ALEF BIT

Hebrew Word Processing: A Review of Available Products

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Introduction

A basic discussion of Hebrew word processing was provided in my article in the preceding issue of *Judaica Librarianship* (Kuperman, 1987). The first part of this companion piece provides an overview of options for Hebrew word processing available in the United States; the second part reviews specific products. The existence of these products was determined from published directories and by "asking around." (Unfortunately, "word of mouth" is still the only way to find out about many of the companies producing Hebrew software.)

Finding published information on Hebrew word processing systems is relatively difficult. Most major English-language word processing programs are widely reviewed and advertised in computer-oriented as well as general serials, e.g., *Consumer Reports, Byte,* and *PC.* They are listed in software directories and discussed in monographs. Hebrew word processors, however, are considered esoteric. Virtually none of the major Hebrew word processing programs has been widely advertised or even reviewed. Several major New York City stores specializing in software are apparently unaware of the existence of software for Hebrew word processing.

Except for the newsletter of the Hebrew Users Group (in Berkeley), described in my previous article, there are no regular sources for reviews of Hebrew software in the United States. Reviews published in Israeli journals, especially in Hebrew, are hard to locate in American libraries, as a search of OCLC and RLIN indicated.

Most software available in the United States is of North American origin, but much Hebrew software is imported from Israel. User access to the authors of the Hebrew programs is limited, and consequently, these programmers are denied feedback 'from American users.

Many Hebrew programs are not aggressively marketed in North America, and the level of support available from producers of Hebrew software is substantially lower than that which is normal from the leading producers of English word processing programs. Furthermore, many programs that facilitate writing, editing, and/or printing Hebrew were not originally designed for Hebrew, and the producers of the software may be less than fully informed of the needs of Hebrew users. The significance of Hebrew word processing—as well as Hebrew desktop publishing and Hebrew data base management—is only beginning to be realized by both the Jewish community and the software industry.

Programs Available

A wide range of programs is available for IBM-compatible (MS-DOS) systems. Some of the programs designed as bilingual Hebrew-English word processors are: *Alef-Bet, Mince,* and *Wordmill.* Among programs designed to allow word processing in a variety of non-Roman scripts, including Hebrew, are: *Multi-Lingual Scholar, Grafeas,* and *Intex.* In addition, there are several programs that facilitate inclusion of Hebrew characters in documents produced by English word-processing programs lacking Hebrew capabilities; examples are *Fancy Font* and *Turbofonts.* Several English-oriented word processors allow for, or have been modified for, Hebrew word processing: *Nota Bene, Wordstar* (with *Computer Linguist/Hebrew Star*), and *Einsteinwriter.*

Apple's Macintosh has always been distinguished by font flexibility. Several word processors, including *Achbar, MacIn-Hebrew,* and *HaKotev,* facilitate Hebrew word processing, in addition to allowing Hebrew characters to appear on the screen and be printed. Others, such as *Linguists' Software,* produce font sets that are compatible with most word processors. With the Macintosh, it is relatively easy to use a Hebrew font without special word processing software, although it requires typing "backwards" and confronting an unpredictable wordwrap.

Screen Display

The Macintosh has always had a programmable character generator to display and print a variety of fonts. Designed to allow English-language users to "spruce up" their documents with multiple fonts, such as italics or gothic fonts, the capacity to display and edit an infinite variety of fonts is exploited by all word processors attempting to produce Hebrew-English output. The ease with which the Macintosh can accommodate Hebrew will be further enhanced with the new generation of Macintosh which was announced early in 1987.

Until recently, all IBM-compatibles came with an inflexible character set consisting of the "standard" 128 ASCII character set and an IBM expansion of the ASCII set that provides for some non-English accents used by other Roman-script languages, some specialized graphics, and a variety of "scientific" characters, including some Greek letters. In order to display Hebrew characters with an IBM-compatible, one must bypass the standard character generator through either an alternate character generator (a Hebrew "chip") installed physically into the computer, or through software utilizing the computer's graphics capacity. The recent development of programmable character generators gives the IBM-compatibles the ability to display Hebrew characters with minimal difficulty.

