СИНАЙСКИЙ КОДЕКС
И ПАМЯТНИКИ
ДРЕВНЕЙ ХРИСТИАНСКОЙ
ПИСЬМЕННОСТИ:
тradиции и инновации
в современных исследованиях

Санкт-Петербург. 2012
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И ПАМЯТНИКИ ДРЕВНЕЙ
ХРИСТИАНСКОЙ ПИСЬМЕННОСТИ: ТРАДИЦИИ И ИННОВАЦИИ
В СОВРЕМЕННЫХ ИССЛЕДОВАНИЯХ

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CODEX SINAITICUS AND OLD MANUSCRIPTS
OF EARLY CHRISTIAN WRITING:
TRADITIONS AND INNOVATIONS
IN MODERN RESEARCH

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В сборник вошли материалы научной конференции «Синайский кодекс. Рукопись в современном информационном пространстве», организованной Российской национальной библиотекой (Санкт-Петербург) в ноябре 2009 г. и посвященной завершению международного проекта виртуального издания греческой рукописной Библии IV в.— Синайского кодекса, стоящего у истоков рукописной библейской традиции. Авторы статей — российские и зарубежные исследователи гуманитарных и технических специальностей: филология, история, реставрация, программисты, хранители библиотечных коллекций. В их работах представлены различные направления и методы изучения средневековой рукописной книги, как традиционные (историко-филологические), так и инновационные, с применением технических достижений и цифровых технологий. Все работы основаны на материале самого Синайского кодекса, а также других известных памятников древней христианской письменности.

This book includes materials from an international research conference Codex Sinaicus: Manuscripts in the Digital Age organized by the National Library of Russia (St. Petersburg) in November 2009. The conference celebrated the successful completion of an international project for the creation of a 3D digital version of one of the oldest surviving texts of the Bible — the fourth century Codex Sinaicus, the font of the hand-written Biblical tradition. The articles in the book are contributed by researchers from Russia and other countries: experts in the areas of history, philology, book and paper restoration, library science and information technology. The papers demonstrate various aspects and methods, both traditional and computer-based, of doing research on medieval hand-written books. All papers are based on materials related to the Codex Sinaicus and other well-known ancient manuscripts of the Christian tradition.

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THE ELECTRONIC TRANSCRIPTION OF CODEX SINAITICUS

The making of the transcription

Over the last decade, ITSEE has become established as one of the leading international centres for the creation of scholarly electronic editions, with a particular focus on manuscripts of the New Testament. The Codex Sinaiticus Project followed a set of transcription procedures developed by the Institut für Neutestamentliche Textforschung (INTF) in Münster, Germany, and the International Greek New Testament Project, which are currently collaborating on a major edition of the New Testament in Greek, the Editio Critica Maior. The software used during the transcription, the COLLABE and ANASTASIA programs, was created by Peter Robinson of ITSEE.

The first stage was the making of initial plain-text transcriptions. The transcribers, Amy Myshral and Timothy Brown, used the digital images taken for the Codex Sinaiticus Project as the basis for their fresh transcriptions of the books of the Septuagint. These were produced by altering an electronic base file already containing a biblical text to correspond to the reading of the manuscript. The principal form of text was taken as that written by the first hand, with subsequent corrections and annotations also recorded. Scribes, correctors and their readings were identified from the research of Myshral, Jongkind and earlier studies of the manuscript. Details of layout were also introduced, including page, column and line identifiers. An extract from a plain-text transcription is shown in Figure 1 alongside the corresponding image from Quire 3 Folio 4r. Because a single font had to be used for the entire file, the Symbol Greek font was adopted throughout.

Also, in keeping with the conventions for biblical editions, lower case letters were used throughout even though the fourth-century copyist wrote in the majuscule script of the time. The indications 'mp' and 'dpl' represent medial punctuation and diplose respectively, while in the bottom line, a correction has been added by corrector ca in the left-hand margin.

Fig. 1. Image and plain text transcription (from Quire 3 Folio 4r)

The second stage comprised the automatic comparison of the electronic transcriptions. Each biblical book was transcribed independently by the two transcribers in order to make the finished text as accurate as possible. These were then compared by Rachel Kevern using the COLLABE software. Once the appropriate parameter settings had been altered to correspond to the encoding conventions used in the files, the program generated a list of differences between the two transcriptions. The occasional discrepancies which were brought to light included different interpretations of hard-to-read passages. The entire list was sent back to the transcribers for them to reach an agreed reading. While some queries could be resolved by further reference to the digital images, less legible text, especially earlier readings erased or altered by correctors, required consultation of the manuscript itself on location in the four holding institutions (the British Library, Leipzig University Library, the National Library of Russia and St Catherine Monastery).

A single final version was prepared in conjunction with Rachel Kevern and deposited on the Birmingham file server. The transcriptions of the New Testament were provided by INTF; they were revised against the new images and additional information added to bring them into conformity with the practices adopted for the rest of the manuscript.

