

# Multi-Lingual Scholar<sup>tm</sup> and Font Scholar<sup>tm</sup>, a word-processor and a tool for font design for the student of Oriental languages

*A test by Jan Just Witkam & A.G.P. Janson\**

## 1. MULTI-LINGUAL SCHOLAR<sup>tm</sup>, THE WORD-PROCESSOR

When compared to other word-processors, what extras does this program offer its users and what is needed to operate it? The most conspicuous extra feature of this program is that it enables the user to work on the same document concurrently with up to five different alphabets of one's own choice — provided, of course, that they are installed. These alphabets can be mixed freely, irrespective of the direction of writing. These five alphabets include all sorts of accents and vowel signs, for both European and non-European languages, and each has multiple font sizes and character styles, theoretically up to 30 fonts per document and in practice, with the fonts that are supplied as standard procedure,

up to 15 printer fonts (5 Roman, 4 Hebrew, 2 Greek, 2 Cyrillic and 2 Arabic fonts); thus with these five alphabets one can write, edit and print in dozens of different languages. The program works in a purely graphical way, so that it offers numerous other features which are seldom available in other word-processing software. One manifest example of such an extra feature is the option of working either with large on-screen characters (in 40 columns) or with smaller characters (in the usual 80 columns). Working with large characters has the advantage that all the vowels, accents and the like can be typed and seen on the screen. Using either of these screen fonts has no consequences for the way the document will be printed, since the program recalculates every page for printing according to the user's specifications.

\* Multi-Lingual Scholar<sup>tm</sup> reviewed by Jan Just Witkam; Font Scholar<sup>tm</sup> reviewed by A.G.P. Janson.

Multi-Lingual Scholar<sup>tm</sup>, program design by Carl A. Forsander and Gary Feldman, M.D. Tested on version 3.0, dated 19 August 1987. Font Scholar<sup>tm</sup>, program design by Gary Feldman, M.D., Carl A. Forsander and Doug Frank. Available from: Gamma Productions, Inc., 710 Wilshire Blvd, Suite 609, Santa Monica, CA 90401, telephone: (213) 394-8622. Prices (summer 1988) for Multi-Lingual Scholar<sup>tm</sup> with Font Scholar<sup>tm</sup>: US\$ 350.00; extra charges for laser printer support US\$ 150.00. A system for quantity discount is applied. A demo-version with limited but sufficient possibilities of demonstrating the main features of the program is available at the same address for US\$ 15.00. Also available, but not seen by the present reviewers, is INSET, by which multi-lingual screen images from MLS can be captured and added to documents in several of the greater word-processors. The MLS package contains: 1 Multi-Lingual Scholar<sup>tm</sup> program disk, 1 Font Scholar<sup>tm</sup>/Utilities disk, 2 font disks, 2 laser font disks (if ordered), 2 manuals, 1 actuator, 1 set of keyboard labels. Gamma Productions, Inc. distributes a Newsletter at irregular intervals to its registered users and others interested.

POSTSCRIPT: While this article was in the press, version 3.1 of MLS has become available. Among the extra features of the new version, the manufacturers mention improved ASCII import/export facilities, transliteration tables for other alphabets, additional overstrike characters and a combined keyboard for Arabic and Persian.

To operate MLS, one needs to have at least an IBM PC (but a fast XT or AT is preferable) or compatible, working under MS-DOS, version 2.0 or higher. One must also have an internal memory of at least 512 K of RAM and a graphic card of the type CGA, Hercules or IBM EGA, or a 100% compatible one. Depending on the graphic card installed, one sees a different resolution on the screen, with a different number of lines. If one starts the program with a smaller configuration (less alphabets, less fonts), less RAM is needed accordingly. During one's work with the program, the computer should be linked to a working dot matrix or laser printer which is connected to a parallel port, or, if no printer is available, the output should be directed to a parallel port. The program is supplied on 5.25 inch floppy disks, which are in no way protected against copying, and which can without difficulty be copied onto a hard disk. The program works only when a special piece of hardware, a so-called printer actuator, which looks like a sort of elongated extra plug, is connected between the parallel port and the printer. When the computer does not receive a signal from this actuator, the program will simply not be loaded. When the actuator is detached during one's work with MLS, the program will pester the user with noise and messages to the effect that the actuator should be reconnected.

According to a configuration file which one can compose oneself (but twelve such files are supplied with the software), the system loads the necessary elements to produce text either by a 9-pin printer, by a 24-pin printer or by a laser printer. The laser printer is in my opinion the most advisable implement in view of the purely graphical nature of the output and the great variety of print commands.

One of the obvious advantages of this program lies in the fact that it actually shows the five different alphabets on the screen. The other advantage is the afore-mentioned possibility of simultaneously working in five alphabets.

The program is operated and presented in a user-friendly way. Faulty commands are indicated by the cursor and diagnosed with a message, and an easy to peruse help file is available during the editing. The tutorial and the reference sections of the handbook (which itself was produced in MLS and printed on a laser printer) are not extensively compiled, but contain a brief and clear mention of all the features of the program. Nevertheless, the program is, precisely because of its numerous graphical possibilities and its ability to concurrently work in bi-directional text, a very complex one, and in order to work with it profitably one needs to have some experience and training,

File REVIEW.TXT	Prev	Next	Alph ROMAN	Ins ON
;CSS,0;-;lm				
10;rm60;fn1				
;S;ls40;ps120;pn1;pc35;uo50;he### ## ##				
Multi-Lingual Scholar™ and Font				
Scholar™, a word-processor and a				
tool for font design for the				
student of Middle Eastern languages				
A test by A.G.P. Janson and Jan				
Just Witkam*				
◀				
1.♦ Multi-Lingual Scholar™, the				

1. A screen print of a text in MLS, in 40-columns (here with CGA adapter, so there are in fact less than 40-columns). On the status line is the following information: the file-name 'review.txt', the names of the 'PREVIOUS' and 'NEXT' linked files (here not specified), the indication of which alphabet is in use, and the indication that the insert mode is on. The first three lines of this document consist of print formatting commands: zero character spacing (:cs) for Arabic (the 5th available alphabet), if it occurs in the document; the settings for left margin (:lm) and right margin (:rm), in 10ths of an inch; the font number: of alphabet No. 1 (= Roman) the 5th font (an italic 12-point); the page size (:ps), in 10ths of an inch; the underline offset (:uo), in 1000ths of an inch; and the header (:he) with indication of a self-counting page number (#), from 1 onwards (:pn1), to be placed in the centre of the header; the command ';pc35' means that the page-number code in the header is given by ASCII character No. 35 (which is '#'), but this is in fact the default. The comma in the first line of the document is in reverse because the cursor is placed over it. The triangles indicate the end of paragraphs and the diamond-shaped symbol indicates a tab. The logogram "™" is typed in MLS with '<alt>-'.  
 2. The same screen as preceding, but now seen with a Hercules graphic adapter in 40-columns. Significantly more text is shown on the screen.

