



# THE ORIENTAL INSTITUTE

NEWS &amp; NOTES

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## TIN SMELTING AT THE ORIENTAL INSTITUTE

*By Bryan Earl, Metals Specialist, and K. Aslihan Yener, Assistant Professor, The Oriental Institute and the Department of Near Eastern Languages and Civilizations*

Several experimental smelting procedures were tested both in the field in Turkey and at the Oriental Institute by our metals specialist, Bryan Earl from Cornwall, with additional analysis by Dr. Hadi Özbal of Istanbul. A video camera documented both experiments, while photographs and slides were also taken for future publication. The courtyard of the Oriental Institute served as the setting for the smelting experiment, which was widely witnessed by faculty, staff, and students from the Oriental Institute. Scientists from other departments of the University of Chicago such as chemistry, geophysics, Enrico Fermi Institute, as well as researchers from the Field Museum and the Illinois Institute of Technology also joined the demonstration. The experiment was successfully conducted on November 11, 1994.

The archaeological excavations at Kestel and Göltepe in the Taurus Mountains of Turkey, led by Professor Aslihan Yener of the Oriental Institute, have disclosed an early Bronze Age tin mining and processing operation. There is at least one ancient mine in the area of the excavations, now named Kestel Mine, but there are undoubtedly more yet to be found. The experiments aimed at establishing production techniques and were designed to determine the magnitude of tin production at the site of Göltepe.

Tin metal does not quickly spring to mind as being of great archaeological importance, but a moment's thought brings one to the problem of bronze. Bronze is normally taken to be some alloy based on copper, particularly the tin-copper bronzes, and the development of such alloys is of great significance. The use of bronze shows that there was a realization that it had valuable properties, which reveals the possession of considerable metallurgical skills. Tin is the key to a host of important archaeological considerations.

Because of the problems associated with the finding, mining, and smelting of tin, any assessment of tin work at an ancient site should be based on a highly practical examination. It is necessary to apply a wide range of very refined techniques to gain an understanding of the details of the operation, any significant conditions that controlled what had happened, and the character of the materials resulting from the work. The trial

at the Oriental Institute demonstrated the methods that had been adopted for the initial assessment of the Kestel and Göltepe sites in Turkey. Using material from Göltepe, it was shown that tin mining and smelting, using methods that had been deduced by examination of the archaeological evidence, were entirely practical. Material quite suitable for the production of tin-bronze was produced.

In the Chalcolithic period (ca. fifth–fourth millennium B.C.) either naturally occurring native copper or copper smelted from some ore by some form of furnace was used. The furnace smelting process needed the development of considerable mining and smelting skills. Some of the copper used was fairly pure metal. The earliest bronze is usually differentiated from copper as having a small amount of arsenic and sometimes iron added, which gave a metal that had superior mechanical properties to copper alone, such as increased hardness. It is difficult to judge whether the additional arsenic was a deliberate addition or a

lucky impurity. Many copper ore deposits, such as the sulfide ores, do have an arsenic ore content. It is possible that the early metallurgists found that adding arsenic ore to their copper gave the desired effect, but so far there does not appear to be any evidence that this was intentional.



**Bryan Earl smelting tin in the courtyard of the Oriental Institute**



**Bryan Earl drying vanned material**

The most important development in the making of bronze was the evolution of the tin-copper alloys. Depending on the tin content, these bronzes provide a wide range of valuable properties, such as hardness, toughness, or ease of casting. To make them requires a deliberate addition of tin to the copper metal. To make a significantly valuable tin-bronze, about five percent of tin is required—more if various specific properties are desired. The tin can be introduced into the copper in several ways. The simplest method is by “cementation,” i.e., adding tin ore of reasonably high grade to molten copper along with charcoal. The most controllable method is to add the tin as metal to the copper.

Tin is not widely distributed and is really a semiprecious metal. Tin hardly ever occurs “native” as metal. Its only really significant ore is cassiterite ( $\text{SnO}_2$ ), which is normally a dull drab brown material that is difficult to distinguish from ordinary rock unless sensitive methods are used. Cassiterite has two specific properties that are useful for its separation and identification. It is very dense and if crystals of the ore are present it can have a bright sparkle because of its high refractive index. Occasionally a lump of cassiterite is found in a lode, but this is not at all common. Rich ore holds about 5.0% metal, good ore about 2.0%, and skilled miners in western England work down to about 0.2% from stream detrital deposits. Tin also occurs in the mineral stannite ( $\text{Cu}_2\text{SnFeS}_4$ ), but this is quite rare and is not considered an important ore. Tin ore is virtually always found associated in some way with an “acid”—high silica content—rock. The density of cassiterite ranges from ca. 6.99 to 7.0 g/cc, gold from 12.0 to 20.0 g/cc, and hematite (an iron ore [ $\text{Fe}_2\text{O}_3$ ], that is found associated with the Turkish tin ore) 5.26 g/cc. The typical waste—gangue—minerals with this ore are quartz, 2.65 g/cc, and calcite, 2.71 g/cc. These densities indicate the relative ease of separation by a “washing” process.

There are considerable similarities in the initial stages of the mining and dressing (concentrating) of tin and gold. Similar to gold, cassiterite is usually found entrapped in gangue mineral if it is in the original lode containing the ore. A lode occurs like the cheese in a sandwich, where the cheese is the orestuff and the bread on either side the surrounding country rock. The lodestuff has to undergo several treatments. To be worked it must first be mined out, crushed to release the valuable material, and then dressed, usually by using moving water to displace the lighter gangue minerals leaving a rich head of the heavy particles of cassiterite or gold.

If the tin-gold ores have been broken down out of the lodes by weathering, the material is often carried to a stream along with the gangue, usually in gravel or sand-like debris. Often the ores can be obtained by washing, but in some cases crushing is needed to release them.

The washing can be done in a number of ways. Using a pan or similar vessel such as conical bowl—a batea—is one method, or the orestuff can be thrown into running water flowing in some form of trough or inclined plane, often with a prepared surface so that the heavy ore particles settle out of the water apart from the waste. In very dry districts winnowing can be used to make an initial separation.