The next stage was the conversion of the transcription to XML (eXtensible Markup Language). The plain-text format required by COLLABE has the advantage of a relatively economic set of mark-up tags for recording non-textual
information, thereby reducing the amount of typing required by the transcribers and with it the potential for error. In order to present the transcription on the website, however, and ensure its long-term preservation, it was necessary to convert it to a generally-recognised computer encoding scheme. For electronic texts in any language, the standard is set by the Text Encoding Initiative (TEI), an international consortium which produces a set of guidelines establishing a universal standard for the mark-up of electronic texts in XML. One section is devoted to features of manuscripts: the intended result is that transcriptions which adhere to these guidelines should continue to be readable in the future whatever technological changes intervene.

A further weakness of XML is that the text of the transcription is separated from paratextual material (such as page numbers or editorial notes). Each element is identified by a section of code, beginning and ending with angled brackets (&lt; &gt;), with further information pertaining to the element (its attributes) included within this section. Elements and attributes may be retrieved and deployed in different ways. In the case of Codex Sinaiticus, the encoding enables the same transcription to be displayed in page view, reproducing the layout of the manuscript by privileging the line, column and page break elements, or as a continuous reading text governed by the elements denoting biblical chapter and verse divisions. The use of XML also means that the interface is not tied to a particular language: the English, German and Russian versions of the Codex Sinaiticus website all rely on the same information encoded in the transcription.

The initial conversion of the plain-text files to XML was carried out through COLLATE. This automated procedure expanded the tags in the transcription to more verbose elements, including giving each line a unique identifier (based on its quire, folio, column and line number) and numbering all the words within each verse. A practice known as «Trojan Horse» mark-up was applied to the line breaks, splitting each one into separate starting and ending elements (beginning with an initial S or E, and identifying the corresponding equivalent). Although this was unnecessary for the correct rendering of the lines, it meant that material in the margins of each column (as opposed to the outer margins of the page) could be assigned to the beginning and end of the appropriate line for display in the correct place. The Greek characters of the biblical text were converted to separate entities to distinguish them from the Roman characters used elsewhere. A sample of the XML from this stage of the process can be seen in Figure 2: as the converted text is around five times longer than the plain-text transcription, only the equivalent of the first six lines from the extract in Figure 1 is displayed here.

A further transformation of this file was required in order to render the Greek text into Unicode, ensuring that it would appear consistently on any computer, and to fix the disposition of marginal material. This was carried out using the Grovetransformer application specially written for the purpose by Andrew West, the Technical Officer of ITSEE. One page was converted at a time, but the process was so resource-intensive that the author would set up a batch to run overnight and review the files the next morning. (The final transcription may be seen in Figure 3 below.)
Judith (Quire 38 Folio 8; NLR, OLDP. O.156.1) posed a particular problem for the transcribers, and subsequently the alignment team, because the ink has faded almost to the point of illegibility. The images of the page taken with illumination from a raking light source offer a slightly better indication of the impressions left on the surface by the stylus than those taken using regular light. Nonetheless, this was one of the pages which the transcribers had to inspect in situ in order to verify the exact reading of the biblical text. The transcription and alignment provided on the website are therefore an indispensable aid for those wishing to study this page in the electronic edition. It is also worth mentioning that the Codex Sinaiticus Project made some experiments with multi-spectral imaging. Although in most cases the digital images were sufficiently clear not to require this technology, on this faded page it proved of some use in identifying the letter forms (see Figure 4).

As the Genesis leaf (Quire 3 Folio 4; NLR, Greek 2, Greek 259) is preserved in isolation, it was necessary to reconstruct its quire and folio number in order for this page to be integrated into the file. First, the total number of characters for the whole of that page was calculated based on the average in the extant lines. The size of the missing portions on either side was determined from the character count in a critical edition of the biblical text, and the approximate number of missing pages reached by dividing the second number by the first. Of course, a critical text does not present an exact correspondence with the missing text of Codex Sinaiticus: while the use of abbreviations and the probable absence of text (based on the extant portion of the manuscript) would have made the text in the manuscript shorter, this is compensated by the blank space in the final column of a book and the use of shorter lines in lists and at the end of paragraphs. In addition, the proposed identifications can be verified by codicological considerations such as Gregory’s Law that quires are constructed so that each opening consists of hair or flesh sides of the parchment facing each other.

The total number of characters of the text of Genesis missing before this page equates to eleven pages (one eight-page quire and three folios), indicating that this is from the fourth page of the second quire of Genesis. However, the distance between the end of this fragment and the first surviving page with a quire number, Quire 10, which starts with Leviticus 20:27, is around fifty-two pages of characters at the same density (six eight-page quires and four folios). This shows that the Genesis fragment comes from Quire 3 Folio 4, and accordingly that there was a quire of introductory material preceding Genesis in the manuscript. The length and content of this is unknown. These calculations also confirm that this St Petersburg page of Genesis immediately follows the Genesis fragment discovered among the new finds at St Catherine Monastery in 1975 (Quire 3 Folio 3).

