Multilingual Graphics-Mode Word Processors: *ChiWriter 4.0* and *Multilingual Scholar 4.0*

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Scholarly writing in religious studies requires several ancient and modern languages. A good multilingual word processor can simplify writing immensely. Unfortunately, choosing an IBM PC compatible multilingual word processor often requires a compromise between a *multilingual* word processor and a multilingual *word-processor*. While many of the best-selling word processors allow German, French and English to be entered into the same document, none offer full support for Greek, Hebrew, Arabic, Coptic, Sanskrit or other languages with non-Roman scripts.

The problem is largely that the IBM PC hardware and operating system software was only designed to handle Western European languages. Unlike the Macintosh, there is limited capability to add additional character sets and no ability to handle languages that are produced right to left (such as Hebrew and Arabic).

There are two basic solutions to the problem: the first relies on the ability of EGA, VGA and Hercules Plus video systems to handle customized character sets. EGA and VGA can display a total of 512 different characters and the Hercules Plus can handle more than 3000 characters. A few word processors, such as *Nota Bene* this feature to allow documents containing several languages. Some companies have designed font utilities, such as *ScriptureFonts* that add additional fonts to *WordPerfect* or other popular word processors. This results in a truly powerful *word processor* with multilingual capabilities for a few languages. The display speed of these programs is very fast. However, the multilingual capabilities are not always smoothly integrated into the word processor. Unless one purchases the special Hercules Plus video card, which few programs support, only a limited number of characters can be accommodated. Even classical Greek stretches the 512 character limit if all combinations of diacritical marks are included and one wants to include Western European languages in your document.

The second approach is to draw each character as a graphics element on the screen and printer. This allows an essentially limitless number of

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character sets (and thus languages) on the screen and printed page. For languages that have a large number of character and diacritic combinations such as Arabic, Chinese and Egyptian hieroglyphics, this is the only practical solution. The disadvantage is that drawing characters in graphics mode is much slower than using the built-in text capabilities of a computer. On a standard VGA monitor, 128 times more bytes must be processed to display a page of graphics than a page of text. The programmer must take great care to keep the program from becoming intolerably slow. There is also a tendency for developers of multilingual programs to offer multilingual functionality at the expense of editing capabilities. Thus many graphics-based word processors are better *multilingual* word processors than they are powerful academic writing tools.

This review will look at two popular graphics-mode multilingual word processors: *ChiWriter 4.02B* and *Multilingual Scholar 4.0* (Dec. 6, 1991 release). Both combine a moderately powerful word-processing engine with the ability to edit documents with several languages that use non-Roman character sets. While neither offer as many word-processing options as industry leading word processors such as *WordPerfect* or *Microsoft Word*, both are quite adequate for writing term papers, articles and theses.

ChiWriter 4.0

ChiWriter was originally designed as a powerful scientific word-processor—hence its ability to draw complex mathematical formulas. It also comes in a multilingual version, which supports Greek, Hebrew, Arabic and Cyrillic fonts by default, and provides a font editor for user customized character sets. The version reviewed here (4.0) is the standard edition, which includes Greek, math symbols and a complete set of accented Roman characters. (The earlier *ChiWriter Greek, Hebrew, Arabic* [*GHA*] *3.x*, with its full implemenation of Greek [with diacriticals], and Hebrew and Arabic [with right to left editing] has not yet been upgraded to a *4.x* version. However, there are plans to release an upgraded *GHA* version in late 1992. It will possess the same redesigned user interface as the standard *4.0* edition reviewed here.)

Commands are selected from Lotus style menus at the bottom of the screen, which are called up with the <ESC> key. Many frequently used commands are also executed with mnemonic <ALT> or <CTRL> plus letter key combinations. While some command choices are not obvious,

most can be learned fairly quickly. Mouse support is promised in a future update. Online help is included, but it is not context sensitive. It is often difficult to find the desired topic since one must wade through a fairly large help document with few index topics. The User Manual is very clear, although the index omits many important topics. The manual also includes a helpful tutorial and a well-organized reference section.