Several programs have relied on hardware modification (a Hebrew "chip") to display Hebrew; these include *Mince, Alef-Bet, Wordmill,* and *Turbofonts.* The "chips" substitute Hebrew for various "higher" ASCII characters, and once installed, the computer will

always display Hebrew when those ASCII codes are typed in. Disadvantages of using a chip are (1) that one loses access to whatever ASCII characters the Hebrew replaces, and (2) while a chip makes it possible to display Hebrew in many programs that don't normally have a Hebrew capacity, some programs will "bomb" (not work) if the character generator has been tampered with. (See discussion in newsletter of The (Berkeley) Hebrew Users' Group, HUG, vol. 3, no. 2, January–March, 1987.) Hardware modification is an inflexible and relatively expensive method of making a computer display Hebrew. Most programs that had been "chip"-oriented are now switching to non-hardware means of displaying Hebrew characters.

An alternative to a "chip" is to use software that causes the computer to display non-standard characters. Using a graphics card (an option that is now virtually standard), a computer program can control what appears on the screen on a dot-by-dot basis, whereas with a "chip," the program can only decide which of a finite set of 256 characters to display. Programs using this graphics capability allow the simultaneous display of full character sets for many scripts, including a full range of diacritical marks. Examples of such programs are *Multi-lingual Scholar, Computer Linguist, Nota Bene, Mince, Intex,* and *Grafeas.*

A new development is a graphics card that creates an alternative programmable character generator. The user can program the character generator to suit specific needs, and once programmed, it will produce any character set. Unlike a "chip," it can be reprogrammed as needs change. The most flexible is the *Hercules Graphics Card Plus RamFont,* which makes it possible to simultaneously work with 12 programmable character sets, i.e., 3072 different characters. The new IBM line of computers (OS2) will also include a comparable programmable character generator as a standard feature. Some packages— including *Computer Linguist, Nota Bene, Turbofonts* and *Grafeas*—already use the *RamFont* feature to facilitate display of Hebrew, and eventually, most word processing programs will probably be modified to exploit the tremendous potential inherent in having access to a large, flexible character set. This improvement will reduce the advantage the *Macintosh* has had over the IBM-compatibles in displaying Hebrew characters.

Word Processing Features

With the exception of *Nota Bene,* the first "top-of-the-line" word processor to attempt to include Hebrew, Hebrew word processors often lack features that are standard among their leading English counterparts. User support for Hebrew software, with one exception, is poorer than that which users of English software routinely receive. Problems such as the lack of standardized coding and incomplete character sets routinely plague Hebrew users, while they have not been a problem for users of English software for many years. These aspects of Hebrew word processing are discussed in detail in this section.

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Features—Most of the Hebrew word processors have a "search and replace" feature, but many lack the capacity to automatically merge text from different documents (often called "mail merge" after its most common application). Almost all lack the capacity for extensive "macros" (user-programmed chains of commands) that are a potentially powerful tool available on all leading word processors. At present, none has an effective Hebrew spell-check program, even though English spell-check programs, thesauri, and even grammar-check programs are "standard" on leading English word processors and are also available from independent vendors. Automatic positioning of footnotes, a standard feature in leading word processors, is absent from most Hebrew word-processing programs, except for *Nota Bene* and *Multi-Lingual Scholar.* Most Hebrew programs claim to be developing new features, and the gap between Hebrew and English word processors will probably close eventually. Many of the features mentioned in this paragraph are not essential to all users, and someone who doesn't need all the "bells and whistles" may not mind the lack of these features in most Hebrew word processors.

Support—Lack of user support from vendors of Hebrew word processors is a serious problem. Most major English word processing programs are supported directly by the producers, and often by local dealers. The leading word processing programs are the subject of numerous books and courses. This sort of support for Hebrew word processing is conspicuously absent. Only one company listed in this article, Davka, which sells *Mince* and *Achbar,* has a toll-free number to answer user questions. *Nota Bene*

and *Mince* have some local distributors, but for most programs there is only one firm selling the program in North America; unless a user lives in the same city as the seller, any assistance in using the program will be at best a long-distance phone call away, if it is readily available at all.

Characters—The character set used in English word processing is governed by a well established, quasi-legal national standard. No such standardization exists for Hebrew. Many Israeli programs use the "upper" ASCII characters for Hebrew and follow an informal standard developed by word processing manufacturers in Israel. Other programs use different and incompatible methods for representing Hebrew characters in machine-readable form. The standard being developed by the Library of Congress and the Research Libraries Group (Aliprand, 1987, p. 15–16), if adopted by the computer industry, will solve this problem; however, that standard was designed for library cataloging and is, in many ways, unsuitable for word processing (e.g., the RLIN/LC character set makes inadequate provision for certain characters that are useful for word processing applications but irrelevant for library usage).

