SyrCOM-96
Proceedings of the Second International Forum on Syriac Computing

(in association with VIIum Symposium Syriacum)

August 13, 1996
Uppsala University
Sweden

Edited by
GEORGE ANTON KIRAZ
University of Cambridge
(St. John's College)

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Preface

I am pleased to present you with this volume containing the papers and demonstration abstracts prepared for the Second International Forum on Syriac Computing, held on 13 August 1996 at Uppsala University, Sweden, in association with VIIum Symposium Syriacum.

This is the second event organised by the Syriac Computing Institute. Our first Forum was held on 8 June 1995 at The Catholic University of America, Washington D.C., in association with Syriac Symposium II.

In addition to the papers prepared for the Forum, I have included at the end a brief bibliography of Syriac Computing covering the last decade.

This Forum would not have been possible without the generosity of the organising committee of the VIIum Symposium Syriacum. To them, especially Dr. Witold Witakowski, I give my utmost appreciation. Thanks are also due to the Chair of the SyrCOM-96 session, Prof. Bo Isaksson.

I also would like to thank Ola Engström, research ingenieur of the Deptartment of Scandinavian Languages, Language Division, Uppsala University, for making computer equipment eavailable during the Forum.

13 August 1996

George Anton Kiraz
Conference Chair

Author Index

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Part I

Reports of the Syriac Computing Institute

SYRIAC HYPERTEXT PROJECT: REPORT III

Robert A. Kitchen
Wolfson College, Oxford

1 Aims

This is the third report on the development of the Syriac Hypertext Project (SHT) of The Syriac Computing Institute, directed by George Kiraz of the University of Cambridge (Report I: Bolton and Kiraz, 1994; Report II: Moxham, 1995). The goal is to produce an encyclopedia of Syriac culture which will be available in the form of a hypertext to users of the Worldwide Web (WWW). There is also planned a printed abridgment of the work.

2 Progress to date

The project has accumulated thirteen hundred entries to date, culled from a variety of sources previously listed in Report II (Moxham, 1995). I have been working through J.M. Fiey's Assyrie Chrétienne, 3 volumes, primarily for people and places not previously covered.

Work on the software has been proceeding, but is not yet complete. Help is needed in this technical area as well as with the writing and compilation of entries.

3 Extent of coverage

The subject matter of the SHT is intended to be as broad as possible, ranging from pre-Christian to modern times and across all parts of the world influenced by Syriac culture. The following are the principal categories:

- people - church leaders, saints, monks, authors, scholars and artists, as well as members of foreign (e.g. Byzantine, Persian, Arab, Mongol) ruling groups to whom Syriac-speaking communities have been subject.
- places - past and present centers of Syriac population, dioceses, monuments, especially monasteries and churches, and important schools.
- works of literature - important writings both religious and secular.
- topics in ecclesiastical history - denominations, hierarchical titles, festivals, liturgical terms, councils and synods, etc.

The first two categories - people and places - are well represented by both famous and lesser-known personalities and cities/monasteries, but there are very few entries for the last two categories.

While a number of literary works have been referred to in other articles by means of curly brackets { } - indicating a full article elsewhere - the only entries thus far written are: "Diatessaron", "Didascalia Apostolorum","Evangelion da-Mepharreshe", "Henoticon", and "Peshitto", "Tome of Leo".

Entries on the Odes of Solomon, Acts of Thomas, Doctrine of Addai, Demonstrations of Aphrahat, Mêmrê/Madrashê of Ephrem, Liber Graduum, the Discourses of Philoxenus of Mabbug, and the later historical Chronicles might be considered.

As for entries on topics in ecclesiastical history little also has been written. Entries on Messalianism, anti-Chalcedonian response, the Syriac Church under Islam, Monophysitism, Syrian Orthodox Church, Church of the East might be contemplated.

4 Evaluation

At this juncture there needs to be an evaluation of the scope and selection of the Project. Some of the articles, particulary those on major personalities and topics, may need to be

edited by scholars with special interest in the subject. Generally, the articles on people and topics with minimum sources and data have already reached their optimum format. As noted above, a number of articles on literature and ecclesiastical topics need to be written, perhaps again assigned to scholars with special interest.

5 Structure of Data

@KEY = Philoxenus of Mabbugh, Mar
@BORN = b. 440 ?
@DIED = d. 523
@ALSO = Philoxenos
@ALSO = Xenaias
@ALSO = Aznoyo
@ALSO = Aksenaya
@ALSO = Akhsenaya
@ALSO = Akhsnoyo
@DATE = May 1993
@FILE = PLACES.KIM
@BY = ied
Syriac scholar and theologian, and bp of {Mabbugh} from 485. Born of Aramaic parents in the {Beth Garmai} village of Tah$,el in Persia, he emigrated as a child during the anti-Christian campaign of Yazdagird II (439-57) and spent his youth in {T$,ur $cAbdin}. He enrolled at the {School of the Persians} in {Edessa}, and defied the School's Nestorian traditions by becoming a convinced henophysite. He went to {Antioch} to propagate his beliefs and was expelled by patr. Calandio. However, {Peter the Fuller} consecrated him chorepiscopus of {Mabbugh} and in 485 metropolitan bishop. He commissioned new Syriac versions of the Nicaean-Constantinopolitan symbol *c.*500 and of the NT and Pss., tr. from the Greek by his chorepiscopus Polycarp 507-8. On a visit to emp. {Anastasius} in 507 he was shunned by patr. Macedonius, whom his ally {Severus} later deposed. In 512 he himself removed the pro-Chalcedonian patr. of Antioch, Flavian II (489-512) by leading an aggressive demonstration of monks against him, and presided over the synod which elected Severus in his stead. The repression of henophysites introduced by {Justin I} led to his being banished to Philippopolis in Thrace in 519 and later to Gangra in Paphlagonia, where he died.
|Church.| Parochial church at {Midyat}, recently restored. It was built in the early period of the caliphate to provide a resting place for Mar Philoxenus' head, which his relatives had brought back from Paphlagonia. Muslims raided the church in 1145 and ejected the head, which was then taken into the safe keeping of the Mar {Abel} monastery.
|Lit. Works.| 1. Thirteen 'Discourses on the Christian life' for the instruction of monks, including 'Twelve chapters against those who maintain two natures in Christ'. 2. Letters, including one to emp. {Zeno} on the incarnation and one to Abraham and Orestes, priests of {Edessa}, refuting the doctrines of {Stephen bar S$,udaili}. 3. A commentary on Jn. 4. 'Book of sentences', or 'Three tractates on the Trinity and the Incarnation'. 5. A confession of faith declaring the one nature and one will of Christ. 6. An anaphora. 7. A prayer book. 8. An order of baptism. 9. 'On chastity'. 10. 'On interdict and excommunication'.
|Bibliography|
@BIBL = G.M.L.Bell and M.M.Mango, {Churches and monasteries}, London, 1982, pp.19-20, 51-3, 131.
@BIBL = M.Mehling, ed., {Turkey}, Oxford, 1989, p.401.
@BIBL = A.Palmer, {Monk and mason}, Cambridge, 1990, pp.66, 77, 113-16.
@BIBL = W.H.C.Frend, {Rise of the monophysite movement}, Cambridge, 1972, pp.185, 188, 201, 214-17, 248.
@BIBL = S.P.Brock, {Syriac fathers}, Kalamazoo, 1987, pp.102-5.
@BIBL = R.C.Chesnut, {Three monophysite christologies}, Oxford, 1976, pp.5-6.
@BIBL = P.Charanis, {Church and state}, in Byzantina Keimena Kai Meaetai, vol 2, Thessalonica, 1974, pp.58, 60, 62-4, 68, 73-4, 76, 108.
@BIBL = E.Venables in W.Smith and H.Wace, {DCB}, vol 4, London, 1887, pp.391-3.