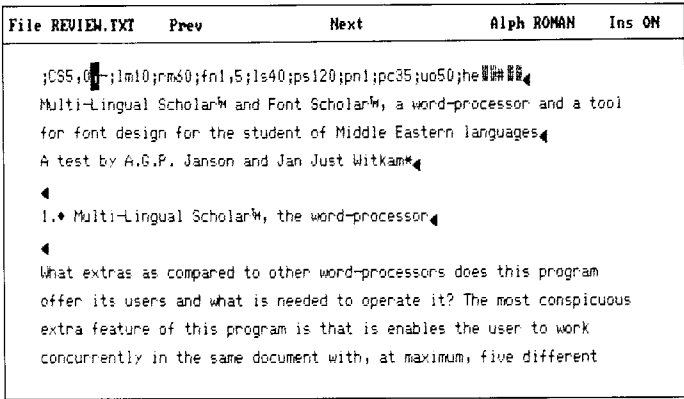
perhaps more than if one had started with any other mono or bi-lingual word-processing program.

Many European scholars and students working with a word-processing program on an IBM or compatible personal computer must have at some stage acutely felt the inadequacy of the ASCII character set, which is supported by most software. When only ASCII codes up to No. 127 are available, it means that no characters with accents can be typed at all. The consequence of this is that practically only English (and Latin) texts, where no accents are required, can be correctly written with these programs. Some of the well-known and widely-used programs, such as WordPerfect and IBM's DisplayWrite, have special national adaptations (German, Dutch, French and the like), but these versions are usually limited both in scope and use. And even when these programs give access to the extended ASCII character set, which is often accompanied by a tiresome operation of striking five or six keys, by customization of one or more keys, or by a change of keyboard, it is not possible to use all of the accents needed in all European languages at the same time, since these accents cannot be distributed freely and floatingly over the characters of the Roman alphabet. The extended ASCII character set contains some of the letters with accents, but supplies these as separate and independent logograms which offers only very limited possibilities.

The makers of MLS have tackled this problem from the other side. They have devised a word-processor which generates all characters graphically, and does not use ROM-based characters. Thus, all characters, both on the screen and on the printer, are drawn graphically. The problem of the accents has been solved by an extensive system of floating accents using overstrike, which enables them to be freely set over every character. At the same time, the makers of MLS have not entirely discarded the system of the ASCII

File REVIEW.TXT	Prev	Next	Alph ROMAN	Ins OFF
;CSS,0;-;lm10;rm				
60;fn1,1;ls20;ps				
120;pn1;pc35;uo50;he### ## ##				
Multi-Lingual Scholar™ and Font				
Scholar™, a word-processor and a tool				
for font design for the student of				
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A test by A.G.P. Janson and Jan Just				
Witkam*				
◀				
1.♦ Multi-Lingual Scholar™, the				
word-processor				
◀				
What extras as compared to other				
word-processors does this program offer				
its users and what is needed to operate				
it? The most conspicuous extra feature				
of this program is that it enables the				
user to work concurrently in the same				
document with, at maximum, five				

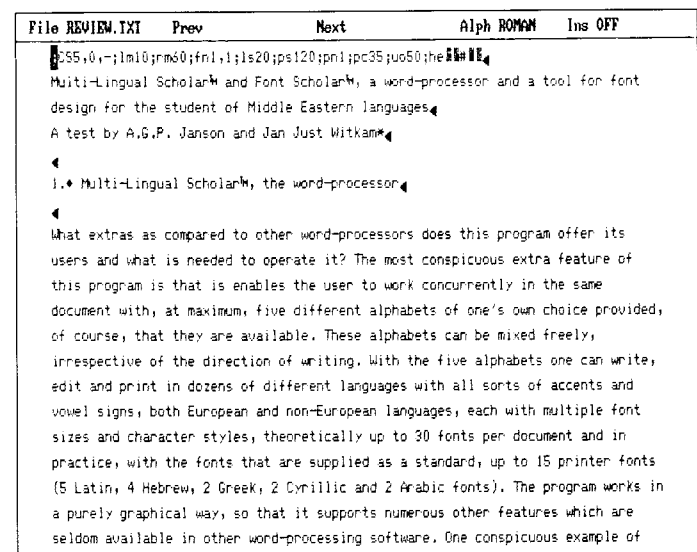
2. The same screen as preceding, but now seen with a Hercules graphic adapter in 40-columns. Significantly more text is shown on the screen.



3. The same screen as No. 1, but now in 80-columns mode, with a CGA adapter, so there are in fact slightly less than 80 columns.

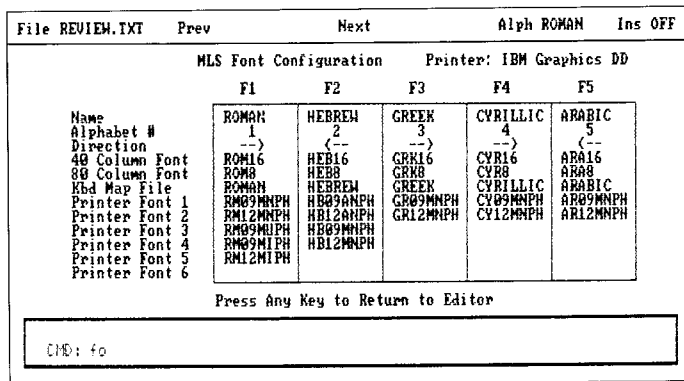
table of 255 characters, but have used it for their own purposes. All characters typed by the user of the program are simultaneously drawn on the screen as well as being given a reference to the ASCII set, and it is with these references that documents are saved on and retrieved from disk. How this works can be seen from the full tables at the end of the Font Scholar™ and Utilities handbook. It becomes clear from these tables that numerous positions in the ASCII set have been used for the extra signs, while all standard graphic symbols of the ASCII character set have been discarded. As a result a truly European word-processing system, with possibilities for the accents of most European languages, written in the Roman alphabet, has come into being.

However, once one starts to draw, everything becomes possible, and the result is a word-processor which by clever exploitation of the limited number of keys of the standard PC keyboard can produce texts which can make use of up to five different alphabets, regardless whether they are written from left to right or right to left. This feature provides the student of Oriental languages with an instrument of great value, as it enables one, and that to a hitherto unseen extent,

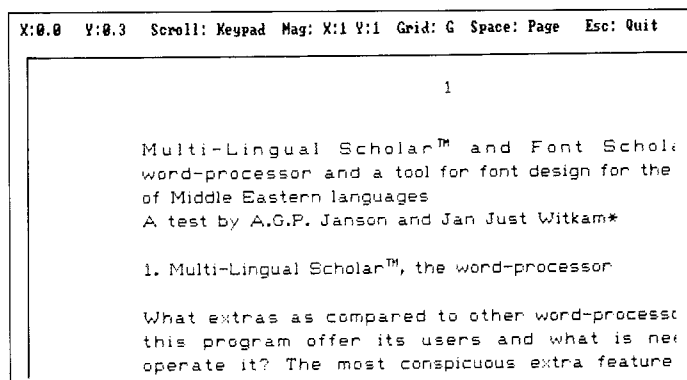


4. The same screen as No. 2, showing a text in 80-columns mode, with a Hercules adapter. Like in figure 2, significantly more text is shown on the screen.