The lack of a standardized character set is significant in transferring files between computer programs or between computers. Since there is no standard coding for Hebrew, there is no assurance that a file generated by one computer can be utilized by another computer. This makes it very difficult to send electronic mail or operate an online data base in this field. Files produced by one system are often gibberish when read by a different system. Some Hebrew word processors use unique coding systems and make no attempt to include a utility to convert their files to an ASCII file, thereby rendering it virtually impossible for any other program to read the file.

Not all Hebrew word processors have complete character sets for either Hebrew or Roman scripts. Some "bilingual" word processing programs lack lower-case English characters, and many lack some of the diacritical marks necessary for writing other languages using the Roman alphabet, in part since many programs substitute Hebrew characters for Roman diacritical marks. Many systems do not have the capacity to display, edit, and print Hebrew vowels and other diacritical marks, such as the *dagesh.* Only *Multi-lingual Scholar, Fancy Font,* and *Achbar* make provisions for the special characters unique to Yiddish. A prospective purchaser must determine if the character set offered is adequate to meet his/her needs.

Printing

Three methods are currently in use for printing the output of computerized word processing systems. The current "state-of-the-art" is a laser printer, which offers tremendous speed and flexibility, and can produce results that rival a typesetter's. Most Hebrew word-processing programs can be used with laser printers, although some programs add an extra charge for adaptation to laser printing. The flexibility and quality of laser printers has led to the development of "desktop publishing," the production of publications (usually newsletters) that can pass for the output of a professional print shop, when they were in fact produced more quickly, cheaply, and easily using a personal computer. Programs are available that offer users a broad selection of fonts and the capacity to design fonts, and while these are primarily marketed with Roman-script application in mind, some also allow the introduction of Hebrew script into documents. While font design programs work best with a laser printer, some enable a dot matrix printer to produce results approaching those of a laser.

Unfortunately, laser printers are expensive, usually over $2,000 for even the least expensive models. The laser printer's two less expensive rivals are the *formed character printer*, primarily the *daisy wheel* printer, which is basically an electronic typewriter used as a computer printer, and the *dot matrix* printer, whose results vary considerably depending on the printer and the software used. The least expensive of either model costs roughly $200, and at this time, even the most expensive models are still substantially cheaper than the least expensive laser printer. Both alternatives are substantially slower than laser printers. The relatively inflexible formed character printer is closer to a laser in quality in many situations, while the dot matrix matches the laser in flexibility, but varies qualitatively from almost-as-good-as a laser to the very low-quality printing that is often associated with computer-printed materials.

Until recently, "letter-quality" meant a daisy wheel printer. Several programs, including *Wordmill, Mince, HebrewStar,* and *Alef-Bet,* support use of a daisy wheel printer, and numerous companies produce Hebrew daisy wheels. While some models are slow and expensive, they are faster than the typewriters they replaced, and the output is better looking. Since the physical form of the printwheels is fairly standard, independent manufacturers make Hebrew wheels offering a choice of typestyles to choose from. For many reasons, the formed character printers are difficult to use, especially if multiple fonts (e.g., Hebrew and English) are

being integrated in a single document. For this and several other reasons, the formed character or daisy wheel printer is considered to be obsolete by many.

The speed and quality of the output from dot matrix printers vary considerably, depending on both physical characteristics of the printer and the quality of the software in use. A dot matrix can conveniently produce any font, including italics or Hebrew. The ability to program a dot matrix to produce user-defined characters has been exploited by virtually all Hebrew word processing systems. Several programs, including *Fancy Font* and *Multi-lingual Scholar,* manipulate the output so that it approaches that of a "letter-quality" or laser printer. Since dot matrix and laser printers work on a similar principle, i.e., the placing of dots on a page in order to form letters, much dot matrix software is transferable to laser printers, and dot matrix printers are often usable as "rough draft" printers in cases where the final copy will be produced by a laser printer.

The Future

With the spread of programmable character generators, the majority of personal computers and word processors will be able to display Hebrew fonts. Since all word processors will be designed to work with multiple fonts, they will readily accept Hebrew fonts. While special software will be required to "type backwards" and to handle bi-directional wordwrap, such features may become other than exotic as vendors of word processors seek to expand into a world market that includes many languages written right-to-left.