The entry will appear on the Web, or in a printed version, in a formatted manner; for example:

Philoxenus of Mabbugh, Mar
b. 440 ? d. 523

Syriac scholar and theologian, and bp of MABBUGH from 485. Born of Aramaic parents in the BETH GARMAI village of Tahel in Persia, he emigrated as a child during the anti-Christian campaign of Yazdagird II (439-57) and spent his youth in TUR 'ABDIN. He enrolled at the SCHOOL OF THE PERSIANS in EDESSA, and defied the School's Nestorian traditions by becoming a convinced henophysite. He went to ANTIOCH to propagate his beliefs and was expelled by patr. Calandio. However, PETER THE FULLER consecrated him chorepiscopus of MABBUGH and in 485 metropolitan bishop. He commissioned new Syriac versions of the Nicaean-Constantinopolitan symbol c.500 and of the NT and Pss., tr. from the Greek by his chorepiscopus Polycarp 507-8. On a visit to emp. ANASTASIUS in 507 he was shunned by patr. Macedonius, whom his ally SEVERUS later deposed. In 512 he himself removed the pro-Chalcedonian patr. of Antioch, Flavian II (489-512) by leading an aggressive demonstration of monks against him, and presided over the synod which elected Severus in his stead. The repression of henophysites introduced by JUSTIN I led to his being banished to Philippopolis in Thrace in 519 and later to Gangra in Paphlagonia, where he died.
Church. Parochial church at MIDYAT, recently restored. It was built in the early period of the caliphate to provide a resting place for Mar Philoxenus' head, which his relatives had brought back from Paphlagonia. Muslims raided the church in 1145 and ejected the head, which was then taken into the safe keeping of the Mar ABEL monastery.
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Bibliography
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A.Palmer, Monk and mason, Cambridge, 1990, pp.66, 77, 113-16.
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P.Charanis, Church and state, in Byzantina Keimena Kai Meaetai, vol 2, Thessalonica, 1974, pp.58, 60, 62-4, 68, 73-4, 76, 108.
E.Venables in W.Smith and H.Wace, DCB, vol 4, London, 1887, pp.391-3.

A partial list of abbreviations employed in the SHT is included below.

bp = bishop
bpric = bishopric
cent = century
E = east
ed. = edition
emp. = emperor
nr = near
patr = patriarch
$c = letter ayin
$, = h5, t5

$- a

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7 Volunteers

The Syriac Hypertext Project is made possible by voluntary work done by interested researchers. New volunteers are welcome. Some of the sources not yet consulted are in French and German, so a reading knowledge of either would be especially useful. So also would be a knowledge of theology, a field in which specialized contributions are required on the ecumenical councils, for example.

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SEDRA-III: from ASCII to Access

ABSTRACT

The Syriac Electronic Data Retrieval Archive (SEDRA-III) is a public-domain database which facilitates automated analysis of Syriac texts and which has potential for wider use in other Syriac applications.

SEDRA-III stores linguistic information in six plain text (ASCII) tables: ROOT, LEXEME, WORD, MEANING, ETYMOLOGY and NOTES. These tables are linked together logically using a network model of data relationships and information within the SEDRA-III database can be retrieved by standardised procedures, which can be implemented on any computer platform.

Data within SEDRA-III can however be easily imported into a relational database format such as Microsoft Access, which although proprietary in nature, is widely-available and offers new and interesting possibilities for developing the SEDRA project.

This paper is divided into three sections, dealing respectively with:

1. the steps involved in migrating the SEDRA data from ASCII tables into Access, covering details of certain changes which needed to be made to the SEDRA's referencing system;

2. the benefits which are immediately available as a result of the migration to Access, including automated maintenance of referential integrity between the SEDRA tables, rapid creation of new queries and data input methods using visual data-processing features such as "drag-and-drop", and easy linking of data within SEDRA to other Syriac data including binary font and audio files;

3. explanation of the ways in which the SEDRA project could in future be expanded, principally by building an "data-access"/"middleware" layer on top of the SEDRA database which would control the ways in which the SEDRA database could be accessed by database administrators, ordinary users and other programmes.

SEDRA-III: from ASCII to Access

Tim Williams

1. INTRODUCTION

This paper builds on the strong foundation established by Dr. George Kiraz over the last seven years, during which he has developed the Syriac Electronic Data Retrieval archive (SEDRA) into the form in which I first came across it in April of this year.

In the short time which follows, I will explain how certain modern software techniques have been applied to the SEDRA project by a software engineer some experience in Japanese software development but with no previous background in the Syriac language.

A general understanding of the nature of SEDRA is assumed throughout, but particular reference should be made to the paper Automatic Concordance Generation of Syriac Texts (Kiraz 1992). However, no assumptions are made about previous familiarity with Microsoft Access.

Section 2 of this paper explains the technological reasons for changing the database platform used for SEDRA and provides details of the steps involved in moving SEDRA to the Access database. Section 3 describes the additional facilities available using Access, while section 4 provides pointers for future development of SEDRA.

2. DATA MIGRATION FROM ASCII TABLES TO ACCESS

2.1. Technological Driving Factors

There are two main reasons for moving SEDRA to a new database platform: firstly because this will allow SEDRA to conform to a number of existing technical standards and secondly because it will increase the availability of SEDRA data to other Syriac applications. While the latter of these two reasons is developed throughout the rest of this paper, the technical standards relevant to the development of SEDRA will be introduced at this point.

Successful software projects either conform to standards or create standards because of their technical excellence. During this phase of the SEDRA project, the emphasis has been on improving conformity with existing open standards, only introducing new ideas for possible standards where no adequate standard for Syriac software currently exists.

Syriac computing is in its infancy and as such technical standards have yet to emerge. Software standards for Syriac computing must not however limit the functionality of Syriac programmes. It is therefore imperative that new standards for Syriac software are developed in the open, so that potential limitations on software functionality which would result from the adoption of particular standards can be identified at the earliest opportunity.

The ASCII file format has previously been used as the standard form of storage for SEDRA data and the SEDRA database was originally created by exporting data from a non-standard database product db_vista, which is now called Ramain Database Manager. The ASCII format was developed by the American Standards Committee for International Interchange and is widely used within almost all computer systems because it is based on the American National Standards Institute's ANSI character-encoding system. This standard has unfortunately restricted the SEDRA project, principally because the ANSI character standard does not:

- recognise the existence of the Syriac language;
- allow for alternative character-sorting sequences;
- deal with relationships between data in different files.

