

Hebrew on RLIN—An Update

Joan M. Aliprand
 Research Libraries Group, Inc.
 Mountain View, CA

Current Status

My earlier paper, "Hebrew on RLIN" (Aliprand, 1986–87), was written "when the design . . . had almost been completed, but before programming had begun to make the design a reality." Since differences between concept and actuality did occur in some cases, the purpose of this paper is to document the differences between what I described and what was actually installed. The scope is limited to the RLIN¹ bibliographic system: the activities of RLG's Jewish and Middle East Studies (JAMES)² cooperative program are not described.

RLIN's Hebrew capability was installed in January 1988. The Library of Congress served as the "beta-test" site in late 1987, and the New York Public Library was the first library to be trained following release of the new features. Many of the principal Judaica libraries in the United States—starting with Brandeis University—have joined RLG as Special Members to participate in the JAMES Program. They do their cataloging on RLIN, but participation in RLG's cooperative activities is *not* a requirement for the use of RLIN for original script Hebrew cataloging.

Any library may be a general RLIN user and do Hebrew script cataloging online. Libraries that belong to the JAMES Program are major Hebraica libraries. With regard to cataloging, JAMES participants discuss issues affecting Hebraica and recommend standards to RLG. Programmatic activities are not limited to cataloging, but cover cooperative ventures in all areas of library service (often funded by grants solicited by RLG); for example, preservation microfilming (the existence of a microfilm copy is shown in RLIN and in the register of microform masters published by RLG).

Computer Encoding of Hebrew Characters

Readers who compare the Hebrew character set for RLIN proposed in November 1986 (see Figure 2 (p. 8) in Aliprand, 1986–87) with Figure 1 in this paper will notice some differences. The composite *hataf* vowels have been added (at positions 4/8 through 4/10) and codes for other characters have been changed; for example, the *rafeh*, formerly at 4/9, is now at

					0	0	0	0	1	1	1	1					
					0	0	1	1	0	0	1	1					
					0	1	0	1	0	1	0	1					
Bits	b7	b6	b5	b4	b3	b2	b1	Row	Col- umn	0	1	2	3	4	5	6	7
	0	0	0	0	0			0	-								י
	0	0	0	1	1			!	1	ר							ט
	0	0	1	0	2			"	2	:							א
	0	0	1	1	3			#	3	..							ה
	0	1	0	0	4			\$	4	.							פ
	0	1	0	1	5			%	5	'							ץ
	0	1	1	0	6			&	6	\							א
	0	1	1	1	7			'	7	:							ה
	1	0	0	0	8)	8	-:							ן
	1	0	0	1	9			(9	∴							י
	1	0	1	0	10			*	:	∴							ן
	1	0	1	1	11			+	;	·	ן						ה
	1	1	0	0	12			,	>	-							י
	1	1	0	1	13			-	=	'	ן						י
	1	1	1	0	14			.	<	˘							ט
	1	1	1	1	15			/	?								י

Figure 1. Hebrew character set for RLIN, as implemented. The position of a particular character is given as the column and row. Thus, the *hataf patah* is positioned at 4/8; that is, column 4, row 8.

position 4/12. Characters that have been dropped—double acute, *shaddah*, super-script *tsereh* (*ta'-marbutah*) and inverted *segol*—are shown in Figure 2.

RLG submitted the November 1986 version of the RLIN Hebrew character set to the International Organization for Standardization (specifically, through NISO³ to ISO/TC46/SC4/WG1) for consideration as the standard character set to be used for the interchange of bibliographic information in Hebrew and other languages written in Hebraic script. The changes result from ISO assessment of the character set. In particular, the Israeli representatives insisted that the *hataf* vowels be included, overcoming (presumably on linguistic grounds) the argument that a graphic symbol should not be able to be encoded in two different ways⁴ in the same character set. The effect of these changes on the layout of the Hebrew keyboard is described below.

This ISO standard is still under development and is at the Draft Proposal (DP) stage. The United States (represented by NISO) and Israel (represented by the Standards Institution of Israel) are the most active participants with respect to this standard. The Library of Congress has accepted the RLIN Hebrew character set as the de facto standard for the exchange of Hebraic script bibliographic data; this will be formalized when the *USMARC Specifications* are revised.

Input Methodology

An RLG-developed software program enables a personal computer to operate as an RLIN terminal. Over the years, the RLIN PC program has been augmented with various non-Roman scripts, in addition to ASCII⁵ and the diacritical marks and special characters of the "alternate Roman" (or "ALA") character set. Cyrillic was the first non-Roman script to be added, followed by Hebrew.

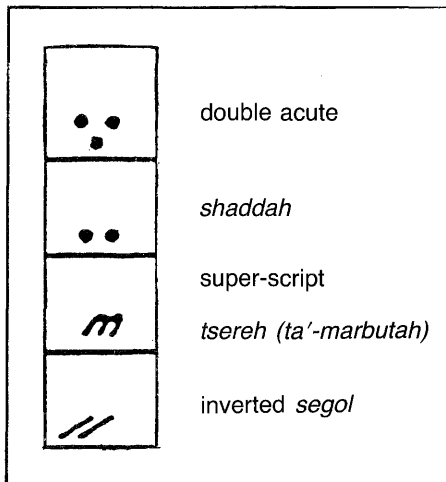


Figure 2. Characters dropped from the Hebrew character set for RLIN.

