

Cutting-edge text processing for scholars

Version .8, updated April 24, 2005

This document is designed to provide a quick reference for scholars who need to use or who are working to support specialized characters in classics, Biblical studies, and medieval studies. Most of us work on one platform primarily and often do not know what is available to other users.

This file is a work in progress; corrections and amplifications are most welcome and may be emailed to David Perry at hospes@scholarsfonts.net . **Red boldface** shows items that need clarification.

David Perry wrote the first drafts of this document. Peter Baker supplied additional information about Unix and Odd Einar Haugen about OS X. Michael Everson pointed to some useful Wikipedia links and Deborah Anderson clarified the facts about OT and AAT tables in the same font. Smokey Ardisson provided information about NeoOffice/J. This version features links so that users can find more information about the various programs.

This document contains:

- information about PDF files and web browsers on all platforms
- lists of software available for Mac OS X, Unix, and Windows; font utilities are listed first, then page layout programs, and finally word processors and text editors
- information about font formats and a list of fonts with advanced features
- a glossary of terms and acronyms, placed last since some readers will not need it

Each program in the software list is evaluated for the following categories.

Unicode support

- **complete** means that the program accepts and displays any Unicode character, including those beyond the BMP, and handles RTL text as well as LTR. Unless otherwise noted, Windows and Unix programs use OT to support Hebrew and Arabic, while Mac programs use AAT.
- **complete, but no RTL** means that the program accepts and displays any Unicode character, including those beyond the BMP, but has no facilities for handling RTL text. Note that it is often possible to display short bits of RTL text that does not require special processing (e.g., unpointed Hebrew, Old Italic) by using the Unicode directional format characters even if the program does not support RTL.
- **BMP only** means that the program accepts Unicode characters but not those in the supplementary planes

Character Entry

- **keyboard** means that the program accepts Unicode characters entered via an appropriate keyboard layout for the script desired. This includes native keyboards for the various OSs and third-party keyboard utilities such as Keyman.

- **Unicode hex input** refers to Mac OS X's facility to enter any Unicode character via its hexadecimal value while holding down the OPTION key
- **built-in** means that the program provides its own facility for entering characters not available from the keyboard in the form of a dialog box or pop-up window such as Word's Insert/Symbol
- **copy from clipboard** means that the program will accept Unicode characters pasted from the clipboard; one may use a utility such as BabelMap, Character Palette, or GuCharMap to copy the characters

Combining Marks

Any Unicode-based program should accept combining marks. However, the display of such marks will probably be incorrect (marks not positioned correctly over the base character or relative to other combining marks) unless both the application and the font used are designed to support combining marks.

There are also platform-specific issues. On Windows, the most recent versions of Uniscribe (Word 2003's private copy and that supplied with XP Service Pack 2) support combining marks via OT. They also substitute precomposed glyphs, if the font contains them (e.g., *a* followed by combining acute would be replaced with U+00E1, *á*). This happens even if the font contains no OT tables to support combining marks, but it is unclear to what characters it is applied—perhaps only to the Latin-1 and Latin Extended A ranges.

- **via OT** or **via AAT** means that the software will take advantage of any support for combining marks offered by a font, using the technology indicated
- **unpredictable** means that the program displays combining marks but has no support for positioning the marks, so the marks will probably not be lined up right; this will vary from one font to another (often marks will be positioned sort of correctly over lowercase letters, but not over uppercase ones, or correctly over average-width letters such as *o* but incorrectly over narrow ones such as *i* or wide ones such as *m*)
- **none** means that the program does not display combining marks

Alternate Glyphs

If a program can display alternate glyphs without modifying the underlying Unicode character, this is indicated along with the technology that it uses to do this (OpenType or AAT). Note that support for alternate glyphs must be built into the font that one wishes to use as well as the program. A list of fonts is provided at the end of the document.

PDF files

PDF files are an important resource because they are supported on all platforms and because fonts can be embedded (if the font designer allows) to support specialized characters, even if the recipient does not have the original font on his/her system.

