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MESSAGE FROM THE DIRECTOR

The generally positive message of 2011 must be tempered by the financial difficulties that we face in the University of California system. The draconian cuts are long gone but continue to impact our work here at the Institute. At the same time, we continue to receive essential private individual and foundation support that allows us to retain and attract the best professors and students to remain one of the best research centers and graduate programs in North America. Our research is moving steadily ahead while our graduate students flourish around the world. Our success is due in no small part to many people—first and foremost to the tremendous support of Mr. and Mrs. Lloyd Cotsen. We also must acknowledge the faculty of the Institute, who continue to do cutting-edge research, creating knowledge and mentoring their graduate students. We also are grateful to have a phenomenal staff headed by Dr. Gregory Arshian, who doubles as both assistant director and visiting professor. We recently were fortunate to bring on board Kathlene Avakian (Finance) and Julie Nemer (The Cotsen Institute of Archaeology Press), who join the incomparable veteran team of Amber Cordts-Cole, Helle Girey, Evgenia Grigorova, Hadley Jensen, Laura Lliguin, Tyler Lawrence, Vanessa Muros, Cheri Quinto, Jill Silton, and Tom Wake.

The bottom line is that we have met the challenges of this economic recession and continue to be a leader in archaeological research and teaching. Over the past year, we have reorganized the Cotsen Institute Press with Professor Willeke Wendrich as the first editorial director and chair of the Editorial Board. We have a larger and more comprehensive board of editors. If we learn anything from history and archaeology, it is that organizations must be flexible and adaptable to meet any unexpected and expected challenges. As I enter my tenth year as director, I am proud to acknowledge our supporters, volunteers, administrators, faculty, students, and staff for the outstanding work and attitude that they bring to our Institute.

CHARLES STANISH

Director, Cotsen Institute of Archaeology
Professor of Anthropology
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**BACKDIRT:**

A Continuing Evolution

Since World War II, UCLA has gradually become the home to an archaeological community of scholars, students, supporters, and volunteers centered on the Cotsen Institute of Archaeology. Our community is one of the largest in the nation and, indubitably, the largest such community on the West Coast. Hundreds of people comprise and shape this community, creating a powerful intellectual domain composed of the interests, visions, backgrounds, and resources of its members. The evolution of Backdirt reflects that growth. Founded a quarter-century ago as an in-house newsletter published by volunteers, Backdirt reported on the activities of a handful of professional and amateur enthusiasts of archaeology and few events at UCLA. The essay by Merrick Posnansky that follows reflects on the dedication and efforts of the first publishers as well as the problems and intricacies that accompanied their work. In 2006 Backdirt changed into a full-color, magazine-style annual review and expanded its content, which was predicated upon the growth of research projects and publications of the Cotsen Institute and of the Archaeology Graduate Interdepartmental Program.

Today the Cotsen Institute runs field projects in North, Central, and South America, the Near East, Europe, Asia, and Africa, and multidisciplinary research has become the norm rather than the exception. The diversity of theoretical perspectives espoused by archaeologists and other explorers of the human past at UCLA reflects the major trends in global archaeological thought. We are adjusting the form and content of Backdirt to reflect these new trends. First, this issue of our annual review reflects the academic activities of the Cotsen community in a more comprehensive manner: we attempt to give all segments of those activities a more adequate representation, which is reflected by the changes that we are introducing in the structure of Backdirt. Second, we shift the focus from reporting on activities of individual scholars and other members of the Cotsen community to presenting a general perspective of world archaeology as seen by that community.

In the “Features” section of this issue, Hans Barnard reflects on the current state of biochemical residue analysis in archaeology. Academics, students, and members of the public with broad interests in archaeology may add this article to their introductory reading list, while scholars specializing in this particular field will find a useful synopsis of the research in residue analysis carried out at UCLA. The work of scholars affiliated with the Cotsen Institute is represented in the “Features” section by a very useful analytical bibliographic essay by R. Ervin Taylor concerning the current developments in radiocarbon dating within a broader historical overview of the method. Among the best papers written in 2011 by UCLA doctoral students, Brett Kaufman’s research formulates a new hypothesis concerning the spread of tin bronzes in the Old World. “Features” also includes one of the best guest lectures of 2011 given at the Cotsen Institute, Michael E. Moseley’s discussion of a specific model of environmental deterioration as primary cause of the collapse of earliest complex agricultural societies in South America.

It is our belief that the history of archaeology is one of the least valued areas of scholarship in the United States. The wealth and importance of archaeological thought created by previous generations is underappreciated, and, therefore, beginning with this issue, Backdirt will contain a section titled “Reflections on Past Achievements,” inaugurated by a personal memoir of James Sackett and devoted to one of the unquestionable leaders in Paleolithic archaeology of the twentieth century, François Bordes. Professor Sackett was a doctoral student of the dean of American Paleolithic studies, Hallam Movius, at Harvard. He also co-directed excavations with Bordes. He reflects on Bordes’ contribution to scholarship and narrates a personal story that includes elements of his biography that are most likely unknown even to many of his French admirers.

We also restructured the section of research reports. Here we present unpublished materials by UCLA-affiliated archaeologists and summarize other research activities of the Institute. Its first part contains progress reports on exciting field projects conducted in Armenia, Israel, and Italy, while the second part is composed of brief research notes.

Along with research and publishing, the Cotsen Institute is vitally concerned with creating new generations of scholars. Reports from the chairs of the Archaeology Graduate Interdepartmental Program (John Papadopoulos) and of the UCLA/Getty Conservation Graduate Program (David Scott) describe the achievements in their areas. Backdirt presents profiles of graduate students, including the four recipients of 2011 NSF graduate scholarships.
The presentation of other activities of the Cotsen community also evolves into two separate, more focused sections: “Community Conversations” and “Community Events.” The four pieces included in “Community Conversations” have intentionally diverse content: the interview with Rowan Flad, currently Associate Professor at Harvard University, represents individual achievements of UCLA’s Ph.D. alumni in archeology; in his interview, Cotsen Institute donor David Boochever muses on the importance of archaeology as perceived by a non-academic; Peter Gould recounts an event reflecting the diverse scope of volunteers’ involvement with the Institute’s fieldwork; and Jill Silton, in a series of unique photographs of burial rituals from Tibet, represents one of the many contributions by the Institute’s volunteers.

Although activities of the Cotsen Institute Press have been on the rise for several years, in 2011 new policies and procedures were instituted which, together with the appointment of Willeke Wendrich as Editorial Director and Chair of the new Editorial Board and of Julie Nemer as Publications Manager, provide a more solid foundation for the Institute’s publication goals during these very challenging economic times. Backdirt not only presents the recently published and forthcoming volumes, as it used to do, but also begins to selectively publish authors’ and editors’ previews of books in press.

Finally, in order to reignite the discussion concerning the intellectual and social relevance of archaeology, we are opening a new section, “Opinions and Letters to Backdirt,” in which Giorgio Buccellati discusses the importance of sustainable preservation of archaeological sites and its role for local communities (Tell Mozan, Syria) and Hans Barnard reflects on the psychological attitudes necessary for successful archaeological publishing.

All in all, the reader will find the 2011 issue of Backdirt quite different from the previous ones, with differences that we hope you find intellectually stimulating and thought provoking.

GREGORY E. ARESHIAN, Managing Editor
HAPPY SILVER ANNIVERSARY, BACKDIRT!
—from “nitty gritty” newsletter to full-color magazine-style review

BY MERRICK POSNANSKY

THE YEAR 1986 WAS a period of hope for the Institute of Archaeology. A lot of thought was given to the future, and a planning committee was established to design the configuration for the Fowler Museum in which the UCLA Institute of Archaeology was to be housed. It was at this time that the first Backdirt was published. It was designed as a biannual newsletter for the Institute, though there were many years when only one issue was produced. There were two years in which new directors came into office—1989 and 2002—when Backdirt did not appear at all, and in the fall of 1999 it dropped the appellation of “newsletter.” Little did we know that it would last 25 years and become the glossy flagship publication for the Cotsen Institute of Archaeology that it is today. The Institute and its editors are to be congratulated for maintaining what is now a hardy annual, and its avid readers consider it essential reading and wish it many happy returns.

At the Institute we regarded the newsletter as our window onto the world. A short video called “Invitation to Adventure” was produced in 1987 but did not return the anticipated rewards of increased membership for Friends of Archaeology or support for the Institute. Premiums of tote bags, caps, and tee shirts were also tried, but not until the Institute actually moved into its new premises in 1989, with more space and improved facilities, did the Institute begin to grow into its present status as a major research unit on campus and an important archaeological institution of North America. The new Institute brought all the archaeologists together in one building with an expansion of activities, a pruning of some, and an enlarged audience for archaeology. Backdirt started with a mere 12 pages, and the editors were two stalwart volunteers, Fellows of the Institute, Peggy Polinger and Stephanie Serlin. The aim of the newsletter was to tell the archaeological world of Southern California and our friends at UCLA, and outside, about the work we were doing and to show our pride in the achievements of individual archaeologists, both faculty and students, at the Institute. There were no color illustrations; those only came in 2003, though color was used to highlight sections of Backdirt from 1996. The logo of the Institute, initially an ornamental “IA,” was superseded in 1987 by a drawing of an archaeologist in silhouette sieving back dirt, and in 1992 by a concentric petroglyph. However, the front-page logo for Backdirt reverted back to a stark, stylized “IA” after 1999. Backdirt has informed its readers about the history of archaeology at UCLA, with features on outstanding excavations and on the arrival or death and departure of outstanding faculty and friends. Many of its obituaries—for Maria Gimbutas, Jim Hill, Clem Meighan, Franklin Murphy, and Elsie Sandefur—are particularly memorable.

1. Departments of History and Anthropology and Cotsen Institute of Archaeology, UCLA
One of the reasons for the creation of Backdirt was clearly the Institute’s need for visibility. Other organized research units had regular newsletters that had circulations both within and outside the campus. The Institute, founded in 1973, had been run creatively for 10 years by Giorgio Buccellati, who established a strong publications division, managed on a shoestring by Dr. Ernestine Elster. They produced periodic book reviews of important books and Archaeology at UCLA which largely provided timely notes from the field and served to inform everyone about the important work UCLA archaeologists were undertaking around the world. The book reviews (Bibliographic Leaflets) and Archaeology at UCLA, normally up to four pages long, provided many of our graduate students with their first writing opportunities and allowed them to create a kind of “calling card” that they could send out with their job applications. The Institute also published, with the help of grants from the Fellows of the Institute, the prestigious hard-cover Monumenta Archaeologica series (now with more than 20 outstanding publications to its name) and various in-house-produced paperback books and reports, many of which have gained a wide distribution.

The UCLA Archaeological Survey was at that time an integral part of the activity of the Institute and had existed as an arm of the Anthropology Department before the Institute was established. The chief archaeologist, a post now subsumed under the role of the assistant director, administered the Survey. For many years the Survey was responsible for publishing the Journal of New World Archaeology. With cessation of the Journal after 1987, and closure of the Survey’s successor, the Information Center, Backdirt became even more important as a conveyor of news about archaeology at UCLA and the role of the Institute in the archaeological life of Southern California. From its earliest issue Backdirt contained a “Did You Know?” section by then administrative analyst of the Institute, Ilene Swartz, which has kept readers informed about the successes and family achievements of our student body. Backdirt has also chronicled the progress of our public programs which have brought so many distinguished speakers to our campus and kept us up-to-date about what is important in the archaeology of the wider world.

A cursory glance at the back issues of Backdirt provides insight into the history of archaeology at UCLA, the creation of an Institute at the Fowler with generous endowments from Lloyd Cotsen, and the ebb and flow of archaeological interest at UCLA. Our 25-year anniversary is cause for celebration, and we are confident that Backdirt will continue its transformational growth.
Discoveries at the Cave complex Areni-1 by the Joint Project of the Institute of Archaeology and Ethnography of the National Academy of Sciences of Armenia, the Cotsen Institute of Archaeology at UCLA, and the University College Cork, Ireland brought unprecedented global recognition to Armenia and its cultural heritage. More than 200 mass media outlets in three dozen countries provided in 2011 an extensive coverage of the world’s oldest wine making installation and the discovery of the world’s oldest leather shoe from Areni-1 which was ranked number seven on the list of the top twelve scientific discoveries of 2010 in the world in all areas of human knowledge, together with the creation of a gel containing anti-HIV medication tenofovir (no. 1), the discovery of a new species of dinosaurs called *Glamosaurus* (no. 2), development of a new, highly effective testing method for autism (no. 4), a new species of a cat-size monkey in the forests of Colombia (no. 5), and the discovery of the Gilese 581g planet that can be a “habitable zone” in a galaxy 20 light years away (no. 6).
The Cotsen Institute Celebrates the Induction of Charles Stanish Into the National Academy of Sciences and Lothar von Falkenhausen Into the American Academy of Arts and Sciences

Charles Stanish and Lothar von Falkenhausen were recently inducted into the National Academy of Sciences and the American Academy of Arts and Sciences. Described as “an honorific society of distinguished scholars engaged in scientific research, dedicated to the furtherance of science and technology and to their use for the general welfare,” the NAS is one of the highest honors in the world a scientist can hold. The National Academy of Sciences was established in 1863 by a congressional act of incorporation signed by Abraham Lincoln that calls on the Academy to act as an official adviser to the federal government, upon request, in any matter of science or technology.

Director of the Cotsen Institute of Archaeology at UCLA and Professor of Anthropology, Charles (Chip) Stanish specializes in the evolution of complex societies and has done extensive fieldwork in the Lake Titicaca basin of highland Peru and Bolivia. Over the last 25 years, he has uncovered sites that span more than six millennia of human occupation in the highland and coastal Andes. He also has attracted attention for the role that the online auction site eBay has played in the illegal trafficking of antiquities. Currently he is starting a major excavations project in Armenia devoted to the study of the emergence of complex societies during the Neolithic of the Near Eastern highlands. At his induction, Stanish was commended for his work, both theoretical and empirical, on the evolution of complex societies with a focus on Andean South America.

Founded in 1780, the American Academy of Arts and Sciences is an independent policy research center that conducts multidisciplinary studies of complex and emerging problems. The Academy’s elected members are leaders in the academic disciplines, the arts, business, and public affairs. Founding Fathers of the United States were among the first members of the Academy.