The Internal Order Key

Indication of right-to-left direction has been shown to be essential for the correct input of mixed Hebrew and Roman (or other left-to-right) text in a field. Both the Hebrew and Roman text are presented in natural (lexical) reading order, and this user-friendliness makes insertion and deletion at text boundaries potentially confusing (see Figure 4 (p. 11) in Aliprand, 1986-87). To facilitate insertion and deletion, an *internal order* key was introduced; it is the SHIFTed position of the *field direction* key, and operates on a toggle basis (i.e., touching the key activates the alternate state).

"Internal order" shows the characters as they are stored in the computer's memory, i.e., the actual "character string" (to use data processing terminology). When "internal order" is in effect, the script that is consistent with the field direction (e.g., Hebrew in a right-to-left field) reads naturally, but the script whose direction conflicts with that of the field appears backwards. The sensitivity of the software

to the direction of the field and the proper direction of each script results in the presentation of the contents of a field in natural reading order when "internal order" is not in effect (the usual case). This is illustrated in Figure 3.

The RLIN PC software also supports the downloading of a bibliographic record or set of records to disk or directly to a local system. Although no local systems available in the U.S.—except ALEPH (Levi, 1984)—can handle Hebrew⁶, the romanized portions of a bibliographic record can be utilized by any system that can accept a USMARC record.

Changes to the Hebrew Keyboard

The changes in the Hebrew character set described in the preceding section affected the layout of the Hebrew keyboard (Figure 4). The composite *hataf* vowels were added in the SHIFTed position on the T, R and E keys. The elimination of the four characters shown in Figure 2—double acute, *shaddah*, super-script *tsereh* (*ta'-marbutah*) and inverted *segol*—released four key positions. As a result, *vov yud* was moved to the SHIFTed J position, and semi-colon to the SHIFTed L position.

Effect of the MultiScript Workstation

In late 1988, a new version of RLIN PC software was released; the principal enhancement was the addition of a Chinese/Japanese/Korean (CJK)⁷ capability. This version runs on both off-the-shelf personal computers (suitable for all scripts other than CJK) and on the RLIN MultiScript Workstation (MSW), a PC-based replacement for the dedicated RLIN CJK terminal. The MultiScript Workstation is an AT-class personal computer equipped with a special character generator for CJK.

A new CJK keyboard was designed for the MSW, and the opportunity was taken to bring as much uniformity as possible to

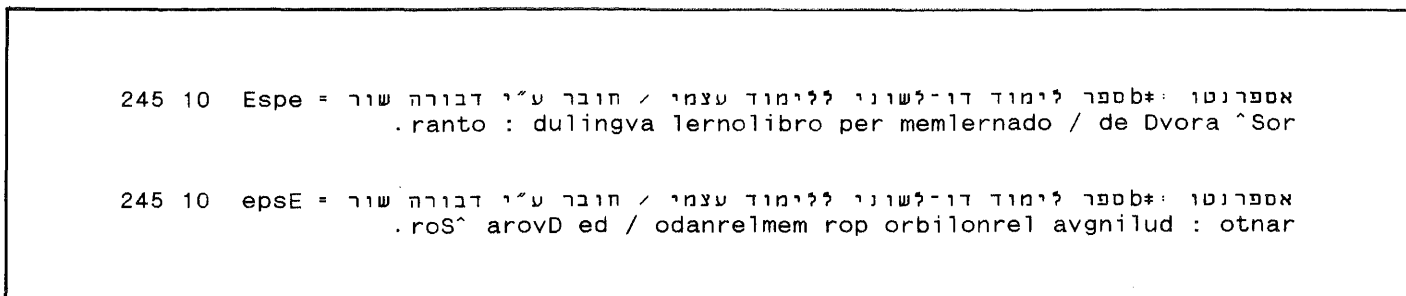


Figure 3. Right-to-left field containing mixed Hebrew/Roman text. Upper view shows normal screen appearance of right-to-left field. Lower view shows effect of *internal order* key on the same field.

Hebrew Keys on an RLIN PC

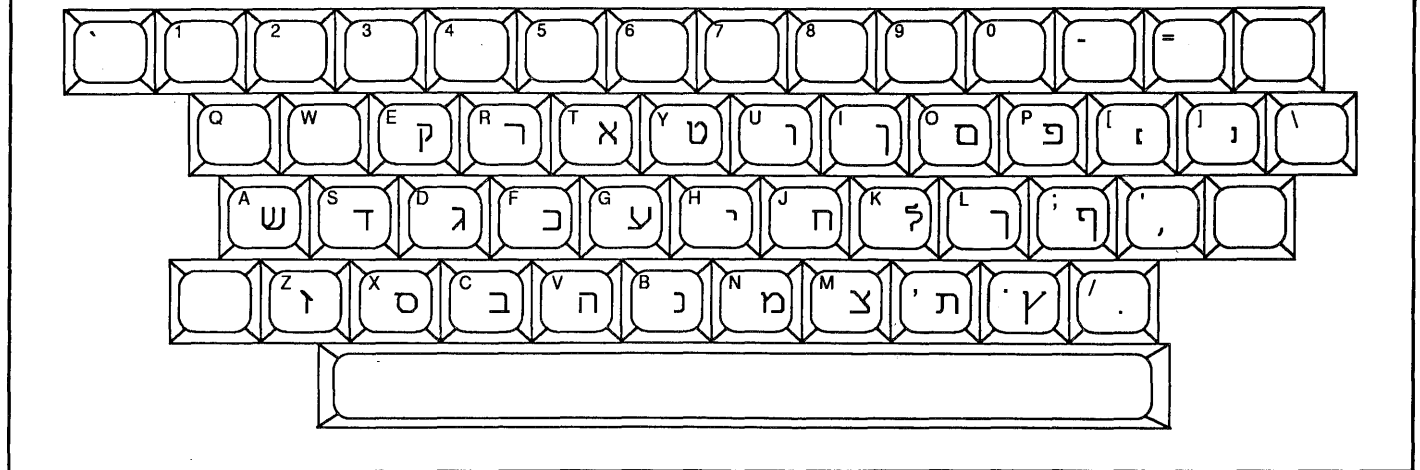


Figure 4. RLIN Hebrew keyboard, as implemented.

