repositories of information resources, quantifying the costs and benefits was of little concern. Now that an emerging, capital-intensive, for-profit industry is in the business of maintaining information resources, there is enormous interest in developing tools to measure and quantify the value of information. Librarians must benefit from this research.

As organizations streamline their operations and eliminate unnecessary administrative layers, the unique contributions of librarians become more visible. This is good news and bad news. If the librarians' vision of service is primarily clerical and passive, there will be scant hope for the future. If it focuses on the professional and informational, if it is proactive, there will be success.

Labor costs are now under the spotlight, primarily because of the escalating cost of fringe benefits, but also because it has become such a high percentage of business costs, especially for businesses in competition with countries where labor costs are low. As a result, any labor-intensive activities not directly involved in service to the customer come under scrutiny. Libraries will be obliged to examine the ratio of back-room to front-room employees. Back-room operations will be downsized, simplified, and streamlined. Reference services, telephone reference, document delivery, and other customer-oriented services will be emphasized.

LIBRARIES MUST PLAN AND PREPARE

What must libraries do to prepare for the future and where does OCLC fit into the picture? The diagram shown in figure 1 is used by organizational development specialists to represent graphically the major points that organizations must address and manage if they want to effect organizational change. It tells us what we must have if we are to get to the year 2001—successfully.

Libraries must have a coherent vision of the services and products they are offering. They must know what differentiates their products and services from the competition (and they do have competition), and they must know what their customers value most about their products and services.

They must have an organizational and managerial structure that gets them moving, keeps them moving, and puts their financial and human resources behind their vision. They must have operational systems that do the same. And they must make sure they have identified and provided for the staff capabilities they need to fulfill their vision.

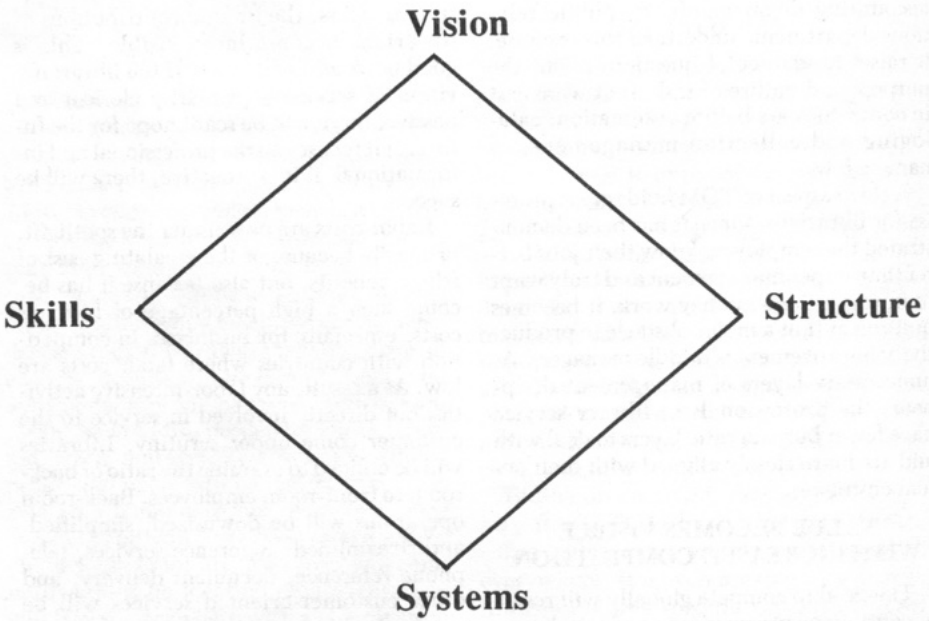

Figure 1. What Libraries Must Do to Prepare.

BETTER RESEARCH IS NEEDED

Victor Hugo wrote: "there is nothing like a dream to create the future." If libraries will be dealing with a "disconnected" customer base, i.e., customers who make electronic requests which we fill electronically, from digitized resources, what "dream" do we have for library services to such a customer base? We need research into customer behavior and requirements.

Technology presents mind-boggling possibilities for libraries to promote and increase the use of all the wonderful things we collect. However, we cannot leverage technology unless we understand more about our customers than we presently do. We need support from our institutions, associations, and membership organizations to conduct surveys of our customers, to get a better handle on where and how formal sources are used in research, and to learn much more than we currently do about how people ask questions and seek answers. To know that 59 percent of the American population visited a library at least once last year, as a recent ALA press release reported, is heartening but not helpful. No business would plan on such limited information. Why did these people visit the library? Did they go to use the photocopier or the collection? Did they find what they wanted? Did they ask for what they wanted? In what way did those libraries add value or meet a requirement? What was the cost/benefit? How can we meet requirements if we don't know what they are? How can we say we add cost-effective value if we don't know what that value is?

Once such information is determined, we need to design services that blend our traditional values about the importance and worth of information with a technology-driven culture.

We need to join forces with economists, logistics specialists, telecommunications experts, and other disciplines to quantify the value of our service.

We need to provide service when our patrons need service. If, in 2001 it is no longer necessary to visit the library to ask a reference question and receive text in response,

what hours of operation are appropriate? Will libraries band together to provide 24-hour reference service?

NEW STRUCTURES ARE NEEDED

In 2001 we need support to make access points to our collections more sensible in an electronic service environment. We need to spend less of our scarce resources on inventory control and more on service. We need to save what is important. We need to figure out how to make a blizzard of new formats make sense in our OPACs. We need something I think of as an International Standard Item Number—so that every conference paper, article, book chapter, and book review has a unique identification number.

We need new ways to organize our staff resources in a service-oriented, technology-driven environment. In manufacturing, there is a concept called "just-in-time" delivery, in which the tire or battery or bolt is not bought and kept in inventory but instead, arrives—on schedule—the day before it is needed for assembly.

We need to hold less in inventory and develop just-in-time solutions to our patrons' information needs. We need to move from "just in case" to "just in time" in our approach to meeting information needs. We need a whole set of new service models—adapted from elsewhere or developed ourselves—to manage service to a mobile clientele.

SKILLS MUST BE UPDATED

We need a great deal of educational and training support from our organizations and associations. Obviously, if we are to become more service-oriented we need the skills to manage a new model. We need to know a lot more about managing technology and about technology itself.