Lothar von Falkenhausen is Associate Director of the Cotsen Institute of Archaeology and Professor of Chinese Archaeology and Art History at UCLA. Educated at Bonn University, Peking University, Kyoto University, and Harvard University, his research concerns the archaeology of the Chinese Bronze Age, focusing on large interdisciplinary and historical issues on which archaeological materials can provide significant new information. He has published numerous writings on musical instruments, culminating in his book Suspended Music: Chime Bells in the Culture of Bronze Age China (1993). Other publications concern ancient Chinese bronzes and their inscriptions, early Chinese ritual, regional cultures, ancient trans-Asiatic contacts, and the history of archaeology in East Asia. His Chinese Society in the Age of Confucius (1000–250 B.C.): The Archaeological Evidence (2006) received the Society for American Archaeology Book Award. Von Falkenhausen is also editor of the Journal of East Asian Archaeology, Early China Special Monograph Series, Salt Archaeology in China, a corresponding member of the Deutsches Archäologisches Institut, and an Honorary Research Fellow, Shaanxi Institute of Archaeology.
Giorgio Buccellati Receives Newly Established Award
FOR BEST PRACTICES IN ARCHAEOLOGICAL SITE PRESERVATION OF THE ARCHAEOLOGICAL INSTITUTE OF AMERICA

In the festive atmosphere of the 112th Annual Meeting of the Archaeological Institute of America, the Founding Director of the Cotsen Institute of Archaeology at UCLA, Professor Emeritus of the Ancient Near East and of History, and Director of the Mesopotamian Laboratory of the Cotsen Institute Giorgio Buccellati received the newly established AIA Award for Best Practices in Archaeological Site Preservation. Upon accepting the congratulations from the Cotsen Institute on this occasion, Giorgio told Backdirt: “The title of the newly established award by the Archaeological Institute of America has an interesting ring to it: ‘Best Practices in Archaeological Site Preservation.’ Interesting, because of the stress on practice, which implies that something concrete is being accomplished. It was an honor for me to receive this award the first time it was offered, and a cause for reflection.

An honor. I mean it in a sense that goes beyond the obvious. The kind of work I have been doing at Mozan, ancient Urkesh, is not exactly popular. Not only is it not in current practice, but my effort is often viewed with benign indulgence at best. Hence ‘honor’ meant approval and encouragement.

And a cause for reflection. Not being in any way a conservator, the qualification of ‘best practices’ seemed best suited for my approach. What I developed over the years was a special sensitivity for problems, a good dose of common sense in trying to cope with them, and an eagerness to find help wherever I could.

And yet, inevitably, practice turned into theory. The key question revolved around the connection between conservation and site preservation on the one hand and archaeology on the other. The integration of these various aspects became an important goal of mine, and part of the answer came in the form of a major component of the Urkesh website, where data and interpretation are treated extensively.

Besides integration, perception. With regard to the architecture, I was seeking to safeguard the ‘document’ and to present the volumes and their setting in a meaningful way. In so doing, I came to realize how I was trying to identify unifying points of view from which the perception would be best for the visitor, and I came to see how this was an effort, in fact, to capture the points of view from which the ancients were perceiving their own built environment.

Finally, relevance. The effort did not originate primarily as a social service, even though it did serve that purpose well. Not specifically trying to be relevant was in the end a source of relevance for myself in the first place. I was learning, learning from listening to actual questions and to the questions I thought I could anticipate. What better ‘best practice’?”
Lloyd Cotsen’s Gift to the People of China

BY LYSSA STAPLETON

Our benefactor at the Cotsen Institute does not limit his interests to archaeology and philanthropy. Lloyd Cotsen is also an avid collector of folk art, textiles, and ancient art who has made exceptional cultural contributions through publications on and exhibitions of his collections and through donations to museums across the country.

Lloyd Cotsen’s collecting history started when he was just a boy with baseball cards and stamps. These early collections are currently housed and catalogued along with his art collections. His first major art collection was assembled between 1960 and 1994 when he was CEO and chairman of the Neutrogena Corporation. Cotsen prefers to acquire materials that are not well studied; his goal is to encourage the investigation and preservation of lesser-known art forms. For this reason, the Cotsen Collections are accessible to researchers and are regularly featured in publications and museum exhibits. His collections have introduced thousands of people to rare, wonderful, and eclectic objects. Collections donated by Lloyd Cotsen have become integral to many museums including the Asian Art Museum of San Francisco, the Museum of International Folk Art in Santa Fe and the Racine Art Museum.

While serving in the Navy in 1950-51 Lloyd Cotsen acquired his first Chinese bronze mirrors. He placed bids on several mirrors at an auction house in Hong Kong but returned to the States before the sale. He later found that he had won only four. Gustaf VI Adolf King of Sweden, who assembled an important and extensive collection of Chinese art during his reign, had outbid him.

This November, Lloyd Cotsen loaned his collection of Chinese bronze mirrors to the Huntington Library and Botanical Gardens in Pasadena for its first and only U.S. exhibition. The exhibit will be on view from November 12, 2011 to May 14, 2012. The mirrors, which date from the Shang dynasty (1600-1046 B.C.) to the Jin (Jurchen) dynasty (1115-1234 CE), include pieces with glass or silver inlay, lacquered and painted surfaces, double-tiered construction, or silver and gold gilding. The exhibition also includes a small number of ancient Chinese textiles from the Cotsen Collection and examines the history, technology, and iconography of both mirrors and textiles.

The exhibition’s opening was accompanied by the release of a two-volume book on the mirror collection edited by Lothar von Falkenhausen and co-published by the Cotsen Occasional Press and the Cotsen Institute of Archaeology Press. The first volume is a catalog of the collection with an introductory article by Suzanne Cahill. The second volume comprises eleven articles by leading scholars examining various topics relating to ancient Chinese mirrors.

After the close of the exhibition, Lloyd Cotsen will donate his mirror collection to the Shanghai Museum. An unsolicited return of cultural heritage materials to the country of origin is almost unprecedented but Cotsen has always considered himself a temporary custodian of the objects in his collections, all of which are all ultimately donated to public institutions. As an archaeologist, Cotsen is both aware of and an advocate for the protection of international cultural heritage. His decision to repatriate his mirror collection to China was a result both of his own views and of the 2009 Memorandum of Understanding signed by the United States and China. Cotsen hopes that once the mirrors are returned to China that they will be, in some sense, re-contextualized. Research on the collection by future scholars will take place alongside the vast archaeological resources of the Shanghai Museum.

Silvered Eight-lobed Mirror with Vines, Birds, and Mythical Animals
Cotsen collection number: O-0792 • Tang dynasty (618–907 CE)
diameter: 18.40 cm • overall height (knob): 1.50 cm • overall height (rim): 0.70 cm • weight: 1088 g

1. Cotsen Institute of Archaeology at UCLA and The Lloyd Cotsen Collection
In 2010–2011, UCLA students were awarded an exceptional number of the highly coveted three-year National Science Foundation (NSF) Graduate Research Fellowships. In spring of 2011, one of our first-year graduate students, Ben Nigra, was also awarded the NSF Fellowship, bringing the total to four. The range and diversity of the projects these students are working on is truly phenomenal. Two students, Brett Kaufman and Hannah Lau, are working in the ancient Near East; Kevin Hill and Ben Nigra are both working in the Andes. The research of each recipient is detailed below.

**Ben Nigra** was born and raised outside of Pittsburgh, Pennsylvania. He received a B.A. in anthropology at the University of Chicago. His honors thesis investigated the expression of group identity on Peru’s southern coast via the form and design of wooden spoons. Before joining the Cotsen Institute, Ben conducted fieldwork in northern Chile’s Tarapaca Valley; in Ilo, Peru; and in southern Peru’s Vitor Valley. His adviser at UCLA is Charles Stanish, director of the Cotsen Institute of Archaeology and professor of anthropology.

Ben's NSF research focuses on the interaction of two distinct archaic states at borderland outposts during the Andean Middle Horizon (A.D. 500–1000). During his graduate work at UCLA he will examine how Wari and Tiwanaku populations exploited desert resources at the recently discovered site of Millo II in southern Peru. Millo lies in the Vitor Valley, a rare area where Tiwanaku and Wari influence overlaps. His research will test the hypotheses that (1) Wari and Tiwanaku were contemporaneous in Vitor during the Middle Horizon, and (2) that each state's expected pattern of resource exploitation at this borderland outpost was modified by virtue of direct contact with the other.

To assess contact between these states, Ben will develop a method for detecting organic residues originating from *Schinus molle*, a plant that may serve as a proxy for land use and economic exchange. *Molle* is a small red berry (‘pink pepper’) that was fermented into a beverage served at redistributive feasts and in ritual contexts. While Wari was a known producer of *chicha de molle*, Tiwanaku preferred maize beers. Organic residue analysis will be conducted on sherds from Wari and Tiwanaku ritual drinking vessels to test for beverage exchange between the two groups. If interaction can be positively identified, he will then juxtapose the site-settlement patterning found in Vitor with known strategies of colonial enclave placement for Wari and Tiwanaku. He hypothesizes that the presence of a foreign state counterpart in the valley will affect how each group settled, exploited local resources, and interacted with host communities.

**Brett Kaufman** received his B.A. at Brandeis University, in Near Eastern studies and economics. His adviser at UCLA is Dr. Aaron Burke, Associate Professor of the Archaeology of Ancient Israel and the Levant. Brett specializes in Bronze and Iron Age Levantine archaeology, with a focus on archaeometallurgy.
He was recently awarded a National Science Foundation Graduate Research Fellowship for his studies concerning the connection between the production of metals and the timber fuel required to produce them. The research is based on bronze weapons and jewelry excavated from the site of ‘Enot Shuni in the southern Levant. ‘Enot Shuni was a large burial ground, and excavations revealed that it is the first site known in the Levant with continuous occupation from the Early Bronze Age IV through the end of the Middle Bronze Age II (ca. 2300–1530 B.C.) (see his featured article in this issue of Backdirt).

Brett has recently published an article about Phoenician citizenship in North Africa in MAARAV: A Journal for the Study of the Northwest Semitic Languages and Literatures. His dissertation will be the first comprehensive analysis of Carthaginian metallurgy utilizing data spanning a 600-year period from the foundation of Carthage until its destruction by Rome.

Hannah Lau grew up in San Francisco and received her B.A. in anthropology and history, with a minor in modern Middle Eastern studies, at the University of Pennsylvania. She has participated in fieldwork in Israel, at Tell es-Safi/Gath; in Kenya, as part of the Laikipia Regional Survey Project; and at Oğlanqala in the Autonomous Republic of Nakhchivan, Azerbaijan. At UCLA, Hannah works with Dr. Elizabeth Carter, Professor of Near Eastern Languages and Cultures. She is primarily interested in the study of faunal remains in the Near East and its implications for reconstructing political economy and historical ecology, and in landscape archaeology in the Near East.

Hannah received an NSF Graduate Research fellowship to support her graduate research in historical ecology and zooarchaeology in the ancient Near East. Faunal data from archaeological sites contributes to our understanding of past human society, illuminating aspects of economy, social organization, and political and ritual structure. She is currently working on two projects that use zooarchaeological data to reconstruct aspects of political economy and historical ecology in antiquity.

As part of the Naxçivan Archaeological Project (a joint University of Pennsylvania and Azerbaijani project) in the Autonomous Republic of Nakhchivan in Azerbaijan, her research is directed toward understanding the historical ecology of the Sharur region through analyses of zooarchaeological remains from the site of Oğlanqala and the Early Bronze Age (Kura-Araxes) sites of Kultepe II and Makht. Oğlanqala is a multi-period hilltop fortress site in northwest Nakhchivan, and while the site has been intermittently occupied through the present, her work focuses primarily on the Iron Age occupations. Hannah’s research specifically focuses on the ways in which the local Iron Age population at the fortified site interacted with their environment, by analyzing how animals contributed to their subsistence economy and how these animal management strategies may have differed from those of nearby communities synchronically and diachronically. Her goal is to clarify the sociopolitical and economic ties between local and imperial state entities, agropastoralists, and semi-transhumant groups and how those relationships may have shifted with changes in the political and social landscape during antiquity.
In addition to working in Azerbaijan, she also works with faunal remains from the Halaf site of Domuztepe (ca. 5900–5400 BCE) in southeastern Turkey. The Halaf period (ca. 6000–5200 cal BCE) in northern Mesopotamia falls between two periods of Near Eastern history marked by dynamic change: the early Neolithic inception of farming, and the Chalcolithic development of complex societies. The Halaf is traditionally viewed as a relatively static period marked by a widespread horizon of material culture, although recent work has demonstrated there is considerably more regional and local variation than is often appreciated. This period undoubtedly contained some significant developments with regard to the way people related to one another and organized themselves economically and socially, thus creating a bridge between the preceding and succeeding periods of change. The primary goal of her research at Domuztepe is to explore the development of commensal politics at a Halaf center during this critical period of social development. To accomplish this, she has evaluated faunal material excavated from a special feasting deposit at Domuztepe and compared it with faunal material from both quotidian refuse at the site and two other special feasting contexts. This comparison provides a more nuanced, qualitative understanding of the composition of large feasting events at Domuztepe and allows her to explore the broader sociopolitical implications of these events.

Kevin Hill grew up in Moorpark, California. He attended Harvard University, where he received his B.A. in anthropology with a focus in archaeology and biological anthropology. As an undergraduate he participated in fieldwork in the American Southwest. Kevin currently works in the Titicaca basin of Peru, with an interest in state formation, political economy, and craft specialization. At UCLA Kevin is advised by Dr. Charles Stanish, Professor of Anthropology and Director of the Cotsen Institute.

Kevin’s research tests models of economic specialization as imperial strategies in the Inca Empire ca. A.D. 1420–1532. He will focus on the nature of craft specialization and commodity production in an Inca province in the Lake Titicaca basin of highland Peru. The specific questions to address center on the nature of pottery manufacture in imperial Inca installations and outlying settlements in the region. The empirical questions to be addressed are: did the Inca employ new and technologically more costly manufacturing processes in their urbanized political centers, or did they rely on existing technologies in the region? If new technologies were indeed introduced coincident with Inca control, were these restricted to the imperial centers, or were they also utilized in secondary and tertiary centers as well?

The analysis of this pottery will utilize a field emission gun variable pressure scanning electron microscope (FEGVPSEM) coupled with energy dispersive X-ray (SEM/EDX). This equipment allows for nondestructive analysis of ancient pottery and provides information on microstructure, surface properties, and compositional characteristics such as slip thickness, firing temperatures, post-firing paints, and temper. The generation of these data will allow him to test the degree to which the Inca Empire altered existing pottery technologies in the region and the degree to which, if any, this new technology was centralized throughout their provinces. This information, in turn, will allow him to address the larger theoretical questions of imperial strategies of commodity production in urban installations. If the data demonstrate that new technologies were imported by the Inca, then we can conclude that imperial authorities exerted control over commodity production via their control of the manufacturing process. If the data demonstrate that the Inca period pottery production technique was not new, then the conclusion follows that control was achieved via the actual distribution of these commodities. If the first pattern holds, then Kevin will test further to see if these manufacturing techniques were restricted to imperial centers or if they were also found in lower-level settlements. The degree to which these technologies were centralized will provide a good empirical proxy on the degree of state control in pottery production and, by implication, the degree of state control over other commodities.