RLIN keyboard operation. This effort resulted in a number of changes to RLIN Hebrew, affecting the invocation of a script, the keying of characters from an "alternate" set, the keying of the subfield delimiter pair⁸, and adding the ability to store and copy text within a record or between records.

All non-Roman scripts are now invoked by depressing the Control (Ctrl) key in association with a letter (see Table 1). For example, Ctrl + H (upper or lower case) yields Hebrew. Because RLG plans for the MSW to be completely integrated with regard to non-Roman scripts in the future, it was considered undesirable to have "C" mean "Chinese" in one situation (MSW as CJK terminal), and "Cyrillic" in another (MSW set for Cyrillic/Hebrew capability), so "C" was assigned to widely-used Chinese, and "S" was assigned to little-used Cyrillic⁹. Note that the letters C, J, and K have a script-invoking effect only on an MSW configured as a CJK terminal, and H and S have no effect (apart from an error message). On an ordinary personal computer or on an MSW configured for Cyrillic/Hebrew input, H invokes Hebraic script, S invokes Cyrillic, and C, J, and K are ineffectual.

The "Alt" key—which was previously used to invoke all character sets other than ASCII—is now reserved strictly to obtain single characters from any "alternate" character set supplementary to the "basic" character set of a script. RLIN does not have an alternate character set for Hebrew, but certain diacritical marks from

the Roman alternate character set are used in the ALA/LC romanization schemes for Hebrew and Yiddish.

The necessity to reinvoke a non-Roman script after keying a subfield delimiter pair has been eliminated. When the subfield delimiter ("double dagger") key is pressed, Roman is invoked for one more character (the letter or number identifying the subfield), and then the previous script is automatically restored.

Store/copy—the ability to store data displayed on the screen and copy it to other fields in a record or to different records—was a feature of the specialized RLIN CJK terminal. This feature has been replicated in the latest version of the RLIN PC software, which means that store/copy is now available for all scripts. Furthermore, the number of pieces of text that may be stored has been expanded from two to a large number (equal to the number of keys on the keyboard times the number of control-type keys such as SHIFT). The limiting factor for the storage of data is likely to be memory size, rather than too few key combinations.

An application of this feature would be in entering records for titles issued by a corporate author. The romanized form of the author's name would be stored on one key; the Hebrew form on another. As each record was entered, the stored data would be copied to the appropriate fields, thus saving numerous keystrokes.

CJK vs. Other Non-Roman Scripts

The MSW can be set to operate *either* as an RLIN CJK terminal *or* as a Cyrillic-Hebrew terminal. (It can also be used as a stand-alone personal computer to run other applications unrelated to RLIN.) It is not yet possible to mix CJK script with Cyrillic or Hebrew text in the same RLIN record. So, a Russian-Chinese dictionary or a book about Hebrew written in Japanese cannot yet be cataloged completely using the proper non-Roman scripts: text in one script or the other can be represented only in romanized form, as shown in Figure 5.

Clustering in the RLIN database—the gathering together of records for the same bibliographic edition of a work—is based on the romanized fields in the records. As a result, the record containing Hebrew script and the record containing Japanese script will cluster together (as shown in Figure 6). Both records will be retrieved by a search using either of the non-Roman scripts, because a match on an access point of any record in the cluster retrieves the entire cluster.

Table 1. Letters to Invoke Scripts on RLIN

C invokes *Chinese characters*
H invokes *Hebraic script*
J invokes *Japanese kana*
K invokes *Korean hangul*
R invokes *Roman script*
S invokes *Cyrillic script*

PROD Books LON DCLP85-B13063 Search CRLG-INT
FIN SP HEBREW LANGUAGE--DICTIONARIES--JAPANESE - Cluster 2 of 3

+B

現代 ヘブライ語 辞典 = ha-Milon he-.hadash 'Ivri-Yapani / [編者 キリスト
聖書塾 編集部]. -- 初版. -- 東京 : キリスト 聖書塾, 1984.
[24], 640 p. : ill. ; 19 cm.

Title on verso of t.p.: The modern Hebrew-Japanese dictionary.
Bibliography: 24th prelim. page.
ISBN 4896061039 : Y5500

1. Hebrew language--Dictionaries--Japanese. I. キリスト 聖書塾. 編集部. II.
Title: Milon he-.hadash 'Ivri-Yapani. III. Title: Modern Hebrew-Japanese
dictionary.

LCCN: 85163652/AJ
L.C. CALL NO: PJ4837.G4 1984 <Orien Japan>
ID: DCLP85-B13063 CC: 9114 DCF: a [CJK]

PROD Books LON CRLG90-B5 Search CRLG-INT
FIN SP HEBREW LANGUAGE--DICTIONARIES--JAPANESE - Cluster 2 of 3 - DEMO record

+B

Gendai Hebraigo jiten = המלון החדש עברי-יפני / [hensha Kirisuto Seishojuku
Hensh'ubu]. -- Shohan. -- T'okyō : Kirisuto Seishojuku, 1984.
[24], 640 p. : ill. ; 19 cm.