We need more technicians, more contract negotiators.

We need to develop better ways to retrain our existing staffs who will be with us through these dramatic changes. Technology used to force major change every ten to fifteen years. It now forces major change every three to five years. We will not have time to ease our staffs into change. We need tools to do it quickly and effectively.

NEW SYSTEMS ARE NEEDED

We need new systems to recognize and reward excellence. We need to count service going out, not books coming in. We need to value questions answered, needs served from our collections, not just the collections themselves. We need to talk among ourselves. We are not separate universes; we are interlocking service providers.

We need to learn from other disciplines. How does American Express do it? How does Delta Airlines do it? How does Hilton do it? What do successful commercial vendors of electronic services know about customer behavior? How can we improve our marketing? How should we package our products and services?

We must

- think of ourselves as providers of a value-based service.
- understand our unique contributions.
- compete aggressively in the markets where we have competitive advantage and not try to be all things to all people.
- retain and grow our share of the information service market.

What OCLC can do is up to you. In a sales model, OCLC is a wholesaler. It sells to you, who are the retailers. If you don't understand your market, OCLC will have real difficulties serving you, and you will have difficulties serving your market. You must think about how you and OCLC can forge alliances for research, training, and administrative systems.

Charles Wiseman wrote: "What you see is what you believe." Early European astronomers looked at the heavens and believed that earth and man were at the center of the universe. What they believed was what they saw: all celestial orbits rotated in perfect symmetry around the earth. At exactly the same time, the Chinese, looking to the skies, saw a cosmos that had no end and no bounds, one that fit perfectly with the mystical components of the Chinese belief system.

When you look at OCLC, what do you believe? What do you see? ■■

News and Announcements

OCLC Awards Three Research Grants

The OCLC Office of Research has awarded three Library and Information Science Research Grants (LISRG) for 1991. The grant recipients and their projects are:

- Barbara Kwasnik, assistant professor, School of Information Studies, Syracuse University, "A Descriptive Study of the Functional Components of Browsing"
- Charles McClure, professor of Information Studies, Syracuse University, "The Future Role of Public Libraries in the Use of Non-Bibliographic, Internet/NREN Information Services"
- Edie Rassmussen, assistant professor, School of Library and Information Science, University of Pittsburgh, "A Study of the Quality of Chinese Records in the OCLC Database and a Proposal for a Rule-Based Validation System"

The LISRG program was begun in 1985 to encourage quality research by faculty in schools of library and information science. Through the program, funds are available for project-related expenditures up to a $10,000 limit per project. Research findings must be nonproprietary, and the principal investigators are expected to disseminate results through conferences and publications. ■■

Clifford A. Lynch Receives LITA/Gaylord Award

Clifford A. Lynch, director of the Division of Library Automation, Information Systems, and Administrative Services, Office of the President, University of California, was awarded the 1991 LITA/Gaylord Award for achievement in library and information technology. The $1,000 award is provided by Gaylord Brothers of Syracuse, New York, and administered by LITA.

Lynch was selected for his contributions to library automation through his work with implementing the MELVYL system at the University of California and for his contributions to networking and network architecture, standards development, imaging technology, and library and information technology literature.

Lynch received the award at the LITA President's Program this past July in Atlanta. Jo-Ann Michalak, LITA president; Namcy Eaton, LITA/Gaylord Award Committee chair; and Charles E. Farley, Jr., vice-president, Gaylord Information Systems, presented the award. ■■

Recent Publications

Book Reviews

Beyond the Book: Extending MARC for Subject Access. Ed. by Toni Petersen and Pat Molholt. Boston: Hall, 1990. 275p. paper, $39.95 (ISBN 0-8161-1924-4).

The editors stated that the purpose of this collection of essays is to "sample the current thinking of those new constituencies who are turning to MARC to provide the vessel for their data collection." The samples provided explore the particulars of unique subject access for special and nonbook collections. Following the order of the essays as presented in the volume, the reader is led to consider the prospect of an enhanced MARC-based information database that can blend the efficiencies of a standard record format and authoritative listings of defined name and subject terms with the flexibility of interfile links provided in relational databases.

Most of the essays describe the history and development of current efforts to catalog various types of special collections. The Art and Architecture Thesaurus (AAT) is discussed as a successful ongoing effort to create a specialized thesaurus of faceted terms, to expand MARC field and content designators to accommodate it, and to assess the laborious process of mapping the "oranges" of AAT terms designed for postcoordinate indexing to the "apples" of LC Subject Headings, which are preconstructed and defined with inconsistent syntax.

The development of the AMC (Archives and Manuscript Control) MARC format serves throughout much of the text to illustrate how MARC can be expanded to meet the defined needs of a special constituency. The importance of an enhanced definition of an authority record to include biographical information for individuals, functional responsibilities for agencies, and other "corporate" entities emerges as an attractive feature for catalogers of unique materials.

Many of the issues and concerns raised by the other essays are important beyond the particular collections from which they emerge. Included in the essays on the cataloging of slides and moving image material are many examples and possible solutions to the dilemma of most appropriately defining title, subject, and object and distinguishing what is contained in a work (drawings, newsreels, cartoons) from what a work is "about." One essay chronicles the efforts of the art community to create standards for local collection inventories of art objects, a byproduct of which has been to communicate collection information to the scholarly community. More importantly, another essay notes that standard cataloging of art objects could provide the foundation for a national visual index to which descriptions of representations of art objects could be linked.

The essays on faceted classification schemes for art and music can be provocative to anyone contemplating methods of improving the recall and precision of voluminous MARC-based databases for which uncontrolled keyword access has been activated.

The editors wisely chose writers who could present these issues cogently for administrators in research library collections, consortia, and systems who are not fully versed in the particulars of the special MARC formats or the retrieval and description requirements peculiar to various categories of special nonbook materials. Specialists and curators in special collections will also benefit from reading of those in other areas who debate whether MARC can support "the multiple independent

views of reality essential to support true scholarly information exchange."—*Martha Hruska, University of Florida, Gainesville* ■■

CD-ROM Information Products: An Evaluative Guide and Directory. Vol. 1. Ed. by C. J. Armstrong and J. A. Large. Brookfield, Vt.: Gower, 1990. 470p. $84.95 (ISBN 0-566-0326-6).

