COMPUTER LABORATORY

John C. Sanders and Peggy M. Sanders

The Computer Laboratory participated in the development of two grant proposals this past year, both of which were successful and will lead to very interesting and important results.

Less Commonly Taught Languages — Mellon Grant

A group of distinguished language teachers and scholars of foreign languages at four universities — the University of Michigan, the University of Chicago, Northwestern University, and the University of Wisconsin — has been awarded a four-year grant from the Andrew W. Mellon Foundation to adapt the most recent developments in computer technology to new modes of instruction for the teaching of three less commonly taught languages.

As one part of this project, Oriental Institute Professor Janet H. Johnson, working in collaboration with Terry G. Wilfong and Janet E. Richards of the University of Michigan, will develop an entirely new type of reader in Middle Egyptian that will be offered to students at the University of Chicago and the University of Michigan, and later to students at all four participating institutions. Colleagues at Northwestern University (Richard Lepine) and the University of Wisconsin-Madison (Magdalena Hauner) will produce a two-year Swahili language and culture course, and colleagues at the University of Michigan (Peter Hook, Tahsin Siddiqi) and the University of Chicago (Mithilesh Mishra) will develop a three-year sequence of lessons in Hindi language and culture. These three languages were chosen because of their diversity, representing as they do different language groups from different parts of the world and presenting very different problems to the scholar, teacher, and student.

As the Oriental Institute's leader in this project, Jan Johnson, working in conjunction with the Computer Laboratory, will create an interactive, platform-independent web-based unified grammar and reader built on a database of approximately 30 representative Middle Egyptian texts (literary, religious, autobiographical, legal) involving thousands of lines of hieroglyphs. Each text will be identified by date, type of text, place of origin of the text, current provenience of the original text, and basic bibliography about the text; cultural and background material (textual and visual) will be provided wherever possible. There will also be linkages to archaeological and historical information. This reader could form the basis for an introductory sequence in Middle Egyptian or could be used as a supplement at all levels of instruction. The authors will also develop a cross-grammatical concordance based on the reader. Both of these innovative projects will provide invaluable tools for the study of this important ancient language to faculty, students, and amateur Egyptologists alike.

The long range goal of this project is to enable us to employ technology in innovative ways to rethink the relationship between student and teacher, the difference between classroom learning and distance learning, and the differences between self-

paced instruction and instruction that follows the academic calendar. The goal is to create a new paradigm for language instruction, one that can be adapted to a variety of languages in the future.

Argonne Collaborative Grant

The University of Chicago and Argonne National Laboratory (ANL) recently awarded Oriental Institute Professor McGuire Gibson and Research Associate (Associate Professor) Tony Wilkinson, and ANL scientist John H. Christiansen a two-year collaborative grant to examine interactions between human communities in the ancient Near East, the environment, and social processes by means of a computer modeling framework developed by the Decision and Information Sciences Division of ANL.

Archaeology provides a wide range of millennia-long data relevant to the growth of complex society, but archaeologists have no techniques for successfully manipulating these multiple data sets to see how such societies developed. ANL has developed an innovative computer modeling framework that can support simulation of dynamically coupled cultural and environmental systems but lacks long-run data to test such models. This two-year collaborative grant seeks to devise means to combine our respective capabilities in order to open up a new arena for future developments in social modeling and Near Eastern civilization studies.

Examples of complex, coupled social/natural system scenarios capable of solution in the long-term by using the innovative computer modeling framework developed at ANL include:

1. Models of agricultural production and urbanization in marginal agricultural areas.

2. Upstream-downstream models in which upstream communities disrupt water supply or initiate unacceptable environmental disturbances that negatively effect downstream communities.

3. Large-scale impacts of settlement, climate, and agriculture on the environment and biological resources of marginal areas, i.e., desertification.

Achaemenid Royal Inscriptions Project

The Computer Laboratory is cooperating with Professors Gene Gragg and Matthew Stolper in the development of the Oriental Institute's first searchable database accessible via our website to scholars, students, and the public world-wide. The aim of the Achaemenid Royal Inscriptions project is to create an electronic study edition of the inscriptions of the Achaemenid Persian kings in all of their versions — Old Persian, Elamite, Akkadian, and, where appropriate, Aramaic and Egyptian.

Each edition of a text is presented in transliteration, accompanied by translations, glossaries, grammatical indexes, basic bibliographic apparatus, basic text critical apparatus, and some graphic apparatus (e.g., plans indicating provenience of the inscriptions, images of exemplars). Each text is available for downloading and printing.