Hebrew on title page vocalized.
Title on verso of t.p.: The modern Hebrew-Japanese dictionary.
Bibliography: 24th prelim. page.
ISBN 4896061039 : Y5500

1. Hebrew language--Dictionaries--Japanese. I. Kirisuto Seishojuku. Hensh'ubu.
II. Title: Milon he-.hadash 'Ivri-Yapani. III. Title: המלון החדש עברי-יפני. IV.
Title: Modern Hebrew-Japanese dictionary.

LCCN: 85163652/AJ
L.C. CALL NO: PJ4837.G4 1984 <Orien Japan>
ID: CRLG90-B5 CC: 9114 DCF: a [HBR]
CALL: PJ4837.G4 1984

Figure 5. RLIN records for a Japanese/Hebrew work. The upper record contains CJK data, and the Hebrew is romanized. The lower record contains Hebraic script and the Japanese is romanized.

Cataloging Standards

The debate over the use of ANSI reversible romanization for fields in the body of the entry ended in 1988 when the New York Public Library abandoned the practice (which had been established for the Hebrew font in the Library's printed *Dictionary Catalog*). The New York Public Library now uses ALA/LC romanization for all parts of its Hebrew records, not just the

headings. The feasibility of reconstructing Hebrew in the reversibly romanized records is discussed below.

The effect of this policy change is illustrated in Figure 7, which shows a cluster of six bibliographic records. The bibliographic data used for the display comes from the Primary Cluster Member (or *PCM*), the record chosen to be representative of

the cluster as a whole; each library having a record in the cluster is represented by its four-letter RLIN Library Identifier code, and also by its National Union Catalog code. The *PCM* is used as the source record for copy cataloging when the user has not chosen another record in the cluster.

Because the fields which are used for clustering (not visible in the illustration) contain

```

PROD      Books      PRI      DCLP85-B13063      Search      CRLG-INT
FIN SP HEBREW LANGUAGE--DICTIONARIES--JAPANESE - Cluster 2 of 3
+B
現代 ヘブライ語 辞典 = ha-Milon he-hadash 'Ivri-Yapani / [編者 キリスト
聖書塾 編集部]. -- 初版. -- 東京 : キリスト 聖書塾, 1984.
[24], 640 p. : ill. ; 19 cm.

ISBN 4896061039 : Y5500
LCCN: 85163652/AJ
L.C. CALL NO: PJ4837.G4 1984 <Orien Japan>
ID: DCLP85-B13063      CC: 9114      DCF: a      [CJK]
-----
DCLP (c-9114 DLC [CJK])  CRLG (c-9114 CStRLIN [HBR])  NYPG (a-9114 NN)
NYPO (c-9114 NN [CJK])

```

Figure 6. Primary cluster display for the records in Figure 5. The two records cluster together because the romanized fields in both records are identical. [CJK] indicates the presence of CJK data in a record; [HBR] indicates Hebraic script.

```

PROD      Books      PRI      NYPX88-B9362      Search      CRLG-INT
FIN PN MEIR, GOLDA ALSO LG HEB - Cluster 9 of 10
+B
גולדה, קובץ לזכרה / העורך, נחמן תמיר ; חברי המערכת, ישראל גלילי, ישעיהו אברך.
-- נתל אביב : עם עובד - תרבות וחינוך, 1981.
160 p., [16] p. of plates : ports. ; 22 cm.

LCCN: 82135518
L.C. CALL NO: DS126.6.M42.G65 1981
ID: NYPX88-B9362      CC: 9110      DCF: a      [HBR]
-----
NYPX (c-9110 NN [HBR])  DCLC (c-9110 DLC)  MHAU (c-9662 MH)
NJPG (b-9110 NjP)  NYCG (c-9110 NNC)  NYCX (a-9668 NIC)

```

Figure 7. Primary cluster display. The records in this cluster come from the following institutions: The New York Public Library (the PCM record), The Library of Congress, Harvard College, Princeton University, Columbia University, Cornell University. Each library is identified by its four-letter RLIN Library Identifier code, and also by its National Union Catalog code.

ALA/LC romanization, the Hebrew record for this title entered by the New York Public Library was able to join the existing cluster of five completely romanized records. In fact, the incoming New York Public Library record replaced the Library of Congress resource record as the *PCM*; both records have the same level of cataloging (9110), but the New York Public Library record contains Hebrew script (as well as romanized Hebrew), whereas the Library of Congress record does not.

Because the New York Public Library record joined the cluster, *all* the records are retrieved when the search contains Hebraic script. Had the New York Public Library not abandoned ANSI reversible romanization, its record would have formed a separate cluster of one record, and the other five records would only have been retrievable via Roman searches. Thus, the New York Public Library's decision improved searching for all Hebraica libraries.

Prior to the implementation of Hebrew on RLIN, RLG's BibTech Committee had endorsed ALA/LC romanization as the only standard scheme to be used for the romanization of Hebrew in RLIN records. With the change to a search-based fee structure, the financial incentive to create records "to standard" is expressed in the form of search credits. To maximize the usefulness to other libraries of data for copy cataloging, libraries should strive to make their original cataloging as complete and standard as possible.

Database Growth

The RLIN bibliographic database currently includes over 29,000 bibliographic records containing Hebrew text (see Table 2 for breakdown by file). Almost all of these records have been entered in just over two years¹⁰. This is *not* 29,000 plus unique titles: since each library contributes its own record, there will be a certain amount of redundancy with respect to titles (as shown in Figure 7).

The number of Hebrew and Yiddish titles in the RLIN database is greater than 29,000. Prior to the introduction of the Hebraic script capability on RLIN, libraries could only enter completely romanized cataloging for Hebrew titles. The RLIN database also contains romanized resource records; for example, records received through the current MARC distribution from the Library of Congress. Furthermore, many non-specialized libraries have continued to do only completely romanized cataloging of their Hebrew material. In October 1987, three months before Hebrew was added to RLIN, the bibliographic files contained approximately 20,000 romanized Hebrew records and 2,000 romanized Yiddish records (as determined from the language code in each record).