With the proliferation of CD-ROM titles, no single library or institution can hope to evaluate all databases of interest. Some 1,400 commercial titles are available, worldwide, according to the 1991 edition of *CD-ROMs in Print*. Reviews of individual CD-ROM products appear regularly in the primary periodicals in the field. Many are brief sketches while some are more lengthy and descriptive. However, in most cases, reviewers do not follow a uniform approach in evaluating the products.

CD-ROM Information Products is the first monograph devoted to original and in-depth evaluations of CD-ROM databases. The Evaluative Guide segment forms the greater part of this book. The reviews are arranged in a consistent format: a two-page fact sheet followed by sections on installation, documentation, the database itself, search software, and a conclusion. Nineteen popular databases, chosen to represent a range of subject areas, database types, and publishers, are described here; the reviews run between twelve and fifteen pages each.

Sample screen displays convey the "look" of the retrieval software through the execution of one or more searches. The reviewers provide information on retrieval and output options, response times, any accompanying tutorial, and limitations of the software. The fact sheet includes a rating of the product for these features and other criteria as well as results of retrieval speed bench tests.

The Directory portion is rather short; only about seven hundred titles are listed here. The arrangement is by broad subject. Each entry includes the publisher, producer, or distributor; type of database (bibliographic, statistical, textual, image, etc.); and an indication of its price (in UK £). Accordingly, there are indexes by subject or type of database, title, and company name. The entries do not include a description of the database but point to the Product Evaluation section if the title is reviewed there.

Surprisingly, unlike the Product Evaluation section, the Directory fails to indicate the hardware requirements for the products—MS-DOS-based PC, Apple Macintosh, or others. Indexing is not comprehensive. Although eight religious titles are included in the list and referred to in the introductory essay on CD-ROMs, there is no subject category for religion.

As the first volume of a projected series, this title promises to be a valuable resource and reference tool. Volume two was just published this summer and future volumes are expected to appear every eighteen months. To keep the Directory portion current, the publisher offers buyers of the book a subscription to an update service called CD-Access. Twice a year, a cumulative directory of CD-ROM products will be made available on diskette along with retrieval software to search the database.—*Ka-Neng Au, Dana Library, Rutgers University, Newark, New Jersey* ■■

CD-ROM Local Area Networks: A User's Guide. Supplement to Computers in Libraries, no.24. Ed. by Norman Desmarais. Westport, Conn.: Meckler, 1991. 131p. $39.50 (ISBN 0-88736-700-3).

As indicated in the introduction of this slender book of slightly more than one hundred pages, the installation and implementation of PCs, CD-ROM drives, and software as standalone workstations are a challenge that most librarians can master with only a good set of documentation. Setting up a local area network (LAN) with PCs and CD-ROM drives on it is much more complex since it involves not only the challenge posed by standalone workstations, but the additional complexities of setting up and operating a local area network with all that it implies: more hardware, more software, more cables, file management, network administration, security, licensing, and more.

The eight contributors, all of whom have installed CD-ROM local area networks, attempt to address these issues and to explain

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the various options to consider or the questions to ask when preparing to set up a local area network for CD-ROM applications. The first of seven chapters explores local area networks in general and the implications for CD-ROM. Chapters two and three discuss CD-ROM network software and hardware, respectively. There is considerable redundancy among the chapters as might be expected in a work in which each chapter is written by a different author. There also is some unfortunate variation in the use of terminology. The author of the first chapter makes it a point to distinguish between PPLANs and CSLANs, while subsequent chapters do not even mention that terminology.

Chapter four discusses the implications for the system manager or network administrator. There are brief sections on planning, budgeting, RFP development, staff requirements, training, security, and a number of other topics. Chapter five, one of the most useful in the book, addresses alternatives to CD-ROM networks. However, tape loading into a local library system is addressed in just two sentences. Chapter six deals with future considerations and examines multimedia at length. The closing chapter focuses on licensing and copyright issues. While negotiation is mentioned, there is no discussion of potential negotiating strategies for assuring not only acceptable license terms, but a cap on future license fee increases. A good bibliography and an adequate index are included.

While the compilation of the seven chapters offers beginners a convenient package for learning about CD-ROM in network environments, those who intend to implement such a network will also want to consult more than a score of good periodical articles that have appeared on the same subject in the past year.—*Richard W. Boss, Information Systems Consultants Inc.* ■■

Integrated Online Library Catalogs. Ed. by Jennifer Cargill. Westport, Conn.: Meckler, 1990. 96p. $35 (ISBN 0-88736-675-9).

The best public speakers both educate and entertain us. These two elements flavor this volume because the eight chapters consist of papers that were presented at a Computers in Libraries conference (March 1989, Oakland, California).

The contributions reflect what the editor considers to be a transition stage in the history of online catalogs; online catalogs are no longer novel. The authors share their experiences with planning, implementation, and the growth of online catalogs.

Three of the chapters are offered by people working outside of libraries in library support roles. One offers practical ideas for cooperation between librarians and vendors planning online systems. A later chapter describes the array of automation services that network offices can provide in addition to OCLC services, such as brokering, consulting, and database preparation. A chapter describing the joint automation project of the five VALNet libraries is included.

The balance of the papers were written by practicing librarians. George Machovec contributes two chapters to this volume. In the first, he emphasizes the necessity of employing a full-time systems librarian and outlines the typical duties attached to such a position. In his second contribution, he describes the deliberations at Arizona State University as migration from one automated system to another proceeded. Gloriana St. Clair and others contribute a chapter of things to consider before hiring an inexperienced vendor. The discussion ranges from contracts to staff morale. Chapter seven examines the negative effects of the online catalog and how they might be addressed. Anne Grodzins Lipow reflects on the way staff training and patron expectations can influence an automation project. In the final chapter, by William Gray Potter, the author makes three main points: technology allows librarians time for more professional tasks, better service creates a greater demand on the system, and an expanded catalog is an important step towards preserving free and open access to library resources.