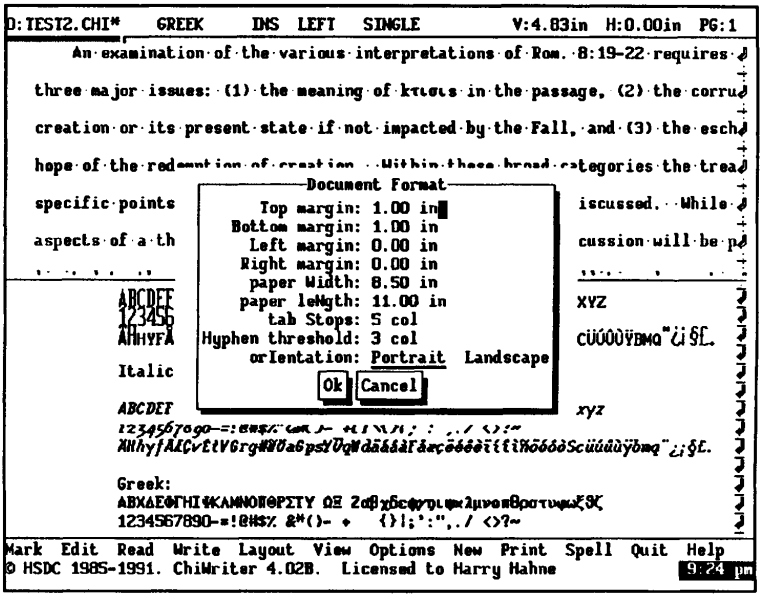

Figure 1: *ChiWriter's* User Interface

Font changes are made by pressing the <F1> to <F10> keys (alone or shifted). A document can include up to 20 fonts. To enter a single character (such as a single Greek letter), one presses a function key once. To enter continuous text in the font, one presses the function key twice. If some text is inadvertently entered in the wrong language or font, a handy feature allows one to change the font by marking a block and pressing the appropriate font function key. The screen can be split to view the keyboard layout of the current font, which simplifies entering a few words in a language that is rarely used.

A major weakness with *ChiWriter* is that is subsumes several different concepts under the category of "font": (1) character sets (Greek, Roman);

(2) character attributes (underline, boldface, italic); and (3) character size (regular, large, small). As a result, there is no easy way to change the attributes of non-Roman text. For example, a Greek book title cannot be italicized. This seriously restricts complex multilingual writing, although one can work around it by designing separate italics and underlined fonts with the font editor. The program could be significantly improved by separating these three features into three distinct concepts (as does *Multilingual Scholar*).

ChiWriter includes a font design program that allows one to design screen and printer fonts. This utility makes it possible to add new languages, characters and character sizes to the standard set. While it is a fairly simple program, it is sufficient to create bit-mapped fonts by turning dots on or off in an enlarged image of a character. Bitstream and other HP Laserjet compatible fonts can be imported and edited.

The word-processing capabilities of *ChiWriter* are moderately sophisticated and sufficient for most academic tasks. It has the usual block moves, text deletion, search and replace and cursor movement capabilities. A powerful footnote capability is included. Numbering and page placement are automatically changed when footnotes are moved. Many options are available for the placement and style of footnotes, e.g., long footnotes are automatically split over two pages. A good spelling checker is included, but it simply ignores foreign language text. A thesaurus, automatic table of contents, indexing and merge printing would be welcome additions.

Ten documents may be edited at one time. By default the documents take the full screen; one can change to a new document by pressing <ALT 1>, <ALT 2> or <ALT 3>. It is also possible to split the screen horizontally to display two documents at once.

A major improvement in *ChiWriter 4.0* is the ability for lines to be longer than the screen width. Very wide margins force the page to scroll horizontally when the cursor reaches the edge of the screen. Another important improvement is automatic paragraph reformatting. In previous versions an explicit command was necessary to reformat the document when margins were changed or text inserted. The document will reformat instantly whenever such changes are made.