While gold can be easily seen, cassiterite is far from easy to detect. Nowadays, a range of very sensitive techniques, such as X-ray fluorescence assaying, is used. However, in the past simple but surprisingly delicate methods for assaying had evolved. A much used assay for cassiterite developed in western England’s metalliferous region: a powdered sample of orestuff is swirled with water on the blade of a shovel and then given a series of upward flicking motions. The heavy cassiterite is tossed up through the water and appears as a cres-



**Map showing location of Göltepe and Kestel**

cent shaped patch at the top of the charge with the lighter waste below. The size of the cassiterite head indicates the richness of the ore. This technique, known as "vanning," was still in use at a major tin mine until 1985. It was a highly practical assay. It had the advantage of separating the cassiterite that could actually be recovered by washing techniques. A skilled vanner can detect down to 0.1% cassiterite in the lodestuff. The introduction of the very effective tin flotation dressing method has shown that vanning undervalues the ore.

For examining ancient archaeological material it is prudent to use old methods when making an evaluation of possible mineral values. Such techniques are probably similar to those that could have been used by the ancient miners. If cassiterite could be found in significant quantity by vanning at an archaeological site, there is a high probability that the ancient worker could have detected it.

Once the cassiterite has been found and concentrated, it has to be smelted to metal. Smelting is done by heating under suitable reducing conditions. Classically, charcoal was both the fuel and the reducing agent.

Kestel Mine was mined by firesetting: working out the rock by first building a fire against it to weaken it and then breaking it out, probably with stone tools. By vanning out the charcoal from the debris remaining in a fireset pocket it has been determined by accelerator dating that one fireset can be dated to about 2600 B.C. Although the mine is located in calcite/dolomite country rock, there is also quartzitic rock both in the mine and outcropping nearby. By sampling and vanning it was found that cassiterite is present in lode structures and in some cases has formed an accessory in the adjacent rock. This, and the patchy distribution of the ore, is typical of cassiterite mineralization. Gold, in small particles, also occurs in the mine. Such an occurrence with cassiterite is not uncommon. Some of the cassiterite crystals from Kestel are of a somewhat unusual and notable red color, which tends to make them stand out in a panning or vanning assay. The value of the ore is too low and the mine gives an appearance of having been worked out.

It is likely that the ancient miners were initially attracted by the small gold content of the orestuff. On working the gold they then also found the heavy cassiterite. It is a matter of considerable interest how they recognized the tin, especially as it was in the nonmetallic oxide that had to be smelted to produce a metal.

Many thousands of stone tools have been found during the archaeological excavations at Göltepe, a small hill about 2 km distant from Kestel Mine. The tools are typical of those used to powder ore. Many of these tools are hand held pounding

and rubbing stones, which have a typical flat face from the grinding action on a stone slab, with a characteristic "dimple" in the middle. It is interesting that this appearance exactly duplicates that of the iron tools used to the present day for bucking (crushing and powdering) ore ready for assaying in western England. During the excavations some ground ore powder was excavated from Early Bronze Age pithouse structures at Göltepe. The powders were differentiated in color from the surrounding materials. Hadi Özbal, Professor of Chemistry at Bosphorus University, assayed these by atomic absorption techniques and found that some had tin contents of over one percent. The minerals associated with this tinstuff have been identified as those found in Kestel Mine and not from the Göltepe rock, which is a flysch. These powders gave every indication of being orestuff in process. As only one small speck of gold has been found in them so far, it seems they represent material that was destined to go forward to be con-



**Bryan Earl indicating vanned cassiterite**

centrated ready for smelting to tin. The ore has an unusually high hematite content, and this is partially concentrated with the cassiterite because of its high density. It seems the gold had been removed.

Göltepe also holds many curious ceramic sherds. These have no domestic association but give every indication of being vessels in which tin smelting took place. They have been loosely termed "crucibles." Microprobe examination by M. Adriaens of the fabric of these crucibles shows patches of very light tin content—probably as oxide—in the inner section. Smelting cassiterite for tin metal in such a container buried in the ground is well known and was practiced in Japan until the beginning of this century. The fuel and reducing agent was charcoal and an air blast was arranged to urge the fire to a sufficiently high temperature for the smelting to take place.

Enough of one of the powder samples was recovered to enable a quantity of cassiterite to be vanned that produced suf-

*continued on page 4*

ficient concentrate for a smelting trial. The concentrate was found to hold 10.2% tin as metal. Investigations of tin smelting in Africa indicate that low concentrations such as this had been used by early smelters.

A small replication experiment was set up, using the method that it was surmised had been used in the past from a study of the material remains. Some clay nozzles ("tuyeres" to the iron smelter) had been found and it appeared that they had been used to provide an air blast to fire the smelting charge held in the clay crucibles. Bellows may not have been available to the ancient miners, so it was decided to use air blown through a pipe, as depicted in the wall painting in tomb 386 of Thebes, ca. 2000 B.C.

By studying the crucible sherds it was evident that they had been made by mixing clay with chaff to give a vessel the properties needed to withstand the thermal shock of high temperature gradients. They all had notably thick walls and it later appeared that this gave good thermal insulation properties so that the heat could be well confined. Three experimental crucibles were fabricated from clay and chaff obtained from Celaller, a mountain village near Göltepe. The crucibles were constructed using a slab construction technique, replicating the size and technique of the crucibles excavated from Göltepe. One of the crucibles was used in the Oriental Institute smelt.

For the trial in Turkey local charcoal broken to ca. 2.0 cm sieve aperture was put into a dried crucible, ignited, and then blown by mouth until a good bright red heat was reached. Small portions of the tin concentrate were then put on the glowing charcoal and then immediately covered with fresh charcoal. This whole operation was then repeated until all the concentrate had been used up. The blowing was kept up for a further twenty minutes and then everything was allowed to cool. The charge was tipped out onto a vanning shovel, the remaining light charcoal and ash were washed off, and a highly magnet attracted fused gray slag was left. The slag was crushed and beautiful round "prills" (globular beads) of tin metal, up to 2.0 mm diameter, were vanned clear. "Prill" tin was similarly smelted, according to Thomas Beare, in sixteenth century A.D. England.