InDesign (Windows and OS X) can create PDF files that contain alternate glyphs but can still be searched via standard Unicode values. **Can Mellel do this too?**

Windows **and Unix??** users must download and install the free Adobe Reader (formerly Acrobat Reader) in order to view PDF files. They must also purchase the full Acrobat product in order to create PDFs. Mac OS X provides built-in support for generating and reading PDF files. Files generated this way from some Mac apps sometimes cannot be read by Windows users. The solution is to open the PDF file in Adobe Acrobat and resave it. Note that Acrobat provides many more options for the creation of PDF files than do the built-in OS X tools—one can control font embedding (important for users of specialized fonts), amount of compression of graphics, and many other things.

How about Unix PDF support?

Web browsers

Almost all up to date browsers have good support for display of Unicode, but none provide advanced features such as OT support. An exception is the Mac version of Internet Explorer, whose Unicode support is noticeably poorer than the competition (Safari, OmniWeb, Firefox, etc.). Alan Wood has an excellent site with much useful Unicode information, including a survey of browsers at <http://www.alanwood.net/unicode/browsers.html>.

Authors of web pages can request that a document be displayed with certain fonts via style sheets, but if the viewer does not have the font(s) on his/her system the display of specialized characters will not be correct. This is an ongoing problem.

Mac OS X

Note about AAT support in OS X applications

(If you need basic information about AAT, see the Font Formats section at the end of this document. The [Wikipedia entry](#) about Apple typography is also useful.) AAT provides system-level support for all kinds of typographic niceties. The Character Palette and TextEdit, the editor that comes with OS X, offer an excellent demonstration of what can be done with AAT; ligatures, fractions, alternate glyphs and more are available, and combining marks are well supported. When OS X was first released, some of us saw what was available in TextEdit and believed that all OS X apps would offer this level of refinement. We thought that if a simple editor could do all these tricks, certainly a full-featured word processor would do them too. Unfortunately this has not turned out to be true. Some of the other apps supplied by Apple (Address Book, iTunes, Keynote and iPhoto) do take advantage of what AAT has to offer in the same way TextEdit does. Many other programs—even some sophisticated ones such as Word 2004—do not. Each program supports only what its designers have chosen to implement.

How to Identify and Access Advanced Typographical Features in Mac Applications

I. The Typography Palette

Many of the applications created by Apple for OS X, both those included with the operating system (TextEdit, iTunes, iPhoto) and those that are purchased separately (Pages, Keynote) use a standard dialog box to control text formatting. Nisus Express ver. 2 also uses the same exact dialog.

This dialog box supplies easy access to many advanced AAT features, so it is worthwhile for users to become well acquainted with it.

- select some text and apply a font that has advanced typographic features (see font list at the end of this document)
- open the dialog by choosing Format/Fonts/Show Fonts from the application menu or by typing ⌘-T
- enlarge the window by dragging the lower right corner if you do not see the up/down arrows and the cog wheel in the lower left of the box
- open the Typography palette by clicking on the cog wheel (what Apple refers to as the Action pop-up) and scrolling up or down as needed. What you see in the Typography palette varies depending on what features the designer has built into the font.

II. Other Ways

Many applications provide access to the more commonly used typographical features via menu items. For example, Nisus Writer Express includes kerning and ligatures on the Format menu, although the Typography palette gives more control over ligatures. You will need to explore the specific capabilities of the application are using.

Customized keyboards easily installed

- one can create layouts in XML; see [directions](#) on Apple web site
- OS 8/9 keyboard layouts may be used by adding the .rsrc suffix
- medieval Nordic keyboards for Mac by Florian Grammel are available [here](#)

- homepage of [GreekKeys](#), polytonic Greek keyboard and fonts for OS X
- links to many other OS X keyboards and some keyboard creation software on the [Mellel website](#)

Character Palette (system utility)

- Unicode support: complete; can find and copy any character in any installed font; can be viewed by Unicode block or by font; will show all fonts that contain a given Unicode character
- alternate glyphs: when a font that supports alternate glyphs via AAT is selected, Palette identifies alternates as such when they are clicked on; if the current application does not support alternates, a message appears at the bottom of the Palette window.