Many existing computing standards will ultimately be relevant to the development of Syriac computing including, in approximate order of priority:

- The UNICODE standard for character-encoding which will ultimately allow all computers with 32-bit operating systems (UNIX, Windows NT etc.) to earmark data as being in the Syriac language.
- The Graphical Display Interface (GDI) and Postscript Control Language (PCL) standards for displaying and printing characters respectively.
- The Structured Query Language (SQL-92) standard which defines the manner in which requests for data should be sent to a database, either local or distant.
- The Open Database Connectivity standard (ODBC 2.0), developed by Microsoft, which defines the manner in which relational database servers should make SQL connections available to client software.
- The distributed Object Linking and Embedding (OLE) and Common Object Model (COM) application programming interface (API) standards, again defined by Microsoft, which establish the way in which programmes should allow their own objects to interoperate with other programmes on the same machine or on a different machine.
- The Microsoft Media Control Interface (MCI) standard for multi-media.

- The Structured Generalised Markup Language (SGML) standard of which Hyper-Text Markup language (HTML 3.0) is a subset and which is capable of formally describing the structure of almost any document.
- The Common Object Request Broker (CORBA) model which rivals the COM standard on the UNIX operating system platform.

The current developments in the SEDRA project do not make use of UNICODE, PCL, SGML, HTML or CORBA but do allow for support for these standards to be added at a later stage.

On a positive note, SEDRA does now conform to a significant extent with the SQL-92 and ODBC 2.0 standards and to a limited extent supports GDI display and printing and MCI sound and provides an OLE/COM compliant API.

It has been possible to make SEDRA comply with these standards and to open up possibilities for future compliance with other standards by using the a product, namely the Microsoft Access database, which already complies with many standards.

Access is an unusual product in that is both a desktop database management tool which can be controlled interactively and also a database engine that can be programmed using many external computer languages to address the Joint Engine Technology (JET) library files.

In fairness to software companies other than Microsoft, many of the same results could have been achieved using a Rapid Application Development (RAD) tool such as Borland Delphi, but the resulting database files would not have been as open to inspection and modification by interested Syriac linguists, many of whom will already have a copy of Access available in their department, but few of whom will have any software development tools.

2.2. Data Migration Procedures

The main elements of an Access database are: TABLES, with their associated indexes; QUERIES, which filter, modify or join tables; FORMS, which can be used to create input screens; REPORTS, format output definitions which can be based on TABLES or QUERIES; MACROS which automatically activate other Access components; MODULES, which contain Visual Basic for Applications (VBA) programme subroutines and functions; and RELATIONSHIPS, which link TABLES together on key fields.

A database schema (or data dictionary) records the names and uses of tables within a database and the uses of fields within those tables. The ASCII-based SEDRA-III database schema is documented in a text file which is distributed along with the SEDRA text files.

Within Access however, the SEDRA field descriptions are stored in Access TABLE definitions and the relationships between fields in different tables are defined using a visual editing screen which shows an Entity Relationship Diagram (ERD). This method of defining and storing the database schema is typical of many other relational database management systems (RDBMS's). When it is possible to record the database schema together with the user-defined data within a RDBMS, it is also invariably necessary to do this.

Since the original SEDRA database schema was not only being copied to Access, but also modified, it was necessary to approach the data migration in the following stages:

- Naming the existing fields within the original SEDRA tables (ASCII files) which were previously referenced by field number. An additional line containing the new field names was inserted at the beginning of the first line of each ASCII file (each SEDRA table was stored in a single ASCII file). For future reference, these tables (ROOT, LEXEME, WORD, MEANING, ETYMOLOGY and NOTES) will be known collectively as the Original Tables.

- Importing data from the Original Tables into Access using the facilities which Access provides for this purpose.

- Defining the relationships among the Original Tables using the Access ERD screen. The main relationships are these:

Relationship	Parent Table	Child Table	Link Field
One-to-Many	ROOTS	LEXEMES	ROOTREF
One-to-Many	LEXEMES	ETIMOLOGY	LEXREF
One-to-Many	LEXEMES	MEANING	LEXREF
One-to-Many	LEXEMES	TABLE	LEXREF

- Creating new integer fields to store multiple record attributes which were previously stored together within a single numeric field. For example the ROOTS table contained a single attributes field which contained the Seyame Flag and the Root Type (Normal, Parenthesised, Bracketed or High Frequency). In this case two new fields were created, one to store the Seyame Flag and the other to store the Root Type. The existing attributes field of the LEXEMES table required the creation of many new fields, to hold not only the Seyame Flag but the Grammatical Category, the Suffixes (first, second and third), the Prefix, the Vowels (first, second, third and fourth), the Radical Type and the Form.

- Creating new tables (Attribute Tables) against which to validate the new attribute fields in the Original Tables. For example a ROOT_TYPES table was created containing four records:

ROOTTYPEREF	ROOTTYPENAME
00	Normal
01	Parenthesised
02	Bracketed
03	High Frequency

The SEYAME_FLAGS Attribute Table which was created contains only two records, which define the numbers used to indicate presence or absence of the Seyame flag.

Many new Attribute Tables were created for the same purpose, namely ensuring the "referential integrity" of any new entries which will be made in the future into the Original Tables.

The large number of the Attribute tables prevents inclusion of full list, but the nature of these tables can be understood from the following list of ten tables and examples of their contents (omitting fieldnames):

Table Name	Example Contents	
ENCLITIC_FLAGS	0	NOT ENCLITIC
GRAMMAR_CATEGORIES	4	NOUN
LANGUAGES	3	ARABIC
LEXEME_SUFFIXES	5	iYNoA
LEXEME_RADICAL_TYPES	6	COMPOUND
RECORDTYPES	2	WORD record
ROOT_TYPES	0	NORMAL
SEYAME_FLAGS	0	NO SEYAME
WORD_NUMBERS	2	PLURAL
WORD_STATES	3	EMPHATIC

- Creating entirely New Tables to store data which has not previously been stored within the SEDRA database itself. From an application development point of view, it is better that more data is maintained in a structured form within the RDBMS, rather than being left outside the database in relatively unstructured files such as Windows *.INI files. The New Tables created are as follows:

Table Name	Data stored
ALPHABET	ASCII codes used in the original SEDRA transcription, the English name for each Syriac character, a sort-order field and related keyboard codes
SCRIPTS	The names of Syriac script variants (Serta/Jacobite, Estrangela, Nestorian).
BINARYDATA	For each combination of records in the ALPHABET and SCRIPTS tables a record has been created containing sample font and audio data.

- Populating the new fields and new tables with data from the Original Tables using Data Manipulation Language (DML) commands, which are subset of SQL. Such "action queries" use the SQL keywords INSERT, UPDATE and DELETE to perform an action on selected tables and fields, subject to a condition specified in a WHERE clause. All the queries used to create the SEDRA database have been saved within the Access version of SEDRA for reference, but they should not be re-executed.

- Creating One-to-Many relationships between the Attribute Tables and the Original Tables. It is not possible to establish such relationships unless the data in the attribute tables already includes all unique instances of data which occurs in the related field of the Original Tables.

- Replicating the existing functions for database management and network expansion which were originally developed to automate concordance generation (Kiraz 1992). The JET engine at the heart of Access provides all the required low-level functions which are necessary to recreate these functions. The simpler functions, such as the functions which return the first record which meets a particular condition have been implemented simply by writing parameterised SQL SELECT queries and saving these in named Access QUERY definitions. More complex functions which process each row of a table in turn necessitated the use of a programming interface to the JET engine, since the ACCESS version of SQL does not support User Defined Functions (UDF's), looping or the use of cursors to mark the current row in an open recordset (this is the collective term for TABLES and QUERIES). Although in the future these functions will be implemented using external programming tools such as Visual Basic (VB) or Visual C++ (VC++), at this stage they have been implemented within Access MODULES, which as explained at the start of Section 2.2, use the VBA programming language. The best examples of the internal functions provided by the JET engine are the FindFirst and FindNext methods which will work on any open recordset.

