

## Bible Study Software, 2004 Van Parunak

A year ago, a detailed review of Bible study software for Microsoft Windows [2] highlighted five areas of functionality: the biblical texts that the packages supported, the search facilities that they provided, collateral study resources, support for the user to generate study material, and help mechanisms. Two of the major packages reviewed were the Logos Scholar's Library (Lib) and BibleWorks (BWk). A major conclusion of that study was that BWk was clearly superior as a search tool for working with the biblical texts themselves, while Lib's focus was on providing an open-ended library of collateral works.

Since that review, both packages have undergone major extensions and revisions. Each is seeking to expand in the direction of the other. Lib has significantly improved its search capabilities, while BWk has greatly expanded the collateral resources that it supports, and both have added new functions that neither had before. This review (summarized in a shorter review published in *JETS*) reviews these two packages under the categories used in the original review. The packages reviewed are the Libronix Digital Library System 2.1a with the Scholar's Library Upgrade, and BibleWorks 6.0.011a.

### 1 Texts

The original motivation for development of Bible study software was in providing a faster, more flexible way to search the biblical text in support of grammatical and lexical analysis. The Bible is a fairly limited corpus, and responsible linguistic analysis has always taken into account other documents in dialects similar to those used in the Bible. Both packages have extended the range of documents in the original languages of the Bible that users can search. Some of these documents include morphological analysis, while others offer just the straight text. This extension of the basic linguistic resources of both packages greatly extends their usefulness. (It is distracting that BWk classifies both the Targum and the Peshitta as Hebrew rather than Aramaic in its menus for selecting texts for display and search.)

Table 1 summarizes the additional texts included in the two packages under review. Those marked with an asterisk require payment of a separate license fee.

**Table 1: Additional Texts**

	BWk	Lib
<b>With Morphology</b>	Qumran Sectarian mss* Josephus Targum	Qumran Sectarian mss*
<b>Without Morphology</b>	Peshitta Tischendorf Apostolic Fathers (Greek, Latin)	Peshitta Tischendorf Old Syrian gospels (Curionianus; Sinaiticus)

An important contrast between the two systems is that BWk is a closed package, while Lib is an open platform with a wide and growing range of separately available materials. Some recent additions to the Lib system in the category of basic texts include the Stuttgart Electronic Study Bible (which includes new editions of BHS and NA27 and a comprehensive new system of

phrase-level annotation), the parallel aligned Hebrew/Greek OT (with word-level concordance of the MT and LXX), and a study edition of the non-biblical Dead Sea Scrolls, and promises forthcoming editions of the Targumim and Tischendorf.

## **2 Search**

Half of the original review focused on the packages' search capabilities including what could be searched for, the interface, how results were presented, and the speed of search. BWk's original search capabilities were excellent, and there are no major functional extensions in the new release, although the interface has been made even easier to use. Lib has devoted considerable effort to extending its capabilities in this area.

### **2.1 What can I search for?**

Lib version 1.1 had some serious gaps in its search language, compared with BWk. For instance, there was no way to retrieve Hebrew forms whose morphology marked them as jussive. The search language has been extended to cover the full range of the morphological coding in the Westminster BHS, although there is still no way to search for words with particular accents, as one can in BWk. Also, there is still no way to search for constructions that span chapter boundaries. Given the arbitrariness of verse and chapter divisions, this is a serious limitation. For example, a strong argument can be made that from a literary perspective, John 2:1-11 really belongs with 1:19-51, while 2:23-25 belongs with 3:1-22, and searches to support paragraph-level analysis might very well need to span the chapter divisions.

Both tools now have mechanisms for comparing different versions of the Bible. BWk shows the results of comparison in the Results Window, the main window that displays the body of text, by coloring individual words. Lib offers a comparable functionality in its Compare Parallel Bible Versions tool, though the comparison is shown in a separate window rather than overlaid on the main display of the text. In addition, Lib offers three other tools for comparing versions: one to compare the extent of the pericopes into which some versions divide the text, one to cluster versions in a two-dimensional space based on vocabulary similarities within a specified region of text, and one to generate a "version difference river," a chart consisting of a horizontal band for each version. The width of each band at each horizontal location is proportional to the difference between the version and the base version selected for comparison at the verse corresponding to that location. As a result, the overall display is narrow where the versions being displayed tend to conform to the base version, and becomes much wider where they differ. An important difference between the two packages is that BWk's analysis of different versions, once activated, is applied to any passage displayed in the Results Window, while Lib's tools require the user to specify a particular section of text and then generate the result for that section.