With a feed of ca. 5.0 g the tin prill yield was ca. 0.175 g. Although the feed for the smelt held a considerable amount of hematite unavoidably tossed up with the cassiterite, the result-

ing tin metal was quite malleable, indicating a reasonably good purity. By theoretical considerations, particularly considering the temperatures achieved, there should have been a high iron phase, normally termed "hardhead"—a tin/iron complex—making the product far less pure. However, the smelting conditions encountered in such furnacing have not only very high temperature gradients but are also dynamic enabling the highly mobile molten tin to separate remarkably clean, although it is still contaminated with iron to a certain degree.

Even though the fine prill tin concentrate could have been remelted with some flux and poured to an ingot, it is quite possible that the prills were taken to the bronze founder. There was no need to have the tin in block form. Although the iron content of the tin produced in this manner could make it unsuitable for making materials such as pewter and solder, the iron impurity is not particularly objectionable if such tin is alloyed with copper because the iron would be largely rejected into a dross and a good bronze could be produced.

The trial smelting at the Oriental Institute duplicated the methods that had been used at Göltepe. Both the identification and concentration of material from the site and its smelting to tin metal were attempted. The trial provided further material for study from the scarce archaeological samples. An addition to the Turkish firing scheme was a small scale "fire assay."

A sample of the Göltepe ore powder was concentrated by vanning, which showed the cassiterite that separated above the lighter waste as a light brown head. It was dried and divided into two portions. The top segment, which was made up of the cleaner (high grade) cassiterite and weighed approximately 50.0 mg by area estimation, was set aside. The lower segment, which had notable hematite contamination, was estimated to weigh 150.0 mg.

The high grade portion of the cassiterite was incorporated with approximately equal volumes of charcoal dust and mixed sodium/potassium carbonate flux (mixed carbonates to ease fusion). The mixture was then placed into a small porcelain crucible with a second larger crucible placed in it to act as a cover. This crucible was now prepared for the main smelt. On a very small scale, this preparation closely followed the fire assay for tin practice in western England.

A crucible that had been made in Turkey was used for the main smelt. Some American hardwood charcoal was crushed



*Kate Luchini, Oriental Institute Assistant Museum Preparator, blowing air into the red hot crucible*

to about 2.0 cm sieve aperture size and ignited before dropping into the empty crucible. A single mouth blown pipe of 0.7 mm bore was then placed in the charcoal, through which air was continually blown, with more charcoal added to keep the crucible full, until the core was seen to be at a bright red heat. The lower grade hematite-contaminated cassiterite was then run onto the top of the glowing charcoal, with no added flux, and immediately covered with more charcoal pieces. Air was blown through the tube into the glowing mix throughout the addition of the material. When the main "furnace" was seen to be well alight, the small fire assay crucible was placed on top and covered with additional charcoal. As the assay settled into the charge and was seen to heat to bright red, more charcoal

was added to maintain the fire. After about fifteen minutes, blowing was stopped and the furnace allowed to cool.

The small crucible was taken out. On breaking open, two tin metal prills were found in the slag. The main charge was treated as in Turkey. After tipping it out onto the vanning shovel, the light fractions were removed, leaving a small residue of ash and matte gray fused slag. One of the larger pieces of slag was separated for study later; the remainder was crushed and vanned under water in order to separate the small prills of tin metal. This main crucible smelt duplicated the Turkish trial in a most satisfactory manner. With a charge of only about 200.0 mg, it was apparent that the method was entirely practical, bearing in mind the losses that can be expected such as the reoxidization of tin to volatile oxide.

The small crucible fusion was included to gain a sample of the highest grade tin that might be expected from the Kestel/Göltepe feed. There was also some concern that the main smelt would not produce tin, given the very small charge and the obvious basic nature of the big crucible smelt. It is not suggested that any such assay method was used by the ancient miners.

Variation in the charcoal effected the success of the smelt tremendously. The use of commercial charcoal briquettes resulted in unsuccessful smelts, while wood charcoal completed the smelt efficiently and resulted in tin metal prills. The test run utilizing a micro-crucible was only partially successful. Even though we did manage to produce prills (tin metal globules), they penetrated the fabric of the micro-crucible and made them impossible to extract. The iron rich charge sample, which was not vanned and thus enriched, fared poorly as well. Tin metal prills were easily produced by using a simple blowpipe and wood charcoal, after having enriched the ore with a vanning shovel to approximately ten percent tin content.

Other variables during the tests were the number of simultaneous blow pipes, the crucible with or without cover, and the nature of the fuel used. A surprisingly high temperature



**Tin prill smelted in courtyard of Oriental Institute fused to fragment of crucible**

can be reached by the simple method of blowing air through tubes into the "furnace." A replica smelt made in Cornwall, U.K., where a platinum/rhodium thermocouple probe was used, showed that 1100°C and over was easily maintained and was sufficient for smelting the ore. Under these conditions it was found that no cassiterite reduction occurred until well over 650°C was attained. When more than one person blew air through tubes into the glowing charge, far higher temperatures were achieved. An experiment with three blowpipes made the fire so hot that it melted a metal blowpipe and vitrified a micro-crucible, indicating a temperature in excess of 1100°C.

It is probable that the ancient miners at Kestel used the smelting process to get a tin that was sufficiently cleaned of gangue to be used in the production of bronze. The products of the Oriental Institute smelt are now being subjected to a barrage of tests—from thin section optical petrography to gallium ion microprobe—to unravel further mysteries. The ancient miners would surely have been fascinated.

*Bryan Earl holds degrees from Camborne School of Mines and Cranfield University. He is a Consulting Mining Engineer and resides in Cornwall, U.K.*

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*For more information on the Oriental Institute's archaeological excavations at Göltepe, Turkey, see K. Aslihan Yener's "Managing Metals: An Early Bronze Age Tin Producing Site at Göltepe, Turkey" (N&N No. 140, Winter 1994) and "The 1993 Excavation Season at Göltepe, Turkey" (The Oriental Institute Annual Report 1993-1994, pp. 31-40).*

*Photographs by Lloyd DeGrane*

## PEGGY GRANT NOMINATED FOR HEART OF GOLD AWARD

Margaret "Peggy" Grant (pictured at right), an Oriental Institute volunteer for twenty-five years, recently received a citation as a 1995 United Way Heart of Gold Volunteer. The Heart of Gold awards recognize and honor outstanding individual volunteers for their contributions to the community.