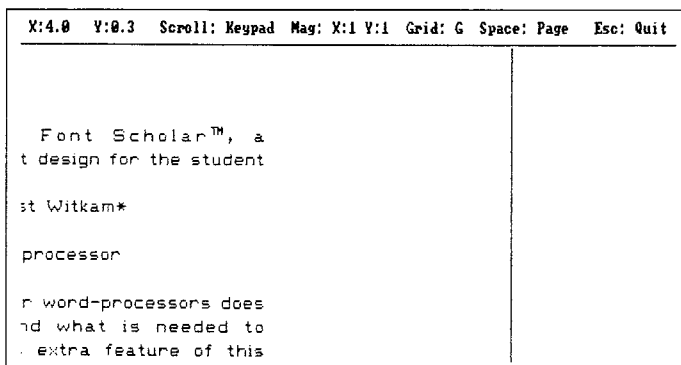
to enter texts in Oriental alphabets directly and in their own scripts into the microcomputer. This is, in fact, the advantage of MLS as compared to any other program with possibilities for Oriental languages that



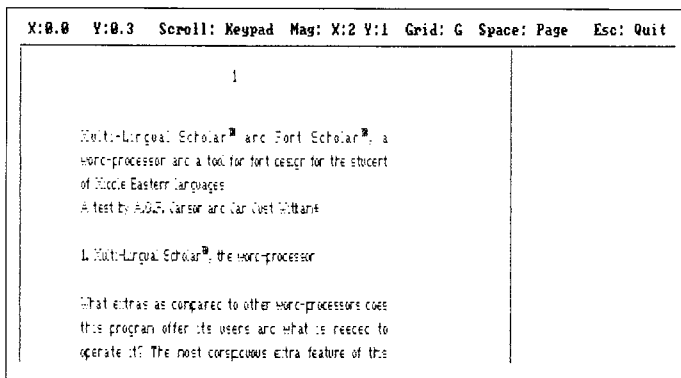
5. A table of the fonts which are supplied and that are used in the document from which illustrations Nos. 1 through 4 originate. The status line (in top) and the command window (below) have remained from the current document. This is in fact the standard configuration. The screen also contains information on the type of printer used (IBM Proprinter (Graphics, double density mode), a 9-pin dot matrix printer, with which all prints for these illustrations, except Nos. 19 and 20 which were made with a laser-printer). Configurations may easily be changed. Five alphabets are shown: Roman, Hebrew, Greek, Cyrillic and Arabic. From the table it is clear how the alphabets are numbered (1 through 5), which is their writing direction ('->' or '<-'), which screen fonts are available (40-or 80 columns fonts), and which keyboard map file is used for each alphabet; all this is followed by information about the available printer fonts. For each alphabet there is a maximum of 6 printer fonts. From the names of the fonts it is clear that 9-point and 12-point fonts may be used. In the group of Roman fonts there are also two italic fonts (the last two). On the bottom of the screen is the command window with the command 'fo' (for fonts), which shows the table of the configuration in use during the editing.



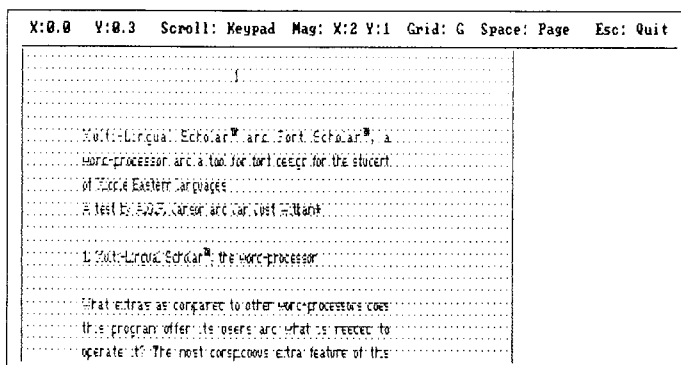
6. A screen print of the view screen, which shows the text of the document 'review.txt' exactly as it will be printed. There is a separate status line, which has information on the position of the viewer in the document ('X:' and 'Y:'). The first view screen of the present document only shows the left part of it. Notice how the print commands (as seen on the screen in illustrations 1 through 4) have disappeared from the view screen and how the header shows a running page-number: the print formatting commands have all been executed.



7. The same view screen as the preceding but now the right part of the page only. Notice the difference in position of the viewer ('X:4.0', while 'Y:0.3' has remained the same), as compared to the previous illustration.