In April 1989, the RLIN database was enhanced by the addition of 90,000 records from the retrospective conversion of the Hebrew and Yiddish card catalogs of the Judaica Department of the Harvard College Library (RLG, Apr. 1989). This was a notable addition to the database; although the records do not contain Hebrew, the romanization scheme is ALA/LC and an effort was made to bring headings into conformity with AACR2. The RLIN records for Harvard's Judaica are being maintained; every two months, an update tape from Harvard is loaded.

USMARC

The linkage subfield (subfield 6) of the USMARC 880 field (Alternate Graphic Representation) has been modified to allow the identification of a field as right-to-left in direction. Right-to-leftness is shown by /r at the end of subfield 6; that is, following the linking tag, occurrence number, and identification of the first alternate graphic set in the field. The default direction for USMARC data (which is not encoded) is, of course, left-to-right.

RLG is already supplying the Library of Congress with tape output of the Hebrew cataloging that LC does on RLIN. The Library of Congress plans to redistribute its

Table 2. Number of RLIN Records Containing Hebrew, by File

As of February 7, 1990:

File	Number of Records
Books	29,016
Serials	178
Archival and Mss.	
Control	0
Machine-Readable	
Data Files	0
Maps	0
Recordings	3
Scores	11
Visual Materials	1

Hebrew cataloging through the MARC Distribution Service.

Future Prospects

Systems are never finished: as the environment of operation changes, the system needs to change. For example, as changes are made to the USMARC formats for bibliographic records and authorities, parts of the RLIN system must be modified to maintain compatibility with USMARC. Improvements unrelated to environmental change are also possible, given demand and the allocation of resources in response to demand.

Integration of CJK with Other Non-Roman Scripts

As described above, RLG's MultiScript Workstation (MSW) currently operates *either* as a CJK device *or* as a device for other non-Roman scripts (Cyrillic and Hebrew). RLG recognizes the need to integrate all non-Roman scripts, so that the MSW is fully "multiscript." Remedying this deficiency requires modification of the programs that run on the RLG mainframe computer. Implementation of such changes must be carefully coordinated with any enhancements for other non-Roman scripts: Arabic is a designated development project funded by the Kuwait Foundation for the Advancement of Sciences (RLG, Dec. 1989).

Indexing and Searching

In RLIN searching, the term being searched for must be at least three characters long, and truncation is allowed *after* the third character. RLIN does not support *forward* truncation¹¹, a search technique which would be very helpful for Hebrew

and other particulate languages. Some thought was given to methods by which Hebrew particles could be detected and ignored in Hebrew word searching. The proposed strategy (Aliprand, 1986-87, p. 11) was to set off the particle by requiring the cataloger to include an explicit mark—the *separator* character—between the particle and the word proper. There is a precedent for this in RLIN—the CJK *aggregator* symbol is used to agglutinate groups of Chinese characters for indexing. For example, with the separator represented by a backslash, the Hebrew word for "in the book" would be input as *ba\sefer*. (All examples in this section are provided in romanization; actual input would be in Hebrew characters.)

Subsequently, the *separator* strategy was rejected in favor of a "behind-the-scenes" approach to particle detection, and three possible implementation methodologies have been suggested. In all cases, a search involving grammatical particles would be indicated by the use of a distinctive index identifier in the search command. RLIN's Boolean searching capabilities and the ALSO command could be utilized to modify such a search if necessary.

The *Koprowski*¹² *solution* calls for the compilation of a list of prefixes (including single prefixes and combinations of prefixes). The user would enter the basic word to be used in the search (with the option of ending truncation), e.g., *sefer*. The system would then convert this into a set of searches—the basic word and its combination with all the prefixes from the list—all linked by OR, i.e., *sefer OR ha-sefer OR ba-sefer OR . . .*

The *Carroll/Ripp alternative* takes advantage of the fact that each non-Roman word in a word index is preceded by a three-character escape sequence that identifies the non-Roman script. Thus, every Hebrew word—even those of one or two characters—is more than three characters long because of the preceding escape sequence.

In the *Carroll/Ripp alternative*, what appears to be forward truncation to the user is, in fact, internal truncation (an existing RLIN feature). For example, a search for *sefer* would be carried out as a search with internal truncation (#) for [escape sequence]#*sefer*. This would match *ha-sefer*, *ba-sefer*, etc. In RLIN, truncation within a search argument also implies truncation at

the end, so the above search would also retrieve the plural and construct forms *ha-sefarim*, *be-sifre*, etc.

The *Pobuda brainstorm* calls for a new, separate index. In building this index, any sequence of letters which might be a particle (i.e., that matches a sequence of letters in the list of particles) is dropped from the word before the remainder of the word is entered in the index, for example *mem* and *he* are dropped from *meha-sefer*. To a reader of Hebrew, many of the entries in this index will be nonsensical, e.g., *rti* from *miharti*, but true particle-less words will be included and will be retrievable.

These three "pnambic"¹³ alternatives have been proposed for the elimination of particles in Hebrew searching. If RLG decides to add particle elimination to RLIN at some future date, the choice will be determined by several criteria, such as the fewest "false drops" and maximum system efficiency. This new searching strategy will probably not be needed until the Hebrew word indexes grow much larger. Users have already been consulted to determine whether the general concept is feasible, and the JAMES Program Committee has endorsed it.