Adobe InDesign (page layout program)

- Unicode support: complete, but RTL requires Middle Eastern version that does not support OpenType fonts
- character entry: keyboard
Unicode hex input (3.0 and later only)
built in via glyph palette
paste from clipboard
- combining marks: unpredictable; varies with font
- alternate glyphs: uses OT (not AAT) to support ligatures, oldstyle numerals, small caps, superscripts & subscripts, and stylistic alternates

Quark XPress (page layout program)

- Unicode support: very limited in current versions; version 7, under development and planned to ship in 2005, will be Unicode-based, but will not offer RTL or complex script (Arabic, Indic languages) support
- character entry: keyboard
built in via glyph palette (in ver. 7)
paste from clipboard
- combining marks: unpredictable; varies with font
- alternate glyphs: not at present; it is reported that version 7 will support a large number of OT features

Create (layout, illustration, and web publishing) [link to Create web site](#)

Note: I have not yet tested this program. I would appreciate feedback from anyone who has used it.

- Unicode support: said to be Unicode-based, but **no info about rtl or Asian scripts**
- character entry: keyboard
Unicode hex input **confirm**
paste from clipboard
- combining marks: the SIL web site indicates that Create supports combining marks via AAT; ligatures, kerning, baseline
- alternate glyphs: via AAT; ligatures, kerning, baseline

Intaglio (drawing and illustration program) [link to Intaglio web site](#)

Note: I have not yet tested this program. The quotations below come from the company's web site. I would appreciate feedback from anyone who has used it.

Unicode support: complete; "Intaglio is fully compliant with the international text standard unicode, and supports direct input of characters from complex Asian alphabets" **does rtl??**

character entry: keyboard
Unicode hex input **confirm**
paste from clipboard

combining marks: the SIL web site indicates that Intaglio supports combining marks

alternate glyphs: via AAT; provides "access to all variations, such as those provided in multi-master fonts, and complete access to all font features such as ligatures, vertical position, letter case, and all alternate characters"

AbiWord (word processor)

[link to AbiWord web site](#)

Unicode support: complete; good bidirectional support, following Unicode bidirectional algorithm; easy to change direction; uses own shaping engine for Arabic, which is still in development

character entry: keyboard
Unicode hex input
built in via Insert/Symbol (Basic Latin and Latin-1 only)
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: no

Mellel (word processor)

[link to Mellel website](#)

Unicode support: complete; excellent RTL support via OT (not AAT)[§]

character entry: keyboard
Unicode hex input
built in **check this**
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: uses OT to support ligatures, oldstyle numerals, small caps, superscripts & subscripts, class-based kerning, and stylistic alternates (limited to only one variant in version 1.9)

Microsoft Word 2004 (word processor)

Unicode support: complete; versions prior to 2004 had almost no Unicode support

character entry: keyboard
Unicode hex input
built in Insert/Symbol (Basic Latin only)
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: no **does Word 2004 take advantage of advanced AAT fonts?**

[§] It is not the goal of this document to favor one program over another. Nonetheless, we would like to point out that the authors of Mellel are seriously interested in supporting the needs of scholars. Mellel is also inexpensive and frequently updated in response to user feedback, and its OT support makes it easy to use Windows/Linux fonts. A demo version is available. So it is well worth checking out.

Nisus Writer Express (word processor)

[link to Nisus website](#)

Unicode support: complete; this is a new version built on Unicode, unlike earlier versions of Nisus Writer **confirm rtl**

character entry: keyboard
Unicode hex input
built in via Insert/Symbol (BMP only)
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: supported via AAT features

OpenOffice.org (word processor)

[link to OpenOffice.org website](#)

Note: OpenOffice does not yet have a native Mac interface (“Aqua”). OS X users can run OpenOffice by using the X11 windowing system. Because OpenOffice is not a native Mac application, it cannot use standard system fonts and some keyboards or copy from the clipboard. See NeoOffice below for an OS X-native port of OpenOffice.