At the foot of the recto of this page is a feature which was not transcribed as text: although the symbols used for scribal annotations were represented by a similar Unicode character or combination of characters (such as  alongside 2 Esdras 17:72, Isaiah 22:22, 24:23, 36:10, Zechariah 13:1 etc.), the library sticker at
the foot of the page was too complicated for this treatment. Instead it was included as a graphic element in its own right. In the fourth column of the recto (and first column of the verso), only a few letters are legible on each line. Some are marked with an underdot, indicating uncertainty as to the exact form of the letter, while the rest of the line has been supplied from the text transmitted in other witnesses: the use of supplied tags in the XML (represented in the translation by square brackets) does not interfere with the text, which means that partially-reconstructed words will be returned alongside complete examples of the same form in the search facility on the website.

Fig. 5. Uncertain letters and supplied text on Quire 3 Folio 4r

The allocation of page numbers also showed that the fragment of the Shepherd of Hermas (Quire 93 Folio 7; NLR, Greek 843) is part of the same folio as the final page held by the British Library. These digital images taken in libraries hundreds of miles apart were assembled as a composite page by Rosalind MacLachlan (see Figure 6). Much of the text on this folio appears as a correction, because a later hand (Corrector d) with a darker ink has added accents to the unaccented text of the first hand: the accented form is shown in the pop-up boxes. At the top of the third column of the verso, an editorial note is supplied in a mouseover box (indicated by the symbol §), explaining that as the initial letters of each line do not always match known forms of the Shepherd of Hermas, the rest of the line has not been reconstructed.

On the recto of this fragment (see Figure 7), there is an example of the paragraph symbol in the second line alongside the title of the third section. This is treated as a marginal annotation, and is therefore located within the opening line-break in order to display it within the margin. However, this coincides with the
start of a new verse, a further piece of information appended to the opening line-
break element of the XML file which can be displayed for the convenience of the
reader. Making sure that these multiple items did not overlap formed part of the
proofreading process. The title itself is indented in the manuscript, a feature which
is reproduced in the transcription.

Fig. 6. Composite image of Quire 93 Folio 7v and transcription

The page from Numbers (Quire 11 Folio 2; NLR, Greek 259) illustrates one
of the advanced features of the XML transcription. In the left hand margin of the
verso, a corrector has added text at the end of Numbers 6:22 not included by the
initial copyist, with a symbol (%) linking the main text to the marginal correc-
tion. In the transcription, this is encoded as a variant reading within the biblical
text: the first-hand omission is represented by the standard symbol ‘T’, with the
correction displayed in a mouseover box. However, in page view, the more sub-
stantial corrections to the biblical text in the page margins are also displayed at
the point where they appear on the page, using the same XML (see Figure 8).
This was achieved through the use of a pointer element, added at the proofreading
stage, which corresponds to the correction through the use of a unique identifier.
The biblical reference also included in the correction element is displayed in the
mouseover box enabling users to identify the marginal material with the biblical
text to which it refers, although in this case it is hardly required as it occurs so
close to the point of insertion.
In conclusion, the electronic transcription of Codex Sinaiticus combines traditional palaeographical skills and textual conventions with current standards for encoding and displaying an electronic text. The adoption of XML has not only made possible innovations such as the alignment feature of the website, linking the text with the images, but also means that the transcription should continue to be usable for the foreseeable future and can be incorporated into further editions or analysed using tools not yet developed. Just as Codex Sinaiticus itself was produced by a team of copyists, so the creation of this transcription has involved the skill and expertise of a number of people: most have already been mentioned above, but a special tribute should be paid to David Parker who, like Scribe D, oversaw the entire process as well as making his own distinctive contribution. It is to be hoped that the Codex Sinaiticus Project now provides a model for other scholars and holding institutions to collaborate on the production of similar editions, and that electronic publications and technological innovations will continue to assist and further the study of manuscripts in the digital age.

Fig. 8. Correction on Quire 11 Folio 2v shown in page view with margin and mouseover box featuring the text of the correction

Приложения

1 See further its website at URL: http://www.its.ac.uk.
2 For details of this collaboration, see: Wachtel K., Parker D. C. The Joint IGNTP/INTF Editions of the Gospel of John: Its Goals and their Significance for


4 Four copyists worked on different sections of Codex Sinaiticus. In certain places where a correction was made during the production process by a corrector within the scriptorium (Corrector S1) and the first hand reading is no longer fully legible, the S1 reading has been preferred on the website.


7 The latest version is available at URL: http://www.tei-c.org/Guidelines/.


9 When the translation included in the website has XML encoding, usually at verse level, this is also highlighted.


11 For a fuller account of this process, see URL: http://codexsinaiticus.org/en/project/transcription_reconstruction.aspx.