RLIN Database

The New York Public Library's reversibly romanized records have been examined to determine whether Hebrew can be added. The process of restoration would be comparable to that by which Hebrew text was included in the printed *Dictionary Catalog*: the substitution of the proper Hebrew letter for its Roman-alphabet representation. Note that the ANSI reversible romanization would remain in the records, because of the RLIN system requirement for paired core fields. Again, the realization of this enhancement to the database is dependent upon the allocation of the necessary resources.

The Board of Governors of RLG has made a commitment to increasing RLG's international activities. This was exemplified by the demonstrations of the RLIN system at the 1989 IFLA Conference in Paris. It is conceivable that records for Hebraica from sources outside the United States may someday be acquired for the RLIN database, as proposed (in general terms) by Adler (1987-1988).

Cataloging Standards

The issue of multiple romanization standards for a particular language or script will recur. As RLIN is used by an international clientele, the pressure will grow for

more than one romanization scheme to be accepted as "standard." Romanization of Chinese is the most contentious case: *pinyin*, the official romanization scheme of the People's Republic of China, is used in many libraries overseas and in many domestic situations (e.g., journalism), but American libraries continue to adhere to the Wade-Giles scheme. In the case of Hebrew, the ALA/LC romanization scheme differs from the international standard for Hebrew romanization promulgated by ISO—a similar problem.

Another cataloging standards issue is the orthography of headings in Hebraic script. Should the Israeli practice of normalizing access points according to a single orthographic convention (Adler, 1988-1989, p. 134) be followed? Or should Hebrew script access points be based on the general principles of AACR2, and so more accurately reflect the orthography of the source?

For non-Roman access points, current RLIN practice allows a non-Roman heading to be paired with a romanized heading (i.e., to have the same tag) only when the romanized heading has been systematically established according to the appropriate ALA/LC table. When the romanized heading is a "popular" form (i.e., different from the ALA/LC romanization), the non-Roman heading must be entered as an unpaired local subject (69X) or added entry (79X) field, separated from the AACR2 heading. Figure 8 shows the application of this rule: the AACR2 main entry is systematically romanized, and so the Hebrew name of the author can be paired with it (in a second 100 field). The AACR2 heading *Maimonides*, on the other hand, is a Latinization, so the Hebrew subject and author/title added entries for *Mosheh ben Maimon* must be entered as separate local fields.

This arbitrary rule is undesirable for two reasons. Logically, there is no difference between a "popular" form, a systematically-romanized form, and a non-Roman form: they are simply different ways of naming a particular entity. The rule should be changed to: Pair the name of an entity written in a non-Roman script with the name for that entity established according to AACR2. The Library of Congress is in fact doing this for its non-Roman records (because local fields cannot be distributed on its USMARC subscription tapes).

Not only is the current rule logically indefensible, it impedes copy cataloging. Local fields are not transferred when a record is copied. When a non-Roman record conforming to the RLIN rule is copied, the cat-

aloger must re-enter the non-Roman access points (even though they exist in the source record). On the other hand, when a Library of Congress record containing non-Roman data is copied, any non-Roman access point paired with a "popular" romanization must be repositioned as an unpaired 69X or 79X field. This means that most copy cataloging must be modified. It is the author's sincere wish that this rule will be changed as soon as possible to facilitate the use of RLIN for non-Roman copy cataloging.

Non-Roman Authorities

Authority control for non-Roman headings is a "hot topic" in USMARC circles. Hebrew headings demand authority control because of the variant orthography that occurs in both Hebrew and Yiddish. The inability of the current *USMARC Authority Format* to accommodate non-Roman data does not justify a lack of authority control in non-Roman headings. Uniformity can still be imposed by a library, either by maintaining a manual authority file for non-Roman headings, or simply by searching on the authorized form of the romanized heading for the person or corporate body and examining the non-Roman headings in the resulting records.

In adding a non-Roman data capability to the *USMARC Authority Format*, it is essential that the changes accommodate all types of catalog—not just the "universal catalog"¹⁴ of the Library of Congress and most other general-purpose libraries, but a complex multiscript catalog, such as YIVO's.

Retrospective Conversion

We can anticipate that libraries will use RLIN for the retrospective conversion of their Hebraica collections; Brandeis University, for example, is using RLIN for this, in addition to current cataloging.

Standards issues will need to be resolved with respect to retrospective conversion activities. Katchen (1989) has questioned the need for complete romanization of the parts of a record that are not in romanized form on the catalog card being transcribed; for example, the subtitle and remainder of title, and the notes. [*A revised version of the Katchen paper appears in this issue.—Ed.*]

Conclusion

As its name suggests, "software" is amenable to change. The principal limiting factor is technical feasibility: some things just can't be done under current conditions.

PROD	Books	FUL/BIB	NYPX89-B1225	Search	CRLG-INT			
FIN TP	PARASHAT HAMELEKH #	- Cluster 1 of 1 -	HBR					
+								
ID:	NYPX89-B1225	RTYP:c	ST:p	FRN:	MS:	EL:	AD:01-26-89	
CC:	9114	BLT:am	DCF:a	CSC:d	MOD:	SNR:	ATC:	UD:02-27-89
CP:	is	L:heb	INT:	GPC:	BIO:	FIC:0	CON:	
PC:	m	PD:1938/9999	REP:	CPI:0	FSI:0	ILC:	MEI:1	II:0
MMD:	OR:	POL:	DM:	RR:	COL:	EML:	GEN:	BSE:
040	NN#cNN							
100	20	Ben-Mena, hem, Yits, ha, k Me'ir.						
100	20	בן-מנחם, יצחק מאיר.						
245	10	Parashat ha-melekh :#b, hidushim u-ve'urim 'al hilkhhot Ishut le-Rabenu Mosheh bar Maymon /#cme'et Yits, ha, k Me'ir Ben-Mena, hem ben Mena, hem Men dil Patsiner.						
245	10	פרשת המלך :#בחדושים ובאורים על הלכות אישות לרבינו משה בר מימון /#אמאח יצחק מאיר בן-מנחם בן מנחם מענדיל פצינר.						
260	0	[Yerushalayim] :#b[.h. mo. 1.], #c698- [1938-						
260	0	. 698- [1938- #c# ירושלים] :#ביחמו'לז, #c						
300		v. ;#c35 cm.						
600	10	Maimonides, Moses, #d1135-1204.						
650	0	Marriage (Jewish law)						
696	00	. 1204-1135d# בן מימון, #a#6#						
700	10	Maimonides, Moses, #d1135-1204. #tHilkhhot Ishut.						
796	00	. 1204-1135d# #a#6# בן מימון, #t#הלכות אישות.						