Unicode support: complete; requires version 1.1.4 for best RTL support, but some bugs remain when switching script direction

character entry: keyboard
built in via Insert/Special Character (BMP only)

combining marks: unpredictable; varies with font

alternate glyphs: no

NeoOffice/J (word processor)

[link to NeoOffice.org website](#)

Note: NeoOffice is a project designed to produce a native Mac version of OpenOffice, solving the problems with the X11 version mentioned above. As of April 2005, a release candidate is available for download; it works well on my system but is not guaranteed bug-free.

Unicode support: complete, including RTL and Asian languages

character entry: keyboard
built in via Insert/Special Character (all of Unicode, not just BMP)
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: no

Pages (word processor)

[link to Apple website](#)

Unicode support: complete

character entry: keyboard
Unicode hex input
paste from clipboard

combining marks: unpredictable; varies with font

alternate glyphs: supported via AAT features

TextEdit (text editor supplied with OS X)

Unicode support: complete

character entry: keyboard
Unicode hex input
paste from clipboard

combining marks: follows Unicode rules for single and multiple combining marks quite well, with a few bugs (Greek breathing and accent combinations are stacked, not side by side)
alternate glyphs: supported via AAT features

Unix

Customized keyboards **need info**

GuCharMap (utility)

Unicode support: complete; can copy any character in any installed font

Scribus (page layout program)

Unicode support: complete **does RTL??**
character entry: keyboard
built in via dialog box that presents entire font at once
paste from clipboard
combining marks: unpredictable; varies with font
alternate glyphs: no

AbiWord (word processor)

[link to AbiWord website](#)

Unicode support: complete; good bidirectional support, following Unicode bidirectional algorithm; easy to change direction; uses own shaping engine for Arabic, which is still in development **this describes Mac and Windows behavior; Unix not yet tested but is likely the same**
character entry: keyboard
built in via Insert/Symbol (Basic Latin and Latin-1 only)
paste from clipboard
combining marks: unpredictable; varies with font
alternate glyphs: no

KWord (word processor)

Unicode support: complete **does RTL?**
character entry: keyboard
built in; the dialog organizes the Unicode charset by numbered "Table" rather than named range; it burdens the user with all the unpopulated ranges as well as the ones available in the requested font
paste from clipboard
combining marks: program centers all marks over base characters (does not consult OT features)
alternate glyphs: no

OpenOffice.org (word processor)

[link to OpenOffice.org website](#)

Unicode support: complete; requires version 1.1.4 for best RTL support, but some bugs remain when switching script direction
character entry: keyboard
built in via Insert/Special Character (BMP only)
paste from clipboard
combining marks: unpredictable; varies with font
alternate glyphs: no

Windows

Note about OpenType on Windows

Windows uses OpenType to implement typographical refinements and to support scripts with complex glyph positioning or substitution requirements, such as Hebrew and Arabic. According to the information on the Microsoft Typography site, the following OT features are supported for standard scripts (Latin, Greek, and Cyrillic): standard ligatures, contextual ligatures, kerning, mark to base positioning, and mark to mark positioning. Note that OpenType kerning is not the same thing as the older pair-based kerning that many existing fonts support; it can support more characters by organizing glyphs into classes. Only recent versions of Uniscribe (a Windows component that handles glyph processing) support these features for standard scripts, and most applications do not take advantage of them; Word 2003 does. Service Pack 2 for Windows XP provides an updated Uniscribe. Applications such as InDesign that support OT features not in this list are using their own text processing engines. The next version of Windows, codenamed Longhorn and scheduled for 2006, will have OT support for many other features at the system level, including stylistic alternates. We hope, but cannot say for sure, that many more applications will take advantage of OT features once this support is available at the system level.

