

deemed unsatisfactory on a number of counts, not the least of which being that it failed to speak of the moral properties of holiness. Although we are constantly on the lookout for a more suitable term, here again we have employed *jukurrarnu* as in *Kaatu-kurlangu Pirlirra Jukurrarnu*, literally "God-possessive Spirit Eternal", "God's Eternal Spirit". Given the Warlpiri's extreme respect for things of antiquity and history, which also have relevance for the present, this is not a bad starting point.

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USING COMPUTERS IN A TRANSLATION PROJECT

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To produce a first draft translation of the Bible requires a lot of careful work. However, every translator knows that the first draft is only the beginning. Once it is completed there are countless corrections to be made, in part based on comments received from others. These comments need to be evaluated and then entered onto the manuscript. A typist may be hired to prepare the various revised drafts as they are produced. And in the end, a clean copy is prepared for the printer. Every time a new draft is prepared, someone needs to proofread the typescript to make sure that there are no errors. There is certainly a lot of careful work that needs to be done after the first draft has been translated.

There are modern machines available to help a translation team with some of this exacting and time-consuming manuscript work. A computer has the capability of making the work of revision much easier, and in some cases more thorough, than has been possible in the past. This article attempts to explain how a computer can be useful to a translation project.

A computer has a keyboard like a typewriter, which allows a person to type material into it. The text is not typed immediately onto paper, but appears in typed characters on a monitor which is like a TV screen. This text is then stored on a cassette tape or disk, and can be recalled for further work at any time.

There is a tremendous advantage in having the first draft of a translation on a tape or disk. A computer has the capability of taking the stored text and allowing a typist to make changes without having to type the entire text again. This means that once a typist has finished keying in the first draft of a translation, the entire text will never have to be typed again. This also means that fewer proofreadings will be needed.

In some cases in the past, translation teams have had to retype all of their work (sometimes an entire Testament), as many as four or five times before it is ready for publication. With a computer, this is no longer necessary. Once the first draft has been completed, someone can type that text into a computer, and any changes after that can be made in the text stored on the disk. And at any time in this process, a copy can be made on paper with the printer that is attached to the computer by a cable.

A computer is used most efficiently in translation work when material is keyed in right from the very beginning of a project. However, there are many teams working today that are fairly far advanced in their work, and have not been able to use a computer up until now. It is worthwhile to begin using a computer for translation work at any stage of the work. The Computer Task Force of the United Bible Societies is urging that all UBS-related translation projects begin to use computer-assisted methods immediately, if at all possible.

Some projects that have used computers

A description of some of the projects that have used computer-assisted methods might be helpful at this point.

The *Kituba language project* of Zaire was not able to use computer-assisted methods for the New Testament. It was completed in 1973. Work then continued on the Old Testament and is almost finished at the time of writing this article. However, even at this late stage, all of the revised drafts of the books of the Old Testament were sent to be keyed into the computer. Printouts were made available and sent back to the translators for proofreading and further revisions and corrections. These changes were sent back to the computer operator, and the text was modified following the indications from the team.

The New Testament that has been in use for 10 years also requires revision to bring it to the same quality level as the Old Testament. So the entire text of the New Testament was also keyed into the computer. The translation team had sent a list of changes that needed to be made to the New Testament text, including new spellings and a list of more modern terms to replace old expressions. Over 100 changes of this nature were required; and each one of the changes had many occurrences in the text. The computer went through the entire text of the New Testament and made the hundreds of changes automatically so that the computer printer was able to provide a text with the requested changes. The team then took the printout to do further revision work on it. Any additional changes will also be done with the help of the computer.

The next two examples illustrate how a computer can be of great help in especially difficult situations. In the case of the *Bolivian Quechua Bible* project, the entire translation was coming to completion at a time when a major change in spelling was required by government agencies and other organizations. The team was facing the very tiring job of either marking up the entire manuscript to indicate all of those changes, or having to retype the entire manuscript for the printer. By using a computer, they were able to avoid all that tedious work.

After keying in the text in the old spelling system, a program was run on a computer to make the spelling changes automatically. This means that the translation manuscript was sent in for composition in the old spelling, but was returned for proofreading to the translation team in the new spelling. They were, of course, delighted to be able to avoid all that work. When

they received the printout, they found that the computer had done an excellent job of making hundreds of automatic spelling changes.

Many Indian and Eskimo languages of Canada use a syllabic writing system that is quite different from the Roman characters used in English and many other languages. As the work on the New Testament for the Indian language called *Ojibwa* came to an end, the team was facing the task of retyping the entire manuscript for the printer on typewriters with syllabic letters. But some Ojibwa areas cannot read syllabic characters; they require Scriptures with Roman script, and that means preparing the manuscript of the entire New Testament in two spelling systems.

Such tiring work is now being avoided through the use of a computer. Equipment purchased by the Canadian Bible Society is making it possible to take care of these problems with computer-assisted methods. The project coordinator and the Ojibwa translator work together with the text in Roman script on the monitor screen, changing, rearranging and correcting the text as needed. And at the end of a day's work they are able to print out a copy of their translation in Roman script as well as in syllabic characters. They use a computer program which makes it possible to print out a text in syllabic characters automatically from the text in Roman characters in their computer.