An annotated bibliography, an index, and a list of contributors are included. The index, lacking entries for MARC, acquisitions, catalog, circulation, serials, or maintenance is the weakness of the book. Aside from this, the submissions are both entertaining and educational reading for any li-

brarian contemplating a long-term relationship with automation.—*Patricia Cline, Illinois State University* ■■

Journal of Interlibrary Loan & Information Supply. Ed. by Leslie R. Morris (quarterly, 1990–). New York: Haworth Pr., 1990. $24/yr. (institutions); $18/yr. (individuals) (ISSN 1042-4458).

In the first issue of the *Journal of Interlibrary Loan & Information Supply*, editor Leslie Morris states: "Interlibrary loan librarians deserve their own journal. Interlibrary loan is not a subfield of reference services, public services, circulation, or any other field." To this end, the new journal attempts to address issues faced by the practicing interlibrary loan librarian and to present related research, such as the use of ILL statistics, the impact of electronic publishing, and aspects of "specialized" interlibrary loan. The journal includes regular features on telefacsimile and OSI (open systems interconnection), a book review column, and a cartoon by Kappa Waugh.

Coverage is national and international in scope and endeavors to be "broad-based." Appearing in the first issue are articles on the effects of CD-ROMs on interlibrary loan, interlibrary loan policies, and international standards for electronic ILL messaging. John Budd's article on interlibrary loan activity among ARL members presents useful statistics showing the large scale rise in lending among major academic institutions. However, this issue is diverse in tone, depth, and timeliness ranging from a brief summary on the twentieth annual Colorado Interlibrary Loan Workshop to a twenty-four-page article titled "The Analysis of Interlibrary Loan Systems: A Taxonomy of Variables," by Peter Lor of the University of South Africa.

Traditionally, articles in the field of interlibrary loan appear in numerous library and information science journals, from *Wilson Library Bulletin* to *Information Technology and Libraries*. These articles have been broad-based, covering aspects of automation, costs, policies, standards, and statistical studies. The 1990 issue of *Library Literature* lists 108 articles under "Interlibrary Loans" that appear in over forty journal titles. Eleven articles appear in the British Library's publication, *Interlending & Document Supply*. One can easily conclude that interlibrary loan is not an ignored or unimportant topic. Rather, interlibrary loan is also of interest to administrators, systems librarians, and those in collection management, reference, and other public service departments. A journal devoted solely to interlibrary loan will reach a smaller audience compared with articles on the topic published in more widely read publications.

This new journal also overlaps to some degree with *Interlending & Document Supply*, which also covers a wide range of interlibrary loan activities. *Interlending & Document Supply* provides more regular international coverage while also including articles on document supply in the United States. In the first issue of the *Journal of Interlibrary Loan & Information Supply*, the editor states that he "always objects to the emergence of a new journal." Noting this, Haworth Press has contributed to the literature by publishing a specialized journal that presents some useful articles for practicing interlibrary loan librarians, yet may defeat its own aim of being broad-based by attracting a limited readership.—*Yem Fong, Head, Colorado Technical Reference Center, University of Colorado at Boulder* ■■

Lancaster, F.W. *Indexing and Abstracting in Theory and Practice*. Champaign, Ill.: University of Illinois, Graduate School of Library and Information Science, 1991. 328p. $39.50 (ISBN 0-87845-083-1).

The work under review covers subject indexing and abstracting for printed secondary services and machine-readable databases, excluding book indexing and the indexing of names. The author does not treat thesaurus structure in detail in this text because of his prior book-length treatment of the subject (*Vocabulary Control for Information Retrieval*, 1972; 2d ed. 1976). This work also does not discuss indexing software, although it distills the research literature on automatic indexing. Hypertext is mentioned once in the text without explanation; the term is not in the index.

The book is intended primarily as a text for library schools. The publisher's brochure also notes its applicability to the workplace, and one assumes this means indexing services, which often employ people without library science degrees. In light of that, Boolean operators should have been explained and defined. For the most part, the discussions are nontechnical and highly readable. The concepts of *precision* and *recall*, for example, are explained without a formula in the text (the formula is only in the glossary); the section on co-occurrence, however, is full of algebraic notation, with few examples to clarify the algorithms.

The treatment of certain topics is not thorough. For example, on page 158, we find the statement that Excerpta Medica abstract bulletins group items under broad subject categories. In contrast to *alphabetico-classed* abstracting services, such as *Biological Abstracts*, Excerpta Medica publications are actually arranged by a detailed *hierarchical classification* with decimal notation. Although the book takes the position that classification and indexing are the same thing, a student completing an indexing course should be conversant with these terms and be able to make these distinctions.

The text is well edited and nearly completely free of typographical errors. There are a few errors, however, in the links between the text and the bibliographic references. The book uses the author-date system of citation. Lancaster (1977) is cited on page 3, but there is no corresponding reference in the bibliography. Danby (1986) is cited on page 8, but the bibliography has 1986a and 1986b, and we are not told which documents the point in the text. (If both were intended, the textual reference should have been Danby [1986a, 1986b], as was done for Hall on page 136.) A more serious problem in the linkage between text and references is that the latter are in an author-title sequence, rather than an author-date arrangement, and so in cases where many works by one author are cited, the reader must scan a lengthy list to find the appropriate date, which does not follow the author's name.

The incompleteness of the bibliography is the major flaw of the book. There are no references to the works of James D. Anderson, Jessica Milstead, Hilda Feinberg, Eugene Garfield, or Hans Wellisch. Limitations of space do not permit this reviewer to discuss their contributions to the indexing literature or to provide full references, but their major publications are cited in: Cleveland, Donald B. and Ana D., *Introduction to Indexing and Abstracting*, 2d ed. (Libraries Unlimited, 1990). Although that text is severely flawed (see my review in *Journal of the American Society for Information Science*, August 1991), its bibliography is more up-to-date than Lancaster's.

To document this statement, I did a bibliometric analysis of Lancaster's 331 references and found that 26 percent date from the 1960s, and 32 percent from the 1970s. It is, of course, appropriate for an author to cite the documents in which a theory was first proposed or tested. The message of the book, however, seems to be that anything worth saying on indexing was said several decades ago. The recent publications that are discussed in the book have been cited mainly for the purposes of refutation. Most are described as obvious, unconvincing, or methodologically flawed. New trends in indexing research are termed "fashionable." A textbook is not the place to single out insignificant publications for ridicule; the author's sarcastic tone mars the book.