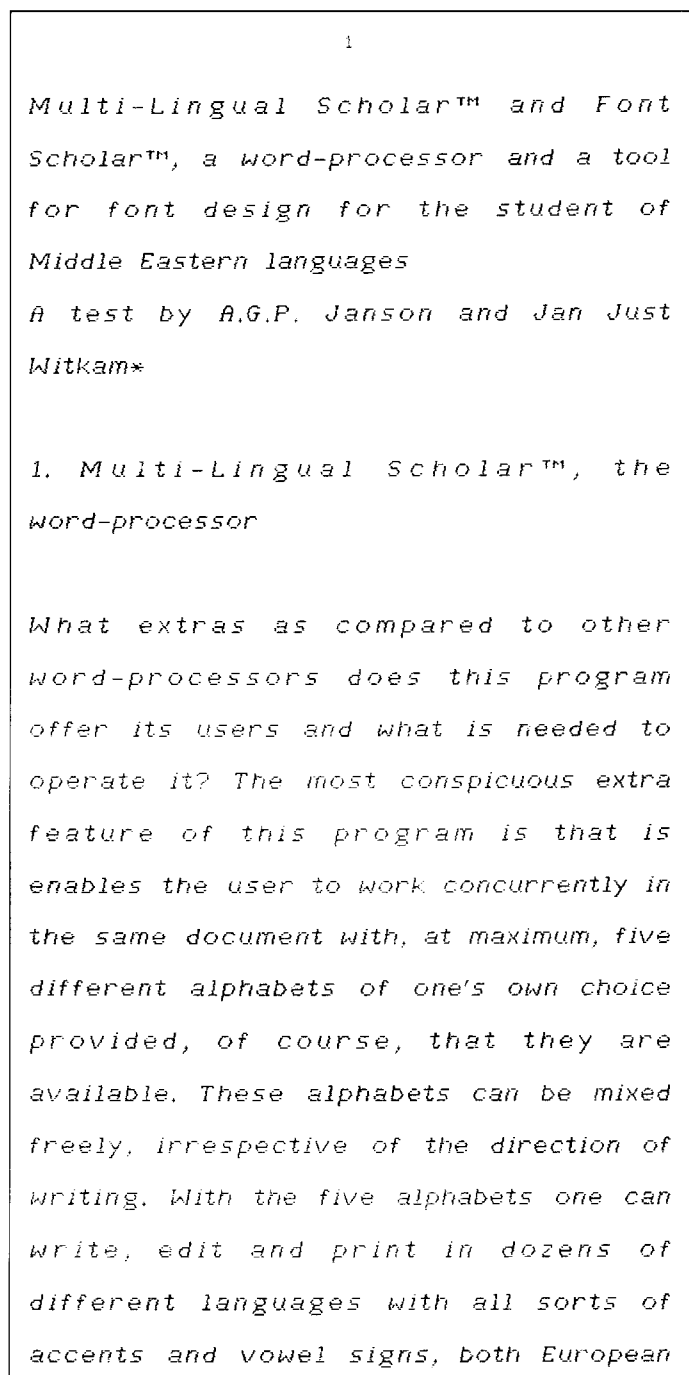


8. The same view screen as the two preceding screens, but now in a vertically condensed form. The characters have become almost illegible, but the width of the entire page is shown. This result was obtained by dividing magnitude X by two (instead of 2 in the two previous view screens).



9. The same view screen as the preceding one, but now with a grid cast over the text. The grid is laid out in tenths of an inch, as one can see when compared to the print formatting command of illustrations 1 through 4 (the ten dots in the left margin of the view screen correspond with the command ';lm10').

I know of. As standard procedure, alphabets are supplied for the Roman, Hebrew, Cyrillic, Greek and Arabic scripts, and these may be used for a much greater number of languages. Many more alphabets are available, both from the producer Gamma Productions, Inc. in Santa Monica, California, and directly from some of its authorized dealers. A recently received list includes as many as twenty-one extra optional fonts: Amharic, Aramaic, Armenian, Assyrian,



10. Print of page 1 of the document 'review.txt', with implementation of the print formatting commands. If no specific print formatting commands are given, a default position is chosen automatically for most options. Here font 5 of alphabet 1 (an italic 12-point) has been chosen (;fn1,5), for which the line spacing (0.20 inch as default) had to be changed into 0.40 inch.

Bengali, Coptic, Devanagari, Gujerati, Gurmukhi, IPA (phonetic alphabet), Khmer, Korean, Phoenician, Sanskrit, Syriac, Tamil, Telugu, Thai, Ugaritic, Urdu/Arabic and Vietnamese. I have also seen a Farsi keyboard and font. The extensive number of accents and special characters supported by the program in the Roman alphabet enables the user to work not only in most European languages, but also in languages other than Russian with the Cyrillic script and for the

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Multi-Lingual Scholar™ and Font Scholar™, a word-processor and a tool for font design for the student of Middle Eastern languages

A test by A.G.P. Janson and Jan Just Witkam\*

#### 1. Multi-Lingual Scholar™, the word-processor

What extras as compared to other word-processors does this program offer its users and what is needed to operate it? The most conspicuous extra feature of this program is that it enables the user to work concurrently in the same document with, at maximum, five different alphabets of one's own choice provided, of course, that they are available. These alphabets can be mixed freely, irrespective of the direction of writing. With the five alphabets one can write, edit and print in dozens of different languages with all sorts of accents and vowel signs, both European and non-European languages, each with multiple font sizes and character styles, theoretically up to 30 fonts per document and in practice, with the fonts that are supplied as a standard, up to 15 printer fonts (5 Latin, 4 Hebrew, 2 Greek, 2 Cyrillic and 2 Arabic fonts). The program works in a purely graphical way, so that it supports numerous other features which are seldom available in other word-processing software. One conspicuous example of such an extra feature is the option to work either with large on-screen characters (in 40 columns) or with smaller characters (in the usual 80 columns). Working with large characters has the advantage that all sorts of vowels, accents and the like can be typed and seen on the screen. Using either of these screen fonts has no consequences for the way the document will be printed, since the program recalculates every page for printing according to the user's specifications.

To operate MLS, one needs to have at least an IBM PC (but an XT or AT is preferable) or compatible, working under MS-DOS, version 2.0 or higher. One also must have an internal memory of at least 512 K of RAM and a graphic card of the type CGA, Hercules or IBM EGA, or a 100% compatible one. Depending on the different graphic cards, one sees another image, with different line breaks, on the screen. If one starts the program with a smaller configuration (less alphabets, less fonts), less RAM is needed accordingly. During the work with the program the computer should be linked to a working dot matrix or laser printer which is connected to a parallel port, or, if no printer is available, the output should be directed to a parallel port. The program is supplied on 5.25" floppy disks, which are in no way protected against copying, and which can be without difficulty copied onto a hard disk. The program works only if a special piece of hardware, a

11. The same as preceding, but now printed with font 1 of the Roman alphabet (;fn1,1), which is in fact the default.

Hebrew script, working in modern and biblical Hebrew, Aramaic and Yiddish is possible. With the use of the features of font design provided by Font Scholar™, many signs can be modified or especially designed in order to serve any specific purpose of the user, and numerous more alphabets will doubtless become available soon. Those alphabets that are cursive, such as Arabic and Farsi, are provided with contextual analysis, so that each character has only one key on the keyboard, irrespective of the shape it will assume in its position in the word. Four keyboards, which are chosen by typing either in lower case, or <shift>, or <alt>, or <control>, are available for each alpha-

File	Prev	Next	Alph	Ins
MUKT1.TXT			ROMAN	OFF
;CSS,0,-;LM10;RM70;LS30;PS120				
Text transcribed from MS Milano, Biblioteca Ambrosiana, C 22 (cf. catalogue by Löfgren & Traini, volume 2, pp. 136-7)				
[f. 1a]				
;cj				
<p>كتاب المنتزع في فنون من الصنع تأليف السلطان الملك المظفر يوسف</p>				

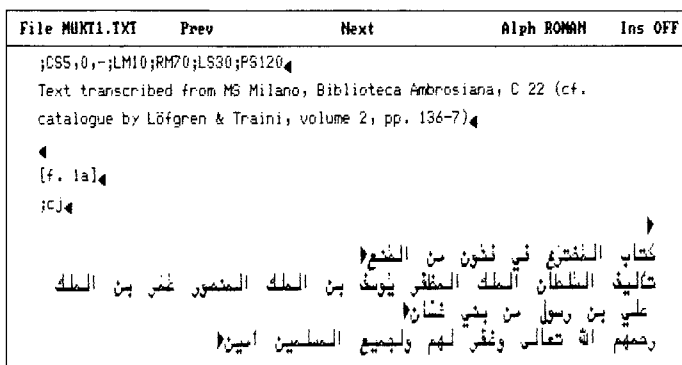
12. Screen print of a document with Arabic text (mukt1.txt), shown in 40-columns mode with CGA adapter. See the explanation of the print formatting commands in the caption to illustration No. 1. The 40-column mode supports Arabic vowels and other reading signs. The command ';cj' is given in order to centre justify the title of the text.