Among Peggy's many services to the Oriental Institute are upgrading the docent training program and developing a training manual for guides, starting the docent library, instituting docent days with special lectures and tours for volunteers, and starting the monthly volunteer newsletter, *Docent Digest*. In 1979 Peggy was instrumental in preparing the way for the creation of a Museum Education Department with its own director and staff. Currently Peggy is working with Ray Tindel, Museum Registrar, to catalog and register objects for the Chogha Mish excavations.

Thanks—and congratulations—to Peggy!

Photograph by Jean Grant



Heart of Gold citation recipient Peggy Grant

## NEWS FROM THE PUBLICATIONS OFFICE

### NEW TITLE PUBLISHED

#### *The Registry of the Photographic Archives of the Epigraphic Survey*

- By The Epigraphic Survey
- Oriental Institute Communications No. 27
- Pp. xviii + 270; 38 plates. 1995. \$25.00

This publication of the photographic registry of the Oriental Institute's Epigraphic Survey in Luxor provides scholars with a quick reference to the photographic documentation contained in the Survey's primary archival holdings.

Organized alphabetically by site and by the Nelson numbers keyed to temple decoration (devised by Harold H. Nelson, the Survey's first field director), the *Registry* lists all negatives available for thousands of individual scenes in Theban temples and tombs. A reprint of Nelson's thirty-eight key plans in reduced format appears as a separate plate section for convenient reference.

**To place an order for this volume, or to inquire about other titles published by the Oriental Institute, please contact The Oriental Institute Publications Sales Office, 1155 East 58th Street, Chicago, Illinois 60637. Telephone 312/702-9508, Facsimile 312/702-9853. Members receive a 20% discount**

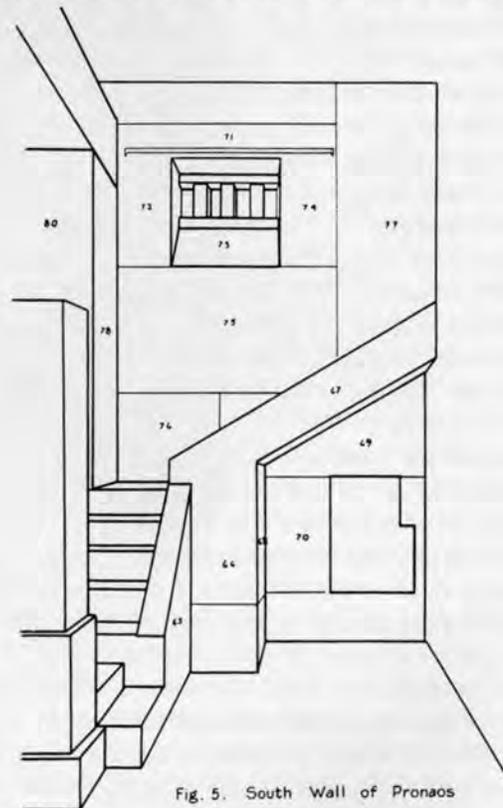


Fig. 5. South Wall of Pronaos

DEIR EL-MEDINAH

From plate 37 (OIC 27)

# ORIENTAL INSTITUTE TRAVEL PROGRAM

## YEMEN/OMAN/BAHRAIN/ABU DHABI

**October 22–November 10, 1995**

Join Assistant Curator **Emily Teeter**, Ph.D., for her popular departure exploring the incense routes of Arabia. Highlights of the trip will include Muscat, Manama, Sana'a, Marib, the Wadi Hadramaut, Hili Archaeological Park, and Umm el-Nar.

**Cost: \$5,950 per person, exclusive of international airfare, plus an additional \$350/person donation to the Oriental Institute.**

## IRAN

**October 24–November 10, 1995**

Research Associate **Abbas Alizadeh**, Ph.D., will lead this historic journey to the land of Darius and Cyrus the Great. Highlights of the trip will include visits to Oriental Institute sites in Iran, such as Persepolis and Bakun, and a day spent with the Qashqaii in their winter pastures.

**Cost: \$5,195 per person, including round trip airfare Chicago/London/Chicago, and two nights in London, plus an additional \$350/person donation to the Oriental Institute.**

## PROPHETS AND PILGRIMS

**November 13–December 4, 1995**

Join archaeologist **Timothy Harrison**, Oriental Institute, for a Red Sea cruise that will highlight Oriental Institute excavations in Egypt, Israel, and Jordan. This cruise, on the Swan Hellenic luxury liner *Orpheus*, will take in sites such as Aqaba, Petra, Megiddo, Qumran, Jerusalem, Ashkelon, Cairo, and, of course, Chicago House in Luxor.

**Cost: \$4,740 per person (N grade cabin; other cabin grades available), including international airfare and two nights accommodation in London, plus an additional \$350/person donation to the Oriental Institute.**

## SYRIA

**March 11–25, 1996**

Conjure the image of Damascus, Aleppo, Palmyra, and Latakia. Let your imagination wander as you join T. E. Lawrence and his band traveling the ancient roads of Syria. **Tony Wilkinson**, Oriental Institute Research Associate, is your expert guide for fifteen days of travel. Visit the jewels of Syrian history: the Krak de Chevalier, Mari, Ebla, and Ugarit. Experience the life of the Damascus bazaar and the beauty of the Islamic architecture in this city, which lays claim to being the oldest inhabited city on earth. Eat breakfast with the bedouin of Palmyra, drink tea in the mountains overlooking Lebanon, and watch the sun set over the Euphrates.