Figure 8. Paired and unpaired Hebrew headings.

Secondary factors that limit change are demand, price, and the resources of the organization responsible for bringing about the desired change.

Libraries with an interest in Hebraica are few, when compared to the RLG membership as a whole. The demands of Hebraica libraries and the demands of other constituencies must be evaluated by RLG, and, when accepted, prioritized relative to all other approved changes. This is no different from the competition for limited resources that exists among the various administrative units of a library. Enhancements to RLIN's Hebrew capability will surely occur, but competition for organizational resources will determine when.

Acknowledgments

Bella Weinberg urged me to write a sequel to "Hebrew on RLIN." John Eilts reviewed this paper before it was submitted for publication, but any errors should be laid at the author's door.

I am particularly grateful to Rosalie Katchen (*Brandeis University*), who raised my consciousness with respect to the impact of unpaired local fields on copy cataloging.

I would also like to thank Zachary Baker for his helpful editorial comments, and Leonard Gold for his assistance with illustrations.

Notes

1. RLIN is the acronym for the Research Libraries Information Network, the automated bibliographic system owned and operated by the Research Libraries Group, Inc. (RLG).
2. The Jewish and Middle East Studies Program was established by RLG in 1988; its Committee members are: Leonard Gold (*The New York Public Library*), Chair; Charles Cutter (*Brandeis University*); Frank H. Unlandherm (*Columbia University Libraries*); Yoram Szekely (*Cornell University*); Herbert Zafren (*Hebrew Union College-Jewish Institute of Religion*); Edith Degani (*Jewish Theological Seminary*); Meryle Gaston (*New York University*); Michael Ryan (*Stanford University*); Robert Singerman (*University of Florida, Gainesville*); Rick Burke (*University of Judaism*); Linda Lerman (*Yale University*); Pearl Berger (*Yeshiva University*); John Eilts (*Research Libraries Group*).
3. The National Information Standards Organization is responsible for U.S. standards in the fields of libraries, publishing, and information science.

4. The other way is as *sheya plus patah, kamats or segol*.
5. ASCII = American Standard Code for Information Interchange, the basic Roman character set used in computing applications.
6. Companies which have shown interest in non-Roman scripts are Geac (which has a contract with the Academy of Sciences in Leningrad), VTLS (which has a contract with the Lenin Library in Moscow), UNISYS, Carlyle, and UTLAS.
7. *CJK* is a registered trademark of The Research Libraries Group, Inc. for the Chinese/Japanese/Korean component of RLIN.
8. According to the conventions of the *USMARC Formats*, a subfield (i.e., a data element within a field) is set off by a subfield code, which is comprised of the subfield delimiter symbol ("double dagger") and a lower case letter or number to identify the type of data element. Since the identifying letter or number is popularly (but incorrectly) referred to as the "subfield code," I have used the term "subfield delimiter pair" to make it clear that I am discussing the input of both the subfield delimiter symbol and the following letter or number.
9. As a mnemonic, "S" can be associated with

the sibilant "C" in "Cyrillic" and/or stand for "Slavic languages" (some of which are written in Cyrillic script).

10. The Library of Congress used RLIN for approximately 2 months before the release of Hebrew to other libraries.
11. *Forward* truncation means truncation close to the beginning of a word, with the remainder of the word or phrase (from the point of truncation to the end) used as the argument of the search.
12. Particle elimination was considered to be a very interesting problem at RLG. The alternatives are named after the following contributors: Richard Koprowski (now with Stanford University), Michael Carroll, David Ripp, and Michael Pobuda.
13. "pnambic" will probably not be found in a standard dictionary, but it is a useful word in the computer environment. It means something that is done behind the scenes; it is an acronym taken from the sentence "Pay No Attention to that Man Behind the Curtain" (*The Wizard of Oz* [motion picture]).
14. "The catalog in which all items in the collection are entered in a single alphabet from A to Z, regardless of language, regardless of form, regardless of subject. The American ideal." (Spalding, p. 8).

References

Adler, Elhanan. "The Use of Israeli Machine Readable Cataloging in American Libraries." *Judaica Librarianship*, vol. 4, no. 1 (Fall 1987–Winter 1988), pp. 23–26.

Correspondence: *Judaica Librarianship*, vol. 4, no. 2 (Spring 1988–Winter 1989), pp. 138–9.

Adler, Elhanan. "Judaica Librarianship: The View From Israel." *Judaica Librarianship*, vol. 4, no. 2 (Spring 1988–Winter 1989), pp. 133–7.

Aliprand, Joan M. "Hebrew on RLIN." *Judaica Librarianship*, vol. 3, no. 1–2 (1986–1987), pp. 5–16.