File	Prev	Next	Alph	Ins
MUKT1.TXT			ROMAN	ON
;CSS,0,-;LM10;RM70;LS30;PS120				
Text transcribed from MS Milano, Biblioteca Ambrosiana, C 22 (cf. catalogue by Löfgren & Traini, volume 2, pp. 136-7)				
[f. 1a]				
;cj				
<p>كتاب المنتزع في فنون من الصنع تأليف السلطان الملك المظفر يوسف بن الملك المنصور عمر بن الملك علي بن رسول من بني غسان رحمهم الله تعالى وغفر لهم ولجميع المسلمين آمين</p>				
;bj				
[f. 1b]				
<p>بسم الله الرحمن الرحيم الحمد لله الم محمود بكل لسان المنيل فواضل الاحسان المتفضل على كل انسان</p>				

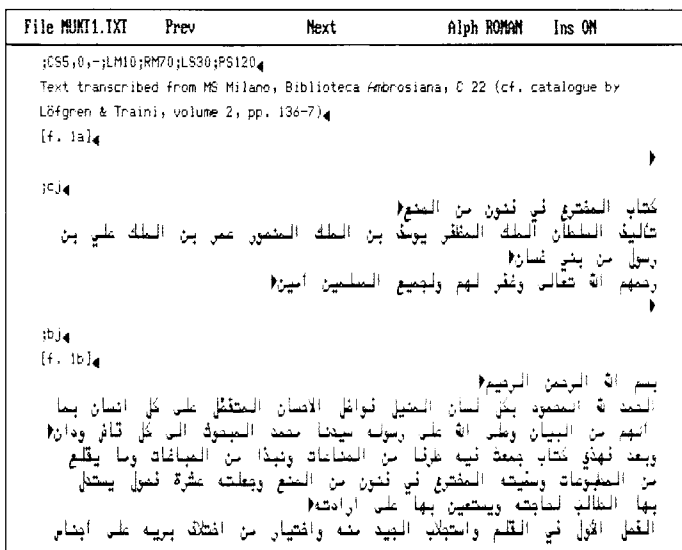
13. The same 40-column screen, but now shown with a Hercules adapter. The text has not yet been vocalized. Both justification commands are visible here: ';cj' for centre justification of the title, and ';bj' for block justification for the main body of the text.

bet. This offers for all alphabets a wide range of signs and accents; in addition it offers for Hebrew and Arabic the possibility of the use of vowel signs and other special accents.

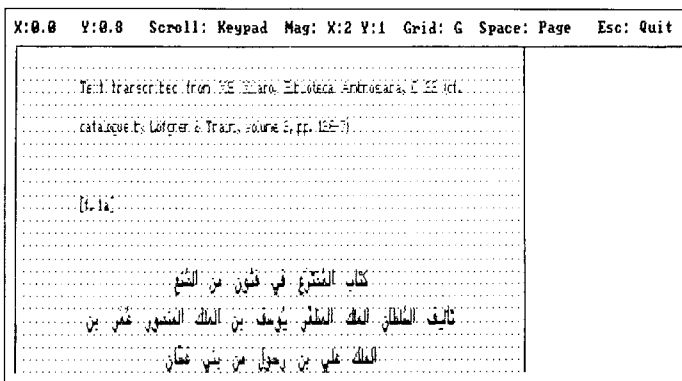
The user's manual is excellently composed and is didactically perfect. It first describes how to start up the program in a given configuration and then treats some of the elementary features in a tutorial. This is followed by a reference section in which are treated the operational features: 1) writing in different languages and working with a bi-directional text, 2) editing with footnotes (which can be done automatically), 3) the command key commands, 4) the command window commands, and 5) the print formatting commands. Especially these latter commands enable the user to profit from MLS as a full-fledged desktop publishing program. The manual concludes with the functioning of the configuration utility. For several features, such



14. The same screen as No. 12, but now shown in 80-column mode with a CGA adapter.



15. The same screen as No. 13, but now shown in 80-column mode with a Hercules adapter.



16. The view screen of a vertically condensed page of the document 'mukt1.txt', with grid (compare also above, illustration No. 9). Note how the print commands, with centre justification, have been executed.

as working in different alphabets and editing with footnotes, sample documents are supplied and their formatting is explained. The range of the print formatting commands is truly impressive: none of the more common graphic possibilities seem to be lacking. The manual of Font Scholar™ gives in addition to rules for designing alphabets information on importing non-MLS files and exporting MLS files to ASCII format or to a



17. The first page of document 'mukt1.txt' printed according to the given print formatting commands. Font 1 of the Arabic alphabet has been chosen.

format used in other word-processors. Two conversion utilities are supplied with the MLS software.

A few remarks on details follow here to conclude this test of the MLS word-processor, with the understanding that it is only fair that, with all the well-deserved praise and admiration, some (mild) criticism of MLS be mentioned here as well.

While working in Arabic and Cyrillic scripts I noted that quickly moving the cursor through the line (which in the other alphabets is done with <home> or <end>) was not possible in the same way as it is with the other alphabets. In the Syriac alphabet designed with Font Scholar™ by Mr. Janson this facility is also lacking. I presume that this is only a minor disadvantage which may be easily remedied.

According to the list of command window commands (Handbook of the Word-Processor, p.4.44), there should be a command 'rename'. This does not, however, seem to be supported by the program, nor is it further explained in the Handbook.

Text transcribed from MS Milano, Biblioteca Ambrosiana, C 22 (cf. catalogue by Löfgren & Traini, volume 2, pp. 136-7)

[f. 1a]

كتاب المُخْتَرَع فِي فَنُونِ مِنَ الصَّنْعِ  
تأليف السُّلْطَانِ الْمَلِكِ الْمُظْفَرِ يُوسُفَ بْنِ الْمَلِكِ الْمَنْصُورِ عُمَرَ بْنِ الْمَلِكِ  
علي بن رسول من بني غَسَّانَ  
رحمهم الله تعالى وغفر لهم ولجميع المسلمين آمين

[f. 1b]

بسم الله الرحمن الرحيم  
الحمد لله المحمود بكل لسان المنيل فواضل الاحسان المتفضل على كل  
انسان بما ألهم من البيان وولى الله على رسوله سيدنا محمد  
المبحوث الى كل قاض ودان  
وبعد فهذي كتاب جمعته فيه طرفا من الصناعات ونبذا من الصباغات  
وما يقلع من المطبوعات وسميته المخترع في فنون من الصنع وجعلته  
عشرة فصول يستدل بها الطالب لحاجته ويستعين بها على ارادته  
الفصل الأول في القلم واستجلاب الجيد منه واختيار من اختلاف بريه  
على أجناس الخطوط وصفة الدواة واختلاف آلاتها من السكاكين  
الفصل الثاني في عمل أجناس المداد وعمل الأحبار السود والأحبار  
الملونة  
الفصل الثالث في عمل الليق وتلوين الصباغات وظلها وحل اللك وما  
يعمل منها لدهان السقوف وحل السندروس  
الفصل الرابع في كتابة الذهب والفضة وما يقومها وحل وغسل  
اللازورد  
الفصل الخامس في وضع الأسرار في الكتب وما يمحوا الدفاتر

18. The same page and print as in illustration No. 17, but now with font 2 of the Arabic alphabet. Note that the final *fā'* is not well designed in this font, nor is the final *yā'*.