Cost : To be announced

## APRIL IN PARIS (AND BERLIN)

**April 7–17, 1996**

Join Oriental Institute Museum Curator **Karen L. Wilson**, Ph.D., on a unique study trip to the great museums of Paris and Berlin. Highlights of the program will include the Cour de Khorsabad at the Louvre, where you can see the cast of our famous winged bull in an installation that recreates the original courtyard of the Palace of Sargon II, and the Egyptian Museum in the former East Berlin, from which we have recovered the "lost" notebooks of the Oriental Institute excavations at Medinet Habu.

Cost : To be announced

**If you would like more information on the travel program, or itineraries for any of the tours listed above, please call the Oriental Institute Membership Office at 312/702-1677.**

### About the Oriental Institute Travel Program

All Oriental Institute programs are customized by the tour leaders who are Institute faculty and museum staff. Drawing on their areas of expertise and specialized training, these tour leaders provide Oriental Institute travelers with a unique look at famed sites and substantive, accurate information on areas visited.

To ensure that we can continue to offer these programs to our members, all tours carry a tax-deductible contribution of \$350 per person.

# CALENDAR

# OF

## TRAVEL PROGRAM

### October 22–November 10, 1995

*Yemen/Oman/Bahrain/Abu Dhabi*

Lecturer: Emily Teeter, Ph.D., Assistant Curator,  
Oriental Institute Museum

### October 24–November 10, 1995

*Iran*

Lecturer: Abbas Alizadeh, Ph.D., Research Associate,  
Oriental Institute

### November 13–December 4, 1995

*Prophets and Pilgrims*

Lecturer: Timothy Harrison, Archaeologist, Oriental Institute

### March 11–25, 1996

*Syria*

Lecturer: Tony Wilkinson, Research Associate, Oriental  
Institute

### April 7–17, 1996

*April in Paris (and Berlin)*

Lecturer: Karen L. Wilson, Ph.D., Curator, Oriental Institute  
Museum

*See page 7 for more information*

## ADULT EDUCATION COURSES

### June 14–August 2

*Travelers, Rogues, and Scholars: Two Centuries of American  
Interest in Ancient Egypt*

Instructor: John Larson, Archivist of the Oriental Institute

*See page 10 for more information*

### June 17–August 5

*History of Ancient Egypt: The Middle Kingdom*

Instructor: Frank Yurco

*See page 11 for more information*

## SUNDAY FILMS

Films related to the ancient Near East are shown at 2:00 p.m. on Sunday afternoons. Except where noted, each film lasts approximately 30 minutes, is offered free of charge, and is followed by a tour of the galleries.

### JUNE

- 4 Egypt: Gift of the Nile
- 11 Iraq: Stairway to the Gods
- 18 Champollion: Egyptian Hieroglyphs Deciphered
- 25 Turkey: Crossroads of the Ancient World

### JULY

- 2 Preserving Egypt's Past
- 9 Iran: Landmarks in the Desert
- 16 Nubia 64: Saving the Temples of Ancient Egypt
- 23 Of Time, Tombs, and Treasure
- 30 Megiddo: City of Destruction

### AUGUST

- 6 Egypt's Pyramids: Houses of Eternity
- 13 Myth of the Pharaohs: Ancient Mesopotamia
- 20 The Royal Archives of Ebla (58 minutes)
- 27 The Egyptologists

### SEPTEMBER

- 3 Rivers of Time
- 10 Turkey: Crossroads of the Ancient World
- 17 The Big Dig
- 24 Nubia 64: Saving the Temples of Ancient Egypt



*Ancient impression on clay cone, damaged; upper register: god in boat (partly lost); lower register: building of ziggurat. Tell Asmar. OIP 72, pl. 49 (no. 513)*

## EVENTS

### "BACK TO THE PAST"

#### Oriental Institute Museum's Summer Adventures for Children

Thursdays, July 6–August 24, 10:30 a.m.

Take a trip in a time machine and travel back to the ancient past during the Oriental Institute Museum's Summer Adventures for Children. "Back to the Past" programs are recommended for children ages 6–12.

- JULY**
- 6 Pyramids and Mummies
  - 13 Food and Fun from Long Ago
  - 20 Two Queens and a Princess
  - 27 The Bull with Five Legs
- AUGUST**
- 3 Do You Dig It? What an Archaeologist Does
  - 10 Chill Out! Staying Cool in Ancient Egypt
  - 17 Egyptian Magic
  - 24 That's Entertainment! Music for Pharaohs and Kings

See pages 12–13 for more information

### SPECIAL PROGRAMS AND EVENTS

#### "PARKS PARTNERS MINI-FESTIVALS"— THE ORIENTAL INSTITUTE AND THE CHICAGO PARK DISTRICT

Selected Saturdays, June–August, 12:00 noon–4:00 p.m.

Come and see us at your neighborhood park this summer!

- JUNE**
- 17 Lathrop Playground, 2915 N. Leavitt
  - 24 Foster Park, 1440 W. 84th St.
- JULY**
- 8 Clarendon Park, 4501 N. Clarendon
  - 15 Piotrowski Park, 4247 W. 31st St.
  - 22 Trumbull Park, 2400 E. 105th St.
  - 29 Riis Park, 6100 W. Fullerton
- AUGUST**
- 19 West Pullman Park, 401 W. 123rd St.
  - 26 Holstein Park, 2200 N. Oakley

See page 12 for additional information

Oriental Institute participation in the "Parks Partners Mini-Festivals" program is supported by the Elizabeth Morse Charitable Trust.

## SUMMER 1995

### University of Chicago Reunion Sifting the Sands of Time: A Century in the Ancient Near East

Friday, June 2, 2:00 p.m.

See page 12 for additional information

### ILLINOIS ARCHAEOLOGY AWARENESS WEEK

#### Saving the Monuments to the Ancestors: Preservation of Ancient Egyptian Tombs

Wednesday, September 20, 7:00 p.m.

See page 13 for more information

### SPECIAL INTEREST GALLERY TOURS "LUNCH TIME IN ANOTHER TIME"

Fridays, July 7–August 11, 11:30 a.m.

This summer, spend your lunch time in another time. Visit the Oriental Institute Museum at 11:30 a.m. on Fridays in July and August for special gallery tours on selected themes or topics.