There appears to be progress towards adopting a standard coding for Hebrew. When Hebrew coding becomes standardized, the display, printing, and transfer of Hebrew data will become routine. Software developers will produce utilities to convert files to the international standard. Standard coding for Hebrew will encourage software developers to produce fonts for screen display and printing to be used with other companies' word processors, whereas at present, display and printing systems are necessarily unique to each system. The prospects for Hebrew electronic mail and Hebrew data base searching are exciting.

Desktop publishing, the latest fad in personal computing, is only beginning to spread to Hebrew computing. Hebrew spell-check programs (dictionaries), and the capacity for online data base services are finally becoming practical. One relatively well-known word processing program already makes provision for Hebrew charac-

ters and "backwards" text processing, and it is likely that many other standard programs will support bi-directional wordwrap and multi-script word processing in the foreseeable future.

The tremendous potential for Hebrew word processing is beginning to be realized. To a certain extent, the computer revolution has until now bypassed communities where Hebrew script is widely used. In a few years, however, nobody will understand why a scholarly journal devoted space to a discussion of something so mundane as Hebrew word processing, which will by then be commonplace in every Jewish school, office, library, and home.

Reviews of Programs

The following reviews are based on actual use, where possible, or alternatively, on demonstration programs, instruction manuals, promotional materials, or published reviews. Information is current as of summer or late 1987, at best. Price information is based on publishers' advertisements, but in some cases, the "street" price is substantially different. The programs are arranged alphabetically by trade names; the mailing addresses and phone numbers of the software distributors are given in a directory following the bibliography. Sample output from the programs is in Figure 1.

Achbar. Distributed by Davka Corporation in Chicago, *Achbar* is perhaps the leading program available for the Macintosh. It was previously known as "Mousewrite." The program is available both from local distributors and directly from Davka, which offers support through its toll-free number. *Achbar's* character set includes vowels (accessed through the upper-case number keys) and unique Yiddish characters. *Achbar* files can be easily integrated with popular desktop publishing programs designed for the Macintosh. The program requires a Macintosh with 512K of RAM. The basic price is roughly $250, and the fonts with vowels cost an extra $25. The fonts for use with laser printing are an extra $100. Davka also has a complete line of products that interface with *Achbar,* including spreadsheet and data base programs, Hebrew and Jewish-interest software for the educational market is another Davka product line.

Achbar fonts are exportable to other Macintosh programs, and fonts from independent producers can be imported if one isn't content with the fonts offered by Davka. Davka's wide range of fonts, available for both the Apple Imagewriter and Laserwriter printers, includes modern-looking sans serif faces and block letters to very traditional-looking

fonts based on Rashi script or the characters used in a Sefer Torah. Sizes range from 10 to 72 points. Given the flexible nature of the Macintosh, it is possible to integrate Cyrillic or Arabic characters using Davka's products, even though Davka doesn't emphasize their multi-script word processing capabilities. Exploiting another Macintosh feature, Davka also sells a line of "Jewish clip art" to allow insertion of Judaic graphics into documents.

Alef-Bet. According to its promotional literature, *Alef-Bet* is the word processor preferred by the Israeli Ministry of Defence. A discussion of the value placed on the Israeli Army's expertise in word processing is beyond the scope of this article. Produced in Israel by Grynberg Engineers, and distributed in the United States by Quad, Inc. of California, *Alef-Bet* is oriented towards use in Israeli offices.

Formerly based on hardware modification, *Alef-Bet* now works with any of several graphics cards. It uses the upper-level ASCII characters, and includes only the Hebrew consonants (no vowels, other diacritical marks, or Yiddish characters). The program is copy-protected using a system that requires the original disk, rather than a copy, on a regular basis. *Alef-Bet* includes sophisticated word processing features such as "mail merge" and "search and replace," and supports a wide range of printers, including daisy wheel printers; however, it lacks footnotes, macros, and advanced file manipulation features that would be useful in adapting other company's word processing systems.

ChiWriter. Sold by Paraclete company from Texas, this is a software-based program for IBM-compatibles offering a wide variety of fonts, including Hebrew and Greek. It works with most popular graphics cards and dot matrix printers. ChiWriter offers most standard word processing features and can input from some of the leading Roman script word processors. The basic price is roughly $100, which makes it the cheapest package available for MS-DOS machines; "extras" are available at a higher price.