The index to the book is quite good. There are a few errors of omission: for example, selective dissemination of information is discussed (in other terms) on page 114, but not indexed. Some entries have insufficient differentiation; for example, "Titles in subject access" has twelve locators. The index lacks continuation headings; for example, page 324 begins with a line of page references.

Despite these flaws, this is an important book, and it is certainly recommended for library schools and anyone interested in the principles of indexing. Instructors of indexing courses who select this as a text will have to supplement it with other readings to cover book indexing, thesaurus structure, and so on.

ITAL readers who may be interested in this book are assumed to be involved in the design of online catalogs. Unfortunately, the book does not discuss the parsing of machine-readable bibliographic records, i.e., the decisions regarding which ele-

ments to index. The *ITAL* reader will, however, benefit from the analysis of the free text versus controlled vocabulary debate and from the integrated approach to indexing and abstracting. The explanation of the effects of increasing record length on search results is highly relevant to the current trend to index contents notes in online catalogs.

I am particularly sympathetic to the author's view that indexing should be slanted to the interests of the user community. I also share his opinion that the distinction between cataloging and indexing is artificial. Thus, the most important implied message of this book for librarians may be the need for customization of cataloging.—*Bella Hass Weinberg, Division of Library and Information Science, St. John's University, Jamaica, New York* ■■

Marks, Kenneth, E., and Steven P. Nielsen. *Local Area Networks in Libraries.* Westport, Conn.: Meckler, 1991. 151p. $42.50 (ISBN 0-88736-705-4).

"The authors offer this work based on their experience in local area networking in the library environment." This statement, from the Preface, is a fair summary of the book. The more than one hundred pages of text have chapter titles that might lead the potential reader to expect technical material with a leaning to computer science ("LAN Installation," "LAN Implementation," etc.), but the book is best described as a list of general principles to be followed by those who have decided to install a network.

The book begins with a chapter titled "LAN Technology," which attempts to give an overview of some of the terminology and concepts used to describe local area networks. The effort is not overly successful in that the descriptions are sparse and the definitions offered may most charitably be described as idiosyncratic. A peer-to-peer network, for example, is not usually classed as being a topology, nor is such a network necessarily implemented by connecting micros via serial ports, nor is this kind of zero-slot-LAN (as it is commonly called) necessarily limited to only two micros. Similarly, while a brouter does combine features of both bridge and router, it is not necessarily between those two types of devices on a continuum.

Fortunately, the main emphasis and value of the book is grounded in technology management rather than technology per se. Although the authors state repeatedly that their experience is primarily based on Novell networks, the principles suggested to guide the planning, installation, and operation of networks most certainly apply to all types of hardware, software, and physical layouts. The authors strike a nice balance between concern for staff acceptance of the network and emphasis on the degree of authority and autonomy required for the network administrator to function. They caution against letting group-think angst seep into the process (". . . the administration of a local area network, including its installation, is not a task for a committee . . . ."). At the same time, they are strongly committed to having the LAN administrator be highly knowledgeable abut the workflow and organization of the library, as well as having strong interpersonal skills.

The publication offers checklists to guide the network installation process from planning through operation. Although this kind of material can be found in the more general industrial sources, the authors have enhanced it greatly with their insights on library culture. While all group-computing works list a need for security, most would never consider explicitly prohibiting posting the password next to the workstation (unless they had library experience). Similarly, the authors caution strongly against such library temptations as skimping on training (or treating it as a one-time cost), letting half-knowledgeable staff participate independently in network administration, and funding recurring expenses with non-recurring budget sources. The only real failing *Local Area Networks in Libraries* has as a guide to managers is the lack of any methodology to determine whether a LAN is preferable to other group-computing arrangements.

In summary, this is a very good book both for the LAN novice who is in a non-technical management position, and for the technoid who has not yet worked with such a staff-intensive computing enterprise. Although high-priced for its length, it may well help a manager avoid wasting money, as well as help him or her anticipate costs previously unconsidered. Those seeking technical de-

tails should look elsewhere.—*William C. Covey III, University of Florida Libraries, Systems Office* ■■

MS-DOS Software for Library and Information Applications. Ed. by Paul F. Burton. Brookfield, Vt.: Gower, 1990. 140p. $44.95 (ISBN 0-566-03617-7).

Librarians are feeling the urge to automate these days. We have heard discussions of whether this urge arises from some genuine need or some technical "keeping up with the Joneses." However, even a genuine need for a computer and software to tackle the job is not enough to result in a successful system. What is needed is concrete, careful planning and that is where this book can come in handy.

MS-DOS Software for Library and Information Applications is a collection of case studies of MS-DOS systems planned and implemented in Great Britain during the 1980s. Don't be misled by the title into thinking that this book contains pointers on how to put together your favorite WordPerfect or Lotus macro. Don't look for comparisons of software alone, since hardware is evaluated and discussed as well. In fact, the book would be more appropriately named "MS-DOS Systems for Library and Information Applications in the U.K."

What the book *does* contain is a collection of innovative and well-planned projects. The systems detailed in this book were inventive approaches to problems that were best served by microcomputer-based systems (whether for logical or fiscal reasons).

This book is most useful in the numerous examples of how careful planning can pay off in the implementation of any system. The editor identifies this thread running through these case studies when he states that they are "exemplary" for the "(often lengthy) systems analyses which were carried out." In fact, many of the processes described could be taken verbatim from a textbook on systems analysis. Problems were identified, existing systems were examined, alternatives were discussed, approaches were suggested, users were consulted, equipment was surveyed, and systems were installed, tested, and evaluated.

This book would provide the greatest benefit to those libraries seeking to solve specific problems or implement special functions. We often spend a large number of hours working through proposals and specifications for large integrated systems. Remember, today's microcomputer was yesterday's mainframe. As PC-based systems continue to grow in power, the scope of their capabilities dictates that we utilize these expensive tools to their fullest. This collection of case studies provides numerous examples of how to do this successfully.—*Rick Gates, University of Oregon Library* ■■

Sloan, Bernard G. *Linked Systems for Resource Sharing.* Boston: Hall, 1990. 143p. paper, $24.95 (ISBN 0-8161-1865-5).

