

## THE EAST MEDITERRANEAN POTTERY PROJECT EXCHANGE OF SPECIALIZED DATA ON THE INFORMATION SUPERHIGHWAY

### 1. INTRODUCTION

The Israel Antiquities Authority is launching the *East Mediterranean Pottery Project* to enhance the study of ancient ceramics using the information superhighway. This highway is largely equals to the rapidly expanding Internet. Nobody really knows what it will be tomorrow but the chaotic stream of freely expressed opinions, information and data will probably grow even more overwhelming during the coming years. Although only in its rudimentary beginnings, the information superhighway has already changed our understanding of computers and computing by setting networks into the central stage. The basic shift from local computing into world wide connectivity has significant consequences to scientific and humanistic research by encouraging "collective thinking" on a new level of shared data. Much noise and superficial information is passing in the Net and it is important that these resources are increasingly utilized in serious scientific study. This was, anyway, the original idea in the creating of this international network of computer networks.

The *Genome Database Browser* demonstrates a very efficient and serious usage of Internet for world-wide exchange of data between scientist tackling similar problems. Fresh discoveries about genes are added to the system as soon as they are found and other scientist practically anywhere around the world can access the new data using low cost equipment. The level of immediacy and coverage achieved by the GDB may not be required in archaeological research. Nevertheless, a new era of archaeological communications was ushered in when the French Minister of Culture, *J. Toubon*, made available images and text describing the discovery of magnificent Palaeolithic caves at Vallon - Pont d'Arc (Ardèche). The data was accessible on the WEB from January 17, 1995 - only a few weeks after the actual discovery of the caves. On similar track, the *Acta Tempestriva* homepage was created by University of Michigan to focus on news about Roman and Italian archaeology.

In addition to archaeological news, also excavation projects are already routinely published on the Internet. The WEB page for the Çatalhöyük project is a shining example of this technique allowing interested archaeologists everywhere around the world to follow the developments in the research of this important site. The Caesarea, Lahav, Megiddo and Sephoris pages are examples of Israeli projects that seek publicity on the information superhighway. In a rather unprecedented manner, the Lahav (Tel Halif) figurine database

was put on-line even before the objects have been formally published (such openness is indeed refreshing in the realm of Near Eastern archaeology). The link between these excavations is that each has a research partner in the USA where the penetration of Internet communications into archaeology is at a higher level than elsewhere in the world.

In addition to providing general information, the Internet is utilized to distribute key results of specialist studies. University of Connecticut *ArchNet* serves as a "virtual archaeological library" providing access to databases and professional presentations of detailed information. For example, the ArchNet resources for the identification and analysis of *prehistoric ceramics from New England* are easily accessible and combine high-quality photos and drawings of the objects themselves and of their finding places within a well-structured disposition of analytical text and references. Another very useful gateway to specialized archaeological studies is the collection of ABZU pages edited by Charles E. Jones in the Oriental Institute of the University of Chicago.

The *East Mediterranean Pottery Project* (hence EMPP) fits into this emerging world of shared information into the category of wide area exchange of specialized data. The main goal of the project is to open the rich collections of pottery objects in the IAA store rooms to the international scientific community in a controlled manner and to invite other organisations and museums to participate in the project by opening the collections under their administration in a similar way. The project will hopefully evolve into an international network of EMPP compatible servers that can automatically perform wide area pottery searches across country borders. The forum may also include pages for scholarly discussions, ceramic project information and even e-mail address books listing researchers involved in East Mediterranean pottery studies. The main emphasis of the EMPP is, however, in the exchange of detailed textual and graphical data about the objects.

For example, a student of Byzantine *North Syrian basins* (Hayes) could use an EMPP compatible workstation to search for registered specimens of this ware around the East Mediterranean basin from Cairo to Istanbul. Even an incomplete search would provide the student with an excellent starting point for further research with its images, morphological and technical descriptions, bibliographical listings of parallel types and other data.

The Internet is evolving so rapidly that we already foresee significant changes in the technical realization of the EMPP project. For example, the virtual reality modeling language (VRML) allows the navigating in interactive three dimensional worlds. Instead of viewing several images taken from one object from different angles the user may rotate a single VRML image on the monitor. Such technical innovations should, however, be used to embellish the standard query engine that forms the backbone of the system.

## 2. INTERACTIVE DATABASE QUERY INTERFACES ON THE INTERNET

The emerging standard for interactive queries is a WEB browser page written in the Hyper Text Markup Language (HTML). Such pages have the ability to process graphics and are therefore vastly superior to text based search engines such as the gopher or ftp servers in ceramic studies where full color pictures and graphical section drawings are of critical importance.