The health of any graduate program can best be gauged by its students and their research, and the exceptional performance of the students of the UCLA Archaeology IDP well reflects the program’s No. 1 standing in the recent National Research Council rankings published in 2010.
During the first decade of the twenty-first century, human losses of life and property from natural disasters exceeded those from war. Earthquakes, tsunamis, floods, hurricanes, tornadoes, and landslides have all exacted a deep toll. The question we face is this: is this vexing condition unique to the new millennium, or is this the nature of the human condition from times long past? Archaeology is well positioned to inform us about this question.

1. Guest lecture at the Director's Council of the Cotsen Institute of Archaeology
2. Department of Anthropology, University of Florida
The title of my lecture “Death by Stoning,” refers not to social vengeance. Instead it treats the human consequences of how big rocks from earthquakes are made smaller by El Niño floods, then smaller still by abrasive ocean currents. Waves eventually deposit sand-sized stones on beaches where winds blow them inland, completely burying human landscapes. Seen in geoarchaeological perspective, the devastating synergisms of convergent catastrophes are normal but not recognized because their time scales elude our detection. I illustrate this with a narrative of the combined environmental influences that contributed to the demise of America’s earliest civilization in coastal Peru. As always, “more research is needed!” but we are now in a position to offer some tantalizing results from recent field work.

**GEOGRAPHIC SETTING**

Changes in the physical environment are products of either solar energy conveyed by the ocean and atmosphere or nuclear energy from the earth’s mantle ultimately conveyed to the surface through tectonic plates. The Andean Cordillera is rapidly growing due to high rates of tectonic activity that produces magnitude >7 earthquakes every decade and volcanic eruptions every lifetime. The towering mountains split the continent into two climate systems, an arid one on the western side and a wetter one in the east. The Pacific watershed is a hyper-arid landscape with a highly regimented meteorological and marine regime. Along the cold Pacific littoral, strong, north-flowing coastal currents and strong daily winds occur in association with a temperature inversion that inhibits rainfall. The regime breaks down when El Niño intrusions of warm equatorial waters bring torrential showers to the normally rainless watershed.

People have inhabited this risky watershed for 12 millennia, making the Andes a perfect laboratory for investigating natural hazards and disasters and their effects on human society. Fatalities are inevitably highlighted in the media coverage of contemporary crises. Yet from an evolutionary perspective, a large loss of life from a natural disaster is generally inconsequential in the long term due to high human reproductive rates. Some 65,000 people were tragically killed in Peru’s May 1970 magnitude 7.9 Rio Santa earthquake, but the population deficit lasted less than a mere 12 months.

A much more sensitive measure of impact is the destruction of subsistence infrastructure that gauges temporary or permanent loss of human habitat. When the means of making a living are significantly disrupted or destroyed, pre-disaster populations will not bounce back as fast or may not recover at all (an example of the latter is New Orleans after Hurricane Katrina).

Humans are well aware of hazards that impact society rapidly and dramatically. Yet there is little understanding of fully comparable physical transformations that transpire gradually and accumulatively over more than two generations. Similarly, if one catastrophe exacerbates the impact of another, awareness of the synergism is often lost (although there is a Middle Eastern saying: “Hailstorm hits the previously beaten place,” meaning that disasters may form a sequence and accumulate) when the events are separated in time. Nonetheless, disasters...
and diseases are similar in that healthy populations generally survive an affliction. Yet, if a second or a third malady strikes in close succession, then the convergent crises can challenge survival. In effect, it is the notion of the “perfect storm” that helps us understand civilizational decline. One catastrophe, no matter how bad, can be handled by resilient human societies. However, two or more catastrophes in combination create synergies that can destroy civilization.

**EARLY CIVILIZATION**

In the coastal region of the Supe and Huara rivers, Peruvian investigators have evidence of multiple catastrophes at the end of what is billed as “America’s oldest civilization.” The archaeological sites include the largest New World architectural works for the preceramic time period that began around 3000 BCE and floresced a millennium later. The people pursued high-yield fishing complemented by specialized farming, and they erected stone-faced mounds, elaborate stone courts, and elite residences. This developed out of Late Pleistocene maritime adaptations that were enriched and intensified as rising sea levels created thousands of bays and coves during glacial meltback. The inlets significantly enhanced biodiversity. They also provided essential shelter for netting small schooling fish from diminutive wooden rafts and petite reed craft.

Contrary to the situation along the American Northwest coast, harvesting the Andean littoral was severely constrained by the lack of vegetation. To sustain growing populations, fisher folk began tending perennial cotton for fiber and hardy trees for wood and fruit by 5,000 years ago. As irrigation agriculture advanced upstream and inland, it became a separate profession. The emergence of separate economies marks the beginning of preceramic civilization, according to Dr. Ruth Shady, the prime mover of Rio Supe research. Indeed, emerging elites managed the complex economy by controlling its scarcest resource: arable valley bottomland. This essential resource occurs in discrete valley side pockets, each irrigated with its own simple canal system. Each was home to separate sets of preceramic monuments as if they were separate estates. From the shoreline complex of Aspero, the architectural centers were strung up the narrow valley, more than 23 km, past the very large (66 ha) complex of Caral, the ancient capital. Six centers have been cleaned and stabilized to create an impressive tourist circuit that has brought to light evidence of an ancient earthquake and other calamities.

**EARTHQUAKE/VERY BIG STONES**

Seismic impact at excavated monuments is evidenced as tilted and broken-down walls and heaps of debris directly atop formerly clean floors that are no longer level. These conditions typify all of Caral’s six major temple mounds. They are particularly dramatic atop the “Templo Mayor.” Here the masonry walls of summit rooms, compartments, and courts were tilted, bent, and broken down as the mound top subsided. The structural devastation is uniquely well preserved because the damage was not repaired but systematically filled over and buried to create a new surface for a final phase of construction that was insubstantial by former standards. Many monuments exhibit short-lived reconstructions, but others were simply abandoned. Using only the Templo Mayor and damage to the Huaca de los Sacrificios, one of the temples at coastal Aspero, a preliminary magnitude (M) of 7.2 was calculated for the seismic event. This is a minimal estimate. Evidence of terminal preceramic shock is now available at four other Supe centers and at the Bandurria monumental complex south of the Rio Huacho. Even if this were the largest earthquake in recent millennia, as it may have been, fatalities were modest because the common populace lived in lightly built quarters of reed and mat that did not result in hazardous collapse even when occupied hill slopes gave way and buried valley side canals. Avalanches were pervasive in the coastal mountains and extended over an area of at least 5,500 km² if the temblor was only M 7.2. This geological “mass wasting” resulted in enormous loads of loose seismic debris lying unrestrained upon the rainless desert landscape.

**EL NIÑO/LARGE STONES**

Predictably, the next disaster to afflict the region was one or more strong El Niño/Southern Oscillation (ENSO) disturbances. Collapsed masonry rubble was covered by flood slack water sediment in at least one area of Caral, but the time sequence is not clear. Historically, strong ENSO events that generate rains recur roughly every 15 years or so. Precipitation is the result of warm equatorial sea and air temperatures replacing normally cool ones, and the consequences of El Niño are well known. Fishing suffers less than farming because seafood remains available even while it changes in nature due to the influx of warm-water species. Deaths from drowning are less problematic than famine resulting from flood destruction of irrigation systems and of food stores in reed, mat, and adobe architecture. Tropical disease, pests, and vermin accompany tropical temperatures that have lasted about 18 months during recent centuries.

**COBBLE STONES**

Seasonal rivers carrying runoff from high mountain rains disgorge rocky rubble into the sea every year. Deltas do not form because the material is transported up the coast by very robust longshore currents. The stones grind together and become smaller as they are propelled along the sea floor. Waves cast rocks onto the beach, beginning with cobbles, near river mouths, which grade down to pebbles and eventually to sand as the distance of marine transport increases. Robust daily winds off the ocean engage loose beach sand and will blow it inland. Some beaches have widened during Holocene times, but often the amount of sediment added to the shoreline is roughly equal to the amount that is eroded away and lost in deep water.
On very rare occasions, perhaps once or twice per millennium, sections of the sediment transport system are completely overwhelmed when excessive loads of geological waste are ejected into the sea. A NASA analysis of time-lapse, high-altitude imagery documented this rare process when the 1972–73 El Niño flooding of the Rio Santa disgorged extraordinarily profuse waste generated by the M 7.9 Santa earthquake of 1970. Longshore currents engaged and transported the material northward well in front of the former littoral in deeper water than had been normal. Waves then cast up cobbles, pebbles, and sand, creating a narrow 20-km-long linear beach ridge representing a new shoreline positioned seaward of the earlier one by up to 1 km in one area near the river mouth. This alteration of the littoral happened rapidly, within a year or two; we know this because the new ridge is visible in 1975 satellite images. The strong ENSOs of 1982–83 and 1997–98 then flushed out more seismic debris that was added to the structure and to supplies of beach sand available for aeolian transport.

The Rio Santa beach ridge provides an analogue for interpreting the creation of the Medio Mundo formation, a unique 100-km-long beach ridge that arises south of the Rio Huacho. This high linear mound extends across and closes inlets and coves, and forms valley mouth embayments. It literally straightened the formerly crenulated shoreline. It impoverished the littoral because loose cobbles and shifting pebbles do not provide secure footings for marine life. Additionally, the linear mound literally pushed fishing into deeper, open, riskier, unprotected waters. Consequently, the early era of extraordinary maritime productivity came to an abrupt end that was eventually replaced by more circumscribed yields of today. Initially, sea foods offered little disaster relief because marine topography and marine life entered an era of radical physical readjustment that endured for decades.

**SAND STONES**

Beach ridge formation added a new source of stress along the lower watershed: invasion by saltating sands. Medio Mundo often graded from cobbles and pebbles into sand that winds could carry. Furthermore, it moved the shoreline seaward by cutting off innumerable embayments. The stranded coves dried, creating numerous sand flats. Powerful daily winds off the ocean transported the new supplies of fine material up to 30 km inland. Much of the landscape was loosely buried in shifting sediment, including farmland, settlements, and monumental centers. Humans rebuild after earthquakes and El Niños, but not so when tiny stones are on the move. ENSO beach sediments feed pulsing sand storms. Tempests anew each morning as winds build power until sun down. Air stream debris assaults eyesight and seeking relief people move elsewhere. The lower Supe region was largely abandoned until sediments stabilized after several centuries. This was certainly not the end of preceramic farming. Arable valley lands were available upstream from Caral and in similar altitudes in parallel drainages. Yet, in overview, this final assault by tiny stones pushed farming into higher elevations, just as cobblestones pushed fishing into deeper waters. The synergistic disasters split and impoverished the fruitful economic symbiosis that sustained the Caral and Supe civilization.

**DISCUSSION**

Presumably, Medio Mundo formed within a year of the first strong El Niño that followed the large preceramic earthquake. The written histories of seismic and ENSO events suggest that the same preceramic generation of people impacted by the earthquake was also impacted by the El Niño event that generated the nucleus of the Medio Mundo formation. Consequently, rapid and profound environmental stress is expectable. The Medio Mundo formation is the longest known Andean beach ridge. This speaks to creation by an exceptional seismic shock, potentially the greatest of Holocene times. Yet, the regional fatalities from this catastrophe and deaths caused by ensuing El Niño perturbations were modest in comparison with the enduring loss of population due to permanent habitat impairment from stones of cobble and sand size. Thus, the humbling of America’s first civilization, Caral, tells us that nature has inflicted great human losses in the past. Given this, the present and the future should come as no surprise.
Among the many developments in archaeology during the past decades is an increased application of biochemical analytical techniques and instruments to identify organic remains at the microscopic and molecular levels. Such research can have important implications for our understanding of how specific objects were used and thus can provide a means to reconstruct the technology, diet or long-distance contacts of ancient societies. Organic residues can be defined as the carbon-based remains of plants, animals, humans, or organic products of human activities either in their original or decomposed state. They thus comprise an enormous array of materials of potential interest that is furthermore composed of a range of biomolecules including lipids, alkaloids, carbohydrates, proteins, and DNA. Organic residues have been identified on a variety of materials—including bone, ceramics, cooking stones, flaked stone and grinding stones—and are found in such remains as coprolites, pigments, and wood from shipwrecks. A comprehensive review of this overwhelming amount of compounds and materials, and the various avenues to investigate them is well beyond the scope of this article. Instead I would like to present an overview of the techniques employed by archaeologists working at UCLA, followed by a brief discussion of some issues concerning the discipline.

It should never be expected that organic residue analysis alone can provide irrefutable answers to archaeological questions, and certainly not to questions that are not sufficiently specific and targeted. For this and other epistemological reasons, residue analysis must always be firmly embedded in a larger archaeological and anthropological research project, serving as one of several research avenues directed toward addressing the same larger research question (Figure 1). After it has been decided that residue analysis should be part of a project, a choice has to be made about the way in which this should be approached. This not only depends on the research questions and the archaeological material, but also on the available instruments, funding, and scientific support.

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1. Cotsen Institute of Archaeology and Department of Near Eastern Languages and Cultures, UCLA
Methods for organic residue analysis can be divided into two large categories, here identified as “microscopic” and “molecular” (Figure 2), so named not after the nature of the residue, which is both microscopic and molecular, but after the technique of their analysis. The search for smaller and smaller organic residues is a logical continuation of archaeological practices, aided by constantly developing insights and techniques. Much like Sherlock Holmes who used a magnifying glass to find critically important evidence previously missed by, for instance, Inspector Lestrade, archaeologists have turned from temples, palaces and mausoleums toward potsherds, flaked stones and bone fragments. At the same time, archaeology has shifted from finding things to finding things out. A microscope is now standard equipment for any archaeozoologist or paleoethnobotanist, and many have successfully used polarized light or electron microscopy to study inorganic as well as organic artifacts. Spectroscopy is another group of techniques that similarly developed out of the study of light and is often used in combination with microscopy.

The surfaces of all the objects around us absorb and reflect specific parts of the white light that usually surrounds us. The effect is that different objects appear to us as having different colors. This can provide important information, such as the difference between ripe and unripe tomatoes or, at a more scientific level, differences in the molecular composition of ripe and unripe fruits. Likewise, objects can be investigated with other sources of radiation energy, such as X-rays, sound, or particles (electrons, neutrons). Comparable to the resultant color of an object in visible light, different materials will respond differently to each of these incident beams. Next to reflection and absorption, the result can furthermore be the transmission or the scatter of the energy, or its emission in a different form (Figure 2, top). Originally, the various methods that were developed based on these phenomena were used to identify inorganic molecules, and later also to study organic residues. At UCLA, expertise in these techniques and their applications in archaeology is mostly concentrated in the UCLA/Getty Master’s Program in the Conservation of Archaeological and Ethnographic Materials.  

Like other techniques, microscopy and spectroscopy have both advantages and disadvantages. Often, they can be deployed nondestructively on solid materials, although several instruments require samples to be removed from the object for special preparation. Observations are usually compared with known standards, introducing issues regarding the accuracy of the match and the choice of the standards. Imperfect and even perfect matches may represent compounds that were not among the standards and can thus not be correctly identified.