Margin and page sizes may be specified in inches, centimetres or lines and columns. These settings may now be saved with a document, unlike previous versions in which settings had to be saved in a configuration file. Unfortunately, even in version 4, the character pitch cannot be

saved along with a document. Since pitch greatly effects the overall page layout, this is a serious omission. Margin measurements in inches or centimetres are meaningless if one does not know the pitch of the final text. One must remember to set the character pitch properly before printing, or document margins and page layout may not be correct. Moreover, one cannot vary the different character pitch in different parts of the document. English comes in small and large fonts, but there is no way to vary the size of non-Roman characters for part of a document. Character sizes are limited to pica, elite, "proportional" and "Helvetica" settings, rather than the more modern point sizes.

ChiWriter has an excellent table creation feature. It is easy to build a table with a desired number of elements by selecting a menu option. Columns and rows can be added or deleted and various types of lines may be drawn around the table. Tables do not allow for wrap around within a table cell. The program also has no ability to format documents in newspaper style columns.

The *ChiWriter* page display is moderately WYSIWYG ("What You See Is What You Get"). All foreign language characters are properly displayed, with full diacritical marks over and under the characters. Mathematical formulas and tables look largely as they will when they are printed. However, even proportionally spaced printer fonts display as fixed spaced fonts on the screen, so some layout surprises can occur in the final printed document.

An excellent macro capability allows one to simplify common procedures. One can assign a macro to any key or create a named macro which can then be selected from a menu. A powerful macro programming language is available, which was used to create many of the program commands. However, the commands of the programming language are only briefly listed in the manual, with no sample programs to guide the user for making effective use of this powerful feature.

ChiWriter had no difficulty importing and exporting ASCII files. It included all characters in the standard IBM PC character set, including accented Roman characters and Greek characters. A utility to convert documents to and from *WordPerfect* format is available as an option. It converts most *WordPerfect* character attributes, extended characters where they are supported in *ChiWriter*, header and footers, footnotes and tables. The most serious omissions are tab settings (which affect page layout), multiple columns, style sheets, merge files and line draw characters. While it

occasionally would lock up when converting a complex document, generally it did a good job of preserving most of the file format information.

The developers of *ChiWriter* have paid a great deal of attention to program speed. On an IBM compatible with a 386 processor, the program changed pages very quickly (in about 0.3 seconds). It took no longer to jump from the beginning to the end of document than to move to the next page. While screen display would be fairly slow on low-end equipment such as IBM XT compatibles, this is one of the few graphical word processors that is actually usable on such equipment. This makes it appealing to students, who frequently do not have powerful computers.

The practical document size seems to be limited to about 75 pages. Larger documents take several minutes to save and require frequent disk access when moving around. When editing a 52 page document with numerous footnotes, "insufficient memory" error messages would sometimes occur. Under some circumstances, the document could not be saved. Until this bug is fixed, it would be wise to save changes frequently when editing large documents. Problems would also occur in a document containing a large number of footnotes (i.e., more than 1000). In most cases one will run up against the page size limit before the footnote number limitation. The solution in either case is to split the document and print the parts separately.

The print quality of *ChiWriter* is quite good, though not as nice as *Multilingual Scholar*. Both HP Laserjet and Postscript laser printers are supported. Unfortunately fewer dot-matrix printers are supported than in previous versions. A notable omission is the excellent Toshiba series of 24 pin printers, which were supported in version 3. Printing time is reasonably fast on laser printers, but slow on some dot-matrix printers, which require multiple passes to get good print quality. If your printer supports downloaded fonts, printing time can be improved by downloading the fonts when the printer is first turned on, rather than when printing each document.