Customized keyboards easily installed via Control Panel

- Microsoft Keyboard Layout Creator: free utility from [Microsoft](#) with good Unicode support (including supplementary characters) but does not support multiple deadkeys for a single character
- Keyman: very powerful third party keyboard creator (not free) from [Tavultesoft](#)

Character Map XP (system utility)

Unicode support: BMP only

BabelMap (utility)

[link to BabelMap web site](#)

Unicode support: complete; good choice for those who need to access SMP characters; more sophisticated handling of Unicode than Character Map

Adobe InDesign (page layout program)

Unicode support: complete, but RTL requires Middle Eastern version
character entry: keyboard
built in via glyph palette
paste from clipboard
combining marks: unpredictable; varies with font

alternate glyphs: uses OT to support ligatures, oldstyle numerals, small caps, superscripts & subscripts, and stylistic alternates

Microsoft Publisher (page layout program)

Note: I have recently read that Publisher 2003 supports combining marks in the same way as Word 2003. I not yet tested this personally and so would appreciate feedback from anyone who has used the program.

Unicode support: complete; **confirm rtl**
character entry: keyboard
built in via alt-x toggle* and via Insert/Symbol (latter BMP only)
paste from clipboard
combining marks: supported beginning with ver. 2003 via OT features
alternate glyphs: no

Quark XPress (page layout program)

Unicode support: very limited in current versions; version 7, under development and planned to ship in 2005, will be Unicode-based but will not offer complex script (Arabic, Indic languages) support
character entry: keyboard
built in via glyph palette (in ver. 7)
paste from clipboard
combining marks: unpredictable; varies with font
alternate glyphs: not at present; it is reported that version 7 will support a large number of OT features

AbiWord (word processor)

[link to AbiWord website](#)

Unicode support: complete; good bidirectional support, following Unicode bidirectional algorithm; easy to change direction; uses own shaping engine for Arabic, which is still in development
character entry: keyboard
built in via Insert/Symbol (Basic Latin and Latin-1 only)
paste from clipboard
combining marks: unpredictable; varies with font
alternate glyphs: no, except that standard ligatures display properly under WinXP SP2; uncertain whether AbiWord uses the updated Uniscribe or another mechanism

OpenOffice.org (word processor)

[link to OpenOffice.org](#)

Unicode support: complete; requires version 1.1.4 for best RTL support, but some bugs remain when switching script direction
character entry: keyboard
built in via Insert/Special Character (BMP only)
paste from clipboard
combining marks: unpredictable; varies with font

* Type a Unicode value, in hexadecimal, and then alt-x to convert it to the appropriate character. You can also use this in reverse to identify a Unicode character in a document; put the cursor after the character in question, hit alt-x, and the Unicode value will be displayed.

alternate glyphs: no

Microsoft Word (word processor)

Unicode support: complete; ver. 2003 has improved RTL over ver. XP
character entry: keyboard
built in via alt-x toggle* and via Insert/Symbol (latter BMP only)
paste from clipboard
combining marks: supported beginning with ver. 2003 via OT features
alternate glyphs: no

BabelPad (text editor)

[link to BabelPad web site](#)

Unicode support: complete; BabelPad is a very Unicode-friendly editor, including complex Asian scripts and RTL (although the RTL does not work quite as well as LTR in the current release, the web site says). It can perform Unicode normalisation and open and save in many different formats. Includes a font analysis utility.
character entry: keyboard
built in via Unicode hex entry and customized character map
paste from clipboard
combining marks: no
alternate glyphs: no

NotePad (text editor supplied with Windows)

Unicode support: complete
character entry: keyboard
paste from clipboard
combining marks: supported beginning with service pack 2 for Windows XP
alternate glyphs: standard ligatures and kerning supported beginning with Service Pack 2 for Windows XP (contextual ligatures probably also, but not tested)

* Type a Unicode value, in hexadecimal, and then alt-x to convert it to the appropriate character. You can also use this in reverse to identify a Unicode character in a document; put the cursor after the character in question, hit alt-x, and the Unicode value will be displayed.

ESSENTIALS OF FONT TECHNOLOGY

PostScript Type 1 fonts, developed by Adobe Systems as part of its PostScript page description language, were the first widely-used scalable fonts. Widely used on Mac OS, they were not supported by Windows, so Windows users had to use special software such as Adobe Type Manager in order to take advantage of them. (Win XP has built-in support for Type 1 fonts.) Later Adobe introduced the **Compact Font Format** (CFF), an updated Type 1 format. The **dfont** format supported by OS X is also an updated version of Type 1.