This first stage of the project, which went on line in spring 1998, presents the inscriptions from Persepolis and nearby Naqsh-i Rustam, where the Oriental Institute of the University of Chicago carried out excavations between 1931 and 1939.

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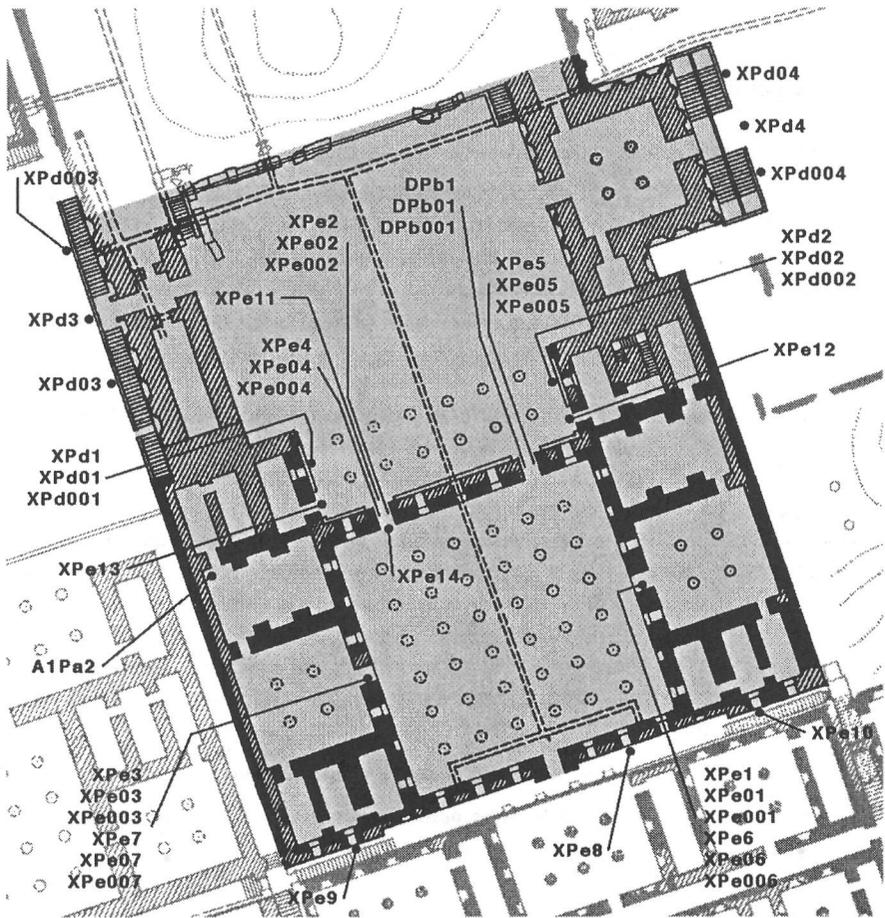
Figure 1. Plan of Palace of Xerxes at Persepolis. Inscription names and positions are located on building plan

Giza Plateau Mapping Project

Construction of the Giza Plateau computer model continues under the direction of Mark Lehner, a Visiting Assistant Professor at the Oriental Institute. Peggy Sanders, an independent computer graphics specialist with Archaeological Graphics Services, continues to build the three-dimensional model of the Giza Plateau and its architecture.

This past year work focused on the architectural components of the Giza pyramids. One by one, each of the architectural models is being created with accurate, three-dimensional details from published maps, survey, and excavation reports. Models have now been completed for the following monuments: Khafre Mortuary Temple, Khafre Valley Temple, the Sphinx Temple; Menkaure Mortuary Temple, Menkaure Valley Temple; the interior chambers of the Khafre and Menkaure pyramids, and the interior chambers and temples of the Queens' pyramids for both the Khafre and Menkaure pyramids.

When all of the architectural components are complete, we will begin texture mapping of appropriate materials to various surfaces in the model and superimpose scanned images of wall reliefs and inscriptions onto the appropriate surfaces of the Giza monuments. Modeling and rendering software will be used to create "walk-through" sequences. We hope the analytical and educational potential of this database will eventually result in a superior product.

For those who like technical details of computer hardware and software, the computer model has been constructed, since February 1997, on a Dell OptiPlex GXpro, 200MHz with 128 MB RAM, using AutoCAD Release 14. The entire database is approximately 35 MB and growing.

Map Series

The Map Series is a new electronic publication of the Computer Laboratory on the Institute's website. The first installment of the Map Series went on line in spring 1998 and displays seven site maps covering the ancient Near East (Egypt, Sudan, Levant, Syria, Turkey, Iraq, and Iran), locating primary archaeological sites, modern cities, and river courses set against a plain background. All site maps are simple conic projections at the same scale and orientation. Future versions of the map series will include terrain relief as a background for each of the seven site maps, one version colored for elevation and a second version colored for vegetation, as well as latitude and longitude (graticule) lines.