Multilingual Scholar 4.0

Multilingual Scholar is first and foremost a *multilingual* word processor. It offers unparalleled multiple language flexibility. A single document can contain up to 32 languages and 255 fonts. The standard character set includes Greek, Hebrew, Arabic/Farsi, Cyrillic and all accented Roman characters. All characters and diacritical marks for each of

these alphabets is properly displayed on the screen and can be printed on a variety of dot matrix and laser printers. Some 20 additional language fonts are available, including Sanskrit, International Phonetic Alphabet, Old English, Punjabi, Sinhalese and Inuktitut. Many languages allow a choice of several standard and optional typefaces.

Entering text in multiple languages is simple: a menu option allows one to choose any of the languages that have been installed. The keyboard layout varies depending on the current language. The keyboard layout for each language may be installed either as the standard typewriter layout for the language or as a mnemonic layout. There are three ways to enter diacritical marks: (1) select the accented character from the appropriate language keyboard; (2) enter the basic character and then enter the diacritical mark as an overstrike; (3) enter the diacritical mark first as a dead key and then press the basic letter key. Up to 3 diacritical marks can be affixed to any character. This flexibility allows one to enter multilingual text in the manner one finds most convenient. For languages whose characters change shape depending on their position in a word, *Multilingual Scholar* automatically selects the proper letter shape to fit the context. This makes entering Hebrew and Arabic much simpler than with most other programs.

When editing in Hebrew or another right to left reading language, the behaviour of the cursor is similar to *ChiWriter GHA 3.x*. If the line is blank the cursor moves to the right side of the screen and the cursor moves to the left as you type. If English text is on the line, the cursor stays in place and pushes the Hebrew text to the right. However, unlike *ChiWriter GHA 3.x*, when switching back to English, the cursor automatically moves past the Hebrew or Arabic text so that one can continue writing in English.

The spell checker automatically switches to the correct dictionary for each language in the document, provided that one has installed the proper language dictionaries. If no dictionary is installed for a language, a warning message announces that text in that language will not be spell checked. Optional language dictionaries are currently available for sixteen languages.

The latest version of *Multilingual Scholar* has a modern graphical user interface, similar to *Microsoft Windows*, with pull-down menus for selecting commands, a scroll bar, optional mouse support, dialog boxes for selecting options and tiled windows for editing multiple documents. This is a big improvement over the non-intuitive command style interface in version 3. Most operations are selected from the pull-down menus. Menus may be

accessed with a mouse or from the keyboard. Some operations, such as turning on boldface or italics, can be performed with <ALT> keys or functions keys to save time. Unfortunately, some frequently used commands have no hot-key shortcut.