More important are the problems created by materials with a heterogeneous composition, either because of inherent qualities (ceramics, organic residues) or because of changes over time (metals, organic residues). Related to this is the influence of the size of the area investigated and the number of readings taken, as heterogeneous materials will by their very nature respond differently in different places. Large areas, on the

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other hand, may return a signal that is actually a mix of two or more distinct responses.

The identification of the individual molecules that make up an organic residue usually starts with removing the residue from the archaeological object on which it was preserved by dissolving it into a suitable extraction solution. This is therefore an inherently destructive technique. The choice of extraction solution is determined by the molecules of interest and the analytical method to be used, thus closing off other avenues of research. To identify individual, unknown compounds in a complex mix—which is how most archaeological organic residues present themselves—it is first necessary to separate the sample into its components (Figure 2, bottom). This is usually done by means of chromatography, with the sample either in solution (liquid chromatography) or evaporated into a gaseous state (gas chromatography), or by electrophoresis (in a gel). Following this, the individual molecules are identified using mass spectrometry. This is a group of different but closely related techniques that use measurements of the mass of a molecule and its fragments for its identification. At UCLA, expertise in these techniques and their applications in archaeology is mostly concentrated in the Pasarow Laboratory for Mass Spectrometry.

Theoretically and practically, the best way to approach complex archaeological residues is to determine the presence of a specific predetermined compound (Figure 1). “Is compound X present in the sample?” is a very specific research question, especially compared with the more open-ended question, “what is the composition of this complex mix of unknown compounds?” It is also more in keeping with the ways in which most analytical methods and instruments are set up. One method to reliably identify very small quantities of a predetermined compound is to use liquid chromatography combined with tandem mass spectrometry (LC-MS/MS). This combination of instruments separates a complex sample into its components by liquid chromatography and subsequently allows only molecules with a predetermined mass into a collision chamber filled with an inert gas. The masses of the fragments that result from their collisions are measured and compared with the spectrum of masses produced by the molecule of interest (Figure 3). A positive identification is made if the sample returns a significant signal for the selected transitions at a specific time after its injection into the instrument (the retention time of the authentic compound). The disadvantage of this approach is that it requires a fair amount of prior knowledge about the material in order to select the molecule of interest, but the obvious advantage is that the method of identification can be precisely tailored to show its presence.

Despite the associated technical and theoretical complexities, archaeologists are especially interested in the possibility of unraveling a complex mix of unknown compounds, and indeed many research projects strive to do so. Their instrument of choice is one capable of combined gas chromatography with mass spectrometry (GC/MS). A GC/MS instrument separates a complex sample into its components by gas chromatography, after which these are ionized by electron impact (EI) ionization and subsequently identified with a relatively high degree of certainty by comparing the mass spectra of the formed ions with those from known molecules in one of several very large digital libraries (Figure 3). The advantages of these instruments are the very high resolving power of gas chromatography and the fact that the abundant fragment ions formed during EI-ionization produce a “fingerprint” for individual molecules. Disadvantages include the requirement for thermal stability of the analytes, which often necessitates their chemical treatment (derivatization), and the relatively small volumes that can be investigated as compared with other methods. Obviously,

Figure 3: General layout of a mass spectrometry instrument. The sample inlet converts the sample into a form fit to enter the ion source and separates it into its components. The different compounds are subsequently charged in the ion source. The mass analyzer then separates ions of a different mass in either time or space, after which each is detected in a detector. The output consists of one or more mass spectra and often also a chromatogram.

only molecules that go into the used extraction solution and subsequently survive derivitization, evaporation and ionization will be available for analysis. These are mostly lipids, stable and well-studied compounds, but widespread in nature and therefore seldom unambiguous concerning their source, as well as alkaloids and terpenoids, which are usually more specific concerning their source. Methods to increase the specificity of this method to identify the origin of the residue include the search for “biomarkers,” molecules that are considered specific for a certain source. Lipid biomarkers, however, are relatively uncommon or often decompose into less diagnostic compounds. Another approach is to identify source materials by the relative proportion of two or more different non-diagnostic lipids, which is then compared with the ratios in a database generated from known sources.

**Some Additional Thoughts**

In order for the powerful and ever improving methods and technologies mentioned here to be used to their full potential, several issues need to be addressed within the archaeological community. Among these are the archaeological and anthropological significance of molecular residues, the disconnect between scientists and archaeologists, and the recognition of the field by colleagues. Although I am unable to suggest a definitive solution for any of these I briefly introduce these closely related issues here and present some of my personal opinions.

A small sample from a prehistoric midden will contain biomolecules from many decomposing species of plants and animals, as well as the decomposing by-products of human activity, such as wood for tools and shelters, bitumen, resins, antler, organic chemicals used in tanning, and so on. Animals and microorganisms feeding on these organic molecules will have contributed not only a host of degradation products, but also their own unique compounds. The organic residue trapped in the matrix of a single unglazed ceramic sherd from such a midden may represent the first food to come into contact with the pot, after which the available binding sites were saturated; or the last, if older residues were continually replaced by new ones; or a combination of all food ever to have been inside the vessel, if the molecules that make up the residue compete for the available binding sites. Instead of—or in addition to—food, the vessel may also have been employed for “industrial” purposes, such as the preparation of organic dyes or glues, or as a censer, smoking pipe, coffin, or simply to store a multitude of things. Possible sources of organic residues furthermore include the refuse surrounding a discarded vessel, as described above, the microorganisms breaking down the organic residues within the ceramic matrix, or human remains decaying close to a pot if it was included as a grave gift.

To make sense of this overwhelming array of compounds and possible sources is obviously very difficult and is made almost impossible by at least two additional issues. The first is that a choice must be made about which group of compounds to interrogate—for instance, lipids, polysaccharides or proteins—as it is not possible to investigate all groups of organic compounds at the same time. Unless a sample is analyzed multiple times in various ways—which is often problematic owing to the lack of sample material, funding, or expertise—this choice determines not only the methods and instruments used, but to a large degree the outcome as well. In residue analysis, it is as if we were confined to studying a needle found in a haystack made from a multitude of different grasses, and we only retrieved that needle because we were using a magnet.

The second problem is the sample's exposure to taphonomic and diagenetic processes. It has now been shown that under the right circumstances, organic residues may survive for a very long time but usually not in their original composition. Shortly after their deposition, organic molecules are subject to microbiological attack and chemical decomposition. This is an area where paleontologists and food scientists have ventured, but their time scales are different from those relevant to archaeology. Organic residues in an archaeological context change not only at the molecular level, but also with respect to the proportion of their components, because of selective decay and leaching. This means that neither molecules nor their relative ratios will match modern equivalents. One way to address this issue is to assemble a specific archaeological online database, like those that exist for GC/MS spectra or fresh proteins.

It should be obvious that organic residue analysis alone can never provide irrefutable answers to archaeological questions and that such research can only be effective within the framework of a larger research project in which the chemical analytical findings are combined with archaeological, anthropological, historical and ethnographical data. On the far end of this spectrum are analytical biochemists; on the other end are anthropological archaeologists. Given their very different educational backgrounds and professional practices, there exists an inevitable disconnect between them. This gap is even larger in the United States, where basic education in science, technology, engineering and mathematics (STEM) is widely available but mostly benefits only those students with an interest or a talent for it, and where education in the history and philosophy of the discipline is almost entirely missing from scientific curricula. Closing this gap will definitely enrich both the scientific and scholarly communities. Within the field of archaeology, publications on organic residue analysis are mostly concentrated in *Archaeometry* and the *Journal of Archaeological Science*; when published elsewhere, and not in general scientific journals such as *Nature, Naturwissenschaften, Science*, or the *Proceedings of the National Academy of Sciences*, they may appear in a wide variety of specialized journals, often making them difficult to find. Indeed, biochemists sometimes use archaeological samples to address biochemical rather than archaeological research questions. As archaeologists do not regularly read *Analytical Chemistry* nor
biochemists *Archaeometry*, the two groups are kept from connecting, although powerful online search engines have now helped to remove this obstacle. More difficult to mitigate is the reluctance on the part of both disciplines to publish information on the analytical or anthropological methods used in their studies. A disinclination attributed to these being either common knowledge among their readers or outside the scope of the journal. Valuable information thus fails to make its full impact on the larger scholarly and scientific communities, which in turn leads to misunderstandings on both sides and heated debates, such as those on blood residues on ancient stone tools and cannibalism in prehistoric North America. The most important requirement to achieve productive cooperation within an archaeological research project is an open dialogue among all participants.

Communication should be aimed at a critical understanding of the methods, prospects and limitations of all research avenues (Figure 1). Archaeologists should not enter a cooperative project with unrealistic expectations. They need to be aware that failures are severely underreported in the literature and that much time, effort, and funding must be invested in method development. Analytical biochemists should understand that identification of the molecules is only a small part of the research, which mostly revolves around sample selection and translating results into human behavior. A closely related challenge is establishing more consistency in both the generation and interpretation of data, a step needed in order to establish the accuracy and robustness of a certain approach or to evaluate the efficacy of the field as a whole. Currently there seems to be too little effort to standardize methodologies or cross-check results, practices well established in the natural sciences. These weaknesses open the field up to more severe challenges and skepticism than would otherwise be warranted.

Given these issues, among others, there is an ongoing debate about relations between the natural sciences, anthropology and archaeology. Archaeology is remarkable as a discipline in that it does not really have specific tools, methods or technologies, but by its very nature seems to be an interdisciplinary endeavor. The basic archaeological tools are usually purchased in a local hardware store catering to builders and decorators rather than from a specialized archaeological supplier. Stratigraphic understanding and many elements of ceramic analysis derive from geological methods, while survey and mapping techniques are adapted from those developed by architects, marine navigators and spies. Other disciplines often consulted for ideas include biology, forensic science, material science, and biochemistry. Archaeological theory is mostly anthropological theory, but also includes elements of (evolutionary) biology, history, linguistics, art history, and physics. Such a mix of methods and theory originating in other disciplines is not at all uncommon among the sciences. So it is hardly surprising that techniques from the natural sciences have made their way into the field of archaeology since the 1950s. Radiocarbon analysis, for instance, is now universally accepted as the gold standard for dating, and geographical information systems (GIS) seem to have a general appeal. Archaeology is ideally situated to be a place where the “soft” and the “hard” sciences (at UCLA, in the North and South campuses, respectively) can meet, something that already happens today. This needs to be encouraged, rather than rejected in an effort to establish the priority of one set of useful theories and tools over another. Denying the natural sciences a place in archaeology is, in a way, comparable to disregarding historical sources before making a critical assessment, or ignoring the theoretical background behind any kind of research. Conversely, handing the discipline of archaeology over to the natural sciences seems not to make much sense either.

Instead, it seems time to recognize that archaeology is a discipline in its own right, albeit one with a more interdisciplinary character than most, and that we need to work together to further develop and define it. This may or may not ultimately result in the creation of a more specific archaeological intellectual toolkit as geology developed from a branch of physics into an independent discipline by creating its own specific methods and techniques, especially in the fields of geophysics and geochemistry. Perceiving scientists as mere technicians or anthropologists as irrational dreamers will not advance either field. The issue is not whether archaeologists should become chemists or chemists archaeologists, but how scholars and scientists from different fields can cooperate effectively to tease as much information as possible out of the material remains of the human past, whether one is using theoretical anthropological models, radiocarbon analysis, GIS, or organic residue analysis to do so.

UCLA Professors Kym Faull (left) and Hans Barnard (right) present their work on the molecular residues of wine in 6000 year old pottery from the Areni-1 cave complex, Armenia at the annual meeting of the American Society for Mass Spectrometry (Denver, 6 June 2011).
François Bordes was one of the most preeminent, internationally recognized Paleolithic (Old Stone Age) archaeologists of the second half of the twentieth century. His name is associated with no outstanding discoveries comparable, say, to the revolutionary findings his era saw being made in sub-Saharan Africa. And indeed he mostly labored in what was already the most thoroughly plowed field of Stone Age research, that is, the rockshelters of the Perigord region of southwestern France. These are not caves but rather large and deep cavities exposed along its limestone valley walls, which served as highly favored places for repeated Paleolithic occupations that left a succession of rich archaeological horizons incorporated into the shelter infill deposits as they gradually built up through erosion by the elements. The Perigord’s rockshelter sites traditionally constituted the standard frame of reference for our knowledge of the Middle Paleolithic (that is, the Mousterian, largely attributed to Neanderthals) and the Upper Paleolithic (that is, the block of stone tool traditions such as the Aurignacian and Magdalenian, which are largely attributed to fully modern Homo sapiens). The importance of Bordes’ work lies, then, not so much in the archaeological novelty of his findings but rather in the innovative approach he brought to excavation itself and in the equally innovative method he brought to analyzing the stone tool assemblages his digging brought to light. It is fair to say that these had a profound effect upon the conduct of Paleolithic archaeology throughout Europe, Asia, North Africa, and in some instances, well beyond. In addition, perhaps more by chance than design, they played a significant role in the controversies over archaeological method and theory that were overheating New World archaeologists at the time.

Other Anglo-Saxon archaeologists (as the French insist upon labeling their British and North American counterparts) might still be found who possibly could create a richer portrait of François Bordes than I am capable of. Nonetheless, I did happen to see much of the man during the last two decades of his life; I frequently worked in close association with members of his research team; and for six years he served as my joint principal investigator of the excavations I directed at the open-air site of Solvieux. I enjoyed cordial—but by choice never intimate—terms with him, and indeed it was not until after his death that I came to appreciate fully his

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personal qualities and professional accomplishments. In any case, what follows is only a brief sketch of the man and his work. My treatment of Bordes himself may have particular interest, since most such attempts one encounters in the literature are exercises in hagiography whose subject emerges more in a form reminiscent of a heroic equestrian statue than of a complex living man. Gratifyingly, the only public monument to Bordes is, in fact, the tram station accessing his old building at the University of Bordeaux. On the other hand, my treatment of his work must of necessity be too brief to do the job adequately. Interested readers can, however, find more thorough exegeses of the topic in several of my publications which remain readily available.

Bordes' Life History

Henri Louis François Bordes was born in 1919 in the Perigord region of southwestern France, a landscape of lofty cliffs, dense stands of forests, and green valleys richly scattered with charming villages that retain much of their medieval and Renaissance character. However, as evidenced by the appalling slaughter represented by the heart-wrenching lists of names on their World War monuments, they no doubt seem more charming to passing tourists than to local inhabitants, whose roots go deep. Bordes grew up as a member of the provincial bourgeoisie, comfortable and cultivated but still—like the rough-hewn peasantry that surrounded it—solidly grounded in the traditional culture, prejudices, and manners of the region. His enthusiasms as a boy involved the then famous Stone Age romance *La Guerre de Feu* (largely forgotten until given new life in the recent American film *The Quest for Fire*) and a bicycle, on which his far-ranging explorations of the Perigord soon gave him an expert knowledge of its natural history and archaeology. His talents were recognized early, and at the remarkably young age of 15 he was issued a permit to excavate a rockshelter site at Le Roc de Gauvaudun. In 1936 he entered the University of Bordeaux, majoring in geology and biology, and meeting his future wife, Denise de Sonneville-Bordes, who was to become a leading expert on the Upper Paleolithic.