### **2.2 Interface**

A major advance in Lib is the provision of a graphical search interface that permits users to represent the relations among text items with boxes and arrows, rather than as a string of text operators, in a manner similar to BWk's Advanced Search Engine. The graphical idioms in the two packages are different, but have roughly the same expressiveness.

One important difference is the documents over which a search may be applied. A graphical search in Lib can be applied only to one document at a time. A graphical search (like a standard

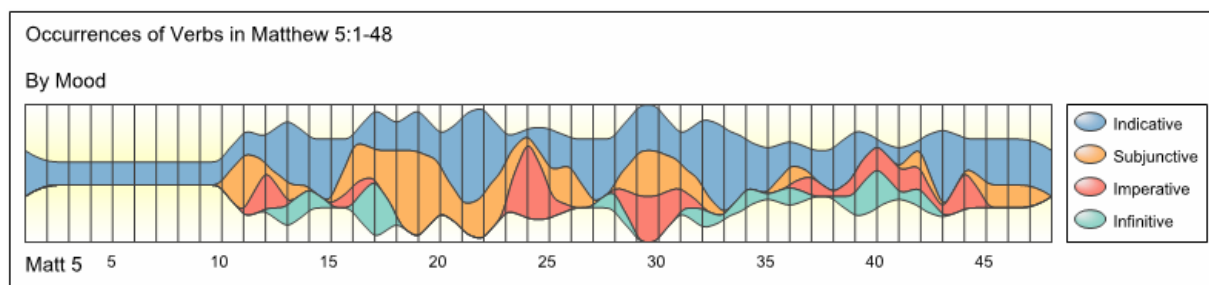
Lib search, and unlike BWk searches) can go through a collection of documents of the same language, but all elements of each construction must be found in the same document for a hit to register. BWk's Advanced Search Engine can construct a query whose elements come from different documents. Thus one can easily construct a query asking for all verses that contain "י" in the Targumim but do not contain יהיה in the MT, something that is impossible in Lib's graphical query language. To accomplish such a search in Lib, the user would generate separate verse lists for each language, then merge and sort them.

The morphological codes supported by both packages are complicated, and users understandably need help in constructing a specification. Lib presents all available codes in a menu with check boxes. BWk requires users to enter the codes in a search field, but has added a pop-up window that shows at any point in the construction exactly what options are eligible for the next position. Users who prefer the mouse to the keyboard can select search codes directly from this pop-up window, clicking their way through a specification.

## 2.3 Results

People are much better at interpreting pictures than lists of numbers, and an important potential benefit of using computers for Bible study is their ability to visualize information. Logos has introduced a new visualization mechanism, the "river," which shows how a particular set of features varies throughout a passage.

For example, Figure 1 shows a "verb river," which compares the prevalence of different verbal moods throughout Matthew 5. The monopoly of the indicative mood in the first ten verses, and the concentration of imperatives in verses 10-33 and again in 44-48, are important clues to the structure of the chapter. (Note, though, that the verse markers are only approximate; the imperatives actually begin in verse 12, not verse 11 as shown on the plot.)



**Figure 1: Libronix Verb River in Matthew 5**

There is no reason to restrict this sort of display to verbal attributes, and it would be very useful if Logos would make available such displays for other grammatical features as well. For example, one might want to track the prevalence of different parts of speech, or even different function words. In the Hebrew OT, the absence of particles such as את, ה, and אשר is a mark of poetry, and one might want to plot the presence or absence of these morphemes to discern shifts into and out of poetic registers in the prophets.

Logos does make the river display available in another context, to compare different versions of the Bible on the basis of differences in word usage between them. Another tool, the Bible clusters tool, also displays differences in word usage across versions, this time by grouping them spatially. It is not clear what value these displays offer in serious Bible study. The fact that two

versions differ or agree in the words they use in a given passage tells very little about the meaning of the passage. It might be of interest in studying historical dependencies among the versions themselves, but these dependencies are usually known explicitly and discussed in translators' forwards. It would be unfortunate if these displays were to encourage people to think that agreement among a number of versions is an indication that they are correct, and that versions that disagree with the consensus are wrong. Such agreements say much more about the sociology of Bible translators than they do about the correct understanding of the text.