Another point of concern is the maximum length of MLS files. At first it seemed alarming to me that the maximum length of a document in MLS is only 64 K, which, by the way, is not mentioned in the Handbook. This is not much, slightly over ten pages in print at most, and hardly sufficient for the philologist who wants to treat a text, even if only of moderate length, with the basic features of the word-processor, such as copy, move, search, replace, merge and similar commands. One is forced to cut one's text into pieces, make a number of separate documents out of it and repeat the command(s) for each single document. Strings in these commands are, however, remembered through more than one document (as long as one does not exit from the program), nor does this limitation apply to viewing or printing, as documents may be linked together in a chain for such operations. The disadvantage of the limited size is enhanced by the fact that MLS is not at all economical in saving its docu-

ments. In order to distinguish between the different alphabets, an extra sign is automatically added for each character of the alphabet, so that a document of the maximum length of 64 K in fact contains only a text comparable to the length of 32 K as written by any other, ordinary, word-processor. In favour of short documents could be argued, however, the time-saving factor involved in the commands 'print' and 'view' where the entire lay-out of a document must first be calculated. For printing or viewing any page within the document the lay-out of all the preceding pages thus must be calculated. With long documents this would be extremely time consuming. Here the limited size of documents comes in handy. The view mode, which has no direct editing or page-making possibilities, gives one an exact idea of what the page is going to look like when printed. When one has fully mastered the intricacies of the print commands, the view mode is an indispensable feature.

I must express some disappointment in the design of the laser fonts of Arabic as they have been supplied: with some extra effort these could have been more elegant, especially the 12-point font. The fonts on the dot matrix printers cannot be, by their very nature, but of draft quality. The use of quad density while printing is very time consuming and in the event the result remains disappointing. Prints made on a 24-needle printer are, of course much more satisfying than those on a 9-pin printer, but the best result is obtained on a laser printer. From all this it becomes clear that MLS was primarily designed for producing output on a laser printer.

Another suggestion would be to provide a few floating accents which can be placed under a character, like the vowels in Hebrew. The two times ten accents which are given with the Roman alphabet (for which the ten function keys are used, in lower and upper case, respectively) are all to be placed over the preceding letter, whereas scholarly publishing of Oriental texts often requires some accents underneath a character as well, e.g. for transcription purposes. Of course, such accents (at least a dot and a stroke to be placed underneath a letter) can be designed by each scholar with the help of Font Scholar<sup>sm</sup>, but not everyone becomes easily proficient in font design and these signs are so generally used in Orientalist publications that they might have been supplied by the manufacturer as standard procedure. It appears, however, that a dot written underneath the letter is now standard available in version 3.1 of MLS, which I have not yet seen.

The protection against piracy is done sympathetically. There are no dangerous protective features on the disks and these can, therefore, be freely copied. The program, however, will only work with the aforementioned actuator, but it is a pity that only one such actuator is supplied with the program. Especially academic users (the obvious target group for this program) have the habit of working both in and outside

Text transcribed from MS Milano, Biblioteca Ambrosiana, C 22 (cf. catalogue by Löfgren & Traini, volume 2, pp. 136-7)

[f. 1a]

كتاب المخترع في فنون من الصنع  
تأليف السلطان الملك المظفر يوسف بن الملك المنصور عمر بن الملك علي بن رسول من بني غسان  
رحمهم الله تعالى وغفر لهم ولجميع المسلمين آمين

[f. 1b]

بسم الله الرحمن الرحيم  
الحمد لله المحمود بكل لسان المنيل فواضل الاحسان المتفضل على كل انسان بما ألهم من البيان وصلى  
الله على رسوله سيدنا محمد المبحوث الى كل قاض ودان  
وبعد فهذه كتاب جمعت فيه طرفا من الصناعات ونبذنا من الصباغات وما يقلع من المطبوعات وسميته  
المخترع في فنون من الصنع وجعلته عشرة فصول يستدل بها الطالب لحاجته ويستعين بها على ارادته  
الفصل الأول في القلم واستجلاب الجيد منه واختيار من اختلاف بريه على أجناس الخطوط وصفة  
الدواة واختلاف آلاتها من السكاكين  
الفصل الثاني في عمل أجناس المداد وعمل الأحبار السود والأحبار الملونة  
الفصل الثالث في عمل الليق وتلوين الصباغات وخلطها وحل اللك وما يعمل منها لدهان السقوف وحل  
السندروس  
الفصل الرابع في كتابة الذهب والفضة وما يقومها وحل وغسل اللازورد  
الفصل الخامس في وضع الأسرار في الكتب وما يمحو الدفاتر والرقوق  
الفصل السادس في غرا المجلدين وغرا السمك وإزاق الذهب والفضة وصفة مساقله وأقلام الشعر  
والريش وجميع آلات الذهب  
الفصل السابع في تجليد الكتب وآلاتها  
الفصل الثامن في معرفة ألوان الحرير على اختلافها والقصارة  
الفصل التاسع في معرفة قلع الأثار والطبوعات من الثياب وعمل الصابون

[f. 2a]

الفصل العاشر في معرفة تطيب النفط وعجن اللك لدهان الخراطين وعمل الكحل للذهب والفضة وقتل  
الذهب للطلا وسبك اللحام للفضة والذهب

الفصل الأول في القلم واستجلاب الجيد منه واختياره واختلاف بريه على أجناس الخطوط وصفة الدواة ]  
[اختلاف] آلاتها من السكاكين وسواها

قال تعالى « ن والقلم وما يسطرون » وقال « اقرأ وربك الأكرم الذي علم بالقلم » الآية وقال صلى الله  
عليه وآله وسلم ان أول ما خلق الله القلم فقال له اجزى فجزى بما هو كائن يوم القيمة قال ابن  
عباس في قول الله عز وجل « اجعلني على خزائن الأرض اني حفيظ عليم » أي كاتب حاسب ومن جلالة  
القلم أنه لم يكتب لله عز وجل الا به وعن ابن عباس أنه قال أو اثاره من علم قال الخط الحسن وجاء  
في التفسير في قوله تعالى عز وجل « ان يلقون أقلامهم » أنها كانت غيلان مكتوب على رؤوسها