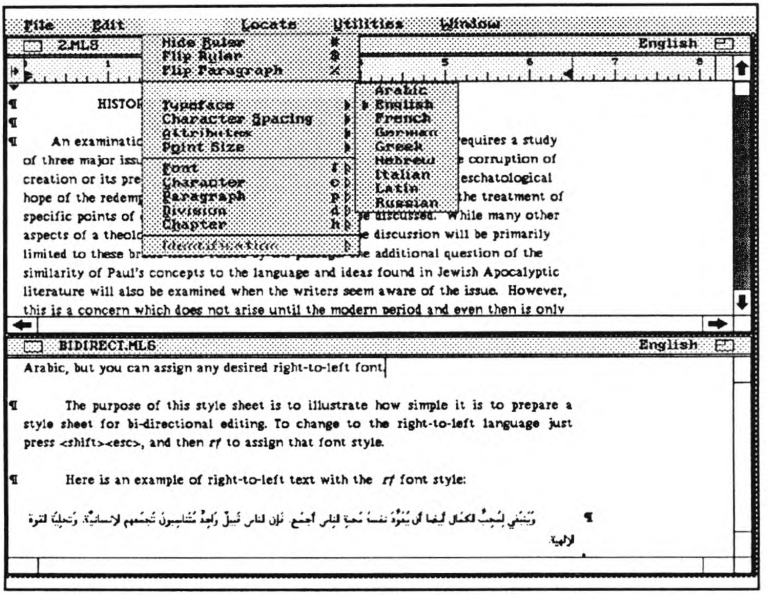

Figure 2: *Multilingual Scholar's* User Interface

Multilingual Scholar offers considerable flexibility in character sizes and attributes. The standard package includes 10 and 16 point fonts for all languages. Fonts in other point sizes are available as an option. All languages can be entered in italics, boldface, underline, double underline, outline, superscript and subscript. Unlike *ChiWriter*, *Multilingual Scholar* carefully separates the functions of language, font, character attributes and character set. A user can create and modify fonts, alphabets, and languages and map them to each other in any fashion. A separate keyboard layout may be designed for each language.

A font design utility called *Font Scholar* allows a user to create and modify screen and printer fonts. This program makes good use of the mouse to simplify font design. Tools similar to those in many drawing programs simplify the creation of characters. Commands include area fills, sizing,

rotation, mirror, and cut and paste. One can vary the brush size to create lines of varying width as in calligraphy. While it is possible to edit fonts with the keyboard, the mouse is far more convenient. The program can make use of a scanner to provide a starting point for a new font or any PCX graphics file. Bitstream and Hewlett Packard bitmap fonts can also be converted for use by *Multilingual Scholar.*

The page display of *Multilingual Scholar* is moderately WYSIWYG ("What You See Is What You Get"). All foreign language characters are properly displayed, with full diacritical marks over and under the characters. Bold, italicized and underlined text is displayed in any language. Screen fonts are proportionally spaced. Unfortunately, since the spacing and width of letters in screen fonts may be slightly different than printer fonts, word-wrap and page breaks on the printed document may be slightly different on the screen. This requires some experimentation to get the desired effect by using the reduced size preview mode to see the relative page layout. There is also no indication of page breaks during editing or even the current line or page number. These limitations are major flaws in what could otherwise be an excellent program for multilingual page layout.

The standard screen font is too small on a VGA monitor for sustained use and is less readable that the normal PC text font and *ChiWriter* fonts (this is due to a single screen font being used for all types of monitors). Thus the appearance on a Hercules compatible monochrome or EGA display is more readable than on a VGA display.

Multilingual Scholar includes an optional ruler line, which can be used with a mouse to set tabs and margins. This is much quicker than going through the menus and dialog boxes to set various parameters. The ruler may be displayed at any time to show the current settings. For documents with multiple character sizes and languages, this helps line up text more accurately.

One can edit up to eight documents at one time, each in its own window. *Multilingual Scholar* uses tiled windows, rather than overlapping windows as in *Microsoft Windows 3.* The advantage is that a window never hides a portion of another window; the disadvantage is that a window cannot be re-sized without saving the document, closing the window and opening a new window. However, one can temporarily change a document to full screen display at any time.

Most basic cursor movement, block move and search and replace commands are available. Search and replace can be limited to a specific

language if desired and vowels may be optionally ignored. Thesaurus, indexing, table of contents generation and merge printing are not included. Footnote styles are set through a style sheet, though options are more limited than with *ChiWriter*. One can choose new numbering for each chapter or the whole document, use symbols such as daggers instead of numbers and optionally include multiple short notes on one line. Unfortunately the footnote feature could not be tested, since it was not included in the December 1991 release. (The footnote feature is promised for a maintenance release to be shipped in mid-1992.)

A powerful style sheet capability allows one to configure default styles for chapters, divisions and paragraphs. Margins, tabs, page sizes, page numbering, defaults font and language and other parameters can be defined. One can create styles for titles, headings, headers, footers, footnotes, quotations and tables. A predefined style can then be used element as needed for different parts of the document. If changes are made to a style sheet, the appropriate portions of the entire document are changed. This powerful feature gives *Multilingual Scholar* tremendous page layout flexibility for complex documents. The style sheets could be made easier to use if there were a list of abbreviations to choose from rather than requiring the user to remember two character style abbreviations.