Both packages can plot the numbers of hits from a search as a function of location in the text, and export these results for analysis by other programs. Logos exports directly to Excel, but records no information about the meaning of the numbers (for example, whether they are raw counts of hits, hits as a percentage of total words, or some other measure). BWk exports a text file in comma-delimited format that can be easily loaded into Excel or other programs, and that includes an explanation of what the numbers mean. Unfortunately, neither package provides a way to plot or export hit locations in terms of specific word locations in the text, a measure that is much more meaningful linguistically than chapter or verse addresses, and that would support the analysis recommended in [1].

## 2.4 Timing

BWk continues to offer very rapid searches, while Lib continues to be quite slow, requiring over two minutes on some searches (even when it is only searching a single resource). My personal style of query building is to begin with a simple query that returns far more than I need, then refine it. This approach requires fast query processing, especially on the initial queries that return a large amount of information. The slowness of Lib makes it awkward for this style of interaction.

## 3 Collateral Resources

Lib, traditionally the leader in digital library functionality, has improved its searching capability to provide more support for textual scholars. Similarly, BWk, with outstanding search capabilities, has added more collateral resources that biblical scholars might want to consult in support of their primary task of studying the biblical text. The previous release of BWk included numerous Greek and Hebrew lexicons, Bible dictionaries, the Westminster standards, the Treasury of Scripture Knowledge, Nave's topical Bible, and Robertson's *Word Pictures in the New Testament*. The new release adds Hebrew grammars (Futato's *Basic Hebrew Tutorial and Beginning Hebrew\**, Waltke and O'Connor's *Introduction to Hebrew Syntax\**, and Gesenius' *Hebrew Grammar* (the Oxford edition recalled fondly by seminarians as "GKC")), Greek grammars (Wallace, *Greek Grammar Beyond the Basics\**, Burton, *Moods and Tenses of New Testament Greek*), a useful table of paradigms for both Hebrew and Greek (but not Aramaic), the apparatus to Tischendorf's New Testament, Matthew Henry's commentary, and a set of sixteen Bible maps from the NET Bible (twelve of which are based on stunning satellite photographs of the Levant). Volumes marked with an asterisk must be purchased separately. The number and range of resources offered in BWk are extremely restricted compared with the thousands of works available through Lib as separate purchases. These include all of the references in BWk and many more, though many of Lib's works are more in the category of general Christian literature than Bible study tools.

BWk's resources are presented through a variety of interfaces, while Lib enforces a single interface across all of its material. BWk's strategy has theoretical advantages, but in practice imposes severe disadvantages.

The primary advantage of distinct interface types is that the interface for each type of document can reflect the internal structure and intended use of that document. For example, BWk's presentation of the Louw-Nida lexicon offers far more information at a glance than does Lib's. Another example is the asymmetry in BWk between the biblical text as the object of study and the role of reference works as supporting that study. The exegete does different things with the biblical text (e.g., elaborate grammatical searches) than with reference works (e.g., jumping back and forth between articles), and distinct interfaces, if thoughtfully implemented, can optimize these operations.

The main disadvantage of distinct interfaces is confusion for the user, particularly when interfaces proliferate as they do in BWk. Lexical resources and Bible dictionaries open in the lexicon window familiar from earlier editions of BWk, and the other resources previously released have their own custom dialog windows. The new grammars and Tischendorf are implemented as Windows help files, which provide some level of internal searching but are inconsistent with other window styles. The Bible maps are JPEG files and open in a web browser. Each of these interfaces supports different modes of interaction, leading to user confusion.

The inconsistency among BWk resources extends to the preparation of the texts. One benefit of an electronic text is the ability to link dynamically to biblical references that it references, to other sections of the same resource (for example, a reference from a word in one article in a lexicon to another article discussing that word), and to other references (for example, a citation of Gesenius' grammar from a lexicon). Lib supports all three kinds of references uniformly, with a consistent interface. BWk does not offer any inter-reference links, and supports biblical links and internal links only sporadically in some works. Even when biblical links are active, they do not give a preview of the verse when the mouse hovers over them, as they do in Lib. These missing links and inconsistencies make the use of collateral resources much more difficult in BWk than in Lib.

The exegete's main interest in supplementary resources is in accessing them to illuminate a particular text. The organization of commentaries and lexica makes it fairly easy to find the articles relevant to a particular text, but grammars and bible dictionaries have long been a challenge. Those trained with traditional paper resources can recall hours spent poring through scripture indices to find sections relevant to a particular text. Both Lib and BWk greatly simplify this task, but in different ways.

BWk offers a menu selection for "lexical and grammatical help" that quickly (in less than a second) provides a list of hot links to places in lexica, grammars, and other references where the current verse is discussed. Curiously, this facility does not cover bible dictionaries or Robertson's Word Pictures, though it does include Matthew Henry.