3. BENEFITS OF ACCESS VERSION OF SEDRA

The main differences between the ASCII version of Access and the new Access version which have not been described elsewhere are these:

- The RDBMS will automatically maintain the referential integrity between tables. It will prevent the entry of new records into the Original Tables if the references used in the new item have not previously been recorded in related Original Tables or Attribute Tables. When the attribute referencing system is changed, the child records in the Original Tables will be updated with the new references. This was achieved by selecting the "Cascade Updates"

option when the RELATIONSHIPS between tables were being defined on the ERD screen.

- Users can easily create new queries: it is not necessary to be able to write SQL in order to create new extracts of data from within SEDRA. It is possible to create most queries using drag-and-drop techniques to select the tables and fields required.
- New user interfaces can be created within the Access environment, by designing FORMS and REPORTS which meet particular requirements.
- Data within Access can be exported to a wide variety of other Windows programmes, if not in the native format for that programme, then via the Windows Clipboard (Cut and Paste operations).
- Finally the Access version of SEDRA now contains pointers to sample font data and audio data in the BINARYDATA file, which allow the construction of QUERIES which return non-traditional (variable length binary) data types. It is in this sense that SEDRA now provides some compliance with GDI and MCI standards. A demonstration of this feature will now follow, circumstances permitting.

4. FUTURE DEVELOPMENT OF SEDRA

4.1. Alternative database platforms

There is no reason why SEDRA should not now be moved to another ODBC compliant database platform: in a multi-user situation with many linguists updating the same tables (ROOTS, LEXEMES, WORDS etc.) it would be more appropriate to use a more heavyweight RDBMS such as SQL-Server or Oracle. Many more sophisticated databases, including the latest version 7.0 of Access, now provide replication facilities which can be used to merge updates from several sources, even when users are not connected synchronously to the same network. Such features will be important if the master copy of SEDRA is to be updated by more Syriac linguists.

4.2. Interfacing SEDRA to UNICODE applications

By adding an additional 32-bit numeric field to the new TRANSCRIPTIONS table to store the relevant UNICODE number for each ALPHABET character in each of the three Syriac SCRIPTS and constructing new SQL queries, the existing ASCII data in the original SEDRA tables could be returned as arrays of UNICODE numbers, which could be processed and displayed correctly by UNICODE compliant programmes..

4.3. Adding a "data-access" software layer

Implicit in the work that has been done on the SEDRA project is the understanding that at some time in the future the SEDRA database will be "wrapped" securely by a layer of software which hides the detailed structure of the database, but

makes the SEDRA information available to other programmes, both for reading and ultimately for updating.

The SEDRA project currently has only two layers: a database file layer, in which the data is stored; and a data presentation and manipulation layer, which includes all the user features already described (TABLES, QUERIES, FORMS, MODULES etc.). The project could be developed into a three-tier application by introducing a data access control layer between the file layer and the user interface layer.

The data access layer could be created using Visual C++ or Visual Basic 4.0 to create OLE custom controls (OCX's) which would make connections to the ODBC compliant SEDRA database and which, when embedded in client applications would allow the SEDRA data to be inserted into those programmes or even updated from those programmes.

Thus could SEDRA provide a spell-checking service to a Syriac word-processing programme or provide tables of Syriac linguistic information in the background to a Web server which was remotely providing a Syriac language research source.

4.4. Conclusions

Syriac computing will have an excellent future if more Syriac linguists can make active use of a common database. The SEDRA database has potential for much wider use and it is to be hoped that this paper and the availability of the Access version of the SEDRA database on the Syriac Computing Institute's web server will encourage greater use of SEDRA and a more rapid cycle of enhancements to the SEDRA database structure and contents.

Finally, on a more general note, it is hoped that this paper has gone some way towards achieving these secondary objectives:

- explaining the implications of changes which are taking place in the global software market.
- creating a climate of cooperation between Syriac linguists and software professionals, such as myself, who wish to enhance their own understanding of international software development issues.

IQ Software Corporation
12/13 Bridge Street
Winchester SO23 0HL
Email: t_d_williams@msn.com

Timothy D. Williams BSc

Reference:

Kiraz, George Anton (1992), Orientalia Christiana Analecta 247, p.461-475.

Project Meltho: Syriac Wordprocessing under Windows (Report I)

George Anton Kiraz
Computer Laboratory
University of Cambridge (St John's College)
Email: George.Kiraz@cl.cam.ac.uk
URL: http://www.cl.cam.ac.uk/users/gk105

July 30, 1996

Abstract

This paper forms the first report of Project Meltho, from the Syriac Computing Institute. The project aims at implementing a Syriac word processing system for Microsoft Word for Windows.

1 Introduction

Until the late 1980s only large publication houses were able to produce good-quality Syriac typesetting, though at substantial cost. As a result, authors had to resort to handwriting, while others – who were expected to produce their work in camera-ready-copy form – either had to resort to transliteration or to endure the high costs of typesetting. The development of Kiraz's Syriac font package (Kiraz, 7 92) for Multi-Lingual Scholar (Gamma Productions Inc.) – which runs under DOS – provided computer users with the means to produce good quality Syriac typesetting.

Today, however, with Windows being ubiquitous, there is a need for a new Syriac word processing system which runs under Microsoft Word. This is the aim of Project Meltho. When completed, Meltho will be available as a shareware product.

2 Current Windows Products

There are currently a number of programs which allow the user to input Syriac texts under Windows.

- Gamma UniVerse (by Gamma Production Inc.). This program is intended to be the Windows version of Multi-Lingual Scholar. The Syriac fonts are based on Kiraz's fonts for the latter. Although, UniVerse allows the user to enter Syriac texts freely, it does not provide for any of the word processing features one would expect from a word processor such as footnotes, columns, etc.

- Gamma UniType (by Gamma Productions Inc.). The Syriac fonts here are also based on Kiraz's fonts for Multi-Lingual Scholar. UniType is a localisation software which allows the user to enter Syriac texts (one sentence at a time) to any Windows application. This is a very useful tool and allows the user, for example, to prepare presentations, banners, leaflets etc. However, because one cannot enter more than one sentence at a time, editing texts can be very cumbersome (UniType was never meant to be a word processor).

- The Syriac Writer (by Esho Marcus and Sargon Hasso). This package provides an add-on to Al-Kaatib International, a bi-lingual word processor from Eastern Language Systems. Al-Kaatib provides many of the word processing features one would expect from a word processor. It is not clear, however, if there will be further developments to the program.

Additionally, there have been attempts to provide Syriac support for Arabic Windows, simply by providing Syriac fonts which map Syriac letters to their Arabic counterparts (see below).

3 Problem Statement

One of the main obstacles in Syriac word processing is that of bidirectionality which can easily be avoided using Arabic Windows. This, however, does not imply that implementing Syriac for Arabic Windows is a straightforward task.

Arabic and Syriac, though share common typesetting characteristics, are very different in many respects. The following is a list of the most important differences.

1. Contextual Analysis. Syriac *he, ṣadhe* and *taw* do not connect to the following character, unlike their counterparts in Arabic. This causes the following character to take the shape of middle or final form rather than initial or stand alone, respectively.