This book was written "to help professional librarians faced with planning for, implementing, managing or evaluating linked systems for resource sharing." The author drew on his experience with the development of an automated resource sharing network, ILLINET Online, and presents his material in an authoritative and concise manner. His presentation is practical for library practitioners at all levels who may be involved in resource sharing projects. He provides useful descriptions of successful resource sharing networks, focusing on both negative and positive aspects of various systems. Sloan includes excellent sources to consult for a more detailed understanding of systems and standards.

Chapter one provides an overview of automated-resource sharing and describes a few of the major automated resource sharing systems including two national level systems—the Linked Systems Project (LSP) and the National Library of Canada (NLC)—along with five state-level systems—ILLINET Online, MELVYL Online Union Catalog, Florida Center for Library Automation, Indiana, and Ohio Library Information System.

In Chapter two, Sloan provides more detailed information on the ILLINET Online system from its developmental stages to the present operation. He describes the technical support, membership, cooperation among diverse types of libraries, sources of funding, and ILLINET's future plans.

Chapter three is devoted to a description of the IRVING Library Network Project. The chapter is a reprint of an article from *Library Hi Tech*, authored by Richard E. Luce, Richard Steele, Nancy Walters, and Eric Boon. Written from a more technical viewpoint than the latter, the authors illustrate a system that links disparate library systems.

Sloan believes a resource sharing network should be implemented based on the benefits to the patrons, not on the availability of state-of-the-art technology. Chapter four, the core of the text, provides a critical list of questions for managers to consider before implementing a resource sharing network. The questions cover technical, organizational, and administrative aspects of system linking. These questions are thought-provoking and helpful. They can be employed as a guide for any resource sharing network, automated or not.

Believing that "as automated resource sharing projects become more successful and established, the distinctions between individual library collections begin to blur, and the concept of the network as a single library begins to emerge," the author has included "Model Criteria for Coordinating Cooperative Collection Development Among Academic Libraries," by Carl W. Deal. This is a generalized group of criteria for the development of statewide cooperative collection development/management programs.

Chapter six discusses the importance of standards and protocols and acquaints the reader with the dynamic nature of the technology as it relates to standards and protocols. Also included are useful appendixes that give models for network agreements and bylaws, interlibrary loan protocols, and funding plans for ILLINET Online.

Linked Systems for Resource Sharing is a valuable resource for those involved in the planning or management of a resource sharing network. Sloan presents practical ideas and suggestions and he provides a strong theoretical framework to evaluate resource sharing systems. In addition, he succeeds in accomplishing his goal of writing a work which is a "guide through the technical and political minefields" involved in automated resource sharing.—

Colby Mariva Riggs, University of California, Irvine ■■

Software Reviews

BibFiler: Bibliography Download for INNOPAC. University of Maine System, Attn.: Marilyn Lutz, Raymond H. Fogler Library, Orono, ME 04469-0139. Price: $60. Hardware requirements: IBM PC or compatible with DOS 2.0 or higher. 28K of free memory. Any drive combination, any type of color or monochrome monitor in standard 80 × 25 text mode.

One of the greatest services a library can give its users is the ability to download records from the online catalog using a personal computer. Such a service allows a user to truly customize the library's catalog for their own purposes. Lists of potential sources can be created, revised, and reformatted into a finished document as bibliographic citations. Used regularly, such a utility can support a continuing bibliography as new sources on a particular subject are added to the library collections. This need is already being met in a number of ways; there are many programs that download and create bibliographic citations. Now an addition to this category of software designed for users of Innovative Interfaces' INNOPAC catalog is available.

The folks at the University of Maine have developed a superb little program that is designed to download bibliographic records from Innopac. BibFiler is a TSR program that allows the user to choose any one of five file formats to create a bibliographic citation from INNOPAC.

THE SOFTWARE

BibFiler is a terminate and stay resident program for IBM or compatible personal computers. It can be used with a floppy or hard drive. It uses DOS 2.0 or higher, and requires only 28K of memory. BibFiler can be used in conjunction with other TSR programs as long as normal conventions are followed when using multiple TSR programs.

When Bibfiler is first loaded, the user is prompted for a file format type. Choices include the entire screen; all bibliographic fields; brief citation consisting of author, title, and publisher; a more complete citation that adds location and call number; or a delimited field record. Next comes a prompt for a filename and an option to add to an existing file or to create a new file. After loading BibFiler, the file format type or file name may be changed by going through the DOS gateway of your communications program. That is the essence of BibFiler. Personal bibliographies can be created and easily modified. You can mix citation formats in a single file or create new files. BibFiler allows you to work easily with multiple files and multiple citation formats in the same session. Files can be printed as is and used to locate the items in the library, or they can be stored and imported into wordprocessors, databases, or spreadsheets.

To invoke BibFiler when searching an Innopac catalog a hot key combination is pressed. At this point the screen is saved using the file format and filename that have been previously chosen. Commands are invoked from the DOS prompt, using the DOS gateway of your communications package. There are only two other basic BibFiler commands. The bibfiler/f command prompts the user for a different format and filename. The bibfiler/u command unloads the program from memory.

FILE FORMAT OPTIONS

Option 1: Save Entire Screen

This option is essentially a screen dump. It can be used to save INNOPAC summary screens, such as a listing of all titles under a particular subject heading. Since the filenames are saved, the file can be used as an ongoing permanent bibliography and updated as new items are added to the library's collection on that subject. Nonbibliographic screens can be downloaded and incorporated into user or staff training manuals.

Option 2: Save All Bibliographic Fields

For this option, bibliographic fields, including the boxed item information, are saved. The resulting file is a near image of the record from the INNOPAC screen. Additional screens on multiple screen records need to be downloaded separately.

Option 3: Save Author, Title, Publisher

BibFiler searches for labeled field names for author, title, and publisher to create the record; multiple field names are supported to accommodate variant field labels at different INNOPAC sites.

Option 4: Save Author, Title, Publisher, Location, Call Number

In addition to the fields in Option 3, the location and call number are saved in this file format. INNOPAC sites that are not running the circulation system integrated with INNOPAC will not be able to use this option effectively since location and call number are designed to come from the boxed item record.