Text transcribed from MS Milano, Biblioteca Ambrosiana, C 22 (cf. catalogue by Löfgren & Traini, volume 2, pp. 136-7)

[f. 1a]

كتاب المخترع في فنون من الصنع  
تأليف السلطان الملك المظفر يوسف بن الملك المنصور عمر بن الملك علي بن  
رسول من بني غسان  
رحمهم الله تعالى وغفر لهم ولجميع المسلمين أمين

[f. 1b]

بسم الله الرحمن الرحيم  
الحمد لله المحمود بكل لسان المنيل فواضل الاحسان المتفضل على كل انسان بما  
ألهم من البيان وصلى الله على رسوله سيدنا محمد المبحوث الى كل قاض ودان  
وبعد فهذي كتاب جمعت فيه طرفا من الصناعات ونبذا من الصباغات وما يقلع من  
المطبوعات وسميته المخترع في فنون من الصنع وجعلته عشرة فصول يستدل بها  
الطالب لحاجته ويستعين بها على ارادته  
الفصل الأول في القلم واستجلاب الجيد منه واختيار من اختلاف بريه على أجناس  
الخطوط وصفة الدواة واختلاف آلاتها من السكاكين  
الفصل الثاني في عمل أجناس المداد وعمل الأحبار السود والأحبار الملونة  
الفصل الثالث في عمل الليق وتلوين الصباغات وخلطها وحل اللك وما يعمل منها  
لدهان السقوف وحل السندروس  
الفصل الرابع في كتابة الذهب والفضة وما يقومها وحل وغسل اللازورد  
الفصل الخامس في وضع الأسرار في الكتب وما يمحو الدفاتر والرقوق  
الفصل السادس في غرا المجلدين وغرا السمك وإلزاك الذهب والفضة وصفة مساقله  
وأقلام الشعر والریش وجميع آلات الذهب  
الفصل السابع في تجليد الكتب وآلاتها  
الفصل الثامن في معرفة ألوان الحرير على اختلافها والقسارة  
الفصل التاسع في معرفة قلع الآثار والطبوعات من الثياب وعمل الصابون

[f. 2a]

الفصل العاشر في معرفة تطيب النفط وعجن اللك لدهان الخراطين وعمل الكحل  
للذهب والفضة وقتل الذهب للطلا وسبك اللحام للفضة والذهب

20. The beginning of the same document as shown in the preceding illustration, but now printed with a laser-printer with the use of the larger Arabic font (;fn5.2).



made with the aid of more than 40 different commands. Some of them I will discuss when treating the creating of new alphabets. To clarify, the same commands are used to create new alphabets as to adjust existing fonts.

When creating new or adjusted fonts or alphabets, one has to realize that at least three kinds of files need to be changed: two files for the screen and at least one for the printer. The way to create or adjust these files is the same. Let us first direct our attention to the screen fonts. As one knows, MLS works with two different 'screens', an 80-column screen (see figures 3 and 4, the small letters) and a 40-column screen (see figures 1 and 2, the big letters). Both screens need their own font. If one starts with editing the 40-column font (extension is always .s16), this font can be made the reference file for all the other related fonts (including the printer font(s)). As stated above, it is possible that the 40-column font can deliver an edited character or a group of characters to the 80-column font (extension always .s8). Of course, this character is much too big for the 80-column screen and therefore one has to reduce this letter, but drawing a new character is not necessary. If one has to change a lot of characters in the large screenfont, it is sometimes easier to reduce the complete font. FS has the possibility of doing this with the command *dimension*. After using *dimension*, one has to bear in mind that minor adjustments still need to be made in the new font. When using *dimension* with a printer font it is possible to reduce or enlarge one specific letter or group of letters.

Printer fonts are made in more or less the same way as screen fonts. However, one can determine the width of the letter when adjusting or creating printer fonts.

Before turning our attention to creating new alphabets, I must stress the necessity of using the instructions which concern naming the fonts. MLS uses some elements within the name to load specific files which correspond with the assigned files given in the configuration file. For instance, if a printer font does not have the extension .PFT, MLS will not be able to load that font and, consequently, one cannot print with that font. Let me explain briefly one complete name: RM09TNPH.PFT. RM means Roman script, 09 means that the font size is 9 point, T means that the type style is Times, N means normal script, P means proportional script, and H means that an Epson or IBM printer with double density must be used. The occurrence of a letter code in the eighth position (A, B, C, D, E, F, G or H) is a naming convention that is used by the manufacturer, so that the user knows that the printer font indicated in the filename will print on the printer specified. The extension .PFT has already been explained.

#### CREATING NEW ALPHABETS

To come straight to the point:

— Creating a new alphabet is not a very difficult thing to do provided one has some knowledge about

ASCII matters. If one has never heard about the American Standard Code for Information Interchange, which is the international accepted code in which numbers, letters and symbols are expressed, it will be more difficult for him to move around easily in the edit or reference file. For an explanation of this I refer to what I state below.

— For those persons who do not have a lot of spare time I would like to give the following warning: creating a new alphabet is a very time-consuming matter. One has to realize that at least three fonts (two screen fonts and one printer font) have to be made if one wants to work with the new alphabet in MLS (see above). Fortunately, the system of edit and reference file makes work a little easier, but one must not underestimate the time needed to adjust borrowed letters to their new environment (e.g. from a screen font to a printer font).

After loading FS, naming the alphabet and selecting the printer one will use to print the new alphabet with, one sees a screen filled with commands and information about the *grid* (width, height, etc.). As far as I know, it is not possible to make screen-prints while working with FS. This means that I cannot show what the screen looks like. The *grid* is a part of the screen in which one can draw the new characters. In this *grid* there is a little blinking cursor which can be moved around, horizontally and vertically with the arrow keys and diagonally with keys 1, 3, 7 and 9. To move more rapidly, one can hold down the shift key to move the cursor five *pixels* at a time instead of the usual one *pixel*. A *pixel* is, in this context, a tiny part of the letter. After pressing <F1>, one can draw by moving the cursor: to switch off drawing just press <F1> again. Likewise, the <F2> key is used to erase. One need not worry about the base-line of the character because the base-line is indicated in the grid. Besides, it is very easy to move an already drawn character through the grid.

It is not possible to change the width of the *grid* when creating a screen font. This means that every character has to be drawn in the same space, including the wide letters. One can understand that wide characters in this case cannot be wide enough in order to have a nice appearance. Although it is perfectly understandable why the width of the *grid* cannot be changed (one is stuck to the 80-or 40-column mode of MLS) it is rather annoying to look at 'mutilated' characters on the screen. For those readers who are familiar with the Syriac Estrangelo alphabet (see figures 22 — 26), I can mention the final unconnected *nun* and the *gimel*, which are both 'wide' letters. Fortunately, one can change the width of the *grid* when creating a printer font, so the print-out has characters with a better appearance.