2. Character Hight. Arabic Windows makes use of 'high diacritics' for tall characters, and 'low diacritics' for short ones. The hight of Syriac and Arabic letters is not compatible, e.g. Arabic *ta* is short, while Syriac *taw* is tall. This causes diacritics to appear *on* consonants, rather than *above* them.

3. Overstrike. Arabic diacritics do not correspond to Syriac diacritics.

4. Ligatures. There is no correspondence between Syriac and Arabic ligatures.

The above problems can be resolved simply by designing a Syriac font in the following manner:

1. Contextual Analysis. Placing Syriac *he, ṣadhe* and *taw* to Arabic letters which do not connect to the following character such as *Hamzated Aliph, ta marbūṭa* etc. The disadvantage is that letters will be assigned to obscure keys in the keyboard layout.

2. Character Hight. Making all diacritics vertically hight. This, however, will result in bad positioning of vowels.

3. Overstrike. Limiting the number of Syriac oversrikes to the maximum number of oversrikes in Arabic fonts.

4. Ligatures. There are two solutions here: (1) Designing combinations of Syriac letters to mimic Arabic ligatures (e.g. *beth* + *mim* which is not a genuine Syriac ligature). In this case, the font will be full of such ligatures and there will be no room left for real Syriac ligatures. (2) Turning ligatures off. In this case, the user will not be able to make use of Arabic ligatures.

This crud solution does not provide Microsoft Word with any mean to distinguish between Syriac and Arabic texts. Any text-related operation (e.g. search, replace, spell checking, etc.) will cause corruption to the text.

4 New Approach

Meltho aims to provide a 'clean' solution to the problem at hand, where Syriac and Arabic texts remain always distinguished. Meltho makes use of the Arabic features which apply to Syriac. Syriac specific features are dealt with independently using `SyrWin`, a library of functions for handling Syriac texts.

4.1 The SyrWin Library

The SyrWin library provides for all the functions related to Syriac texts. Program developers can use SyrWin to add Syriac support to their Windows applications. The library contains definitions of letters and diacritics, their characteristics and any other information about them. When loaded, SyrWin reads a number of configuration files and builds tables to map symbols to their location in fonts, keyboard tables, sorting tables, etc.

The C code for using SyrWin takes the following form:

```
/* load SyrWin */
...

/* initialise SyrWin */
SW_Initialise();

/* use SyrWin functions */
...

/* shut down SyrWin */
SW_ShutDown();

/* unload SyrWin */
```

A complete reference to SyrWin will be provided upon completion of the library.

4.2 The Main of Meltho

The main core of Meltho is written in C and is compiled into a dynamic link library. When loaded, it runs behind the scene acting as a filter between the user and Microsoft Word. Meltho looks at all events caused by the user's input. If an event is related to Syriac, Meltho handles it accordingly and sends the necessary commands to Microsoft Word. Otherwise, Meltho passes the user's input untouched to Microsoft Word.

4.3 Features

The first version of Meltho will support the following features:

- Fonts. Estrangelo, Serto and East Syriac. Users will be able to use third party fonts.
- Keyboard. Various keyboard layouts will be provided. Additionally, users can produce their own layouts.

- Vowels. High vowels will be placed on tall consonants and low vowels on short one.
- Ligatures. Ligatures will apply automatically, but can be turned off by the user.
- Garshūnī. Macros will be provided to convert Arabic texts between Syriac and Arabic scripts.
- Transliteration. Macros will be provided to allow the automatic transliteration of Syriac texts.
- Find/Replace. This will be handled as to keep the Syriac and Arabic texts distinguished. Other text-related features might be added in the first release.

5 Conclusion

We are now at the preliminary stages of this project. The basic functionality of `SyrWin` has been designed and implemented. The same applies to the interface between Meltho and Microsoft Word.

In the future, we are also looking at providing Syriac support for Microsoft Access.

Acknowledgements

The Syriac Computing Institute thanks the supporters of Project Meltho: Mor Gabriel Monastery, Turkey; Microsoft Inc., Middle East Product Development, USA; Dr. Sebastian P. Brock, UK.

References

Kiraz, G. (1987-92). *Alaph Beth Font Kit: Aramaic, Coptic, Hieroglyphic, North Semitic, Phoenician, Sabaean, Syriac and Ugaritic Fonts.* Alaph Beth Computer Systems.

Part II

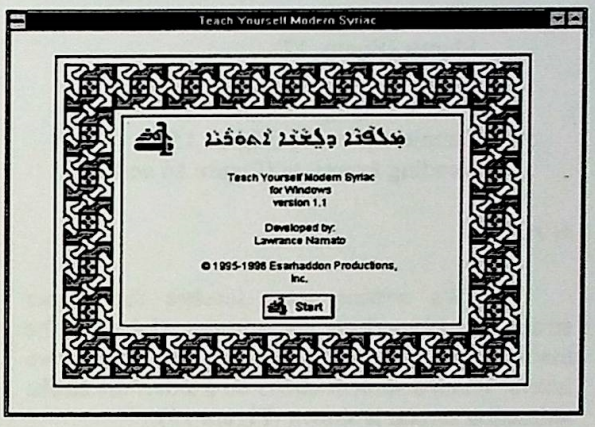
Computer Aided Learning/Teaching

Computer Aided Language Learning

Peter Jasim
Nineveh Software Corporation

Teach Yourself Modern Syriac *is a CD-ROM based instructional course for teaching Modern Assyrian (neo-Syriac). The software presents a self-paced lesson, both in Assyrian and English, using audio and video to teach Syriac to a beginner. Lessons begin with the alphabet and progress to vowel points and reading. The software runs on MS-Windows 3.1.*

Introduction



With the recent advancements in computer technology, particularly the wide scale availability of sound cards and CD-ROM drives, it becomes possible to effectively use computers in teaching a language. The combination of audio and video presentation, a well designed language course, and self paced study, as made possible by the interactive nature of the computer, can effectively teach a language to a beginner. This kind of self paced, multimedia presentation is what ***Teach Yourself Modern Syriac*** offers.

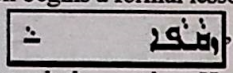
Teach Yourself Modern Syriac (henceforth, TYMS) is produced by Esarhaddon Productions, and was designed and developed by Deacon Lawrence Namato of the Holy Apostolic Catholic Assyrian Church of the East. TYMS runs on MS Windows 3.1 or higher, and requires a sound card and a CD-ROM drive, as it is only available on CD-ROM. TYMS teaches the basics of Assyrian, including the alphabet (ܐܠܦܒܝܬ), the vowels (ܨܘܬܐ), reading(ܩܪܝܢܐ), and writing (ܟܬܒܢܐ).

The Alphabet

The initial screen of TYMS teaches the alphabet (Appendix A, Figure 1). When a letter is clicked with the mouse, TYMS pronounces that letter through the computer's speaker. When the student masters the alphabet, he will proceed to the next lesson by clicking on the next  button. The speaker buttons,  and  , narrate the lesson in English and Assyrian. TYMS teaches the three Assyrian fonts: Estrangelo, Eastern, and Western (serto)

Pronunciation

Once the student has mastered the alphabet, he will proceed to the pronunciation lesson (Figure 2), which follows the alphabet screen. The vowels are introduced two at a time at first, along with simple words using the vowels just introduced. For example, the student clicks on  , TYMS says ***ba***; next the student clicks on  , TYMS says ***ba***; finally, the student clicks on  , TYMS says ***baba***, and places the English equivalent, ***father***, to the left of the Assyrian word.