Option 5: Save Author, Title, Publisher, "/, Delimited

This option downloads the fields necessary to create a bibliography; it saves the same fields as Option 3 in a format ready to import to another program. The manual includes clear instructions for importing to Lotus 1-2-3, dBase, WordStar, WordPerfect, and Professional Write.

THE MANUAL

BibFiler comes with a twelve-page manual, and the listing of the source code. The manual is clearly written, leading the user through installation and use. At many points it anticipates common problems and gives clear explanations and ways to avoid them. The manual assumes some understanding of TSR programs but it is not impossible for the novice to install, load, and use BibFiler, given a familiarity with DOS.

SUGGESTED ENHANCEMENTS

Few enhancements are warranted. INNOPAC sites not running the integrated INNOPAC catalog and circulation will find that they cannot use option 4 effectively. Although many of BibFiler's options can still be used, the location and call number are designed to come from the boxed item information record. Therefore, location and call number could only be downloaded using options 1 and 2. While

the manual guides the user through possible pitfalls when dealing with multiple TSR programs, it still assumes some previous familiarity. Do not expect perfectly clean copy of all your downloaded citations. Certain options running under certain conditions will include extraneous lines. Option 1, "save entire screen," downloaded the Procomm status line. The BibFiler manual alerts you to these various anomalies so at least there are no surprises.

BibFiler was written while Innopac sites were running under release 6. Release 7, due for installation this winter, will include an option to download a record. Currently BibFiler has more features than are planned for the INNOPAC menu option. BibFiler can be used for any INNOPAC site; therefore it is possible to use it while accessing other INNOPAC catalogs through the Internet. Some of the BibFiler options can be used on other online catalogs.

Once a library owns BibFiler it can be used and distributed as the library sees fit. This generous agreement allows use to be tailored to local conditions, distributed individually, or made available on a network. BibFiler provides a way to really customize library collections to individual needs, resulting in increased service for the library user.—*Ann Fiegen, University of Arizona* ■■

Other Recent Receipts

Advances in Library Resource Sharing. V2. Ed. by Jennifer Cargill and Diane J. Graves. Westport, Conn.: Meckler, 1990. 250p. $55 (ISBN 0-88736-490-X).

Ardis, Susan B. *An Introduction to U.S. Patent Searching: The Process*. Englewood, Colo.: Libraries Unlimited, 1991. 222p. paper, $32.50 (US); $39 (outside North America) (ISBN 0-87287-856-2).

Audiovisual Policies in College Libraries. Clip Note no.14. Comp. by Kristine Brancolini. Chicago: Association of College and Research Libraries, 1991. 152p. paper, $19.95 (ISBN 0-8389-7495-3).

Brandt, D. Scott. *Unix and Libraries*. Westport, Conn.: Meckler, 1991. 143p. $39.50 (ISBN 0-8876-541).

Buckland, Matthew. *Information and Information Systems*. New York: Praeger, 1991. 248p. $16.95 (ISBN 0-275-93851-4).

Byrne, Deborah J. *MARC Manual: Understanding and Using MARC Records*. Englewood, Colo.: Libraries Unlimited, 1991. 260p. paper, $29.50 (ISBN 0-8788-813-9).

Cabeceiras, James. *The Multimedia Library: Materials and Selection and Use*. 3d ed. New York: Academic, 1991. 320p. $49.95 (ISBN 0-12-153953-9).

CD-ROM Licensing and Copyright Issues for Libraries. Supplement to Computers in Libraries No. 23. Ed. by Meta Nissley and Nancy Melin Nelson. Westport, Conn.: Meckler, 1990. 95p. $34.95 (ISBN 0-88736-701-1).

CD-ROM Market Place 1991: An International Guide. Westport, Conn.: Meckler, 1991. 176p. paper, $30 (ISBN 0-88736-680-5).

CD-ROM Product Guide. Parsippany, N.J.: Bureau of Electronic Publishing (141 New Rd., Parsippany, NJ 07054), 1991. 162p. paper, $4.95.

Chen, Ching-chih. *HyperIntro to CD-ROM Technology and Products (Version 1.0)*. West Newton, Mass.: Microuse Information, 1990. Distributed by Library Information and Technology Association (LITA). Set of 2 diskettes with HyperCard interface for Mac SE, II and IIC. (ALA-LITA Order Code 7377-9) $49.50 U.S. and Canada; $89.50 Other International.

Chen, Ching-chih. *Optical Discs in Libraries: Use & Trends*. Medford, N.J.: Learned Information, 1991. 240p. paper, $79.50 (ISBN 0-938734-49-0).

Cox, John. *Keyguide to Information Sources in Online and Database Searching*. New York: Mansell, 1991. 248p. $90 (ISBN 0-7201-2093-4).

Dempsen, Lorcan. *Libraries, Networks and OSI*. Bath: U.K. Office for Library Networking (The Library, University of Bath, Bath BA2 7AY, UK), 1991. 232p. paper, $60 (ISBN 0-9516856-0-0).

Dewey, Patrick R. *Adventure Games for Microcomputers: An Annotated Directory of Interactive Fiction/1991*. Westport, Conn.: Meckler, 1991. 157p. $49.50 (ISBN 0-88736-411-X).

Directory of Telefacsimile Sites in North American Libraries, Sixth Edition. Ed. by C. Lee Jones. Bethlehem, Pa.: CBR Consulting Service, 1991. 472p. paper, $32.50.

The Future of Serials. Ed. by Patricia Ohl Rice and Jane A. Robillard. New York: Haworth, 1991. 260p. $29.95 (ISBN 1-56024-081-4).

The Good Serials Department. Ed. by Peter Gellatly. New York: Haworth, 1991. 183p. $29.95 (ISBN 0-86656-962-6).

Guide to Budget Allocation for Information Resources. Ed. by Edward Shreeves. Chicago: American Library Assn., 1991. 42p. paper, $7 (ISBN 0-8389-3397-1).

Jain, Raj. *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation and Modeling*. New York: Wiley, 1991. 686p. (ISBN 0-471-50336-3).

Library and Information Services Today: The Yearly Chronicle, 1991. Ed. by June Lester. Chicago: American Library Assn., 1991. 310p. paper, $36 (ISBN 0-8839-0566-8).