The Map Series was produced from map projection, terrain relief, and cartographic data in the Mountain High Maps product, by Digital Wisdom, Inc., of Tappahannok, Virginia.

Epigraphic Survey Photographic Negative Database Program

In its first season of use the Epigraphic Survey's new photographic negatives database management program performed very well, to the delight of the staff based on their telephone and fax communications from Chicago House during their 1997/98 season.

One of the last instructions I gave the Epigraphic Survey staff as they packed up and headed back to Chicago House in September 1997 was to really test the database management program in its first year of use, to try to "break" the program so that we could find its faults and fine tune it to their needs. A few minor glitches that appeared at the very beginning of its use were able to be fixed in the field because Jason Ur, a Mesopotamian archaeology student in the department who wrote the actual FoxPro source code for the database program, was in Egypt in January 1998 to excavate at Giza with Dr. Mark Lehner. He made a short visit to Chicago House and fixed most of the early problems with the program.

To make a long story short, the staff continued to use the program throughout the season and discovered a few more problems, returning to Chicago in April 1998 with many requests to have this feature added and this feature changed in some small way. They did exactly what we asked them to do, and in one case they even exceeded our expectations. Much to the surprise of both myself and Jason they found a way to duplicate records, something we both thought to be impossible. In the world of computer software writing, however, these events are all for the good,

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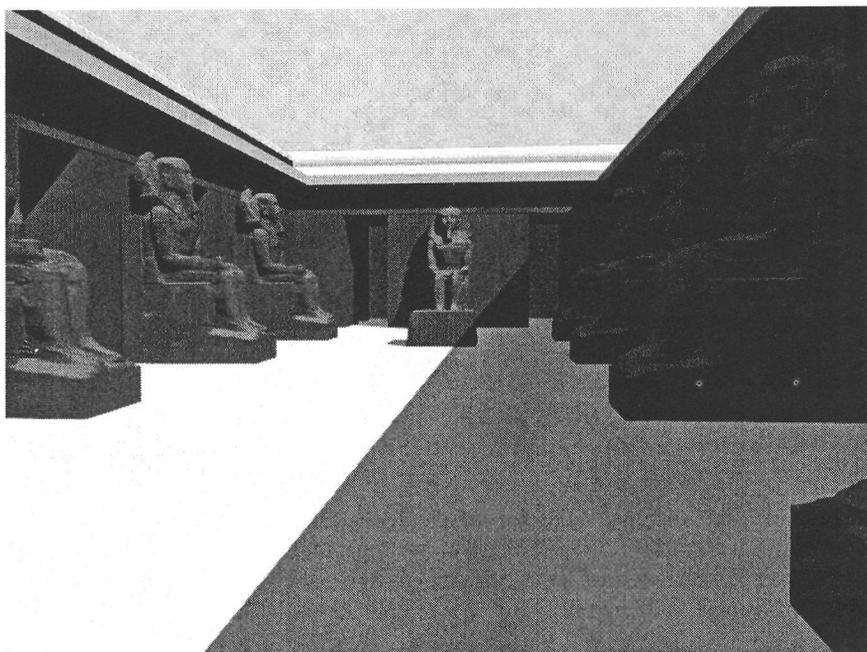
Figure 2. Computer reconstruction of Sphinx Temple at Giza. View of courtyard with larger-than-life Khafre statues in place

as they will help Jason to fix certain "bugs," or mistakes, in the program, and in general to clean up the way the program presents itself to the Epigraphic Survey staff.

These corrections are being made as this publication goes to press, so once again check back in next year's *Annual Report* to see how the new, improved version of the database management program functioned in its second year of use at Chicago House.