The other vowels are similarly taught (Figure 3). Having introduced the vowels in an informal manner, the next lesson begins a formal lesson in the vowels (Figure 4). When the student clicks on a vowel category, for example  , all letters of the alphabet are shown with that vowel (Figure 5) and vocalized through the speaker. Having introduced a vowel, the next screen displays words which use that vowel (Figure 6). Each vowel is thus introduced, with a list of words which use that vowel.

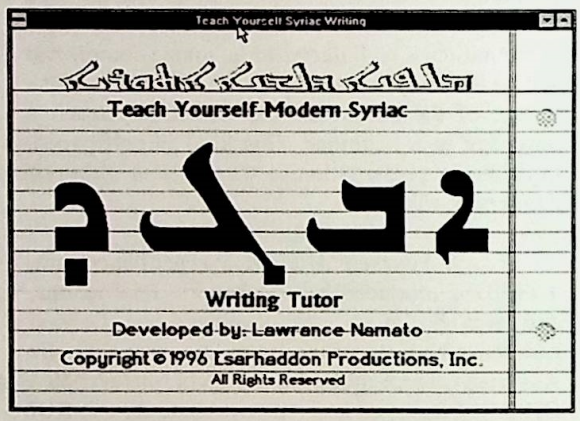
Language Elements

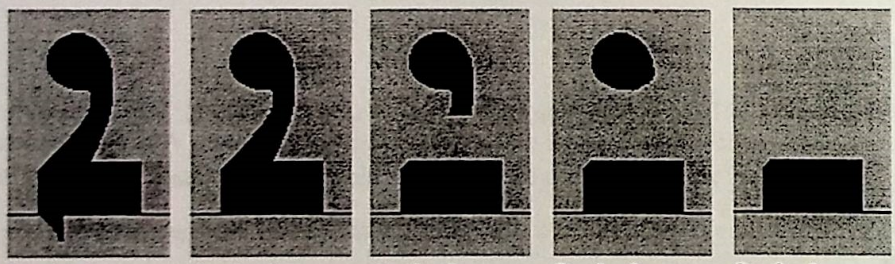
In addition to the above, TYMS teaches the following elements of Assyrian:

Letters which change their phonetic value (Figure 7).
Silent letters (Figure 8).
Month names (Figure 9).
Weekday and Season names (Figure 10).
Assyrian Numbers (Figure 11).
Plurals (Figure 12).
Prepositions (Figure 13).
Pronouns (Figure 14).
Simple sentences (Figure 15).
Reading exercises (Figure 16 and 17).

Writing

TYMS's writing tutor teaches the proper strokes used in writing the Assyrian alphabet. The main screen (Figure 18) shows the twenty two letters. When a student clicks on a letter, the stroke animation screen is shown (Figure 19).





Stroke 5 Stroke 4 Stroke 3 Stroke 2 Stroke 1

When a student clicks on the scroll bar (in Figure 19), the letter is drawn in the middle of the screen, using the proper strokes. For example, for Allap, the above sequence occurs as the user clicks on the scroll bar. The other letters are similarly animated.

Conclusion

Teach Yourself Modern Syriac presents a new method of teaching the Assyrian language. Given the proliferation of home computers, and the natural rapor between children and computers, teaching a language via a multimedia computer should be particularly effective with children, as well as adults.

Ordering Information

Teach Yourself Modern Syriac ($49.95 plus shipping and handling) maybe be purchased directly from Esarhaddon Productions, which maybe be contacted via email at lnamato@ibm.net, or via postal mail at:

Esarhaddon Productions Inc.
428 East Clarendon Drive
Round Lake Beach, Illinois 60073
USA

312 743-5304 (Local and International)
847 676-7117 (FAX)