He joined the military at the outbreak of World War II but was soon demobilized after the fall of France—a devastating event that no doubt fed his aggressive francophilia. In 1942, when the Germans extended their occupation into the entire country, he joined the Resistance as a Maquisard. He sometimes worked in obscurity as a coal miner to avoid being sent to Germany as a labor conscript. He referred to this period as the time he truly worked in the “underground.” Then came a dangerous and eventful two years as a fugitive fighting in the Maquis, an adventure finally brought to an end by a serious grenade wound. At the end of the war he returned to university life, gaining his doctorate at the Sorbonne (1951) with a classic dissertation that substantially revised the loess and gravel geoarchaeological sequence of the Paris Basin. In 1956 he became a professor at the University of Bordeaux, quickly gathering about him a coterie of students and researchers in what was to become the famous Institut du Quaternaire. And so Bordes found himself reigning over the conduct of Paleolithic archaeology in the Perigord as a whole. And he remained doing so until his untimely death by heart failure 25 years later during a visit to the University of Arizona, Tucson. He was buried in the Perigordian village of Carsac, where he had long maintained a house that served both as his retreat and the operations center for his excavations.

Bordes the Man

Bordes was one of a kind. He was a sturdy, vigorous, restless, volatile man. He could be gruff, rough, curmudgeonly. His occasional, seemingly uncontrollable outbursts of anger could be as unsettling as they were inappropriate to the occasion. And he practiced a congenital but milder testiness as a kind of art form. To cite but one example: when knapping flint tools, at which he was an expert, it always seemed to upset him when he inevitably arrived at the point of exhausting the flake core, which he would then hurl away in disgust, accompanied by a yell of “merde!” Although often bad-humored, he was nonetheless very good-natured, quite a different thing, especially when he found himself in the high-spirited atmosphere of a student site crew, or when cleaning a stratigraphic section with one or two experienced colleagues, or, again, when relaxing in the company of a French household that shared his own cultural background and outlook. Especially among the last he could be charming, thoughtful, and a delightful conversationalist. His habitual suspicion of other nations never extended to their

Bordes knapping flint at UCLA, circa later 1960's. The author is standing behind him.
individual citizens (with the possible exception of the English, whom he seems never to have forgiven for Trafalgar and Waterloo), whom he welcomed both as crew members and students. And he was uncommonly generous in sharing his data with any researchers, regardless of nationality, once they had mastered some degree of expertise in the trade.

I used the word “trade” advisedly, because a key facet of Bordes’ character was his pride in being a journeyman fieldworker, or homme de terrain. Given his natural contrariness, this often tempted him to assume the role of an intellectual philistine. (He once listed for me all of the classic books that he would not want on a desert island, taking care to omit all of the great works most of us at least claim we would want to have.) Yet he was, in fact, a cultivated man. Even more importantly, he was a well-recognized writer of science fiction, under the pen-name of Francis Carsac (inspired, of course, from his beloved home in the Perigord), publishing seven full-length novels and a score or so of short stories. Interestingly enough, these were translated into several European languages (they were especially well received in the Soviet Union) but were never destined to appear in English. I am not a fan, let alone a judge, of the sci-fi genre but remember being struck by one of his stories that dealt with a mysterious planet whose inhabitants were totally immobilized by apathy. I cannot help but suspect that the premise especially intrigued, and at some level disturbed, Bordes, who to my knowledge was never incurious, who possessed an almost tactile sensitivity to the world around him, and who was never bored. It bears adding that his career as a popular writer both contributed to, as well as reflected, the remarkably straightforward, unpretentious, and solid style of his scientific writings, which to my mind have been equaled by few prehistorians.

Although, on balance, I regard Bordes as a remarkable man, and certainly an eminent scientist, there are two aspects of his self-centered character that to my mind marred, or at least tempered, his achievement. One was the factionalism he promoted in French academic life, especially marked by his failure to come to terms with the Paris school of academics researching the Stone Age headed by André Leroi-Gourhan. True, it is difficult to imagine two such different characters: the boisterous, hard-headed geologist from Bordeaux, and the somewhat diffident, highly cultivated, but perhaps overimaginative scholar from Paris. Yet, despite their intellectual differences and remarkably different styles, the two schools of thought played complementary roles and had much to learn from each other. Some sort of reconciliation between the two would have lent a holistic hybrid vigor to French Paleolithic archaeology that it sorely lacked. A more far-sighted man than Bordes would have realized this.

The second fault I see is no doubt related to the first. This was his apparent belief that he had hit upon the right approach to Paleolithic archaeology and that, consequently, the job of his successors would largely be to work out those of its permutations he himself had neither the time nor the inclination to pursue. Seemingly, these were likely to amount to little more than intellectual embellishment of what he himself had already achieved. As he once put it to me: “Look Jim, I’ve built a town, laid out the streets and sewers and electric lines, and constructed the houses; if you want to put a statue in the town square, feel free to do so.” Of course, this kind of hubris is not rare in eminent archaeologists habituated to dominating their field, but it is sooner or later defeated by science’s restless need to more or less constantly be taking new, often unexpected turns. In the face of this, one has the choice either of encouraging one’s followers to wrestle with new advances or of moving to a new venue where one’s expertise, habitual practices, and reputation still carry great value. Possibly this accounts for Bordes’ ultimately devoting his last three years of research not to the Perigord but instead to early man sites in the Murchisan Basin of Western Australia.

THE TRADITIONAL APPROACH

We turn now to Bordes’ professional contribution. It is a daunting task to review this for readers who may not know, nor particularly care about, such questions as to whether a bladelet qualifies for the Dufour type unless it is longitudinally twisted and carries retouche alterne, or whether the Perigordian II stage is in fact a “phantom” industry produced by the contamination by frost-heaving of Perigordian I levels with the Aurignacian I levels which overlie them, or, again, whether the so-called Levalloisian culture of the Paris Basin is in reality no more than a Mousterian techno-complex whose distinctive tool shapes are the mechanical by-product of having been made on a special kind of flake. Probably no corpus of archaeological literature could seem more arcane and inaccessible to the non-specialist than the 170 articles on such topics that make up the bulk of Bordes’ oeuvre. However, he was not simply one of the ablest and knowledgeable practitioners of his trade, but in addition the creator of an innovative approach whose...
impact, as we have noted, influenced Old Stone Age research well beyond France itself.

The nature of this contribution is most easily defined in terms of the background against which it arose, which we shall call the “traditional”—in contrast to the “Bordesian”—era that followed. Given the taphonomic complexity of their sites and the recalcitrant, one might say defiantly alien, nature of Paleolithic stone tools, traditional researchers understandably adopted a form of what I call straight archaeology. In other words, they pursued a craft-like involvement with their archaeological record, cultivating a narrowly empirical preoccupation with the typology of its artifacts and the makeup of the deposits from which they derive. Dismissing paleoanthropological interpretation as premature speculation at best, they concentrated their efforts upon industrial systematics—that is, the task of defining typological variation among their stone tool assemblages—and, in turn, taking advantage of whatever light could be shed by stratigraphy, constructing taxonomic skeletons of how the lithic industries they segregated organized themselves over time and space. Their aim, in short, was (and, in truth, largely still remains) not to interpret but rather to map the lithic industrial variation that structures the Paleolithic archaeological record.

Of course, disciplines involved in digging up and making sense of the premodern past are based in one form or another of straight archaeology. But what set traditional Paleolithic research apart was the assumption—quite understandable in the light of its empirical grounding in stone tools and stratigraphy, along with its strong historic connection with geology—that the Stone Age archaeological record should be attacked in a manner that emulated the approach that earlier had been used by paleontologists in unraveling the fossil record. They might use words like “culture” and “tribe” (tribus), but these signify no more than that stone tools were made by people and that these people were no doubt primitive. Yet, given the quite special nature of their archaeological record, it is not surprising that efficacy (perhaps science’s most powerful tool when confronting empirical ambiguity) prompted them to regard stone tools at least metaphorically as if they were indeed fossils. The most singular expression of this idiom of research was their attempt to ground systematics upon fossiles directeurs—that is, diagnostic artifact types like Mousterian hand-axes, Gravette points, and Solutrean laurel leaves, whose restricted distributions as “index” or “zone” type-fossils in the archaeological record were believed to delineate the major “cultural” traditions (perhaps more accurately termed as “industrial blocks”) of Paleolithic times.

Now, the notion of the fossile directeur tended to foster two more implicit assumptions. The first was that the Paleolithic record paralleled the paleontological record in such a manner that we should expect to find a one-to-one correlation between its archaeological levels and the obvious natural stratigraphic units of the site deposits in which they are found. The second was that any given industrial complex, like any given paleontological complex, should be more or less invariant in the manner in which it expresses itself: in other words, a specific stone tool tradition should give rise to only one characteristic type of industry in any specific block of time and space in the archaeological record.

Given our current heightened knowledge of the complexity of the Paleolithic record, it is easy to see how the paleontological model greatly restricted the grasp of traditional prehistorians. Assuming to find a lock-step correlation between cultural and natural stratigraphy, they deemed it sufficient to excavate a site only in terms of its more obvious stratigraphic units—that is, the usually thick zones of relatively homogeneous sedimentological composition, which may indeed represent the major episodes of its depositional history but which at the same time can in reality incorporate several distinct archaeological horizons that often vary significantly in the details of their typological makeup. As a result, excavation techniques themselves inadvertently mixed these horizons and consequently blurred the archaeological record. At the same time, the differences that distinguish one archaeological industry from another were framed largely in terms of the presence or absence of the key fossiles tool forms. Indeed, so little attention was paid to the supposedly “banal” areas of typology that a large proportion of the stone tool artifacts excavators initially brought to light never found their way back to the laboratory at all. One of the sadder but highly informative tasks any historian of Paleolithic archaeology should undertake is to occasionally leave off reading the old site reports and instead excavate the spoil heaps of their excavators in order to discover the amount and kind of lithic material so many of them discarded.

As a result of all this, the artifact assemblages recovered for any given time period within any given region tended to exhibit a homogeneous and quite stereotyped aspect. And when, in turn, those from different time periods were compared, they inevitably appeared to exhibit fairly distinctive qualitative breaks reminiscent of the manner in which index fossils delineate temporal phasing in geological history. Thus it might be said that prehistorians literally created an empirical archaeological record that did in fact parallel the paleontological record in consisting of a more or less straightforward succession of industrially invariant stages which could be simultaneously identified and defined by a series of index fossile forms. It should be obvious that all this promoted a kind of methodological circularity whereby prehistorians were capable of observing as excavators only what they had already assumed to be true as taxonomists. To be sure, I exaggerate, overgeneralize, and, in the case of a handful researchers, probably fail to do justice to their efforts. Furthermore, the above paragraphs qualify as no more than informed supposition on my part, since traditional Paleolithic archaeologists were too insular and at the same time too bonded by shared if unstated assumptions ever to write explicitly about issues of method and theory. In any event, I believe it fair to state that the traditional logic of
inquiry promoted excavation techniques and classificatory procedures that dramatically reduced the ability of researchers to perceive novelty or to appreciate the more subtle kinds of variability and alternate patterning that might reside in Paleolithic archaeological deposits.

**The Bordesian Approach**

However tedious, the above recital of what traditional Paleolithic archaeologists did should serve to greatly simplify my abbreviated treatment of what Bordes himself accomplished. Although his achievement was massive, it is fair to say that he did not so much reinvent the field as reformulate it: a matter of clearly perceiving the shortcomings of his predecessors and developing new methods to compensate for them. To be sure, as in any science, many of Bordes’ contemporaries were on the same track, conducted research along similar methodological lines, and in certain areas probably surpassed him. Nonetheless, the bulk of his own contributions, popularized without doubt by his stature in the field and the impact of his personality, so branded European Paleolithic archaeology in the period 1959–1980 that it is altogether fitting that the era bears his name. My treatment of the substance of rockshelter sites like Laugerie-Haute, Combe Grenal, and Pech de l’Azé, with which his name is directly attached, let alone with those, such as the Harvard excavations at the Abri Pataud, which he generously placed in the hands of foreigners. A serious reader might wish to consult excavations at the Abri Pataud, which he generously placed in the hands of foreigners. A serious reader might wish to consult excursions at the Abri Pataud, which he generously placed in the hands of foreigners. A serious reader might wish to consult.

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To a great extent, what might be called the Bordesian approach simply involves a strategy designed to greatly enhance the overall quantity and quality of the data realized from the archaeological record. Excavation techniques now take on the character of stratigraphic dissection whereby artifact assemblages are segregated not according to a site’s major depositional blocks but instead with reference to the specific “occupational” horizons and the minimal sedimentological units discernible within them. (In some instances this has led to a nearly tenfold increase over the divisions traditional excavators earlier recognized at the same sites.) All lithic material, including unused tool blanks and industrial debris, is now saved, along with the standardized tools shaped (as a rule) by retouch. They are richly documented with respect to their provenance and, equally important, accompanied by representative samples of faunal, palynological, and sedimentological data carefully segregated with reference to their respective archaeological horizons. This latter information is employed to develop a *chronostratigraphic* approach to space-time systematics, wherein the design of regional space-time schemes entails a holistic level-by-level correlation of the site stratigraphies involved, founded as much upon their paleoenvironmental contents as upon the artifactual contents of their occupational horizons. While it might fairly be argued that such advances in the technology of archaeological research are simply refinements of earlier sampling and analytic procedures, their combined effect has nevertheless been to cause a leap in the degree of resolution with which prehistorians are able to observe and control the archaeological record. Moreover, although they constitute common practice today, this was not the case a half-century ago.

No less important, this effort is complemented by a new approach to systematics that has had an equally profound effect. In brief, the traditional concept of the qualitative *fossil directeur* has been set aside in favor of the notion that it is the relative frequencies of several tool types viewed in the ensemble, rather than the presence or absence of a few of them viewed individually, that is essential to refined systematics. Again, the basic idea is not new. But it was Bordes who first saw clearly that translating the notion of what one regards as industrially *diagnostic* into quantitative terms was not simply a matter of counting but, in addition, that it required the introduction of two new elements into the methodology of systematics. One is that artifact typology and the ordering of archaeological assemblages must constitute distinct procedures: in other words, the definition of an assemblage’s formal content must be operationally distinguished from its genetic affiliations to other assemblages in space-time systematics. As we have seen, this distinction was never clearly made in the traditional approach, since it was the inherently circular role of *fossile directeurs* to define simultaneously an assemblage’s content and assign it within some larger ordering scheme. The second is that artifact classification must be extended to the entire range of formal variation occupied by recognizable tools rather than simply to those specific areas that potentially possess the greatest diagnostic value in assemblage ordering. This “banalization” of artifact classification in the form of standardized type-lists makes it possible for every artifact recognized as a purposeful stone tool to be assigned to a specific type category and subsequently be counted. Obviously, without this global typological inventorying, which was by no means consistently recognized in traditional systematics, quantitative statements about relative tool frequencies lose most of their meaning.