Library Computing in Canada: Bilingualism, Multiculturalism, and Transborder Connections. Ed. by Nancy Melin Nelson and Eric Flower. Westport, Conn.: Meckler, 1991. 150p. $39 (ISBN 0-88736-792-5).

Library Technical Services: Operations and Management. 2d ed. Ed. by Irene P. Godden. New York: Academic, 1991. 285p. $49.50 (ISBN 0-12-287041-7).

Library Technology 1970–1990: Shaping the Library of the Future: Research Contributions from the 1990 Computers in Libraries Conference. Ed. by Nancy Melin Nelson. Westport, Conn.: Meckler, 1990. 175p. $35 (ISBN 0-88736-695-3).

Lynch, Mary Jo. *Alternative Sources of Revenue in Academic Libraries*. Chicago: American Library Assn., 1991. 80p., paper (ALA Order Code 5742-0-0010) $8; ALA members $7.20 (ISBN 0-8389-5742-0).

Management of CD-ROM Databases in ARL Libraries (SP169). Association of Research Libraries (Department #0692, 1527 New Hampshire Ave., NW, Washington, DC 20036), 1990. 147p. $3.

Olsen, Nancy B. *Cataloging Motion Pictures and Videorecordings*. Lake Crystal, Minn.: Soldier Creek Pr. (Postal Drawer U, Lake Crystal, MN 56055), 1991. 150p. paper, $25 (ISBN 0-936996-38-2).

Operational Costs in Acquisitions. Ed. by James R. Coffey. New York: Haworth, 1991. 117p. $22.95 (ISBN 1-56024-008-3).

Preserving Knowledge: The Case for Alkaline Paper. Washington, D.C.: Association of Research Libraries (1527 New Hampshire Ave., Dept. 0692, NW, Washington, DC 20036), 1990. 126p. paper, $9; non-members $18 (ISBN 0918006-18-X).

Proceedings of the Sixth Integrated Online Library Systems Meeting, May 8–9, 1991. Medford, N.J.: Learned Information, Inc., 1991. 174p. paper, $30 (ISBN 0-938734-52-0).

Ranade, Sanjay. *Mass Storage Technologies*. Westport, Conn.: Meckler, 1991. 175p. $49.50 (ISBN 0-88736-570-1).

Saettler, Paul. *The Evolution of American Educational Technology*. Englewood, Colo.: Libraries Unlimited, 1990. 570p. $38 (ISBN 0-87287-613-6).

Saffady, William. *Micrographic Systems*. 3d ed. Silver Spring, Md.: Association for Information and Image Management (AIM) (1100 Wayne Ave., Suite 1100, Silver Spring, Md. 20919), 1990. 242p. $30 ALA members; $35 nonmembers (ISBN 0-89258-190-5).

Stankus, Tony. *Scientific Journals: Improving Library Collections through Analysis of Publishing Trends*. Westport, Conn.: Meckler, 1991. 225p. $29.95 (ISBN 0-86656-905-7).

Stueart, Robert D., and Maureen Sullivan. *Performance Analysis and Appraisal: A How-to-do-it Manual for Librarians*. New York: Neal-Schuman, 1991. 174p. paper, $35 (ISBN 1-55570-061-6).

Talley, Marcia D. *Automating the Library with AskSam: A Practical Handbook*. Westport, Conn.: Meckler, 1991. 165p. $39.50 (ISBN 0-88736-801-8).

Training of Technical Services Staff in the Automated Environment (SP171). Washington, D.C.: Association of Research Libraries (Department #0692, 1527 New Hampshire Ave., NW, Washington, DC 20036), 1991. 157p. paper, $25.

Virtual Reality: Theory, Practice and Promise. Ed. by Sandra K. Helsel and Judith Paris Roth. Westport, Conn.: Meckler, 1991. 143p. paper, $39.95 (ISBN 0-88736-728-3).

Westin, Alan F. and Anne L. Finger. *Using the Public Library in the Computer Age: Present Patterns, Future Possibilities*. Chicago: American Library Assn., 1991. 70p. paper, $16.50; ALA members $14.85 (ISBN 0-8389-0565-X).

Women Online: Research in Women's Studies Using Online Databases. Ed. by Steven D. Atkinson and Judith Hudson. New York: Haworth, 1990. 420p. $39.95 (ISBN 1-56024-037-7).

Woodworth, Anne. *Library Cooperation and Networks: A Basic Reader*. New York: Neal-Schuman, 1991. 208p. $39.95 (ISBN 1-55570-088-8).

Wright, Kieth, and Judith F. Davie. *Serving the Disabled: A How-to-do-it Manual for Librarians*. New York: Neal-Schuman, 1991. paper, $35 (ISBN 1-55570-085-3).

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Letters

To the Editor:

Readers of "Reader Use of a Nationwide Research Library Network: Local OPAC vs. Remote Files" by Susan Lazinger and Bluma Peritz in the Sept. 1991 *ITAL*) may also find the results of my dissertation research interesting (*A Reference and Planning Model for Library Online Public Access Catalogs* [Ph.D., University of North Carolina at Chapel Hill, Dept. of Computer Science, 1990]).

My study investigated architecture models (centralized, distributed, standalone, for OPACs, and included an analysis of multi-institution and inter-institution searching patterns in the Triangle Research Libraries Network (TRLN). TRLN is the highly interconnected distributed network of catalogs developed and operated by the libraries at Duke University, North Carolina State University and the University of North Carolina at Chapel Hill. The analysis covered the transaction logs for one complete semester for the three universities.

Results were quite different than those reported by Lazinger and Peritz, indicating that there is plenty of opportunity for more research before we understand this topic. For example, in my study the majority of searches were of the home institution only. This could be a result of more inexperienced users, a factor suggested by Lazinger and Peritz, or could be a result of the comprehensiveness of each library collection. It may also be the result of system user-interface factors and defaults.

In any case, the point of this letter is not to review my own results, but rather to encourage further research in this area. Universal access to global library holdings is a nice fantasy, but building interconnected catalogs is only worth the expense if we meet the needs of real users.—*Jeanne Sawyer, Quality Program Manager, Tandem Computers, Inc., Cupertino, California* ■■

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