Appendix A

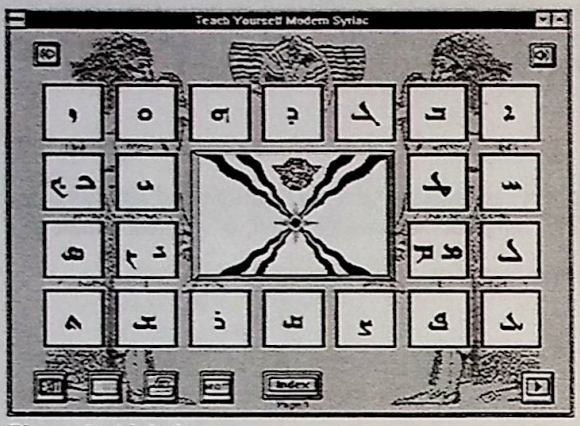


Figure 1: Alphabet

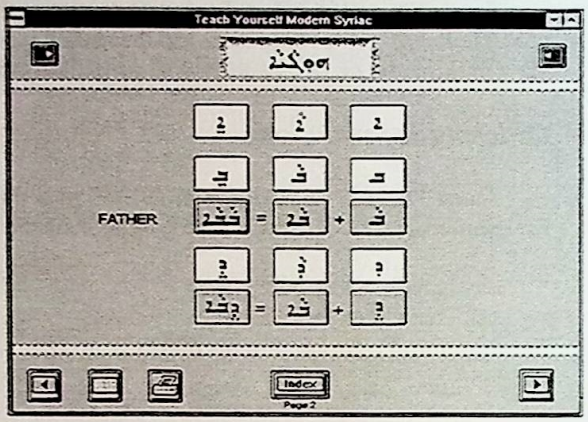


Figure 2: Pronunciation

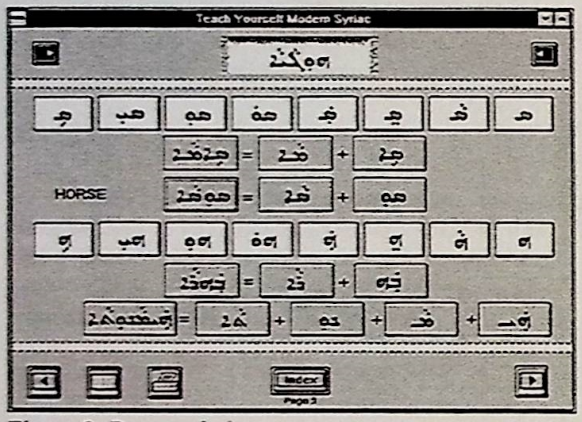


Figure 3: Pronunciation

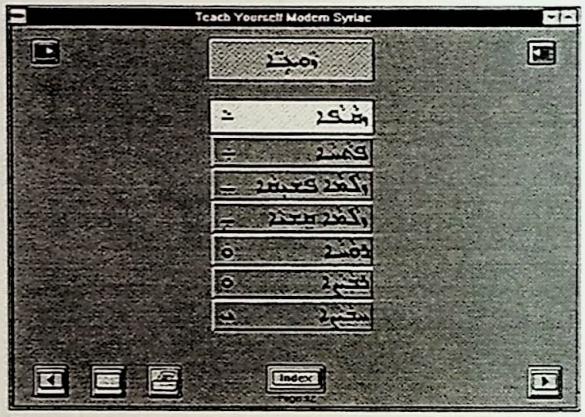


Figure 4: Vowels

Figure 5: Vowels

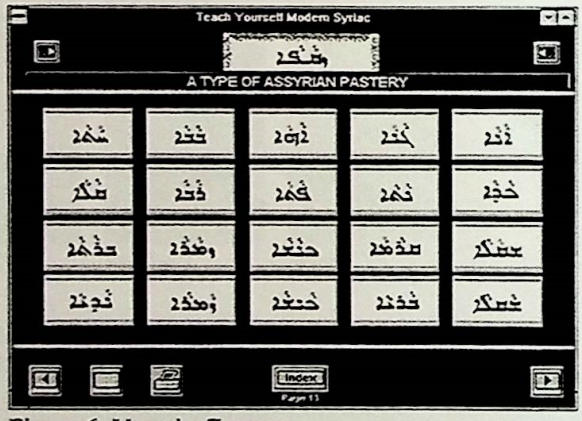


Figure 6: Vowels, Zqapa

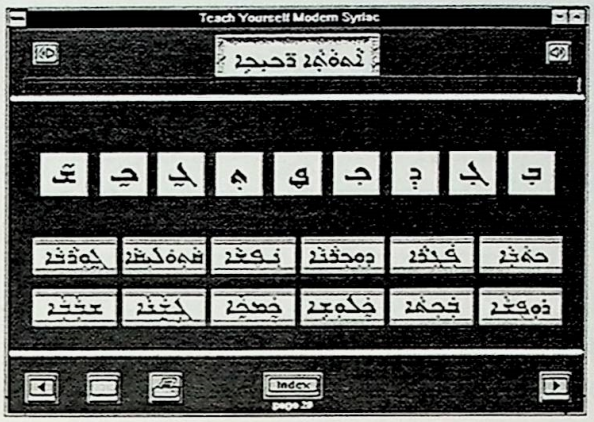


Figure 7: Modified letters

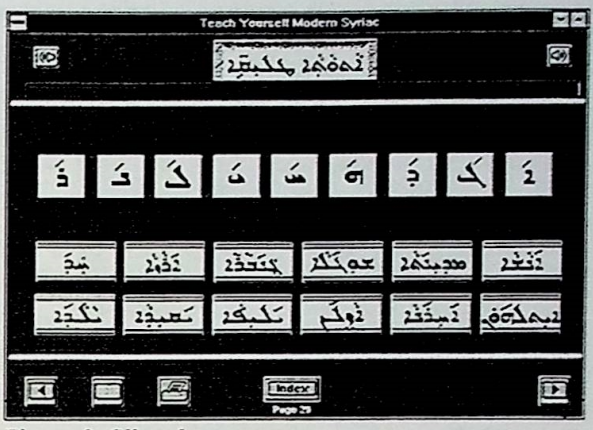


Figure 8: Silent letters

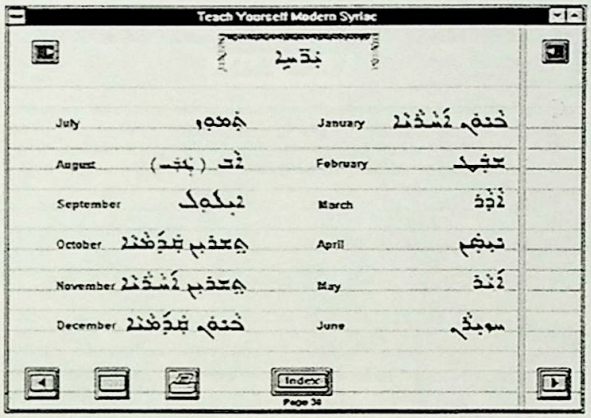


Figure 9: Months

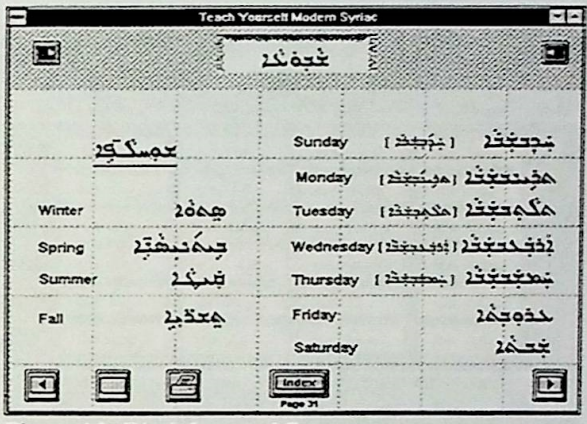


Figure 10: Weekdays and Seasons

Figure 11: Numbers

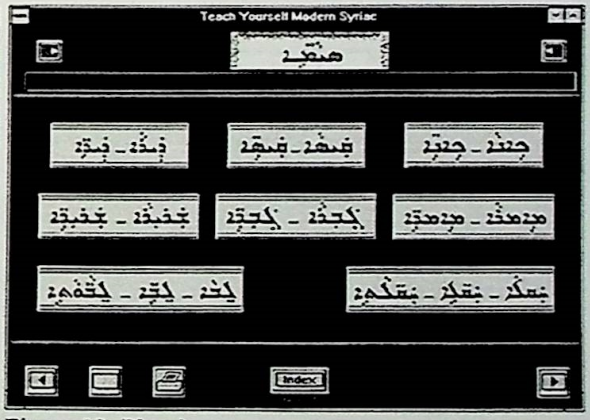


Figure 12: Plurals

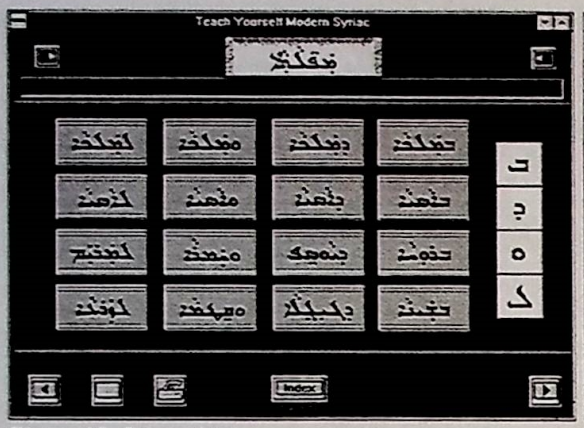


Figure 13: Prepositions

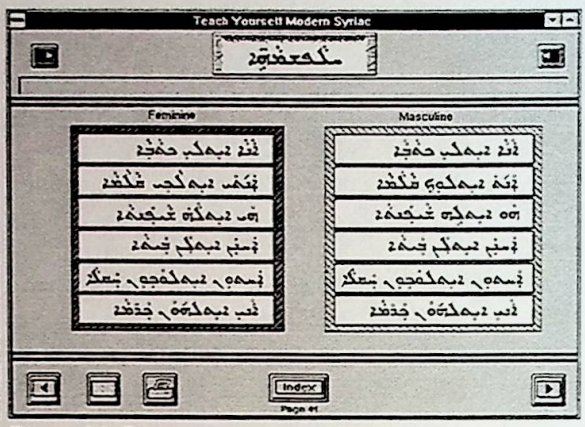


Figure 14: Pronouns

Figure 15: Simple sentences

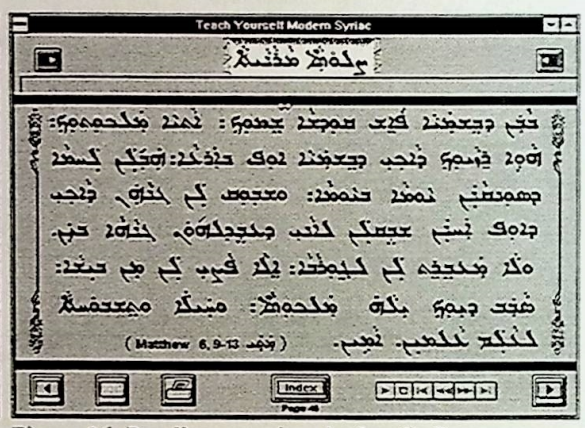


Figure 16: Reading exercise, the Lord's Prayer

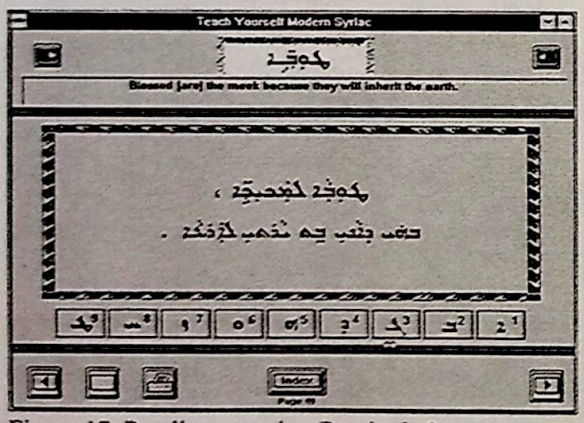


Figure 17: Reading exercise, Beatitude 3

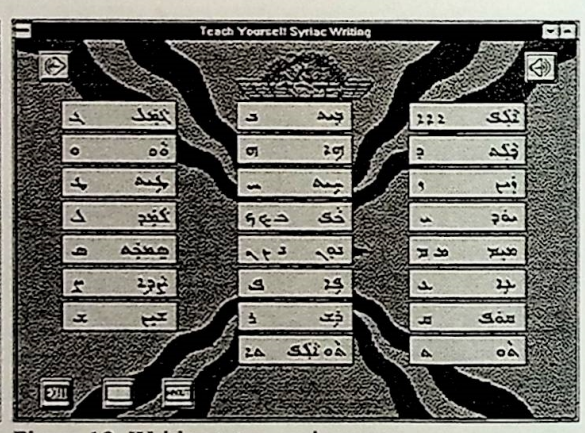


Figure 18: Writing tutor, main screen

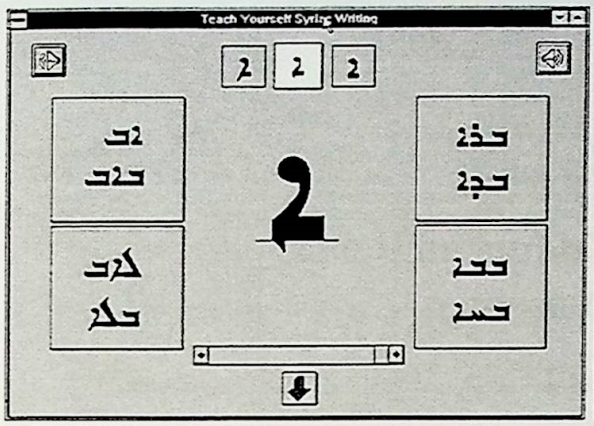


Figure 19: Stroke animation screen

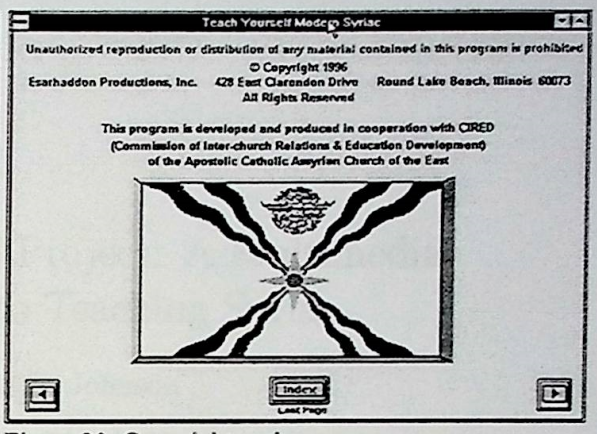


Figure 20: Copyright notice

The Hammurabi Project: A Multimedia Approach to Teaching Syriac

Dale A. Johnson

July 30, 1996

Abstract

The paper proposes to demonstrate the uses of Visual Basic proramming for crafting a multimedia approach to the teaching of Syriac. A CD master will present the visual and audio components of a beta project that uses the theme of Hammarabi to illustrate techniques in programming. Wireframe modeling, creation of textures, rendering, audio editing and a variety of methods will be surveyed. Included in the paper will be references to Java programming, Gif89a building, and HTML code to demonstrate how overall methodology must include eventual migration to the internet. Proper planning in the beginning eliminates extra work when adapting projects for use on the World Wide Web.

CD's will be available with a full working multimedia version of the project.

Part III