Armed with its comprehensive type-lists and some relatively simple techniques of statistical description, Bordesian systematics revealed that the archaeological record is a vastly more complicated affair than the traditional approach envisaged. Perhaps most importantly, we no longer conceive of it as comprising simple linear successions of stereotyped industries, but instead as a complex of highly *polymorphic* industrial complexes which can assume a variety of alternate expressions at one and the same time in any given region. Bordes coined the term *évolution buissonnante* (literally “bushy,” but perhaps better translated as “ramifying,” evolution) to account for this polymorphism.
INDUSTRIAL VARIABILITY AND THE MOUSTERIAN QUESTION

And here arises an unresolved issue regarding the nature of Bordes’ thought. The term *évolution buissonnante* obviously has a paleontological ring to it and, in his mind, may well have had more than simply metaphorical value. We must ask, then, whether Bordes’ innovations, regardless of how important, were still largely a matter of methodology rather than of theoretical perspective. In other words, did he in fact continue to embrace the traditional “paleontological” mind-set? We can only give an equivocal answer, reminding ourselves in passing of the fact that ideas that cohabit in one and the same mind are not necessarily logically interdependent and that some indeed may logically preclude others.

For one thing, Bordes enthusiastically promoted many projects that were framed by “anthropological” aims, such as the search for habitation structures by the eminent amateur prehistorian Jean Gaussen, one of the pioneers of open-air Paleolithic research in a region hitherto dominated by rock-shelter excavation. Gaussen’s results ultimately led to my own work at the vast open-air station of Solvieux, at which Bordes himself served as co-collaborator. And one of our principal aims, or at least hopes, was to establish recurring clusters of horizontally segregated “tool kits” whose distribution might serve at least as a kind of structural grammar—if hardly an explanation—underlying the patterns of activities conducted on Paleolithic living floors. The idea was not a new one, to be sure, as attested by much of the work begun earlier by prehistorians in sub-Saharan Africa and by the splendid open-air sites being attacked at the same time as our own by Leroi-Gourhan’s group in the Paris Basin.

Yet, on the other hand, and much more familiar to the North American audience, was Bordes’ redefinition of the Mousterian as a polymorphic complex of four distinct tool complexes, or *assemblage-types*, which supposedly interstratified in the rock-shelters of the Perigord and which consequently were thought to be somehow quasi-contemporary. Here his thinking does seem to have paleontological overtones, since he argued that these assemblage-types had independent genetic connections to earlier, pre-Mousterian (that is, lower Paleolithic) industrial traditions. Since Bordes sometimes referred to these connections as being “cultural,” it seemed to follow—at least when filtered through the mind-set of anthropologically trained American archaeologists—that he must have believed that the Mousterian assemblage-types themselves actually represented four distinct ethnic groups, or “tribes,” which somehow shared the Perigord more or less simultaneously. And, their argument continued, would not a more likely explanation be that the assemblages in fact represented four different sets of spatially segregated activities conducted by one and the same ethnic group, rather than more or less the same set activities practiced by four different ethnic groups? Finally, it did not require, at least among the “New” archaeologists of the time, much of a reductionist intellectual jump to see in Bordes’ alleged position a parallel to the outmoded normative approach they attributed to traditional Americanist archaeology, in contradistinction to the processual approach they themselves advocated.

The most noticeable reaction to this particular instance of Bordes-style polymorphic variability (at least in the sense that bellowing smoke is the most noticeable attribute of a steam engine) was, of course, the so-called Mousterian “debate” between Bordes and Lewis Binford. To be sure, the basic issue it raises is of the utmost importance, particularly in prehistoric archaeology: how are we to distinguish in the archaeological record between what might be called activity and ethnicity, task and group—in other words, between what was going on and who was doing it? We need not attempt to untangle the course of the debate here, both because any anglophone archaeological student has at least a rough idea of what it was about and because my own role as a participant was far from dispassionate or unbiased. Suffice it to say that, to my mind, the direction it took was in about equal measure salutary and damaging to the progress of archaeological thought in this country and to the manner in which New World archaeologists regarded their Old World colleagues.

In any event, our concern here is restricted to François Bordes, whose role in the business is marked about equally by ambiguity and irony. For one thing, it was already starting to become clear to him, as well as to many other knowledgeable
researchers at the time, that his four assemblage-types did not adequately organize Mousterian industrial variability. For another, faults were beginning to appear in his chronostratigraphic scheme for the Perigord, which suggested that the assemblages were not in fact contemporaneous in the manner he first thought. Hence the premise on which the debate was founded became questionable fairly early in the game. Then again, Bordes himself actually debated very little, at least in print, and then largely in English. For the issue was very much an Anglo-Saxon affair, which was met with a mixture of bemusement, if not indifference, even in France itself. Finally, to be frank, it would be interesting to know whether the “debate” itself was not something of a canard in any event. The only source for many of the popular notions Americans hold about it derive from the imaginative Selbfschriften that Binford himself wrote as companion pieces to his own articles. This is not to say, I hasten to add, that Bordes would not have enjoyed a confrontation with Binford along personal lines. Although I never saw the two of them together, I suspect that Bordes was genuinely attracted to Binford, a man whose intelligence, brand of humor, combativeness, and need for self-assertion matched his own, and who—not being a Paleolithic archaeologist himself—could enthusiastically confront Bordes in a manner he might not tolerate from a fellow expert in the trade.

There is little I can add, since I can recall Bordes speaking to me only twice of the matter, and even then simply in the form of casual remarks tossed off during the course of fieldwork. The first time, he said that he in fact initially suspected that the Mousterian assemblage-types were indeed activity-specific, most likely representing varying expressions that one and the same culture might take in its seasonal rounds; and that he only later abandoned this view because he could find no corresponding differences in their associations with faunal assemblages, hearths, site organization, and so forth. I took this to mean that he viewed the question of Mousterian variability—as he did most Paleolithic issues—as a largely empirical matter which could only be resolved on strictly empirical terms. Here, of course, he was speaking in the guise of a straight archaeologist for whom paleoethnological interpretation could wait. The second time the subject came up he turned his words took a more cynical turn: in short, that the debate’s real value lay in the fact that it was an easily grasped and easily popularized matter that served to promote his reputation among Anglo-Saxon archaeologists and students who were otherwise too ignorant of Paleolithic archaeology to know the difference between a burin and a hand-axe.

**Bordes in America**

Finally, a word is in order regarding Bordes’ quite special relationship to America, which he first saw in 1959, revisited numerous times, and where he ultimately met his untimely death. His feelings about the United States, true to his contradictory character, were highly mixed. For he was intensively chauvinistic, as we have seen, and in fact viscerally anti-American when it came to matters like foreign policy. Some of his remarks on the topic were callously insensitive, especially to those of us who had lost family, friends, and neighbors on French soil in two world wars. Yet his love of our land, as opposed to the foreign policy of our nation, was itself altogether genuine. He was particularly attracted, as are many Europeans, by the vast and raw beauty of the Southwest, an attraction no doubt enriched by an almost juvenile nostalgia for the lore of the old Far West created by American cowboy novels and movies. And there was something in the openness of the American character he particularly enjoyed, perhaps, fairly or not, in contrast to the supposed reserve of our anglophone counterparts across the ocean.

My impression is that Americans were more likely than his own countrymen to find him in a relaxed, congenial, and receptive mood. In part this was due to the fact that he was as welcome in New York as in Los Angeles, in Chicago as in San Francisco. And American intellectual life of those years probably seemed less factionalized and partisan than it was in France (a fact, as we have seen, for which he himself must bear some responsibility). Then too was the great esteem he enjoyed among American replicators of stone tools, stemming from his early association with Donald Crabtree. Knappers all belong to the same fraternity and practice a craft and mind-set that over-ride ethnic, linguistic, and even archaeological boundaries. As a result, Bordes was able to forge close and empathetic bonds with skilled colleagues who may never have known nor cared how the stratigraphy of Pech de l’Azé correlates with that of Combe-Grenal or why the former Perigordian III stage is now called Perigordian VI. I imagine he welcomed the intellectual vacation this afforded.

Bordes was fond of American students, and they reciprocated warmly. They found it difficult to resist someone who loved to show off, spoke English so colorfully and amusingly in a strong French accent, all the while sporting a cowboy hat and a Far West bolo tie. But, at a more fundamental level, they felt the force of his scholarly dedication and eagerness to share his knowledge; they appreciated the fact that he took them seriously, even if they did not always have the preparation needed to follow the details of his argument. I believe this is why he took so much care in writing that lucid exposition of Mousterian archeology, *A Tale of Two Caves* (1972), which to my knowledge sadly never appeared in French.

Bordes’ relations with his fellow prehistorians in America are not so easily summarized. While he was highly respected by nearly all—he was (and remains so 30 years after his death) the center of controversy with respect to theoretical matters—I doubt he took it all too seriously. To be sure, he admired the accomplishments and vigor of North American archaeologists and for obvious reasons followed developments in Paleo-Indian research closely. But he never bought the proposition that archaeology is anthropology or it is nothing. And he thought the philosophical posturing of the New Archaeology of his era pretentiously absurd. At the same time, he seemingly felt that...
the problem was exacerbated by the fact that most American archaeologists were to be found in academic departments of universities and colleges, intellectual settings which by their own nature promote theoretical controversy for its own sake (especially among those of its participants who otherwise would have nothing of substance to say). I suspect he held, probably rightly, that American archaeology would be better served if the country possessed a semi-independent, empirically oriented scientific establishment comparable to the excellent Centre National de la Recherche Scientifique, which supplied the bulk of the full-time archaeological researchers in France.

Again, of course, I simplify. No one denies that a scientific engine cannot be driven without good theory, and Bordes knew this as well as any American archaeologist. But to the end he remained a militantly down-to-earth *homme de terrain*. It was ignorance and intellectual pretension, not ideas, that he opposed. And if he sometimes struck Americans as being disinterested and oversimplistic in handling theoretical questions, we must keep in mind the dualistic nature of his character. For archaeological theory must have seemed rather dull in comparison with the rich store of novelty and imagination he found in sharing the same mind with his alter ego, Francis Carsac. Perhaps Americans would have had a greater and more nuanced appreciation of François Bordes had they also been given the opportunity to know Francis Carsac. But Carsac, unfortunately, never spoke a word of English.
The Archaeology Interdepartmental Program at UCLA is a graduate program in which students can acquire a uniquely configured body of knowledge from multiple departments within the university. There are currently over 30 enrolled graduate students in the Archaeology IDP, and our students have covered the globe in their pursuit of academia’s highest degree. We are proud to announce the following five recently completed Ph.D. dissertations.

**Jamie Aprile** completed her Ph.D. with a dissertation entitled “Pylos and Nichoria: A Case Study in Urban/Hinterland Political Economy,” under the supervision of Professor Sarah P. Morris. Dr. Aprile is currently teaching part-time at the University of Texas at Austin.

**Petya Hristova**’s dissertation, entitled “Masks and People: Reconstructing the Early Mycenaean Funerary Ritual through Archaeological Images and Context,” was completed under the supervision of Professor Sarah P. Morris. Dr. Hristova is currently teaching part-time at San Jose State University.

**John (Mac) Marston** (currently a postdoctoral fellow at the Joukowsky Institute of Archaeology at Brown University) completed his dissertation entitled “Evaluating Risk, Sustainability, and Decision Making in Agricultural and Land-use Strategies at Ancient Gordion,” supervised by Professor John Papadopoulos. Mac was nominated as the student marshal for the doctoral hooding ceremony. This is the highest honor bestowed annually upon two among all the graduating Ph.D. students at UCLA, and this was awarded to him for his “outstanding achievements during doctoral study at UCLA.”

**Elizabeth Mullane** (currently IHUM Fellow at Stanford University), completed her dissertation entitled “Megaliths, Mounds, and Monuments: Applying Self-organizing Theory to Ancient Human Systems,” under the supervision of Professor Monica L. Smith.

**Davide Zori**’s dissertation, entitled “From Viking Chiefs to Medieval States in Iceland: The Evolution of Social Power Structures in the Mosfell Valley,” was supervised by Professor Jesse Byock.

Two other students, **Seth Pevnick** and **Jennifer Rashidi**, are nearing completion of their dissertations and hope to file in the coming months. Seth Pevnick, currently the Richard E. Perry Curator of Greek and Roman Art at the Tampa Museum of Art, is completing his dissertation, “Foreign Creations of the Athenian Kerameikos: Images and Identities in the Work of Pistoxenos-Syriskos” (supervised by Professor John Papadopoulos). Jennifer Rashidi’s dissertation is entitled “Animals, Disease and Medicine in the Ancient Near East: Towards a Pathocoenosis of Ancient Mesopotamia” (supervised by Professors Gail Kennedy and Robert Englund). The range and scope of the research of our recent Ph.D. students, in terms of theory and methodology, on the one hand, and the regional focus, on the other, give ample testimony to the capacity of the Archaeology IDP.

In addition, a whole slew of students have recently completed their M.A. degrees in Archaeology: Kanika Kalra, Brett Kaufman, Karl La Favre, Hannah Lau, Hillary Pietricola, Catherine Pratt, and Stephanie Salwen.

We are especially proud of our students for their success in competitive funding at the university and national levels. The four students recently awarded National Science Foundation Graduate Research Fellowships are showcased in the News section. But I would like to add that three of our continuing students—Brett Kaufman, Kristine Olshansky, and Catherine Pratt—were awarded competitive year-long Graduate Research Mentorships for 2011–2012. Congratulations to them all!
SPOTLIGHT ON 2010–2011 FIRST-YEAR ARCHAEOLOGY IDP STUDENTS

The 2010–2011 incoming class consisted of six highly talented students, all with stellar undergraduate degrees. Two of these students—Christine Johnston and Evan Carlson—entered the program with an M.A. from other institutions, Christine from the University of British Columbia (in her native Canada), Evan from Columbia University in New York. Christine, who came to the program with a four-year fellowship from the Social Sciences and Humanities Research Council of Canada (SSRHC), is working in Aegean and eastern Mediterranean archaeology under the supervision of Professors Morris and Papadopoulos, while Evan is working on Near Eastern archaeology with Professor Elizabeth Carter.