Computer Linguist/Hebrew Star. This program is a "patch" to *Wordstar* version 3.30 or 3.31. If you have *Wordstar*, you can use *Hebrew Star* with it to allow Hebrew word processing. *Computer Linguist* produces software for a variety of other alphabets as well. *Hebrew Star* costs $195 (which does not include the cost of *Wordstar*). Originally called *Pangloss*, it is probably the best of several programs available for modifying *Wordstar* for Hebrew users. (See review in newsletter of (Berkeley) Computer Users'

Group, HUG, vol. 3, no. 2, January–March 1987.)

Hebrew Star includes vowels, and utilizes the upper ASCII characters. The current version works with most of the graphics cards available for IBM-compatibles. Printing is supported on a large number of dot matrix printers, laser printers, and daisy wheel printers (though the latter cannot print vowels). While *Wordstar 3.3* might be considered a bit old-fashioned, in mid-1987 a new edition, version 4.0 was released, which may restore *Wordstar* to its status as a leading word processing program. Eventually, *Computer Linguist* will adapt its program for the new edition, with the result that the combination of *Wordstar* and *Computer Linguist/Hebrew Star* will allow integration of Hebrew with a major word processing program.

Einsteinwriter. The American (English-language) version of *Einsteinwriter* is a relatively inexpensive word processor that, while well reviewed, is not regarded as a major word processing program for serious academic or business applications. The Hebrew version, however, has become a major word processor in Israel, winning substantial support among businesses and some government agencies. Among users in Israel, it has gained a reputation as being easy to use. The bilingual version is now being introduced to the American market. It includes utilities to facilitate transfer of files between systems, and it especially addresses the problem of Hebrew files occasionally getting reversed (transmitted left-to-right) when transferred between systems.

Fancy Font. Produced by Softcraft of Madison, Wisconsin (formerly of Los Angeles), *Fancy Font* was originally designed to allow users of dot matrix printers to get high-quality output from inexpensive 9-pin dot matrix printers. It takes the output from any word processor that can produce an ASCII text file (almost all English word processors, but not all Hebrew ones), and prints the output using its own high-quality fonts. With a 9-pin dot matrix printer, it requires between 15 and 30 minutes to print a single page, but the quality approaches that of a laser printer. Better dot matrix printers produce similar results, but much faster. The program also works with a laser printer. *Fancy Font* costs $180 by mail order, but often retails for slightly less. Versions of the program for specialized applications are available. The Roman script fonts range from four to 72 points and cover a tremendous range of typestyles, including many designed for special applications (e.g., music, chess, unusual alphabets, etc.). Extra disks from the large library of fonts cost $15 each, includ-

ing the disk with the Hebrew fonts. Utilities to facilitate designing fonts are also available.

The Hebrew font disk contains two sets of fonts, with documentation, and a refreshingly modest note from Softcraft explaining their lack of expertise in the area of Hebrew typography, and soliciting user feedback. The Hebrew fonts they distribute were designed by users rather than by the company.

One Hebrew font has a traditional-looking character set available in 10, 12, 24, and 30 point sizes. Except for the 12-point font, all lack some letters, though it would be possible, but not easy, to use *Fancy Font's* font editing programs to correct this fault. The 12-point font includes most vowels and Yiddish characters; however, it lacks the *dagesh* for most letters in which it has little or no significance in Israeli pronunciation, and doesn't include the *hataf* vowels. The 18 and 36-point fonts are "modern," sort of sans-serif fonts, that lack the Yiddish characters. These fonts use an entirely different system of coding than the 12-point font, although this is also user-adjustable.

Even with a word processor that works exclusively in Roman letters, *Fancy Font* makes it possible to insert Hebrew text that will *print* as Hebrew. Unless the screen display has been modified to *display* Hebrew, the screen will show English gibberish, but the printed output will be Hebrew. *Fancy Font* can be used to produce high-quality output from almost any Hebrew word processor, but to interface the programs would require programming beyond the skills of the average user of a word processing program.

Fancy Font has tremendous capabilities for font design which might be usable to expand the range of fonts available when printing Hebrew. *Fancy Font* also includes a data base of ready-to-edit Hebrew characters for those wanting to try designing their own fonts (possible, though not easy). *Fancy Font* is not the only program of its type, although it is probably the most comprehensive and so far, the one most sympathetic to Hebrew.