Many more examples could be given of the usefulness of computer-assisted work in translation. Computers available today are portable enough to be used in any part of the world. This means that efficient methods of preparing and processing translation manuscripts by computer are available to almost any project. It is certainly worth the investment of effort and funds to put today's new machines to work in the preparation of Scriptures for the world.

Ways a computer helps in manuscript preparation

Following is a summary of some of the ways a computer can assist in manuscript preparation.

1. The number of *typings and proofreadings are reduced*. A translation manuscript normally goes through a number of typings before a clean copy is ready for the printer. When manuscripts are prepared with the help of a computer it is possible to reduce the work to only one typing. The translation can normally be keyed into a computer after the first draft has been produced. Once this early draft has been put into a computer, it is possible to change and revise the text almost without limit. Words can be changed, entire verses that have been omitted can be inserted at any point without having to retype the entire page, chapter, or book. Proofreading is still indispensable, but the number of readings can be reduced.
2. It is easier to *make manuscript changes and corrections* when a computer is used. Computers have a search feature that makes it possible to make hundreds of changes in a text on the basis of a few commands. This is particularly helpful when, even at a late stage of a project, it is decided

that a particular word needs to be spelled differently or when an error has been repeated throughout the text.

3. *Composition and typesetting* are linked to the process. Once the translation has been revised and checked to the satisfaction of the translation team, the manuscript stored on the magnetic disk is available for immediate typesetting without having to undergo a new typing by the compositor. This eliminates at least one entire proofreading at this stage.
4. An additional long range value of using computers for text processing is the possibility of *revising and changing a translation* even years after the first edition has been printed. It is not necessary to retype the entire manuscript even if a major revision of the text is necessary. The entire manuscript is stored on tapes or disks that can be used for preparing reprints and revisions as required at any time.

Standard format markers

In order to help the typesetting phase of the work, certain standard format codes can be inserted into the manuscript.

For every edition of Scriptures, the Bible Society needs to indicate to the typesetter what the specifications of the edition are to be. For example, answers are needed to the following questions: What typesize should be used? Should the chapter numbers appear as large, bold numbers at the left-hand margin? Should the section headings be printed in boldface at the left-hand margin or perhaps in italics in the middle of the column? By putting standard format markers in the manuscript when the very first draft is being keyed into a computer, the manuscript is already being prepared for the typesetter. These markers make the typesetting very flexible, since the typesetter can define them in various ways. For example, the verse markers can be interpreted to cause the numbers to be printed in boldface embedded in the text, or as small raised numbers.

Typists of Bible translation projects should attend a short instruction session to learn how to do this properly. Instruction sheets about format markers are available from the Regional Translations Offices and Translation Consultants.

Manuscript checking and copy-editing

Format markers also make it possible to do computer-assisted manuscript examination.

A computer can be of assistance in checking various aspects of a translation. A printout can be provided with lists of selected passages to help check the contextual consistency of key words or the treatment of parallel passages. In order to find out how the word "spirit" has been translated in various passages, for example, it is possible to command a computer to print all the passages in which that word occurs (on the basis of the Greek form). A printout of all the pertinent verses one under the other on a page makes it much easier to check the difference in meaning from one context to another than other checking methods.

Parallel passages from the Gospels can also be printed out one under the other; this helps to make it a fairly routine procedure to check the differences and similarities between the passages following the base form. The result of such work is a much more thorough check of some aspects of the translation than can be done manually.

A computer can assist in making copy-editing work more efficient and thorough as well. A referenced wordlist can be made of entire books, and of the entire Bible. This computer procedure lists every word that occurs in the manuscript in alphabetical order (including, of course, those that are spelled incorrectly!). For every word, at least five references are usually given to indicate where they occur in the text. In this way misspelled words are spotted and can be corrected quickly. This is a tremendous help to the proofreading stage of the work.

Another computer program checks all the chapter and verse omissions in the text. All chapters and verses that do not occur in the text are indicated in a computer printout.

Of course, there are many things that a computer will not be able to check, and manual proofreading in the traditional way is still necessary. But the assistance of a computer can eliminate some of the proofreadings and take away some tedious aspects of checking work, and should help to make it much more thorough.

Can computers help with the translation itself?

Some people wonder whether computers can also help in the translation process itself. It is true that computers are being used to make some machine translations, but the source documents are usually of a scientific or technical nature. For texts in which the full resources of literary style and language are needed (such as is necessary in Bible translation), computer programs are still much too limited to make good translations. The best that can be done in some cases is to have a computer simply assist in the translation process; a computer operator must be present at all times to constantly check what the computer is doing and to make his contribution to the ongoing translation process.

In Bible Society work, we are not using computers for this purpose. Using a computer to transfer the meaning of the Biblical text from one language to the other would not be more efficient than doing a translation in the traditional way (at least at the present time).

However, as stated above, during the stages of revision, checking, manuscript preparation and proofreading, computer assistance can be an enormous help. Since a computer makes it easy to edit and change a text, it is a powerful tool for manuscript processing and translation checking. Not only can some of the tiring and repetitive aspects of the work be eliminated, but the work can also be done more thoroughly and accurately.

All UBS translation personnel are now becoming familiar with computer-assisted translation processing. And we recommend that translation teams throughout the world investigate the possibility of using computers in their work.