The other four 2010–2011 students came to the program with B.A. degrees from some of the finest institutions in North America: Ben Nigra (University of Chicago) is working on Andean archaeology under the guidance of Professor Charles Stanish and was recently awarded a three-year National Science Foundation Graduate Research Fellowship; Chelsey Fleming (New York University) is working on Aegean prehistory and Classical archaeology with Professors Morris and Papadopoulos and is the recipient of the UCLA Chancellor’s Prize; Kathryn Chew (Scripps College) is studying Egyptian archaeology under the guidance of Professor Willeke Wendrich and was awarded the Eugene Cota-Robles Fellowship; and Kristine Olshansky (UC Santa Barbara) is working on Near Eastern archaeology with Professors Stanish and Areshian and was awarded a UCLA year-long Graduate Research Mentorship for 2011–2012.

All six students have already left their mark on the program, and we look forward to tracking their future academic growth.

THE INCOMING CLASS OF 2011–2012 ARCHAEOLOGY IDP STUDENTS

The talent and diversity of the incoming class of 2011–2012 IDP students is truly exceptional. Two students—Ellen Hsieh and Hsiu-p’ing Lee—hail from Taiwan; another, Myles Chykerda, from Canada. All three are entering the program with completed M.A. degrees. Ellen was awarded the highly prized Taiwan Ministry of Education Fellowship, which offers three years of funding; she was also awarded a Fulbright Fellowship. Two of the first-year cohort—Terrah Jones and Rachel Moy—were awarded UCLA Eugene Cota-Robles Fellowships, and Rachel was also awarded the Chancellor’s Prize.

Two of our incoming students have strong backgrounds in the sciences: Laura Griffin in physics and chemistry, Terrah Jones in chemistry and anthropology. Laura, who also holds an M.S. in physics from UCLA, will be working with Professor Ioanna Kakoulli in the eastern Mediterranean, and Terrah will be working with Professor Charles Stanish in the Andes.

Both Hsiu-p’ing Lee and Ellen Hsieh will be studying the archaeology of China, Hsiu-p’ing under the supervision of Professor Lothar von Falkenhausen, Ellen with Professor Min Li. Rachel Moy’s regional focus is on Egypt, where she will work with Professors Willeke Wendrich and Kara Cooney, and Myles Chykerda will be working on Classical Greek archaeology with Professors Morris and Papadopoulos.

The faculty and staff of the IDP, together with the greater Cotsen community, are looking forward to welcoming the new first-year students in the fall, and we wish them every success in the program and during the time they spend at UCLA.
2010–2011 ARCHAEOLOGY GRADUATE INTERDEPARTMENTAL PROGRAM FIRST-YEAR STUDENTS:

**BEN NIGRA** was born and raised outside of Pittsburgh, Pennsylvania. He received a B.A. in anthropology at the University of Chicago, concentrating on archaeology and physical anthropology. Before joining the Cotsen Institute, Ben conducted fieldwork in northern Chile’s Tarapaca Valley; in Ilo, Peru; and in southern Peru’s Vitor Valley. At UCLA, he works with Charles Stanish (Director, Cotsen Institute, and Professor, Department of Anthropology). His research interests are in state expansion, frontiers, economic incorporation, and political economy during the Andean Middle Horizon.

**CHELSEY FLEMING** will be a second-year graduate student studying classical archaeology under Sarah Morris (Steinmetz Professor of Classical Archaeology and Material Culture, Department of Classics) and Professor John Papadopoulos (Chair, Archaeology Graduate Interdepartmental Program). Before coming to UCLA, she completed a B.A. in classical archaeology and fine art from New York University and is interested in the iconographic exchange between cultures in the Mediterranean Basin. Her research interests include the archaeology of colonialism, the art and archaeology of Magna Graecia, and the relationship between text and image.

**CHRISTINE JOHNSTON** is a native of Vancouver, BC, and comes with a master’s degree in classical and Near Eastern archaeology and a Bachelor of Commerce from the University of British Columbia. Her interests lie in economic and political history, and exploring the ways in which economic interaction and trade facilitated cross-cultural exchanges. Regionally, she focuses on the Mediterranean world of the Late Bronze and Early Iron Ages, and has participated in field programs in the Levant, Greece, and in the Pacific Northwest. She works with Professor John Papadopoulos (Chair, Archaeology Graduate Interdepartmental Program) and Sarah Morris (Steinmetz Professor of Classical Archaeology and Material Culture, Department of Classics).

**EVAN CARLSON** received an M.A. in anthropology from Columbia University and has a B.A. in Classical and Near Eastern civilizations, Greek, and computer science. His primary research focus is the social makeup and formation of ancient cities, as seen analytically through the lenses of phenomenology, spatial theory, mobility, and power relations. Evan’s M.A. thesis examined early settlements and urban centers as gathering places for different people who lived through changing social identities, conflicts, synergy, and attempts at control that inevitably arise when people inhabit a closely packed, constantly changing space. Evan came to UCLA to work with Professor Elizabeth Carter (Department of Near Eastern Languages and Cultures) on researching the relationship between rulers and urban populations in the formation of four planned capitals constructed on virgin soil between the fourteenth and thirteenth centuries B.C. in the Near East.
KAthryn Chew received her B.A. in anthropology and media studies from Scripps College in Claremont, California. She also studied Egyptology and archaeological methodology at the American University in Cairo. In her graduate work at UCLA, Kathryn will focus on the interrogative abilities of georeferenced three-dimensional models, specifically on the delineation and representation of spatial valuation and use for the enhancement of the phenomenological content of models. Kathryn will also engage with UCLA’s recently launched Digital Humanities graduate certification program, as well as a variety of other digital projects under the guidance of her academic advisor, Professor of Egyptian Archaeology Willeke Wendrich.

KRISTINE MARTIROSYAN-OLSHANSKY grew up in Armenia and moved to the United States in 2000. She received her B.A. in classical civilization and Russian language from UC Santa Barbara. She has participated in the excavations of the medieval capital Dvin in Armenia and has been conducting fieldwork at the Areni-1 Chalcolithic cave site in Armenia since 2008. For her graduate studies, she works with Charles Stanish (Director, Cotsen Institute, and Professor, Department of Anthropology) and Gregory Areshian (Assistant Director, Associate Researcher, and Visiting Professor, Cotsen Institute) and her primary research interests are the Neolithic and Chalcolithic of the Near East, ancient landscapes and natural environments, lithics and ceramic analysis, and GIS applications in archaeology.
MYLES CHYKERDA comes from Edmonton, Canada, where he received a B.A. Honours in Anthropology and Classics (2004) and joint M.A. in classical archaeology and in humanities computing (2010), both from the University of Alberta. Although originally interested in the archaeology of the Roman army, his focus shifted to Greek defensive strategies at both the city and regional level while studying under Dr. Margriet Haagsma. Through his Ph.D. work, he plans to expand these concepts to a broader geographical, material, and temporal range in order to examine the emergence of state organization and regional identity in the Thessalian plains.

LAURA GRIFFIN grew up in Atlanta, Georgia, where she got a B.S. in physics and chemistry from Emory University. She also holds a M.S. in physics from UCLA. Laura has done ecological field research on the microbial cycling of sulfur in the coastal ocean, and she is currently working with Professor Ioanna Kakoulli (Archaeological and Ethnographic Conservation and Materials Science) on projects involving the chemical characterization of ceramics from coastal Mayan and Panamanian sites. Through a combination of techniques in geochemistry, molecular biology, and modeling, Laura plans to examine patterns of access to terrestrial and aquatic resources, domestication and food production technologies, population density effects, and the topologies of human networks.

ELLEN HSIEH comes with a master’s degree in anthropology from National Taiwan University. She had prior Neolithic archaeology experience, but shifted to historical archaeology and maritime archaeology, which are developing fields in Taiwan. Her M.A. research focused on imported ceramics in an aboriginal village site in northeast Taiwan, and in her future studies she intends to expand her previous research to take a broader perspective to discuss the dynamic relationship among different groups around the Asia waters, especially in the seventeenth-century European contact era.

H. P. (HSIU-PING) LEE graduated from the Institute of History at National Taiwan University and is interested in the ancient Chinese civilization and archaeology, with a special focus on the interrelationship between political domination and material culture during the Shang-Zhou period (ca. 1046–211 B.C.). Although he studied ancient Chinese history, he used a lot of archaeological evidence in his master’s thesis at NTU, discussing and analyzing the social development of Nanyang Basin, the region between the Yellow and Yangzi Rivers. He is looking forward to working with Professor Lothar von Falkenhausen (Department of Art History; Associate Director, Cotsen Institute).
**Rachel Moy** was born and raised outside of Chicago, Illinois. She received her B.A. in classical archaeology and Near Eastern Studies from the University of Michigan, Ann Arbor. Previously, Rachel has conducted fieldwork at Megiddo in Israel and the Garfield Farm Excavation in Illinois. At UCLA, she studies under the direction of Professor of Egyptian Archaeology Willeke Wendrich. Rachel’s research interests include Egyptian religion, reuse of sacred space and construction of religious landscapes, and foreign interactions, especially with Nubia.

**Terrah Jones** is from Green Bay, Wisconsin, and she received B.A. degrees in both anthropology and chemistry from Ripon College. While in attendance at Ripon College her focus was on archaeological science using chemical techniques to compositionally analyze ceramic artifacts from 19th century Scotland. She has also done work in Moquegua, Peru assisting with the creation of an electronic database for paleobotanical remains from Cerro Baúl (ca. AD 650 – 900) and the Ring Site (ca. 11,400 BP). In her graduate work here at UCLA she works with Charles Stanish (Director of the Cotsen Institute of Archaeology, Professor in the Anthropology Department) and her primary interests are pre-Columbian Andean archaeology, trade and exchange in archaic states, and expanding her knowledge in archaeological science.
The UCLA/Getty Master’s Program in the Conservation of Archaeological and Ethnographic Materials

Report from the Chair

by David A. Scott

The UCLA/Getty Master’s Program in the Conservation of Archaeological and Ethnographic Materials is a cooperative effort between UCLA and the Getty Conservation Institute. It is administered by the Cotsen Institute of Archaeology and grants a three-year M.A. degree in conservation, aiming to educate and train students in the highest standard of conservation practice. We accepted six very well-qualified students in the fall of 2009, and they are all safely on track to finish their M.A. degrees in 2012:

Tessa de Alarcon received her B.A. in studio art from Carleton College in Northfield, Minnesota. Last summer she interned at Kaman Kalehöyük in Turkey and also at the Natural History Museum in Los Angeles; this summer she will begin her third-year internship at the University of Pennsylvania Museum of Archaeology and Anthropology. In April 2011, Tessa presented a poster called “Cahuilla Sandals: Materials and Construction Methods” at the 2011 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. Also in April 2011, she presented an invited paper titled “Improvements in the Histological Analysis of Archaeological and Cultural Materials Using Photoluminescent Semiconductor Nanocrystals” at the 2011 Society for American Archaeology annual meeting in a symposium sponsored by the Society for Archaeological Sciences. Tessa has also submitted a coauthored paper entitled “Case Studies in Basketry Repair: Two Abenaki Baskets” to the Journal of the American Institute for Conservation, and another paper called “A Comparative Study of Corrosion Inhibitors for the Treatment of Archaeological Copper and Copper Alloys” for consideration by Anatolian Archaeological Studies.

Lily Doan is a southern California native who completed her B.A. in anthropology from California State University, Long Beach. Her internships included work at the UCLA Fowler Museum, the Gordion excavations in Turkey, and the Los Angeles County Museum of Art. Her thesis work examines how an artist interview should be conducted, which is an important component in the conservation of contemporary art, and which may influence the study and treatment of a Balinese cili figure. She retains an interest in collections that range from archaeological to contemporary, in the collaborative nature of conservation, and in the preservation of living traditions. In April 2010, Lily co-presented a poster on “A Comparison of Block Lifting Materials and Techniques” at the 2010 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference.

Elizabeth Drolet is from Atlanta, Georgia, and received her B.A. in archaeology from Boston University. Last summer, Elizabeth worked on the conservation of stone, bronze, and iron objects at the site of Gordion in central Turkey, on the cleaning and repair of Minoan ceramics, bronzes and beads at the INSTAP Study Center in East Crete, and on the documentation and maintenance of earthen architecture at the site of Tell Mozan in northern Syria. She also participated in a materials characterization workshop at the Kaman-Kalehöyük excavation in central Turkey in the summer of 2010. Elizabeth is currently working on research into the deterioration of archaeological ceramics, the thesis to be entitled “Characterization of the Deterioration of Low-Fired Ceramics in Varying Burial Environments.” This summer, Elizabeth will...
be assisting with the excavation and conservation of materials at the site of Tell Tayinat in southeastern Turkey, and will be working on the repair of ceramics and continued work on the conservation of the earthen architecture at Tell Mozan. In the fall, she will start a year-long internship in the Sherman Fairchild Center for Objects Conservation at the Metropolitan Museum of Art in New York. In April 2010, Elizabeth co-authored a paper called “The Chemical characterization and Removal of Lac Dye Staining on White-Gound Ceramics” which was presented at the 2010 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. In April 2010, Elizabeth also presented an invited paper with the title “The Use of the VPSEM in Archaeological Conservation: Two Case Studies” at the symposium “From the Field to the Microscope: In Situ Scanning Electron Microscopy and Microanalysis in Conservation, Art and Archaeology.” The symposium was co-organized by the Materials Science and Engineering Department and the UCLA/Getty Conservation Program and partially funded by the Kress Foundation. In February 2011, Elizabeth co-presented a poster on “The Identification of Fibers from a Mummy Bundle, Tarapaca Valley, Chile” in the Archaeology Graduate Student Conference at UCLA. In April 2011, Elizabeth presented an invited paper titled “Differential Burial Environments: Effects on Low-Fired Ceramics and Implications for Archaeological Research” at the 2011 Society for American Archaeology annual meeting in a symposium sponsored by the Society for Archaeological Sciences, as well as a paper entitled “Time, Erosion and Earthen Architecture: Documenting the Effectiveness of Protective Shelters for Mud-Brick Structures” at the 2011 ANAGPIC annual conference.

NICOLE LEDOUX is from Boston, Massachusetts, and received her B.A. in anthropology from Harvard University. In the summer of 2010, Nicole completed an internship in archaeological conservation at Poggio Colla, an Etruscan site in Italy. She also spent part of the summer documenting and treating ancient Nubian artifacts at the Museum of Fine Arts, Boston. For her third-year internship, Nicole will be working at the American Museum of Natural History in New York City. In April 2010, Nicole presented a paper called “Treatment and Technical Study of a Lakota Beaded Hide” and co-presented a poster entitled “A Comparison of Block Lifting Materials and Techniques” at the 2010 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. In April 2011, she presented a poster on “An Investigation of Loss Compensation Materials for the Conservation of Coiled Basketry” at the 2011 ANAGPIC annual conference. Nicole is currently completing research on this topic for her M.A. thesis.