After having drawn a character, one can specify with the command *vowel* whether or not the current character should be modified by a vowel or accent marker (like the vowel markers in Hebrew and Arabic and the

accent markers in Greek). *FS* gives one the opportunity to examine the designed character before saving it. With the command *examine* one can review the appearance of the character on the screen and with the command *print* one can review the appearance of the character on a print-out. It is also possible to review a range of characters. As I experienced, the command *print* is very helpful in getting a clue as to how to refine a character.

If one is satisfied with the appearance of the character, one needs to save it. What one actually does is associate the new character to a certain ASCII code, which is displayed on the screen. This means that the new character 'replaces' the usual ASCII sign. For instance, ASCII No. 65 = A, but the new character, let us take an *'alef*, replaces 'A'. If the new alphabet is loaded in *MLS*, then an *'alef* will be produced when pressing the A key. One has to realize, however, that not all of the 255 ASCII values can be used freely since *MLS* does not recognize those signs which cannot be entered directly from the keyboard. If the command *xtra* is applied, these values can be used to store characters which need not be entered from the keyboard, but which have to exist to produce correct script, i.e. the contextual characters which exist in Arabic, Farsi and Syriac alphabets. It is clear that these contextual characters have to be drawn in the grid also. Most of the characters in the Estrangelo or Arabic alphabet exist in four shapes: keyboard, initial, medial and final. Some characters in the Estrangelo alphabet have five shapes (keyboard, initial, medial and two final shapes). The only thing one can do in this case is linking the fifth character (one of the two final shapes) to another key on the keyboard. The initial, medial and final characters must be stored (with the *xtra* command turned on) in the so-called illegal ASCII values, because they are not entered directly from the keyboard. *MLS* determines whether the output is an initial, medial or final shape of the character on the basis of the position of the character within the word. It is not necessary to do this oneself.

*MLS* is able to determine the correct shape of the character, because the user instructs *MLS* which initial, medial or final characters belong to a specific keyboard character. This is done in a so-called map file. In this file one affirms more or less when *MLS* has to use an initial, medial or final character. I will illustrate this by means of one character: the Syriac *bet*. First of all, one determines where the keyboard character (I linked this character to ASCII No. 66) will be located on the keyboard, in this case key 'b' (standard ASCII No. 98). Then the initial *bet* is linked to this keyboard character, and the medial and final character are similarly dealt with. In short, when the ASCII No. 98 key is now pushed, an ASCII No. 66 will be the output. According to its place within the word, ASCII No. 66 will automatically change to an ASCII No. 165, 166 or 167, which stand for initial *bet*, medial and final *bet*. The last three

ASCII codes are so-called illegal ASCII codes. Finally, *MLS* has to know whether the character can be dealt with like a space (for instance, a number), which is in our example not the case, and whether the character takes a final form within a word or not. This seems contradictory, but some letters within a word are not connected to the left. This means, of course, that that specific character can show a final form within a word. The next character will then have an initial form.

I have mentioned above the so-called Estrangelo alphabet, which is one of the three different Syriac alphabets. This alphabet is not delivered with *MLS*. To test *FS* I decided to create a new alphabet with contextual characters: the Estrangelo alphabet. At the time I began, I did not know that different Syriac alphabets would be available. Nevertheless, I continued to develop the Estrangelo alphabet since the process was so instructive.

As I have already explained, *MLS* needs two screen fonts and at least one printer font. Since there is hardly any difference between creating a screen or a printer font, I will restrict myself to showing some phases in developing a printer font.

Figure 22 shows a rather imperfect alphabet. Just look at the second paragraph, line 4, third word, where you can see that the second character is much too close to the third character. And then there is the *seyame*, the two dots above certain words to indicate the plural, which occasionally causes a little white space between two characters where this is not required. See, for instance, fourth paragraph, line 2, last word. As one can see in figure 25, these problems, and others too, were solved. I simply added some white or deleted some white near to the relevant characters. Because of the fact that some changes were also made in the appearance of several different characters (some were made wider), a new lay-out of the same text was generated by *MLS*. This means that the last above-mentioned example is now in another place: fourth paragraph, line 3, first word.

Next I started to develop a quad density font, which is a font that produces a very fine printing quality. One disadvantage of this font is that it prints exceedingly slowly. One printed DIN A4 (c. 12 inch) page will cost you about half an hour! To edit this quad density font, I used the double density font, but because the double density font appears very small in the quad density drawing *grid*, I enlarged it (with the command *dimension*). The result of this is what you see in figure 23. The characters are now very bold and therefore need further adaption by erasing a lot of *pixels*. Figure 24 shows you the adaption half-way through. The final result, figure 25, is acceptable in my opinion, although I am aware of the fact that a few minor adaptations can be made. For those who have access to a photo-copier, which can reduce the original, it is possible to make slightly reduced copies of the quad-density prints. The result is only slightly inferior to the output of a laser-

printer. The manufacturer of FS provides a utility to use a scanner for quick font design. I have not tested this possibility as I have not the required scanner at my disposal, but I can imagine that this will save time.

Concluding this review of Font Scholar™, I can state that FS is a moderately priced and at the same time very powerful font creating program. One has to realize that creating new alphabets is extremely time-consuming, particularly for those who do not have much 'computer-experience'. One could wonder if it is sensible, from a time-sparing point of view, to create a

new alphabet. Especially now that more than 20 different alphabets are available with doubtless still more to come. And then, of course, there is the good possibility that others scholars have created, for their own use, the same alphabet as you intend to create. In the Newsletter which Gamma Productions, Inc., distributes, information is given about special activities of different scholars who work with MLS and FS. It would be a good thing if more scholars working with MLS and/or FS would report their special activities, for others might profit from them.

Alphabet: ESTRANG		Map: ESTRANG										Lower Case Keyboard		
“	”	1	2	3	4	5	6	7	8	9	0	=		
.		Ⲁ	ⲁ	Ⲃ	ⲃ	Ⲅ	ⲅ	Ⲇ	ⲇ	Ⲉ	ⲉ	[	]	
		Ⲋ	ⲋ	Ⲍ	ⲍ	Ⲏ	ⲏ	Ⲑ	ⲑ	Ⲓ	ⲓ	:	:	
		ⲕ	Ⲕ	ⲕ	Ⲗ	ⲗ	Ⲙ	ⲙ	Ⲏ	ⲏ	.			

Ctrl F1-F5 - Alphabet    Space - Select Keyboard  
 Ctrl PrtSc - Print    ESC - Edit

Alphabet: ESTRANG		Map: ESTRANG										Upper Case Keyboard	
									*	(	)	_	+

Ctrl F1-F5 - Alphabet    Space - Select Keyboard  
 Ctrl PrtSc - Print    ESC - Edit

26. Distribution of the Syriac characters over the (lower case and upper case) IBM keyboard. A number of keys has remained unused. Estrangelo alphabet, designed by A.G.P. Janson.