Conservation Laboratory Photographic Database Program

Laura D'Alessandro, Head of the Conservation Laboratory, asked the Computer Laboratory in winter 1998 to write a database management program to organize and provide an efficient query capability for the thousands of photographs (both prints and slides, color and black/white) that have been taken by the Conservation Laboratory's staff or Institute photographer, Jean Grant, during the ongoing building renovation project. As with the Epigraphic Survey database program described above, the overall program structure and file formats were developed by John Sanders, and Jason Ur, a Mesopotamian archaeology student in the Department with experience developing FoxPro applications, was hired to write the actual source code. The database will start to be used by Laura, Barbara, and Susan in late summer 1998, so check back in next year's *Annual Report* to see how the new database management program is functioning for the Conservation Laboratory.
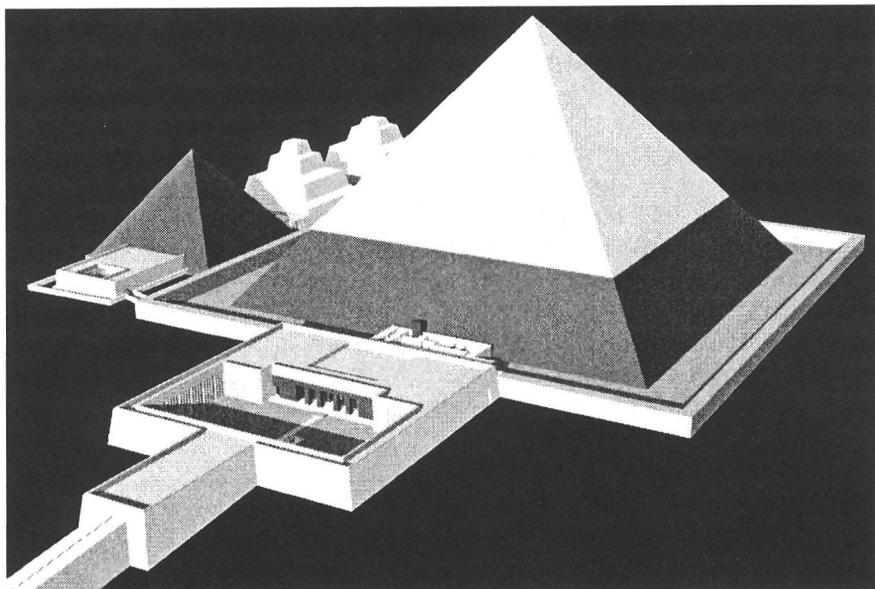
Figure 3. Computer reconstruction of Menkaure Mortuary Temple, Menkaure Pyramid, and Queen's Pyramids complex at Giza. Aerial view from northeast

Isthmia Project

The multi-phased three-dimensional computer model of the ancient site of Isthmia (Greece) is nearly complete, and Peggy Sanders continues to produce a variety of images in slide or print form for lectures and reports by Prof. Elizabeth Gebhard (University of Chicago Department of Classics). Before Prof. Gebhard left to spend the summer in Edinburgh and Greece, we began to develop a plan to link the long-standing Isthmia computer database of artifacts and features with our AutoCAD plans of the excavation trenches. Also continuing, albeit at a slower pace in recent months, is the development of the Isthmia website. The agenda for the website is to report on excavation of the nearby Rachi settlement.

Getty Museum

Peggy Sanders made another trip to the Getty Museum in Malibu, California in October 1997. She spent one week drawing pottery for the Corpus Vasorum Antiquorum (CVA) series. For the most part, the drawings included Etruscan vessels for a second volume being written by Dr. Richard de Puma from the University of Iowa.

Department of Near Eastern Languages and Civilizations Website

In an effort to offer accurate course listings on the University of Chicago's Humanities website, the Department of Near Eastern Languages and Civilizations (NELC) asked Peggy Sanders to update its web pages, which now include a complete course schedule and course descriptions for the forthcoming 1998/99 Fall, Winter, and Spring Quarters.

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Laboratory Equipment and Institute Resources

In late summer 1997, the Computer Laboratory purchased a new high performance IBM-compatible computer system. A 200MHz Dell 6200 OptiPlex GXPro, with 128 MB RAM and 6 GB disc storage, this PentiumPro-based graphics workstation will be used for archaeological database development and as a second image processing workstation for the Laboratory. This computer system is also the host for the Laboratory's new Nikon LS-1000 35 mm slide scanner, acquired as part of a 1996 Technology Enhancement grant from the University's Office of the Provost. As expected, the slide scanner has been in demand by several projects in the Institute. Everyone who has used the scanner has been impressed with the quality of digital images it produces from 35 mm slides, and how easy and fast the scanning procedures are with this piece of equipment. As predicted in the *1996/97 Annual Report*, a sign-up sheet is required and the line forms in the hallway, please.

World-Wide Website

For further information concerning several of the above mentioned research projects, the Institute's World-Wide Web (WWW) database, and other electronic resources in general, see *Electronic Resources,* below.

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The Oriental Institute, in general, and the Computer Laboratory in particular, lost a good friend with the passing of Mr. William Pattison. A warm and caring individual, Bill was always willing to listen and contribute to the comings and goings of the Institute with a positive outlook and energy to burn. His efforts on behalf of public education and his overall love on life will be greatly missed.