Grafeas. Produced by Apollon Engineering of Columbia, Maryland, a joint Greek and American effort, *Grafeas* describes itself as "The word processor for global communications." It supports word processing in numerous scripts including Hebrew, Arabic, Greek, Roman, and Cyrillic. It requires 512K of RAM and either a common Hercules monochrome graphics card or an IBM EGA card.

The Hebrew character set includes a *dagesh* in all characters in which it can theoretically appear, even if not reflected in modern pronunciation. The Hebrew letters appear on the lower-case keyboard, while the letters with a *dagesh* are on the upper-case keyboard. The vowels use the number keys plus several other keys. The Hebrew character set is a modern-looking font. *Grafeas* also includes a utility for designing fonts. While the program's internal coding is non-ASCII, it includes flexible utilities to produce ASCII files for export.

Alternating between scripts is easy in *Grafeas*. Separate commands are used to switch between scripts and to change the direction of the writing. It is possible to alternate between different scripts on the same line, though mixing different directions is a little difficult. Both laser and dot matrix printers are supported, and it is possible to print *Grafeas* files using *Fancy Font*.

Grafeas can be purchased by mail order only for about $400. A toll-free number is available for ordering, but not for user support.

HaKotev. This is a relatively new program for the Macintosh, which will eventually be available for the IBM-compatibles. It is the product of Eastern Language Systems of Provo, Utah. It is relatively inexpensive, costing only $99 for the basic package, $15 for the demonstration disk, and $99 for the software to produce high-quality output with the Apple Laserwriter.

It comes with a variety of relatively modern and more traditional typestyles in both 12 and 24-point sizes. The wordwrap is designed for Hebrew (right-to-left), and while one can easily insert English text, the program's manual suggests using an English word processor for typing large amounts of left-to-right text, exploiting the ease with which a Macintosh allows integration of the output of different programs. The keyboard is based on the IBM Hebrew typewriter, and there is no option for switching to a mnemonic keyboard. Hebrew vowels are on the upper-case keyboard.

Intext. Produced by Intex Software Systems of New York and England, *Intext* offers a line of multilingual word processors that support Arabic, Cyrillic, and Chinese in addition to Hebrew and Roman scripts. The current version, 2.0, requires 384K, and costs $195 for two alphabets, and $250 for three. *Intext* utilizes standard ASCII codes and requires a graphics card for displaying non-Roman scripts.

Linguists' Software. This company exploits the Macintosh's ability to work with diverse fonts to produce Akkadian cuneiform, Egyptian hieroglyphics, and many non-Roman characters sets, including Hebrew traditional and modern-looking fonts, but not Rashi script. They also offer a complete set of Hebrew diacritical marks, including several used only in a Sefer Torah. Some of their fonts are designed especially to work with the leading word processors used with the Macintosh, including *Achbar*. Prices range between $80 and $100. The company also offers a data base based on the Biblia Hebraica Stuttgartensia.

MacInHebrew. This is "shareware" for the Macintosh. The program is distributed at cost and can be copied from some electronic bulletin boards. It offers Hebrew characters, including vowels, for use on any Macintosh, and some word processing features. It also includes some hard-to-find fonts such as Rashi and Old Hebrew.

Mince. This is Davka Corporation's product for the IBM line of computers. It is available both by mail order and from local distributors. Davka Corporation has a toll-free number for information and support. The program requires 256K of RAM, and costs between $370 and $450. With an IBM or Hercules graphics card, a Hebrew "chip" is required, but with either a CGA (Color Graphics Adaptor) or EGA (Enhanced Graphics Adaptor) card, no hardware modification is necessary.

Mince uses the upper ASCII characters for Hebrew. Hebrew vowels are available only in some versions. *Mince* includes basic features such as variable justification, mail merge, search and replace, and a memory disk-emulating program. A broad selection of dot matrix and daisy wheel printers is supported, and support for laser printers will be available in the foreseeable future. Davka also sells several daisy wheels.

Multi-lingual Scholar. Developed by Gamma Productions in California, this is perhaps the most flexible (and complicated) software package for Hebrew word processing.