TrueType fonts were developed jointly by Apple and Microsoft and were introduced with Windows 3.1. For some time a tug of war went on between Type 1 and TrueType fonts, with the former a standard in the publishing industry and the latter growing in popularity due to built-in Windows support. With OS X, Apple made it possible for Mac owners to use standard Windows TT fonts without any change. (TT fonts under OS 7–9 had to be in a Mac-specific form with both a data fork and a resource fork, even though the actual outline data was the same as for a Windows font.)

Most recently, Microsoft and Adobe have developed the **OpenType** specification. OpenType fonts may use either TrueType or CFF outlines. They may also contain information that allows applications to do many things with characters that were not possible previously, such as substitute one glyph for another in certain situations, position glyphs properly relative to one another, etc. These features are necessary to support languages such as Arabic and the many Indic languages that use complex scripts. They can also be used to provide typographic refinements (ligatures, small capitals, alternate glyphs for the beginning or end of a word) in standard scripts. OT also makes possible the use of combining diacritical marks, which were intended as an integral part of Unicode from its inception but which had never been available in practice on any platform. The various things that an OT font can do are referred to as *features*.

Sources of confusion remain, however. Users often assume that an OT font has features not found in regular TrueType fonts. This is not true, however, since Microsoft defines an OT font as a Truetype font with a digital signature (for antipiracy and security purposes). So a font with a digital signature but no special features displays with the “O” icon in Windows, while a TrueType font with many advanced features but no digital signature looks like a plain TT font. (Digital signing certificates cost \$200–400 per year; therefore specialized fonts produced by individuals or small companies often do not have signatures.) CFF-flavored OT fonts always have the “O” icon and have the extension .otf rather than .ttf.

With OS X, Apple introduced **AAT** (Apple Advanced Typography) fonts. These fonts are designed to provide most of the same typographic enhancements in standard scripts as OT fonts do, based on use an updated version of Apple’s earlier GX technology. AAT in some ways is more sophisticated in OT—for instance, it can do kashida justification in Arabic. AAT technology works well but is not easy to develop for. The tools available are not as user-friendly as those for OT and Apple does not seem terribly interested in helping software developers take advantage of AAT in their products. Many font developers have asked Apple to support OT so that they do

not have to develop separate products for the Mac, but so far no decision from Apple about this has been widely publicized. The [Wikipedia article](#) on Apple typography states in §7.2:

Apple is currently in the process of incorporating all of OpenType within the AAT spec, making AAT a superset of OpenType. This will allow for a very rich feature set, though some of the original AAT specification will be made redundant.

Assuming that this is correct, OT may well become the cross-platform standard, with some additional features available on OS X. We have received some other information that suggests Apple's OT support will not be quite as ambitious as this article implies, so it is hard to say right now what will happen. With the introduction of Panther (OS 10.3), Apple has added support for OT class-based kerning.

Two companies have adopted OT on the Mac by developing their own text handling engines: Adobe Systems, because they want cross-platform compatibility for InDesign and their other products, and Redlex, authors of Mellel, because they found it easier to support Hebrew with OT than with AAT.

It is possible for a TrueType font to contain both OT and AAT tables. This offers the potential for a truly cross-platform smart font, although no such fonts are available yet.

So we face a difficult situation at the moment. The user must know what technology a font uses, what applications support it, and what characters or features the font contains. Not all vendors make it easy to find this information. We look forward to a simpler future for end users.

FONTS AVAILABLE

Note: this list includes only fonts of interest to scholars that have advanced OT or AAT features. There are many others available that use standard TrueType or Type 1 outlines only.

TrueType fonts and TrueType-flavored OT fonts work on all three platforms. See notes above about which applications support OT features.