- JULY**
- 7 Treasures of the Oriental Institute
  - 14 World of the Pharaohs
  - 21 Unearthing the Past: Archaeology and the Ancient Near East
  - 28 Ancient Nubia and Egypt
- AUGUST**
- 4 They Wrote on Clay
  - 11 Treasures of the Oriental Institute—(Repeat of July 7 program)

See page 13 for more information



Drawing of sealing: Etana mounted on eagle's back above sheepfold; herd and two shepherds; cheeses drying(?) and two attendants above. Tell Asmar. OIP 72, pl. 62 (no. 657)

# ADULT EDUCATION

## TRAVELERS, ROGUES, AND SCHOLARS: TWO CENTURIES OF AMERICAN INTEREST IN ANCIENT EGYPT

It can hardly be called an auspicious beginning. In 1788, the first well-documented American traveler in the Land of the Pharaohs died from the lethal combination of a "bilious complaint" and the "dose of acid vitriol" used to treat him. This summer, join John Larson on a much safer journey through space and time during a course that explores two centuries of American interest in ancient Egypt.

Since the late 1700s, American knowledge of ancient Egypt has resulted from the combined efforts and experiences of explorers, archaeologists, dilettantes, collectors, diplomats, spiritualists, artists, lecturers, curators, philanthropists, and rogues. This course will trace the origins and development of American Egyptology, highlighting unsung heroes and heroines along with such well-known scholars as the Oriental Institute's own James Henry Breasted, the first American to receive a teaching appointment in Egyptology when he joined the University of Chicago in 1894. Along with historical exploits and discoveries, the class will include a look at current Egyptological activities sponsored by American scholars, universities, and museums.

**INSTRUCTOR** John Larson, Archivist of the Oriental Institute Museum, has taught a number of adult education courses on Egyptian art and archaeology. He also specializes in the history of Egyptology.

This course will meet at the Oriental Institute on Wednesday evenings from 7:00 p.m. to 9:00 p.m. **beginning June 14, 1995 and continuing through August 2, 1995.** The instructor will provide a list of suggested readings at the first class session.



*Time-out during the excavations sponsored by the American businessman, Theodore M. Davis, in the winter season of 1901/1902. Davis' niece, Miss Janet R. Buttles, is seated in the foreground where she displays one of the excavator's discoveries. Mr. Davis is standing behind her. The other non-Egyptians are (left to right): Mr. Robb de Peyster Tytus, Professor Percy Newberry, and Mr. John Farley. Theban Necropolis, Egypt. From a notebook of Janet R. Buttles, now in the Oriental Institute Archives*

# COURSES

## HISTORY OF ANCIENT EGYPT: THE MIDDLE KINGDOM

Famine and anarchy beset ancient Egypt as local rulers vie for power. The struggle ends with the country reunited and the rise of the prosperous Middle Kingdom when Egypt extends its realm into ancient Nubia in pursuit of minerals and gold. Then most of Egypt falls to the Hyksos, outsiders who invade and rule for more than a century. Covering the era from ca. 2200 B.C. to 1600 B.C., this course is the third in an eight-part series that traces the history of Egypt from its beginnings to the nation of today.

**INSTRUCTOR** Frank Yurco is an Egyptologist who has taught numerous courses on topics of ancient Near Eastern history, culture, and language, both at the Oriental Institute and the Field Museum.

This course will meet at the Oriental Institute on Saturday mornings from 10:00 a.m. to 12:00 noon **beginning June 17, 1995 and continuing through August 5, 1995.**

### Required Texts:

*A History of Ancient Egypt.* Nicholas Grimal. Oxford: Blackwell Publishers, 1992.

*Ancient Egypt: Anatomy of a Civilization.* Barry J. Kemp. New York: Routledge, 1989.

*Ancient Egyptian Literature, Vol. 1.* Miriam Lichtheim. Berkeley: University of California Press, 1975.



*Stele of Kaka and his wife Benit. OIM 16955. First Intermediate Period*

Tuition for Adult Education Courses is \$95 for Oriental Institute members; \$115 for non-members. A minimal materials fee may be charged at the first class session to cover the costs of special handouts.

PLEASE ENROLL ME IN THE FOLLOWING ADULT EDUCATION COURSE(S)

\_\_\_\_\_ *Travelers, Rogues, and Scholars: Two Centuries of American Interest in Ancient Egypt*

\_\_\_\_\_ *History of Ancient Egypt: The Middle Kingdom*

\_\_\_\_\_ I am a member and enclose \$95 for tuition for each course

\_\_\_\_\_ I am not a member and enclose \$115 for tuition for each course

\_\_\_\_\_ I would like to become a member of the Oriental Institute. Enclosed is \$35 for an individual membership or \$45 for a family membership. Please send a separate check for membership fee.

Total enclosed \$ \_\_\_\_\_. Make check(s) payable to the Oriental Institute.

I prefer to pay by  check,  money order,  credit card

MasterCard/Visa: \_\_\_\_\_

Account number

Expiration date

Signature

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Daytime phone \_\_\_\_\_

Send to: **The Oriental Institute, Education Office, 1155 East 58th Street, Chicago, Illinois 60637**

# SPECIAL PROGRAMS AND EVENTS

## UNIVERSITY OF CHICAGO REUNION

### Sifting the Sands of Time: A Century in the Ancient Near East

Friday, June 2, 2:00 p.m.

Karen L. Wilson, Curator of the Oriental Institute Museum, offers a fascinating look at the history and behind-the-scenes operation of our world-renowned museum, which has been exhibiting its collections since the 1890s. Part of the Uncommon Core lectures for the University of Chicago's Reunion 1995, this program includes a slide presentation, gallery visit, and discussion session. For additional information, call the Museum Education Office at 312/702-9507.

## "PARKS PARTNERS MINI-FESTIVALS"

### THE ORIENTAL INSTITUTE AND THE CHICAGO PARK DISTRICT

Selected Saturdays, June–August, 12:00 noon–4:00 p.m.

Come and see us at your neighborhood park this summer! The Oriental Institute joins the city's major museums and cultural institutions for "Parks Partners Mini-Festivals," a summer-long series of free family festivals cosponsored by the Chicago Park District. Bring the whole family to enjoy afternoons of music, dance, stories, games, and hands-on activities for everyone.