MLS can run five scripts simultaneously. It is possible to create, edit, display, and print a line containing Hebrew, Roman, Cyrillic, Arabic, and Greek characters. Other scripts are available as options. A variety of fonts is available for each script (e.g., Hebrew fonts include script, traditional, and "modern" (sans serif). Creating additional scripts and fonts is possible with the program's font-editing utility. The best mode of dot matrix printing approaches letter-quality, and laser printing is supported for an extra charge.

In *MLS*, all Hebrew vowels, including the *hataf* vowels as well as the *holom* and the *meteg* are available. All letters in which it is theoretically possible to have a *dagesh* can be produced with one, even where the *dagesh* is not reflected in modern pronunciation. The characters unique to Yiddish are also included. At present, *MLS* offers the most complete Hebrew character set of any word processor, and surpasses the RLIN/LC character set.

One can choose between a standard Israeli typewriter keyboard, a mnemonic keyboard, or a user-defined keyboard (a keyboard-editing utility is included). Using the phonetic keyboard, the basic letters are on the main keyboard, and the letters with the *dagesh* are on the upper-case keyboard. The final forms of letters are on the alternative keyboard, and various other characters are scattered. After typing a letter, one can select a vowel using any of the function keys, and the vowel then appears on the screen correctly positioned under the letter.

Alternating between scripts is, in theory, quite easy in *MLS*, though changing between scripts oriented in different directions isn't as smooth as it might be. Right-to-left text, including blank spaces inserted while writing right-to-left can only be changed or deleted while in right-to-left mode. To replace an English word with a Hebrew word, it is necessary to delete it in Roman script, and then insert the Hebrew. Word wrap in *MLS* in very flexible (perhaps too flexible). The program looks to the first character of the paragraph to know which way to wrap. If one is writing an English (left-to-right) document, but wants to begin a paragraph with a Hebrew word, one must start the paragraph with an English pseudo-space, to tell the program to wrap left-to-right.

Multi-Lingual Scholar uses two bytes per character, with the first byte indicating which font is in use. The system is sufficiently flexible to allow for encoding multiple diacritical marks, which it can print and display. While using ASCII codes, *MLS* employs them in a very unique way. A relatively simply utility program is provided to facilitate conversion between *MLS* and other systems; the utility features a conversion table that the user sets up to meet specific needs.

The program is partially copy-protected. There is no problem copying the program disks onto a hard disk or to make back-ups; however, a special plug (the "actuator") is required to run the program. Without the plug, the program will almost immediately bomb. While making copies is not interfered with, the program will run only in a computer in which the actuator is installed. The actu-

מַ֫ה טֹבוּ אֹהָלֶיךָ ‏1

עברית והמחשב ‏2

חבגדהוזחטיכלמנסעפנקרשת ‏3

וציורו לענות לכולם ולרשום סד כך וכך לזה וכך וכך לההוא. ‏4

וְהָאָרֶץ הָיְתָה תֹהוּ וָבֹהוּ וְחֹשֶׁךְ עַל־פְּנֵי תְהוֹם וְרוּחַ אֱלֹהִים ‏5

.ו ✕Ｗ⊄φ⅄>◉╤ᒷ⟨⟩Ψ⅂⊗ᖷIＹᒐΔ⅂ᒑ⋠ ‏6

בְּרֵאשִׁית בָּרָא אֱלֹקִים אֵת הַשָּׁמַיִם וְאֵת הָאָרֶץ וְהָאָרֶץ הָיְתָה תֹהוּ וָבֹהוּ וְחֹשֶׁךְ ‏7

ator plugs into a parallel port without interfering with the computer, so unless one plans to use the program on more than one machine, or to make copies for friends, there is no problem.

MLS requires 512K memory and a graphics card. It usually sells for $350, and its last update cost a relatively high $75. It is currently sold directly from California by mail order; Gamma expects to establish a distributor network.

Nota Bene. This is a relatively new word processor designed for English users, but which, by design, includes provision for Hebrew, including a right-to-left word wrap. *Nota Bene* is aiming at the academic market and includes among its many features options to facilitate footnotes and data base manipulation. These extra features make *Nota Bene* more expensive than the other leading word processors.

According to the company's promotional literature, *Nota Bene* will have a complete Hebrew character set including vowels, but it won't display vowels on the screen in the correct place (they will be next to rather than

under the character, which is highly undesirable). The character display requires access to a system capable of displaying more than 256 characters, such as the *Hercules RamFont* or the *EGA* card.

