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# MEPS IN THE MULTILINGUAL PUBLISHING AND TRANSLATION

The paper is dedicated to the structural and functional peculiarities of the multilingual computerized fully automated prepress system called MEPS (at first “Multilanguage Electronic Phototypesetting System”, now “Multilanguage Electronic Publishing System”).

The uniqueness of this system is in its ability to handle over 600 languages. By typing a simple command, the keyboard can be electronically altered so that text can be entered in any desired language for which it has been programmed. MEPS does not translate from one language to another, the translated text has to be entered into this system. Bible Translation System as a part of a special computer program called Watchtower Translation System had been developed later to help translators to organize their work and easily access reference material. Before translation begin, publications are carefully planned, researched and written. All texts have been checked for factual accuracy and correct, up-to-date language usage. The main goal of translators is for the reader to feel as if the material were originally written in his native language. After final approval, the translated text is sent to various facilities for printing.

This research provides the history of development and functional description of MEPS, which has been invaluable in supporting simultaneous multilingual publication of Bible based literature.

***Key words:*** *computer, software, processing, typesetting, offset printing, language, character, camera, phototypesetter, translation*

Статтю присвячено опису багатомовної електронної видавничої системи MEPS – системи офсетного друку, розрахованої для різних мов та кодувань і яка уможливлює одночасний випуск біблійної літератури багатьма мовами. Розглядається історія створення спеціального програмного забезпечення та процес перекладу.

***Ключові слова:*** *комп’ютер, програмне забезпечення, фототрафарет, цифрове кодування, шрифт, офсетний друк, мова, переклад*

Статья посвящена описанию многоязычной электронной издательской системы MEPS – системы офсетной печати, предназначенной для различных языков и кодировок и позволяющей одновременно издавать на многих языках основанную на Библии

литературу. Повествуется об истории создания специального программного обеспечения и процессе перевода.

***Ключевые слова:*** *компьютер, программное обеспечение, фототрафарет, цифровое кодирование, шрифт, офсетная печать, язык, перевод*

The international organization of Jehovah's Witnesses is known for the printed Bible based literature in most countries of the world (e.g. magazines "Awake!" and "Watchtower"). Watch Tower Bible and Tract Society (*WTS*) develops and expands worldwide the production of Bibles, magazines, books and booklets. The reasons a special system for publishing this literature had to be developed, were: 1) to replace the prepress operations that became obsolete when hot-metal typesetting, along with letterpress printing, was abandoned; 2) to meet multilanguage needs in publishing, because existing phototypesetting equipment in the industry fell far short of doing this. This paper will closer describe the development of such system and translation process.

*Three Generations of Photosetters.* As printers became more and more aware of phototypesetting, manufacturers intensified their interest in producing a machine that could set a type image efficiently, speedily and with knife-edge quality. Foremost among these manufacturers were the regular makers of type-metal casting machines. A number of successful photosetters were produced that closely resembled their "hot metal" counterparts. For this reason they are referred to as first-generation photosetters. Instead of molds and molten metal, the machines were equipped with film and image-bearing templates or matrices, as they are referred to. Though capable of setting type of good quality, these machines achieved no real advantage in speed. In most instances, they are operated directly from a keyboard and are limited to the speed of the operator [6, p. 7].

A distinguishing feature of the next generation of hotosetters was the swing farther away from mechanical principles and the centering of emphasis on electro-optical

technology. Also, because of the high setting speed, which may vary from 20 to 40 characters per second, a number of independent keyboards were required to generate enough text input to drive the machines efficiently.

Though varying considerably in approach, in the main these photosetters operated by projecting a filmed image of each character individually through lenses, after which it was flashed into position on a film, or on bromide paper.

Whatever the design, the heart of the mechanism lay in the matrix or image carrier. One system, for example, had eight complete typefaces located along the rim of a glass disk. As the disk revolved at high speed the light source flashed the image of the individual characters along a system of mirrors to a revolving turret containing lenses, where they were enlarged to the typographer's preference. The same character could be reproduced in any of 16 sizes [6, p. 8].