You'll find us at the following parks on **Saturdays from 12:00 noon to 4:00 p.m.** on the dates listed below:

**June 17**—Lathrop Playground, 2915 N. Leavitt

**June 24**—Foster Park, 1440 W. 84th St.

**July 8**—Clarendon Park, 4501 N. Clarendon

**July 15**—Piotrowski Park, 4247 W. 31st St.

**July 22**—Trumbull Park, 2400 E. 105th St.

**July 29**—Riis Park, 6100 W. Fullerton

**August 19**—West Pullman Park, 401 W. 123rd St.

**August 26**—Holstein Park, 2200 N. Oakley

For additional information, call the Museum Education Office at 312/702-9507.

*Oriental Institute participation in the "Parks Partners Mini-Festivals" program is supported by the Elizabeth Morse Charitable Trust.*

## "BACK TO THE PAST"

### ORIENTAL INSTITUTE MUSEUM'S SUMMER ADVENTURES FOR CHILDREN

Thursdays, July 6 –August 24, 10:30 a.m.

Take a trip in a time machine and travel back to the ancient past during the Oriental Institute Museum's Summer Adventures for Children. Offered on Thursdays at 10:30 a.m. throughout July and August, "Back to the Past" programs are recommended for children ages 6–12. Each program lasts approximately one hour and includes a gallery visit and hands-on museum activities. Admission is free and reservations are not required.

Please note that these programs are designed for individual children and family groups and cannot accommodate larger school or community groups. Larger groups may make arrangements for guided tours by calling the Museum Education Office at 312/702-9507.

- JULY**
- 6 Pyramids and Mummies**—Get all "wrapped up" in ancient Egypt. See some real mummies, make some discoveries about pyramids, and view some treasures from ancient tombs. Make your own "mummy" to take home.
  - 13 Food and Fun from Long Ago**—Find out what children in ancient times did for fun, the treats they loved to eat, and the games they enjoyed. Learn how to play an ancient board game.
  - 20 Two Queens and a Princess**—Meet a woman who became an Egyptian pharaoh, see one of the world's most beautiful queens, and make a royal crown fit for a princess—or a prince!
  - 27 The Bull with Five Legs**—Come face to face with an ancient creature who has the body of a bull, the wings of an eagle, the face of a man—and who stands on five legs! Find out how to avoid the creature's ancient spell and write your own "magical" messages on a clay tablet.

# SPECIAL PROGRAMS AND EVENTS

- AUGUST**
- 3 Do You Dig It? What an Archaeologist Does**—Is Indiana Jones a typical archaeologist? Come and find out! Discover amazing ways that archaeologists learn about the past and then create an “ancient artifact” to take home.
- 10 Chill Out! Staying Cool in Ancient Egypt**—Dipping your toes in an ancient pool, feeling the breeze from a feathered fan—adventure back 4,000 years to learn how Egyptians and people from other ancient lands stayed cool even when temperatures reached 120 degrees! Have your picture taken wearing ancient Egyptian-style summer clothes.
- 17 Egyptian Magic**—To bring themselves good luck, the ancient Egyptians created beautiful amulets, or magic charms. See amulets made of gold and precious stones and then create your own version of an Egyptian good luck charm.
- 24 That's Entertainment! Music for Pharaohs and Kings**—Take a look at ancient musical instruments and see the mummy of a royal musician. Then try your hand at making a sistrum, a musical instrument from ancient Egypt.

## SPECIAL INTEREST GALLERY TOURS

### “LUNCH TIME IN ANOTHER TIME”

Fridays, July 7–August 11, 11:30 a.m.

This summer, spend your lunch time in another time. Visit the Oriental Institute Museum at 11:30 a.m. on Fridays in July and August for special gallery tours on selected themes or topics. Tours last approximately 45 minutes. Admission is free and reservations are not required. Meet in the museum lobby.

- JULY**
- 7 Treasures of the Oriental Institute**—Mummies from ancient Egypt, striding lions from the city of Babylon, and a hoard of golden treasure from ancient Persia are featured on this tour of highlights from the Oriental Institute Museum's collection.
- 14 World of the Pharaohs**—Travel through 3,000 years of ancient Egyptian civilization on this tour that includes pyramids, the Book of the Dead, and a colossal statue of King Tut.
- 21 Unearthing the Past: Archaeology and the Ancient Near East**—Archaeologists from the Oriental Institute have been excavating Near Eastern sites since the Institute was founded in 1919. This tour introduces sites in Egypt, Iran, Iraq, Israel, Syria, and Turkey and features finds that range from intricately carved figurines of gods and goddesses to a 40-ton, human-headed, winged bull.
- 28 Ancient Nubia and Egypt**—The special exhibit “Vanished Kingdoms of the Nile: The Rediscovery of Ancient Nubia” is the starting point for this introduction to ancient Nubia, as well as the rivalry between Nubia and its north African neighbor, ancient Egypt.
- AUGUST**
- 4 They Wrote on Clay**—The world's first system of writing can be seen on clay tablets created 5,000 years ago in ancient Mesopotamia. See some of the earliest clay tablets ever produced, as well as objects inscribed with sophisticated examples of ancient literature and law.
- 11 Treasures of the Oriental Institute**—(Repeat of July 7 program)

## ILLINOIS ARCHAEOLOGY AWARENESS WEEK

### Saving the Monuments to the Ancestors: Preservation of Ancient Egyptian Tombs

Wednesday, September 20, 7:00 p.m.

“Saving the Monuments to the Ancestors” is the theme for the 1995 celebration of Illinois Archaeology Awareness Week, September 17 through September 23. In conjunction with this statewide event, join us on Wednesday, September 20, at 7:00 p.m. for “Saving the Monuments to the Ancestors: Preservation of Ancient Egyptian Tombs”—A slide lecture by **Emily Teeter**, Assistant Curator, Oriental Institute Museum.