The significance of *Nota Bene* is that it is the first "state-of-the-art" word processor to include Hebrew, as opposed to *Wordstar*— for which a separate program allows introduction of Hebrew text—or as opposed to employing any of several ways to print or display Hebrew text within a program not designed for it. *Nota Bene* is aimed at serious academic users, is somewhat more complicated than many other programs, and costs between $350 and $500. The Hebrew capacity will cost an extra $100, and at least initially, not all functions will be supported while the Hebrew capacity is in use.

Turbofonts. Produced by Image Processing Co. of Madison, Wisconsin, *Turbofonts* is a memory-resident utility that makes it possible to display and print a large selection of non-standard fonts, including Hebrew. Printing options include support for the leading laser and dot matrix printers. The program requires a PROM (Program-

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Figure 1. Sample fonts (typestyles) of Hebrew word processing software.
 1. Achbar, Avital font (laserwriter), 72 pt.
 2. Fancy Font, Sans serif font (dot matrix printer), 36 pt.
 3. MacinHebrew, Troyes font (dot matrix printer), 12 pt.
 4. Mince, Brother printer with Kineret daisywheel.
 5. Linguists software, Laser-Hebrew, 24 pt.
 6. Linguists software, Old linear Phoenician, 24 pt.
 7. Multi-lingual Scholar, Modern font (dot matrix printer), 9 pt.

mable ROM) chip or either a *Hercules Ram-Font* or an IBM Enhanced Graphics Adapter card. The basic program costs $149 by mail order, an extra $75 for a chip (if necessary), and an extra $25 for support of laser printing. The program substitutes special characters for the upper ASCII characters. According to the authors, the program will work with most of the major word processing programs, i.e., one can insert the special characters into the standard word processor.

Wordmill. Produced in Israel, but distributed in America, *Wordmill* is one of the leading Hebrew word processing programs. It has traditionally relied on a Hebrew chip and is copy-protected. Files are not readily convertible to standard ASCII characters. It includes most of the standard office-oriented word processing features. The producers appear to be more oriented towards business applications than scholarly or educational concerns. In using *Wordmill*, one selects a primary language, but the program readily integrates Hebrew and Roman script. File names can be in either script, though that apparently causes some problems when sorting files.

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Directory of Programs Discussed

Achbar, Davka Corporation, 845 N. Michigan Ave., Suite 843, Chicago, IL 60611. (800) 621-8277.

Alef-Bet, Quad Inc., 23601 Draco Way, Canoga Park, CA 91307.

ChiWriter, Paraclete Computer & Software, 1000 E. 14th St., Suite 187, Plano, TX 75074.

Computer Linguist (a.k.a. HebrewStar), P.O. Box 70742, Eugene, OR 97401; c/o David Rothenberg, 422 Fifth St., Lakewood, NJ 08701.

Einsteinwriter, c/o Dr. Michael Samet, Eaton Corporation, 500 South Sepulveda Blvd., Box 491480, Los Angeles, CA 90049.

Fancy Font, SoftCraft Inc., 16 N. Carroll St., Suite 500, Madison, WI 53703. (800) 351-0500.

Grafeas, Apollon Engineering, P.O.B. 807, Columbia, MD 21044. (800) 822-3327.

HaKotev, Eastern Language Systems, 39 West 300 North, Provo, UT 84601.

Intext, Intex Software Systems Ltd., Suite 4330, One Penn Plaza, New York, NY 10119. (212) 750-1140.

Linguists' Software, 106R Highland St., South Hamilton, MA 01982.

MacInHebrew, c/o Joseph Weinstein, MIT Hillel, 312 Memorial Drive, Cambridge, MA 02139.

Mince, Davka Corporation, 845 N. Michigan, Ave., Suite 843, Chicago, IL 60611. (800) 621-8277.

Multi-Lingual Scholar, Gamma Productions, Suite 609, 710 Wilshire Blvd., Santa Monica, CA 90401.

Nota Bene, Dragonfly Software, Suite 500, 285 W. Broadway, New York, NY 10013. (718) 624-0127.

Turbofonts, Image Processing Systems, 6409 Appalachian Way, P.O.B. 5016, Madison, WI 53705.

Wordmill, Bigger Byte Business Computers, Inc., 1 South Central Ave., Valley Stream, NY 11580 (516) 825-8722.

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