Other designers located the light source within a revolving drum, the typefaces being located on the drum's surface. As the drum spun, light was flashed through the characters on the drum's walls and into the lenses. One ultrafast system was designed much like the honeycomb of a beehive. Each character, located within a grid, had an independent light source. Physical movement was kept to an absolute minimum. An advantage of optical systems was that the photo images of the letters were not subject to wear and tear as were the matrices of metal casting machines. Another advancement had been realized with the introduction of more flexible minicomputers. Instead of utilizing a computer system that was rigidly made to perform a present function, the computer's capacity could then be used in a variety of applications by simply running a small program tape through the memory.

In this way, a computer with a small capacity could be used to its maximum advantage. In addition, the number of key strokes could be reduced by storing, in the computer's memory, the routine instructions and even repetitious words, phrases and portions of the text of the material to be printed.

On a much larger scale, a third generation of machines was developed. They were classified in this group because of the absence of almost all mechanical principles. Unlike second-generation setters that carried the image of the letters in a grid, or a rotating drum or disk, the characters were then recorded in digital form in a computer's memory. This would allow access to thousands of characters at any one time, and at astounding speeds. When recalled, this information was amplified and converted to a visual type-image on a cathode-ray tube or screen, where it was photographed. Not dependent on visual origin, by electronic manipulation the type could be enlarged, expanded or condensed [6, p. 8].

Thus, by the late 1970's the traditional methods of processing and printing text were being phased out in favor of computer processing, phototypesetting, and offset printing. At that time the WTS was already producing literature in about 160 languages. However, the problem here was that available electronic equipment could process simultaneously only a limited number of languages. So, in 1979 experts in the field were called in to design, to build and to develop a system MEPS for getting written Bible literature published quickly in many languages. MEPS was the acronym for "Multilanguage Electronic Phototypesetting System" (now "Multilanguage Electronic Publishing System") [3, pp. 114, 596].

*Development of MEPS.* Available computer hardware was used, and programs were prepared to help fill the administrative and multilanguage publishing needs. To maintain high standards and have the needed flexibility, it was necessary to develop specialized programs for typesetting and photocomposition. There were no programs available for entering and phototypesetting many of the 167 languages in which the WTS was then printing, so Jehovah's Witnesses had to develop their own.

The project was completed in 1986. By May of that year not only had the team working on this project designed and built MEPS computers, phototypesetters, and graphics terminals but, more important, they had also developed the software required for processing material for publication in hundreds of languages. As of 1992 the

software was available for processing material in over 200 languages. The system has been programmed for the entry of over 600 languages in 2014 [7, p. 147].

The heart of the system is the MEPS computer, housed within a compact, handsome frame. Inside, hundreds of tiny silicon chips, with intricate electronic circuitry, provide the computer with the capacity to handle all the activity of work stations, which are composed of a familiar but enlarged typewriter keyboard and a graphics display screen. The keyboard has its own microcomputer to control the keys and to represent commands, characters or combination commands [5, p. 24-27].

The work station was designed to perform two basic functions. The first function, or operation, is to enter written text. In other words, the terminal serves basically as a typewriter, only the entered text appears on the screen rather than on a piece of paper. If a printout of a document is needed, a nearby printer (similar to a high-speed typewriter) can be activated to type out on regular sheets of paper everything that has been entered. Such material can then be editorially read or proofread.

The uniqueness of MEPS is in its ability to handle many different languages. By typing a simple command, this same keyboard can be electronically altered so that text can be entered in any desired language for which it has been programmed. There is essentially no limit to the number of languages that MEPS can be programmed to produce.

After the written text in any language has been entered, by a few simple keystrokes the function of the work station can be altered so that a page of the publication can be composed right at the same work station. Any selected type face, or font, in the desired size can be assigned to any portion of the written text. Also, boxes can be drawn to identify the exact areas where text, titles, pictures, charts and captions will appear. Then, when ready, the written text is “poured” into the text boxes and around areas reserved for illustrations.

After a publication has been composed on the display terminal, it is transferred from there in such a form that the printing plates for the offset presses can be

produced. This is accomplished by the MEPS phototypesetter. It is housed in a cabinet that matches the rest of the MEPS hardware. The phototypesetter produces an image on photographic paper by using a tiny beam of light as a very small paint brush. After the photographic paper is processed, it is photographed to produce film that, in turn, is used to make offset printing plates.