Text can be arranged in multiple columns. Columns can be snaking, as in newspapers, or side by side for tables and charts. However, there appears to be no easy way to set up a table with lines between elements.

Learning to use *Multilingual Scholar* fully is moderately difficult. The manual is complex and requires careful reading. The index lists so many page numbers for each entry that it is time consuming to find the appropriate section. Fortunately a tutorial section eases the initial learning burden. The lack of online help also hinders program use. While a help facility has been promised for a maintenance release, it will not be context sensitive. Many common procedures are more difficult than with most word processors. Text can only be deleted a character at a time or by marking a block. There are no single key commands for deleting a words or lines. There is no macro capability to reduce common procedures to a single keystroke.

Multilingual Scholar had difficulty importing ASCII files containing accented characters. (The manual warns that imported documents must not have any diacritical marks.) It is a serious limitation for a multilingual word processor to not at least handle the standard IBM character set, which

includes most accented Roman characters and most of the Greek alphabet. Version 3 included a powerful configurable utility for importing and exporting multilingual text in up to five languages. Unfortunately, this is no longer included in version 4. Moreover, there is no ability to import or export documents in *WordPerfect* or any other word-processor format.

The print quality of *Multilingual Scholar* is very good for both Roman and foreign language characters. Standard character sets are proportionally spaced. A good selection of printers are supported, including the HP Laserjet and Deskjet series. Unfortunately, Postscript devices are not supported. If Postscript were included, this program would be very useful for preparing typeset multilingual newsletters, journals and manuals.

The major weakness of *Multilingual Scholar* is its speed. On an IBM compatible with a fast 25 MHz 386 processor, it took over fourteen minutes to search and replace 1000 items, compared to only four seconds in *WordPerfect 5.1* (DOS version)! To move from the beginning to the end of a 23 page document took 47 seconds (virtually instantaneous on *WordPerfect 5.1*). Performance is even slower if one does not have extended or expanded memory. These long pauses can seriously interrupt the writing process. Even on a fast 386 machine, a good typist can overfill the keyboard buffer, forcing one to wait as characters are slowly displayed. While graphics-mode programs are always slower than text mode programs, the responsive screen of *ChiWriter 4.0* shows that a graphics-based program does not have to be intolerably slow. Version 3 of *Multilingual Scholar* was almost as fast as *ChiWriter*. Many users will find that the convenience of the redesigned interface does not compensate for the new version's painfully slow speed.

Conclusions

ChiWriter 4.0 offers good multilingual capabilities for a moderate selection of languages. Its word-processing capabilities are adequate, though large documents must be broken into pieces. The program is fairly simple to learn and use. Cursor movement and page display is quick for a graphics-based program, though search and replace is slow. Writing mathematical formulas is easy. Although most of the rough edges from version 3 have been removed, it still has a few quirks, such as not saving character pitch with a document and the inability to underline and italicize non-Roman text. Before settling on *ChiWriter* decide if you need more powerful word-

processing capabilities such as a thesaurus, indexing, table of contents generation, merge printing, columns and other modern word-processing conveniences. If you need to edit multilingual text and your word-processing needs are fairly modest, then *ChiWriter* is worth looking at more closely.

Multilingual Scholar 4.0 probably offers the most extensive multilingual capabilities of any PC word processor. It allows great flexibility to combine mixed languages in a single document. With some effort, it can be adapted to a wide variety of languages. It sports an attractive, modern graphical user interface, though it is not compatible with *Microsoft Windows*. Nevertheless, a considerable learning period is required to master fully its power. Its major shortcoming is its very slow speed. For any medium sized document, the time it takes to move from page to page and do common operations such as search and replace could seriously interfere with the writing process. Nevertheless, if you need to write documents containing many languages or languages with unusual scripts and you have a fast computer, this program is worth considering. If Gamma Productions is able to solve the speed problem in a future release, *Multilingual Scholar* could become a top IBM compatible *multilingual* word processor.