A simple yet efficient way to perform interactive queries is to use the HTML navigation tools. The well-known Romarch homepage uses this method allowing users to narrow down their searches in a set of related documents. Such an associative search can be fruitful and even lead to unexpected new directions. However, the daily maintenance and updating of the links requires intensive work even when computer assisted and the method alone is not ideal for querying object databases.

HTML enhanced form based searches provide a simple way to access object databases. The capability to select search strings from a predefined set of strings makes these pages easy to understand and to use. The Tufts University's *Perseus Project* is an excellent example of how to use this technique. The user may look for data according to catalogue numbers, key words or category definitions and receives professional level details about architecture, sites (with plotted maps), objects and original texts including full-color illustrations. The same search technique is used, for example, with good results in the *Classical Architecture of the Mediterranean Basin* image database. The method seems well on the way of becoming a world wide standard.

## 3. MULTIPLE DISTRIBUTED SERVERS

The EMPP project will utilize the above described HTML forms technique to allow interactive searches for pottery objects. The main thrust of the project is to combine multiple database servers located in different countries or continents to respond to a single EMPP query. The success of wide area searches requires that the participating machines are kept listening for EMPP requests and that they process such queries and return search results in a commonly understood format. Because of the information superhighway, there is no need to develop expensive dedicated communication lines or new protocols.

The EMPP database servers operate in the background processing requests without human intervention and return filtered public information to the clients. Local protocols, database engines and operating systems are hidden from the EMPP query allowing for maximum freedom on the server side. This may sound utopistic but various wide area search engines are already in established use performing sophisticated distributed database searches (for example the WAIS systems using the Z39.50 protocol to communicate

between server and client). Accordingly, the main obstacles in reaching the general goals of the EMPP project are more in the realm of general logistics and terminological standards than in network communication or database search techniques.

#### 4. IMPLEMENTATION OF KEY WORD SEARCHES AND ALIASING

The Israel Antiquities Authority has been developing a bi-lingual archaeological Thesaurus since 1992 under the direction of Dr. Benni Sass (Hebrew - English). It is an evolving collection of loosely arranged words that also includes internationally established words for ceramic wares and technical terminology. The Israel Antiquities Authority implementation of EMPP key word and category searches is based on this Thesaurus.

There are, of course, several other Thesaurus implementations, such as the J. Paul Getty Thesaurus for Art and Archaeology. Since such collections of words may not be directly compatible it may be necessary to create an internal system for terminological aliases that equates key expressions. Internet connections could be utilized also for this purpose to create a truly multilingual pottery thesaurus with rich sets of terminological variations.

#### 5. POTTERY TYPOLOGY AND THE DELTA STANDARD

Key word searches can be done only when dealing with widely used terms for ceramic families and wares. Wide area pottery searches face a much more thorny problem when one is trying to locate typological parallels for vessels that do not belong to such internationally recognized categories as Attic Black Figure Vases. There is no universally accepted method for ceramic classification and even within the limits of a single period or region one may find diverse solutions between colleagues. We can only propose a possible direction where a standard approach could be found for passing typological identification keys along the information superhighway.

The basis of the typological classification system recently developed in the Israel Antiquities Authority as part of a wider computerization project has been borrowed from biological research. It adopts the DELTA standard, a flexible general system for processing taxonomic descriptions. The system was invented by Mike J. Dallwitz and first published by him in 1974 (DALLWITZ 1974; see also DALLWITZ, PAINE and ZURCHER 1995). This approach to plant and insect classification system has gained wide acceptance among biologists because it concentrates in an easy to understand way on those features that are most important for the taxonomy. It has apparently not been adopted previously on the typing of inanimate objects.

The implementation of the DELTA standard into typology is still in the beginning stage but the early results have been impressive. The user can eas-

ily focus on the important diagnostics and make a note of these features in a convenient and flexible way required by the very unfocused world of ancient pottery making. We have implemented DELTA syntax using a relational database model and a GUI that supports SQL and digital images.

The main point in adopting the DELTA format is to find a platform independent identification system that could be adopted by archaeologists working in many different countries and in different computing environments. An essential element of any typological identification system would therefore be its ability to read and write plain DELTA format output for international (Internet) exchange of data.

We have supplemented the DELTA based identification key system with a method to create hierarchical order between the defined ceramic types. Such a class, type, variant hierarchy may have both regional and chronological significance. The hierarchy is handled by a subsystem that arranges defined ceramic types into groups within a very loosely formed address based tree structure.