Katchen, Rosalie. Paper delivered at Program Meeting sponsored by LITA/RTSD Retrospective Conversion Interest Group (held on Jan. 8, 1989 during ALA's Midwinter Meeting).

Levi, Judith. "ALEPH: An Online Real-Time Integrated Library System." *Judaica Librarianship*, vol. 1, no. 2 (Spring 1984), pp. 58–63.

The New York Public Library. Research Libraries. *Dictionary Catalog of the Research Libraries: a Cumulative List of Authors, Titles, and Subjects Representing Books and Book-like Materials Added to the Collections Since January 1, 1971*. [New York]: The New York Public Library, [1972–81].

[RLG, Apr. 1989] Research Libraries Group, Inc. *Harvard Judaica Records in RLIN are a Major*

Contribution to RLG's Newest Cooperative Program. Press release (April 7, 1989).

[RLG, Dec. 1989] Research Libraries Group, Inc. *RLG Awarded Grant from the Kuwait Foundation to Develop Arabic Script Capability in RLIN*. Press release (December 15, 1989).

Spalding, C. Sumner. "Romanization Re-examined." *Library Resources & Technical Services*, vol. 21, no. 1 (Winter 1977), pp. 3–12.

Correspondence: *Library Resources & Technical Services*, vol. 21, no. 3 (Summer 1977), pp. 303–5.

[USMARC Authority Format] *USMARC Format for Authority Data: Including Guidelines for Content Designation*. Prepared by Network Development and MARC Standards Office. Washington: Cataloging Distribution Service, Library of Congress, 1987–

[USMARC Specifications] *USMARC Specifications for Record Structure, Character Sets, Tapes*. Prepared by Network Development and MARC Standards Office. Washington: For sale by the Cataloging Distribution Service, Library of Congress, 1987.

Joan Aliprand is employed by the Research Libraries Group, Inc. as a Library Systems Analyst; she wrote the external design specifications for adding Hebrew to RLIN, and will soon begin work on the external design specifications for Arabic. Ms. Aliprand is a graduate of the School of Librarianship, University of New South Wales, and also studied at the Graduate Library School, University of Chicago. She has held professional positions at the University of California at Berkeley, the University of Chicago, and Macquarie University (in Sydney, Australia).

COMMENTARIES

(Continued from p. 5)

for every subdivision end in the digit 9, labeled "other"—the standard device in the UDC to provide for topics at present unknown, but to be classed at a particular subdivision that will comprise it as a species of a certain genus. No other current classification system provides such "escape hatches," or is flexible enough to take future developments into consideration as far as this is humanly possible.

Given the present state of knowledge or ignorance about the JDD, I thought that the time had come to provide a classification scheme that would do three things: (a) put the entire topic in its proper Jewish (but not necessarily sectarian) context; (b) provide a reasonably detailed breakdown where needed, to enable scholars to class not only books, but also articles, essays, reports, and the like, dealing with specific aspects of the JDD; (c) provide also, as far as possible, for future developments in this field. Prof. Schiffman seems to believe that all this should have been postponed until a "definitive" scheme could be designed—say, in another 50 or 100 years, or however long it may take Biblical scholars to sort out the problems of the JDD and to resolve the various disputes and squabbles among themselves. I happen to believe that it is better to light a candle than to curse the darkness in which the traditional library classification systems had left the Judean Desert Documents.

Hans Wellisch
Professor Emeritus
University of Maryland
College Park, MD

Library for sale . . . large collection of Talmudic studies, Yiddish and Germanic studies and various linguistic topics; specializing in early Christian period. Ideal for new collections. Owned by renowned scholar. Contact Prof. N. Susskind (407) 686-3208 or Anne Dykstra (718) 972-0380.



*Hebrew-English Library
Management Program For
IBM PC And Compatibles*

Welcome to the most advanced, yet easy-to-use Hebrew/English Library Management Program for the PC—**Safran Davka!**

Designed for use by schools, synagogues, and institutional libraries, as well as individuals with large personal collections, Safran Davka is a fully bilingual system that's easy to install and use, and has a wealth of features found only in library systems that cost thousands more.

Safran Davka is another superb program designed by Davka Corporation, the world's largest developer of Hebrew and Judaic software. When you purchase Safran Davka, you're guaranteed Davka quality and reliability.

Safran Davka's powerful features will increase your

productivity and efficiency. You can keep track of multiple copies of each individual volume, and its Circulation Module assigns card numbers to library

Safran Davka Features

- Requires no special hardware chips
- Works with most dot-matrix printers, and HP LaserJet II
- Fully Bi-lingual
- Tutorial booklet for easy learning and use

users, charges out books, keeps a record of overdue books, and immediately indicates which books are in the library and which are on loan, and even who has them!

Safran Davka will print catalog cards, spine labels, and book labels. Books can be retrieved using three dif-

ferent searching criteria—title, authors or subjects. Safran Davka does not require any hardware modifications or special chips. It works with almost all dot-matrix printers as well as the Hewlett-Packard Laser Jet printer.

**Safran Davka
Basic Module
\$299**

**Safran Davka
Basic Module PLUS
Circulation Module
\$349**

Demo Disk Just \$7.95.
Safran Davka is also available for the Macintosh. Call for more details.

Minimum System Requirements

- IBM PC or compatible
- 640K RAM and hard disk drive
- CGA, Hercules, or EGA Card
- 9-pin dot matrix printer or 24-pin in 9-pin mode, or HP LaserJet Series II

**To Order, Or For More
Information, Call
Toll-Free 1-800-621-8227**

Davka Corporation
845 N. Michigan Ave
Chicago, IL 60611
(312) 944-4070