Multilingual Word Processors Compared

★ = *good* ■ = *fair* □ = *weak or not supported*

Product	*ChiWriter 4.02B*	*Multilingual Scholar 4.0*
Hardware supported	PC	PC
Ease of Use		
Menus	★	★
Dialog boxes for options	★	★
Mouse support	□	★
On-line Help	■	■[1]

Context sensitive help	□	□
Page and line indicator	★	□[2]
Tutorial	★	■
Index in manual	■	■
Copy protected	NO	YES[3]

Editor Features

Edit multiple documents	10	8
Documents in windows	2	8
Search and replace	★	★
Block moves	★	★
Many deletion options	★	■
Many cursor move options	★	★
Spell checking	■	■
Style sheets	□	★
Footnotes	★	■[1]
Columns	□	★
Tables	★	■
Table of contents	□	□
Indexing	□	□
Thesaurus	□	□
Merge printing	□	□
Undo deletions	★	■[4]
Undo any command	★	□
Macro language	★	□

Keystroke macros	★	□
Import ASCII	★	■
Import *WordPerfect*	★	□

Multilingual Features

Languages supported		
Accented Western European	★	■
Accented Greek	★[5]	★
Pointed Hebrew	★[5]	★
Arabic	■[5]	★
Cyrillic	★[5]	★
Coptic	□[5]	□[5]
Sanskrit	□[6]	★[7]
International Phonetic	□[6]	★[7]
Optional languages	□[6]	★[6]
Font design utility	■	★
Ease of entering accented characters	■	★
Underline, italics, boldface for all languages	□[8]	★
Standard character sizes	■	■
Optional character sizes	□	★
Multilingual spell checking	□	★[9]
Convert language of block	★	★

Printing

Printers Supported		
Epson 9 pin	★	★
Epson 24 pin	★	★
IBM Proprinter	★	★
Toshiba 24 pin	□	★
HP Laserjet	★	★
HP Deskjet	★	★
Postscript	★	□
Other	□	■[10]
Print quality	■	★
Print speed	■	■
Proportional fonts	■	★
Multiple character sizes	■	★[7]

1. Not included in the December 1991 release, but promised for mid-1992.
2. Relative position in document is indicated by scroll bar.
3. A supplied hardware actuator which plugs into the parallel port is required to run the program.
4. Undo previous delete only.
5. *ChiWriter GHA 3.x* and the future *GHA 4.1*.
6. Font could be easily added with font design utility.
7. Optional fonts cost $50 extra. Numerous languages and fonts in various point sizes are available.
8. A special underline, boldface and italics font needs to be designed for each language.
9. Optional dictionaries are required for each language ($125 each).
10. Okidata 9 pin and NEC 24 pin printers supported.

The Multilingual PC Directory: A Guide to Multilingual and Foreign Language Products for IBM PCs and Compatibles. By Ian Tresman. Stamford, CT: Knowledge Computing, 1991. ISBN 1-873091-01-X. Pp. 253. $34.95US.

This is an informative, well-designed source guide featuring over 250 multilingual and foreign language products, including word processors, laser fonts, translation packages, desktop publishing packages, operating systems, spellcheckers and much more. The orientation, system requirements and functionality of each product is briefly documented. Screen images for a number of products are also included. Individual product descriptions are cross-referenced to company "profiles," which document the product manufacturer or publisher and their international affiliates and dealers. A series of informative appendices featuring an international order guide, a foreign language reference guide, a glossary of terms and a bibliography all precede a very extensive index.

The extremely rapid pace of change in the computer industry has left a few entries out of date. Tresman does, however, expect to offer regular directory updates to those wishing to be placed on the publishers mailing list.

This directory brings together a wealth of data and presents it in a well-organized manner. Even a regular computer periodical reader, e-mail user and industry watcher will find product information here that has not been presented in a systematic fashion anywhere else.