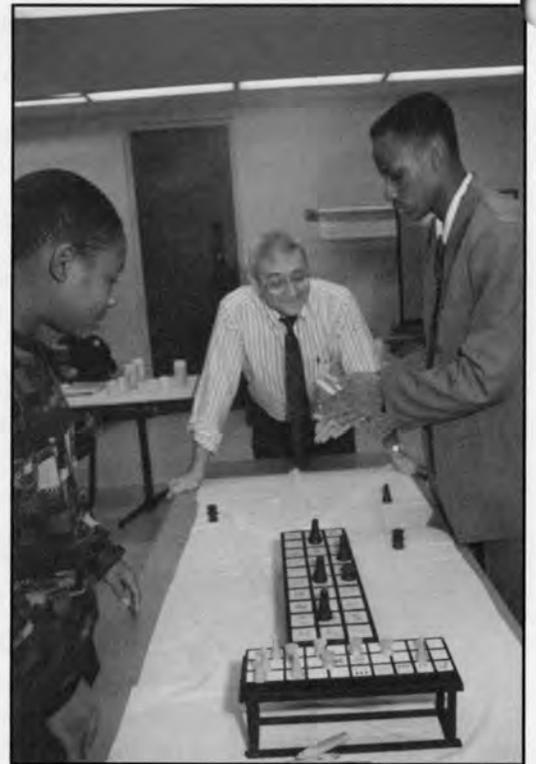
Decorated tombs were built by the ancient Egyptians to commemorate the memory of their ancestors. These structures are being endangered by environmental pressures, as well as tourism and development. Emily Teeter will discuss what is being done to protect and preserve these unique monuments.

# NEWS FROM THE EDUCATION OFFICE



## HIGH SCHOOL SPACE EXPLORERS DISCOVER ANCIENT SKIES AT THE ORIENTAL INSTITUTE

This past winter, a group of Chicago high school students involved in a program called Space Explorers came to the Oriental Institute to examine the heavens through the eyes of the ancient Egyptians. Part of a multi-year math and science project cosponsored by the University of Chicago's Office of Special Programs and the Department of Astronomy, these young people took part in six Oriental Institute sessions that included lectures, museum tours, behind-the-scenes visits, and hands-on programming. Led by Janet Johnson, Professor of Egyptology, and Peter Piccione, Egyptologist, the program also included presentations by Laura D'Alessandro, Museum Conservator; Charles Jones, Research Archivist; Carol Redmond, Education Outreach Coordinator; Donald Whitcomb, Research Associate; and Jean Niblack and Carol Yoshida, Oriental Institute Museum Docents.



*Upper left: Janet Johnson introduces the Space Explorers to an astronomical instrument found in the tomb of King Tut*

*Upper right: After giving a lecture on ways the game of senet reflected ancient Egyptian beliefs about the heavens and earth, Peter Piccione offered lessons on how to play the game*

*Lower left: Space Explorer students were encouraged to spend time studying exhibits in the museum*

*Lower right: Using wood, special paints, and clay, students create their own reproductions of the senet game*



## VISIT THE *SUQ*

### THE GIFT SHOP OF THE ORIENTAL INSTITUTE MUSEUM

—MEMBERS ALWAYS RECEIVE A 10% DISCOUNT—

#### A REMINDER FOR THE ANNUAL INVENTORY SALE AT THE *SUQ*

Starts Memorial Day, Monday, May 29, from 12:00 noon to 5:30 p.m., and continues through June 7 with extended hours: open until 5:30 everyday and until 8:30 on Wednesdays. Closed Monday, June 4. Note the special discounts for this sale:

Members: 20% off books  
30% off all other merchandise

Non-Members: 10% off books  
20% off all other merchandise

*The Suq*  
1155 East 58th Street  
Chicago, Illinois 60637  
312/702-9509  
312/702-9510

## REVISIT AYLA

The current exhibit "Ayla: Art and Industry in the Islamic Port of Aqaba," which highlights the Oriental Institute's excavations at Aqaba, Jordan, has been held over for the summer. The exhibit illustrates the art and industry of this port city from the 7th through 11th century. Artifacts demonstrate patterns of settlement, commerce, and industry connecting this port on the Red Sea with Egypt, Arabia, and the Indian Ocean. Objects include a reconstructed kiln and its products, stylistic embellishments in lamps and steatite vessels, coins and weights, and artistic pieces in glass and ivory.

The archaeological excavations, led by **Donald Whitcomb**, Research Associate (Associate Professor), The Oriental Institute, will continue at Aqaba in the fall of 1995.

*Lower left: Ayla exhibit opens, November 7, 1994, Oriental Institute Museum*

*Lower right: Donald Whitcomb discussing the Islamic coins on display in the Ayla exhibit with Professor Wadad Kadi on opening night*

*Photographs by Jean Grant*

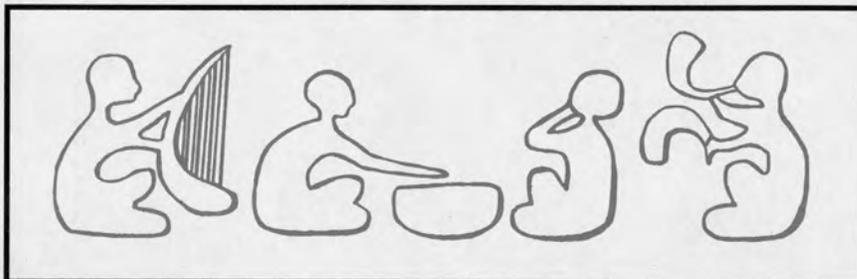


# THE ORIENTAL INSTITUTE

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## LIMITED-EDITION TOTE BAG AVAILABLE TO MEMBERS



The image on the tote is a drawing by the late Professor Helene J. Kantor, taken from a Protoliterate seal excavated at Chogha Mish, Iran. Made of sturdy 100% natural cotton canvas and printed in a handsome chocolate brown, the tote bag measures 16" x 14" x 4" and has 26" over-the-shoulder reinforced fabric handles. The tote bags are available through the Membership Office for \$20 each (add \$4.95 shipping and handling for each bag ordered). Visa, MasterCard, and personal checks accepted. Call 312/702-1677.

## News & Notes

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All inquiries, comments, and  
suggestions are welcome.