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#### BIBLIOGRAPHY

- DALLWITZ M.J. 1974, *A flexible program for generating identification keys*, «*Sys. Zool.*», 23, 50-57.
- DALLWITZ M.J., PAINE T.A., ZURCHER E.J. 1995, *User's Guide to the DELTA System. A General System for Processing Taxonomic Descriptions*, Ed 4.03. Division of Entomology CSIRO.

#### *Internet addresses of WWW pages mentioned in the article*

The Genome Database Browser: world wide database for research on human genetics

<http://gdbwww.gdb.org/gdb/browser/docs/topq.html>

French Ministry of Culture: recent discovery of Palaeolithic Cave Art from Ardèche

<http://www.culture.fr/gvpda.htm>

ArchNet: World Wide Web Virtual Library for Archaeology WEB pages by Thomas Plunkett and Jonathan Lizee, University of Connecticut

<http://www.lib.uconn.edu:80/ArchNet/ArchNet.html>

ArchNet: A Virtual Catalogue of Prehistoric Pottery from New England

<http://www.lib.uconn.edu/ArchNet/Topical/Ceramic/Windsor/Windsor.html>

ABZU Guide to resources for the study of the Ancient Near East available on the Internet Maintained by Charles E. Jones, University of Chicago, Institute of Oriental Studies

<http://www-oi.uchicago.edu/OI/DEPT/RA/ABZU/ABZU.HTML>

ÇATALHÖYÜK: WEB page by Timothy Ritchey.

<http://catal.arch.cam.ac.uk/catal/catal.html>

ROMARCH: Internet resources on Roman art and archaeology. University of Michigan.

<http://www.umich.edu/~pfoss/ROMARCH.html>

GREEKARCH: Internet resources on Greek art and archaeology. University of Michigan.

<http://www-personal.umich.edu/~jmucci/greekarch.html>

ACTA TEMPESTIVA: index on new discoveries and projects on Roman and Italian archaeology. Editor Dr. Pedar W. Foss. University of Michigan.

<http://www.umich.edu/~pfoss/acta.html>

CAESAREA MARITIMA: Combined expeditions by University of South Dakota, the University of Maryland and Haifa University Center for Maritime Studies.

<http://www.usd.edu/~clehmann/caesarea.html>

LAHAV (Israel) DigMaster Digital Archaeology Archives.

The Cobb Institute of Archaeology. Mississippi State University.

<http://www.cobb.msstate.edu/>

MEGIDDO: home page for the Megiddo excavations.

Prof. B. Halpern, The Pennsylvania State University.

<http://cac.psu.edu/~rlg7/hist/proj/megiddo.html>

SEPPHORIS: J.F. Strange, Report of the excavations in 1994.

The University of South Florida. Hypertext version prepared by Thomas R. W. Longstaff.

<http://www.colby.edu/rel/Sep94.html>

PERSEUS Project. An Evolving Digital Library on Ancient Greece.

Tufts University with several other universities and organizations.

(<http://www.perseus.tufts.edu/>)

Virtual Reality Modeling Language (VRML)

For recent examples and standards see WebFXsystem

(<http://www.paperinc.com>) and Sun Microsystem Java programming language ([www.javasoft.com](http://www.javasoft.com))

Classical Architecture of the Mediterranean Basin. Extensive image database. Prof. Michael Greenhalgh, Australian National University.

[http://rubens.anu.edu.au/architecture\\_form.html](http://rubens.anu.edu.au/architecture_form.html)

The Getty Arthistory Information Program

[http://www.ahip.getty.edu/ahip/Text\\_home.html](http://www.ahip.getty.edu/ahip/Text_home.html)

DELTA: DEscriptive Language for TAxonomy. M.J.Dallwitz Division of Entomology. Commonwealth Scientific and Industrial Research Organisation, Australia.

<http://155.187.10.12/delta/delta.html>

## ABSTRACT

The information superhighway technology has made it possible to create world wide multiple server databases for scientific and humanistic research. These allow a deeper level of exchange of data in archaeology than news services and information about excavation projects. The archaeological information passed along Internet channels is bringing scholars to think together in a way never before seen in the history of the research.

The Israel Antiquities Authority *East Mediterranean Pottery Project* is an attempt to enable searches on multiple database servers containing information about ceramic objects in museum and private collections. The search engine is based on HTML forms that provides a platform and operating system independent environment required by a widely distributed database search.

The two main obstacles in the expanding of the system are terminological problems arising from language and usage differences and the lack of a common system for type identification. The suggested solutions include the creating or adopting on local level of a pottery Thesaurus that allows extensive conceptual aliasing between distributed databases and the adopting of the DELTA syntax for passing typological identification keys between different databases.

The future will show how the launching of the EMP project will be received by the international community and what is the growth potential of this and other similar scientific projects appearing on the information superhighway.