Adobe fonts Adobe has released many of their fonts in "Pro" versions **add link** with advanced OT typographic features, including alternate glyphs. (Not all features are present in all the Pro fonts, so check the list carefully before buying. Minion Pro includes polytonic Greek.) While these fonts do not have specialized characters for classics or medieval studies, they are useful for experimenting with OT. Under OS X, not all of the characters in the PUA of these Pro fonts are accessible; the problem seems to be a bug in the way OS X interprets the cmap (cmap is a table that tells what glyphs in the font are matched with what Unicode values).

Cardo .98 TrueType-flavored OT font with large character repertoire (Latin, Greek, Hebrew and more); supports standard ligatures, discretionary ligatures, historical forms, old style numerals, small capitals, stylistic alternates, and stylistic sets via OT features. Documents to test OT features in InDesign and Mellel are available. Download from [Scholarsfonts](#) website.

- Junicode Designed for medievalists; two versions available from [Peter Baker's web site](#):
- TrueType-flavored OT font; version 6.4 supports combining mark positioning, standard ligatures, discretionary ligatures, class-based kerning, fractions
 - CFF-flavored dfont (OS X); next version will support the same features via AAT
- OS X fonts Lucida Grande is the main system font on OS X and is useful for testing Unicode support in applications because it contains a very large glyph complement. Lucida Sans, basically the same font but with a smaller number of glyphs, comes with WinXP, so the Lucida family may be useful in creating cross-platform documents. Apple Chancery, Hoefler Text, Skia, and Zapfino have advanced AAT features (these are not of special interest to scholars, but may be useful for experimenting with AAT). An AAT version of Palatino with many advanced features was installed on my system when I purchased iWork 05 (Pages, Keynote).
- SBL Hebrew The most technically advanced font available for Biblical Hebrew; a TT-flavored OT font, designed by John Hudson of Tiro Typeworks and available at no cost to individuals from the [Society for Biblical Literature](#).
- Ezra SIL Another excellent OT Hebrew font modelled after the type in the Biblia Hebraica Stuttgartensia; it includes a keyboard and excellent documentaiton; free download from the [SIL web site](#).
- Doulos SIL Available in both Mac (AAT) and Windows (OT) versions, Doulos SIL provides complete support for Latin and Cyrillic. "Latin" includes IPA and all the various Latin characters in Unicode that are used for less common languages of Europe or non-European languages. It does not have special characters for medievalists or classicists, but does support combining marks and alternate glyphs and so may be useful for experimentation. Download from [this link](#).

GLOSSARY

AAT	Apple Advanced Typography; see above under Font Formats.
BIDI	bidirectional text, containing both left to right (LTR) and right to left (RTL) strings. The Bidirectional Algorithm is a part of the Unicode Standard that specifies how applications should behave when they contain both LTR and RTL text.
BMP	Basic Multilingual Plane. The original Unicode character allocation of about 64,000 characters, U+0000–FFFF. It is devoted mostly to characters used in living languages. Sometimes referred to as Plane 0.
CFF	Compact Font Format; see above under Font Formats.
codepoint	a hexadecimal number that indicates the position occupied by a character in the Unicode Standard
combining mark	a diacritical mark, such as a grave or macron, that is designed to be placed after a base character; the operating system or application, using information supplied in the font, must position the mark properly over the base character.
glyph	shape assumed by a particular character in a particular font
dfont	font format used on OS X; see above under Font Formats.
OT	OpenType; see above under Font Formats.
OTF	an OpenType font; see above under Font Formats.
PDF	Portable Document Format, a cross-platform document format developed by Adobe Systems.
RTL	right to left reading order, required for Hebrew, Arabic, Syriac, and a few other languages; most other scripts are read from left to right (LTR).
SMP	Supplementary Multilingual Plane. A second group of about 64,000 characters, U+10000–1FFFF. Many historical scripts are placed here.
Supplementary Planes	Groups of about 64,000 characters beyond the original Unicode allotment. So far many historical scripts have been placed in Plane 1 and rare Asian ideographs in Plane 2.
TTF	TrueType Font; see above under Font Formats.

For the most up to date information about Unicode, consult the website of [The Unicode Consortium](#). The current version of Unicode is 4.1, released in March 2005.