Bibliography

Syriac Computing: A Bibliography (1975-1995)

George Anton Kiraz
Computer Laboratory
University of Cambridge (St John's College)
Email: George.Kiraz@cl.cam.ac.uk
URL: http://www.cl.cam.ac.uk/users/gk105

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The advent of Syriac Computing goes back to the early 1970s when scholars in Germany started compiling concordances for Syriac texts (see under 'Text Tools' below). During the next decade or so, computer applications regarding Syriac were limited to scholarly projects. By the late 1980s, however, with computers becoming ubiquitous, Syriac applications were produced not only for the scholar but also for the end-user.

This brief bibliographical survey covers the past two decades. The first listing classifies publications by subject. The second is arranged by author.

Listing by Subject

- **Aligning Texts**: Kiraz (1996a), Kiraz (1996b), Piano (1994).
- **Bibliographies**: Coakley (1995), Erhart (1995).
- **Catalogues**: see 'Bibliographies'.
- **Coding**: Buck (1995), Jasim (1995a), Jasim (1995b), Kiraz (1989).
- **Computing, General**: Kiraz (1990).
- **Concordances, Computer-Generated**: Kiraz (1993a), Kiraz (1994b), Sprenger (1973), Strothmann (1983-).
- **Concordance Generation**: see 'Text Tools'.
- **Corpora**: see 'Texts'.
- **Fonts**: Anderson (1995b), Hasso (1989), Kiraz (1987-92). See also 'Word-processing'.

- **Graphics**: Hajjar (1995).
- **Hypertexts**: see 'Texts'.
- **Lexicography**: Kiraz (1994a), Kiraz and Ponsford (1994), Kiraz and Ponsford (1995).
- **Localisation**: Brandt (1995).
- **Morphology**: Grimley-Evans et al. (1996), Kiraz (1996c).
- **Text Tools**: Borbone (1987), Borbone and Mandracci (1989), Borbone (1990) Harder (1989), Kiraz (1994a), Sprenger (1977), Sprenger (1979), Weitzman (1989).
- **Texts/Hypertexts**: Anderson (1995a), Bolton and Kiraz (1994), Cook (1986), Moxham (1995), Nieuwoudt (1989).
- **Transliteration**: see 'Coding'.
- **Typesetting**: Haralambous (1995).
- **Wordprocessing**: Brandt (1995), Hasso (1991), Kiraz (1993b), Suh (1995). See also 'Typesetting & Fonts'.

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