To print in any given language, its alphabet must have various type-faces, or fonts, such as bold or italic. An artist first draws a letter, or character. Then that character is viewed by a camera that converts the letter into a configuration of tiny dots shown on a screen. The pattern of these dots is registered and then transmitted electronically to the MEPS computer. Afterward the character is edited on the MEPS screen by adding or detracting dots and the ready-to-use character is stored in the computer for use as needed.

While MEPS can process many different languages, it does not translate from one language to another. People are used to do the actual translating. Machines are unable to replace humans as truly effective translators. The MEPS graphics terminal has been designed to display a great variety of languages. The keys on the keyboard have been made so they can be redefined, that is, they can electronically be altered to care for any language for which the computer has been instructed, or programmed.

While MEPS can handle all these languages, a person who knows the language has to do the translating, and the translated text has to be entered into MEPS [5, p. 24-27]. All the work (including preparing, translating and printing of the material) has been done by volunteers in the USA, England, Germany, Japan, South Africa and a lot of other countries worldwide.

Coordinated with this software development was a large font-digitizing operation. This required intensive study of the distinctive characteristics of each language.

Artwork had to be done for each character in a language (for example, each letter in capitals and lower case, as well as diacritical marks and punctuation – all in a variety of size ranges), with separate drawings for each typeface (such as, lightface,

italic, bold, and extra bold), possibly in a number of distinctive fonts, or type styles. Each roman font needed 202 characters. Therefore, the 369 roman fonts have required a total of 74,538 characters.

Preparation of Chinese fonts called for the drawing of 8,364 characters for each, with more characters to be added later. After the artwork was done, software was designed that would make it possible to print the characters in clean, sharp form. The software had to be able to handle not only the Roman alphabet but also Bengali, Cambodian, Cyrillic, Greek, Hindi, and Korean as well as Arabic and Hebrew (both of which read from right to left) and Japanese and Chinese (which do not use alphabets) [4, p. 21-27].

To keep pace with the needs of its publishing work, the WTS decided to make use of modern computers, along with its own software. The MEPS Programming department developed a computer program called the Bible Translation System which became part of a program called Watchtower Translation System. This program does not translate the text, but it helps translators to organize their work and easily access reference material [2, p. 85]. This greatly speeded up the production process. It also made it possible to provide the benefits of the publishing programs to more of the WTS's branches throughout the world.

*Translation Process*. Before translation can begin, publications of Jehovah's Witnesses are carefully planned, researched, and written. During this process, the Writing Department at their world headquarters in New York thoroughly checks all text for factual accuracy and correct, up-to-date language usage. The Writing Department then sends the text to hundreds of translation teams worldwide – most of whom live and work where the language into which they translate material is spoken.

The majority of translators translate into their mother tongue. They must thoroughly comprehend the original material as well as the target language. The main goal is for the reader to feel as if the material were originally written in his mother

tongue. It should not read as a translation. To that end, they try to use language that is natural [1, p. 4-5].

Preparing to begin translation, the team meets to discuss the original text. Each team member analyzes the original text carefully to get the feel of the material and to discern its basic structure and the target audience. The translators explore solutions to tough translation problems, considering not just words but groups of words, weighing their real meaning and intent, constantly reminding themselves of the target audience for each article. Next, the team members share their thoughts, learning from one another. Their aim is for readers to understand the text the very first time they read it as well as to elicit the same reaction in them of the translation as the original writer intended for his audience to experience.

Once the whole article has been translated, one team member reads it aloud while the others make notes, highlighting problems that might need to be fixed: ideas have been omitted or added, naturalness of the text, proper spelling and correct grammar. After final approval, the translated text is sent to various facilities for printing and distribution. After all, readers around the world benefit from the Bible's practical wisdom in their own language [1, p. 6-7].

Since the MEPS project was undertaken in 1979, the computer industry has made extraordinary advances. Powerful computers with great versatility are now available at a fraction of the cost of the earlier equipment. Even though this system does not make writing simple and does not translate, it made the preparing of a text in many languages easier. Truly, development of MEPS is an important achievement in the multilingual publishing.

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