Lib has always offered similar functionality through its search facility. A right click selection on any verse enables the user to search for any references to that verse in the entire digital library (not just in a limited set of resources, as in BWk). This search can take a while: my laptop requires a minute and fifteen seconds to find 608 references to Isa 13:1. These include not only references to that particular verse, but also to Isa 13 or even to the entire book of Isaiah.

Returning references to Isa 13 when one is studying a single verse in Isa 13 is of mixed value. A discussion of the chapter as a whole might provide relevant context. More often, these references prove irrelevant to a detailed exegetical study of a particular verse, and it would be preferable if there were an easy way to retrieve references to different structural levels of the text. Lib's generic search capability is extensively configurable, and the user can always generate a search that is limited to a set of resources or a specific reference (rather than intersecting or containing passages), but there is no easy way to customize the right-click search facility.

## 4 User-Originated Material

For centuries, students of the Bible have marked up the text itself to stimulate their thoughts and record their insights. Previous editions of both packages have permitted users to attach notes to a given verse, in an electronic analog of "writing in the margin." Now both packages include new tools to support this activity.

Both packages have added a facility to enable users to generate sentence diagrams of selected passages and export them to other Windows documents. BWk offers a larger set of graphical widgets (67) than Lib (22), but assumes that the user understands the value of sentence diagramming and how to do it. Lib includes an excellent text on diagrammatical analysis (Lee Kantenwein's *Diagrammatical Analysis*) that will enable the independent student to develop skill in using this important analytical tool.

In an analog to the use of underlining or a highlighter pen, BWk can attach multiple layers of color or text attributes (bold, italic, underline, strike-through) to a text. These notations can be generated either manually, or as the result of a search. Unlike the highlighting that both packages use to show the results of a current search, these notations are stored in separate files and persist even after a search is closed.

## 5 Getting Help

I have had several occasions when I have needed help with each of these packages. BWk provides prompt feedback by email, which I personally prefer to telephone support. An email query to Lib leads to an invitation to call their 800 help number for verbal assistance (in my experience, usually after an extensive hold).

In general, BWk is a much more robust software package than is Lib. After installing the graphical query editor in Lib, the Hebrew morphological search window began garbling morphological specifiers for searches. Two hour-long consultations with technical support people did not yield a solution, and repeated follow-up emails for help went unanswered for four months. Given the speed differences between the packages, I do my searching in BWk, and so do not miss Lib's morphological search capability, but if it were my only package I would be deprived of an important tool with no recourse. (Lib has since identified and corrected this problem.)

In my original review, I criticized the limitations of Lib's help system. Lib has greatly improved its help facility, providing indexing and search capabilities analogous to the standard Windows help system. It still provides help in a Libronix dialog window, not through the standard Windows help mechanism. Dialog boxes, unlike the Windows help browser, take over control of the main program, which cannot be manipulated until they are closed. In a program that uses the

standard help browser (like BWk), the user can find a relevant section in the help manual, then <Alt-tab> back and forth to the program to carry out what the help recommends, or even (with a sufficiently large screen or a two-monitor system) have the help open side by side with the main program. In Lib, the user must read the help, then close it in order to manipulate the program, a clumsy and sometimes frustrating arrangement.

## 6 Summary

The latest revisions have made two powerful software packages even more useful. The changes are clearly in the direction of moving each package toward the other's main strengths. Lib, the leader in general-purpose digital library functionality, has strengthened its tools for searching the biblical text, in support of detailed exegetical study, while BWk, the leader in exegetical searching, has integrated a number of collateral resources most likely to be of interest to the exegete. Still, each tool remains dominant in its original area. BWk's search capability is still more comprehensive than Lib's, and its greater speed is much better suited to a user whose primary interest is in frequent, flexible exploration of patterns in the biblical text. The wide range of collateral resources available in Lib, the consistency and completeness of the interface available to them, and the flexibility of the links among them, are far beyond what BWk has attempted. For the reader who relies heavily on what other books say about the Bible, Lib remains the platform of choice. For the student primarily concerned with linguistic study of the text itself, BWk is unsurpassed.

## 7 References

- [1] H. V. D. Parunak. Prolegomena to Pictorial Concordances. *Computers and the Humanities*, 15:15-36, 1981.
- [2] H. V. D. Parunak. Windows Software for Bible Study. *Journal of the Evangelical Theological Society*, 46(3 (September)):485-495, 2003.