DAWN LOHNAS is from Santa Barbara, California, and received her B.A. in studio art with a minor in anthropology from UCLA. In the summer of 2010, Dawn worked at the National Museum of the American Indian, helping to prepare a range of objects from across the Western Hemisphere for exhibit in “Infinity of Nations,” currently on display at the George Gustav Heye Center in New York City. Her projects included treatments on a variety of peyote ceremonial objects, as well as quill treatment and stabilization on a Cree Métis hide jacket. She also treated several vessels now on display on the National Mall in Washington, DC. In April 2011, Dawn presented a poster called “Characterization and Analysis of a Likely Khipu from Northern Chile” at the 2011 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. This poster is the result of an ongoing study of a piece from the UCLA Fowler Museum collection, which will soon be submitted for publication. For her master’s thesis, Dawn is evaluating the effectiveness of calcium hydroxide nanoparticle dispersions for the consolidation of painted earthen architectural surfaces. Next fall, she will be interning in the Antiquities Department at the Getty Villa.

ROBIN O’HERN is from Honolulu, Hawaii, and received her B.A. in religious studies from Swarthmore College, as well as an M.A. in theological studies from Harvard Divinity School. This summer, Robin will be working at the Cleveland Museum of Art. Her two projects include documenting and treating a group of Islamic ceramics and a sixteenth-century wood polychrome sculpture from Germany. In April 2010, Robin co-presented a poster called “A Comparison of Block Lifting Materials and Techniques” at the 2010 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. In February 2011, she presented two posters at the UCLA Cotsen Institute of Archaeology Graduate Student Conference. She presented again her poster on block lifting materials and techniques and, in addition, a poster called “Identification of Fibers from a Mummy Bundle, Tarapaca Valley, Chile.” In April 2011, Robin presented her thesis research on the surface encrustation of Komo masks at the 2011 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. Lastly, Robin wrote an article
A RCHAEOLOGY & CONSERVATION
GRADUATE PROGRAMS

In April 2010, Cindy Lee presented a paper called “The Chemical Characterization and Removal of Lac Dye Staining on White-Ground Ceramics” at the 2010 Association of North American Graduate Programs in the Conservation of Cultural Property (ANAGPIC) annual conference. The following year at ANAGPIC, she presented a poster on the conservation treatment of a Makah Indian basket. Cindy Lee will complete her third-year internship at the Museums of New Mexico, Santa Fe. There she will have the opportunity to work on ethnographic collections, including a collection of Navajo ceramics, in addition to working on-site at a number of pueblos. During the summer of 2011, she plans to take part in the Haiti Cultural Recovery Project, run in Port-au-Prince, Haiti, under the auspices of the Smithsonian Institute.

The UCLA/Getty Master’s Program in the Conservation of Archaeological and Ethnographic Materials also enrolled eight new students in the fall of 2011: Alexis North, Ayesha Fuentes, Brittanay Dolph, Caitlin Mahony, Carinne Tzadik, Catherine Mallinckrodt, Geneva Griswold, and Madeleine Neiman. We welcome them to the Cotsen Institute and look forward to sharing their successes in the program.


CINDY LEE SCOTT is from Kapuskasing, Ontario, Canada, and received her B.A. and M.A. in classical archaeology from Brock University, Canada. Her pre-program work in conservation was conducted on the island of Crete at the Institute for Aegean Prehistory Study Centre for East Crete. During the summer of 2010, Cindy Lee worked at the National Museum of New Zealand – Te Papa Tongerawa. There she worked on materials from the early twentieth century for an upcoming exhibit at Te Papa, and participated in the assessment and consolidation of a number of large ethnographic objects for outgoing loans. Among these objects was a Maori waka, a 15-meter-long wooden war canoe adorned with albatross feathers and paua shells, used by the indigenous peoples of New Zealand. She also assisted in the on-site consolidation and stabilization of a number of greater-than-life-sized wooden sculptures, currently on loan at the small local museum, Te Manawa, in Palmerston North, New Zealand.
ALEXIS NORTH received her B.A. in anthropology and classical history from New York University in 2006. During that time she excavated at paleoanthropological sites along the East African Rift Valley, at a Classical Greek marketplace in the Peloponnesos, and the Late Roman city of Aphrodisias, in southwestern Turkey. She completed 2 1/2 years of pre-program conservation work at the Brooklyn Museum of Art, and is interested in both the conservation of, and ethical questions surrounding, burial sites, mummies and other human remains.

BRITTANY DOLPH graduated from the State University of New York at Buffalo with a B.A. in anthropology. Originally concentrating on cultural anthropology, she expanded her focus to include archaeology after attending field school at Old Fort Niagara, on Lake Ontario. Her interest in conservation was piqued by participation in a re-housing project and subsequent work with historic artifacts at the National Museum of American History in Washington, DC. She has most recently worked as a technician for two years in the Objects Conservation Laboratory at the National Gallery of Art. While she is interested in megalithic art, she is also looking forward to gaining experience with ethnographic objects, and especially those comprised of organic materials.

CAITLIN MAHONY received her bachelor’s degree in anthropology from Skidmore College in 2009. As an undergraduate, she had the opportunity to conduct ethnographic fieldwork in Samoa and became interested in cultural objects and their need for preservation. Her pre-program experience includes internships at the National Museum of the American Indian, National Museum of Natural History, University of Pennsylvania Archaeology and Anthropology Museum as well as the Ethnological Museum in Berlin. This fall, she begins her master’s study at UCLA where she hopes to strengthen her skills of analysis and treatment of materials of cultural heritage.

CATHERINE (CASEY) MALLINCKRODT received a B.A. in anthropology from Washington University and M.F.A. (’88) from Yale University. She is an active studio artist, and has worked in leadership of non-profit educational institutions, and as an independent radio producer. Casey is currently a pre-program intern in the anthropology conservation lab at the American Museum of Natural History in New York, working primarily on large-scale wooden objects. She previously worked in the sculpture conservation lab at MoMA, and for private conservators in New York City.
GENEVA GRISWOLD received her B.A. in art history and Hispanic Studies from Scripps College, and her M.A. in Art History from The Courtauld Institute of Art. Geneva has also assisted with the treatment of the Royal Presidio Chapel’s stone façade, located in Monterey, CA, as well as with the architectural stabilization efforts of the Shunet el-Zebib, a Second Dynasty funerary monument located in Abydos, Egypt. Her research interests include the treatment of painted surfaces, ceramics, as well as preventive conservation methods.

MADELEINE NEIMAN attended Bryn Mawr College where she majored in anthropology with a focus on archaeology and ethnohistory. She was introduced to archaeological conservation while working in the field on excavations in Virginia and New Mexico. This past fall, Madeleine completed a pre-program internship in the Colonial Williamsburg Foundations’ archaeological conservation lab where she participated in the treatment of a variety of ceramic and metal artifacts. Her current research interests include the conservation of ceramics and the ethics of treating archaeological collections.

AYESHA FUENTES was born and raised on Whidbey Island in Washington State. She has a B.A. in art/religion from Williams College and a M.A. in art history from Tufts University. While pursuing her first graduate degree, she worked for the Objects Conservation Lab at the Museum of Fine Arts, Boston. Ayesha is particularly interested in devotional objects, mortuary art, and the use of human remains in material culture as well as issues of consecration. For her master’s thesis, she wrote on Tibetan skull cups. At the moment, she is particularly fascinated by issues of conservation of South Asian arts and religious monuments.

CARINNE TZADIK attended the University of Texas at Austin and graduated in 2007 with a B.A. in art history and a minor in chemistry. She has most recently been working at the UCLA Fowler Museum doing her pre-program work. Carinne will focus her studies on conservation techniques for metal and stone.
JEANNE ARNOLD (Professor of Anthropology) continues work on three primary research projects. Two projects focus on complex hunter-gatherers on the North American Pacific Coast and the third is a modern material culture study of contemporary Los Angeles households. Ongoing work on the Channel Islands centers on evidence for the invention of Chumash plank canoe, craft production systems and political economy on the northern Channel Islands, and the role of property ownership in the emergence of political leadership. Work also continues with the Department of Anthropology’s Center on Everyday Lives of Families.

JEFF BRANTINGHAM (Associate Professor and Vice Chair of the Department of Anthropology) conducts research on paleoanthropology of the Tibetan Plateau, method and theory, evolutionary theory and simulation modeling. One of his projects is the UC MaSC (Mathematical and Simulation of Crime) Project, which is funded by the Human Social Dynamics Program at the National Science Foundation. The project integrates theoretical, methodological and empirical work to develop analytical and computational models of crime pattern formation. Simultaneous development of mathematical and simulation models, as well as empirical testing, will provide a guide for the experimental use of these tools in the social sciences. Also, the interdisciplinary foundation of the project provides a model for collaboration between mathematicians and social scientists.

AARON BURKE (Associate Professor of the Archaeology of the Levant and Ancient Israel) is the Co-Director of the Jaffa Cultural Heritage Project (JCHP), an interdisciplinary cultural heritage project with a research focus on the history and archaeology of Jaffa. Initiated in January 2007, the project is a collaborative effort between its senior partners, the Israel Antiquities Authority (IAA) and UCLA, and other partners including The Gutenberg Universität in Mainz (Germany) and the Old Jaffa Development Company. Burke received a Shelby White-Leon Levy Program for Archaeological Publication Grant for 2008–2009 with Dr. M. Peilstöcker, co-director of JCHP, for the publication of Bronze and Iron Age remains from Jacob Kaplan’s excavations in Jaffa.

ELIZABETH CARTER (Professor of Near Eastern Archaeology) continues work at the site of Domuztepe. The site, located at a major crossroads between highlands and lowlands along the Syro-Anatolian frontier of south central Turkey, has been the focus of survey and excavation projects since 1995. In order to share the results of this project and others in the region, Carter and her students hosted a variety of speakers through the Anatolian Research Interest Group, which met on many Friday afternoons throughout the school year at the Cotsen Institute.
KARA COONEY (Assistant Professor of Egyptian Art and Archaeology) earned her Ph.D. in Near Eastern Studies from Johns Hopkins University in 2002. She has been part of major archaeological excavations in Egypt at the royal temple site of Dahshur, elite Theban tombs and the craftsmen’s village of Deir el Medina. In 2005, she was co-curator at the Los Angeles County Museum of Art for “Tutankhamun and the Golden Age of the Pharaohs.” Her first book, The Cost of Death: The Social and Economic Value of Ancient Egyptian Funerary Art in the Ramesside Period was published in 2007.

CHRISTOPHER DONNAN (Professor Emeritus of Anthropology and Chair of the Cotsen Institute Executive Committee) completed a book about the excavations of Dos Cabezas, a companion guide to the popular Moche Tombs at Dos Cabezas published by the Cotsen Institute of Archaeology Press. Donnan has also authored a book on the excavation of Chotuna, a site that corresponds to an ancient Peruvian legend. The book, Chotuna and Chornancap: Excavating an Ancient Peruvian Legend, is forthcoming from the Cotsen Institute of Archaeology Press in January 2012.

SUSAN DOWNEY (Professor of Art History) has been a member of the Mission Franco-Syrienne de Dura-Europos (Syria) since 1988 and continues to instruct, publish and lecture on the results of this multi-year project. While she contributes to the Interdepartmental Archaeology Graduate Program through the instruction and mentorship of graduate students, she is also very active in a number of key administrative committees at UCLA. Downey also regularly teaches undergraduate and graduate courses in Greek and Roman art and archaeology and travels for public and university lectures on her research in Syria and Iraq.

IOANNA KAKOULLI (Associate Professor of Materials Science and Engineering and incoming Chair of the UCLA/Getty Master’s Program in the Conservation of Archaeological and Ethnographic Materials) operates in the multidisciplinary field of archaeological sciences (interfacing science and archaeology) with research interest in the study of material culture from the macro to the nano-length scale using novel non-invasive and non-destructive techniques and portable imaging and spectroscopic technologies. She is the director of the Archaeomaterials Group (http://www.sscnet.ucla.edu/ioa/archaeogroup/), and co-director of the Tarapacá Valley Archaeological Project in northern Chile and project ByzanTiuM (Byzantine Technique and Materials) in Cyprus.

RICHARD LESURE’s (Associate Professor of Anthropology) interests include ancient belief systems, social relations, and sociopolitical organization, as well as the conceptual framework of archaeology and the history of anthropological thought. His field research has concerned pre-state (“Formative”) societies of Mesoamerica and he has worked along the Pacific coast of Chiapas and in the highland state of Tlaxcala. Prof. Lesure recently published Settlement and Subsistence in Early Formative Soconusco: El Varal and the Problem of Inter-site Assemblage Variation with the Cotsen Institute Press, and in 2011 the monograph The Goddess Diffracted: Explaining Femaleness in Prehistoric Figurines with the Cambridge University Press.

MIN LI (Assistant Professor of Archaeology of China) received his Ph.D. in anthropology from the University of Michigan in 2008, and his MA in Anthropology from University of British Columbia in 2000. Focusing mostly on Chinese archaeology, Li has co-directed excavations at Daxinzhuang funded by the Wenner-Gren Foundation for Anthropological Research, conducted lab research on faunal remains and ceramics, and participated in land survey, and underwater reconnaissance on shipwrecks and coastal settlement sites at Changdao Archipelago.
KATHRYN MCDONNELL (Assistant Professor of Roman Archaeology) is a Classical archaeologist interested in various aspects of Italian archaeology, particularly the material culture and archaeology of the Roman Empire. She co-directed the excavations at San Martino in T orano di Borgorose, Italy. Her research interests include Roman tombs, the archaeology of non-elites, the archaeology of gender, Latin epigraphy, and historical and Roman slavery. Her current project is a book on Roman tombs and the construction of social identities.

Since 2004, SARAH P. MORRIS (Steinmetz Professor of Classical Archaeology and Material Culture in the Department of Classics and Advisor of the Post-baccalaureate Program in Classics), along with John K. Papadopoulos, and Lorenc Bejko (ICAA & Institute of Archaeology, Tirana, Albania) co-directed the excavation of the burial tumulus at the site of Lofkënd. The project was carried out as a collaboration of the Cotsen Institute, the International Center for Albanian Archaeology (ICAA) and the Institute of Archaeology, Tirana. The overall aim of the Lofkënd Archaeological Project was to initiate protohistoric investigations in south-central Albania and the final season of excavations at the Early Iron Age tumulus was in 2007. Morris is also exploring Bronze Age vessels from Greece to trace the early development of wine and wine-related materials.

The primary research projects of JOHN K. PAPADOPOULOS (Professor of Classics & Chair of the Interdepartmental Graduate Program in Archaeology) all have to do with the theme of death and particularly burial grounds in the formative period between ca. 1200 and 600 B.C. He is actively involved in the excavation, research, and publication of three important Early Iron Age cemeteries: the burial tumulus of Lofkënd in Albania, the Early Iron Age cemeteries in the area of the Athenian Agora, and the cemetery that spans the Late Bronze Age through the early Classical period at the site of Liatovouni in Epirus, northwest Greece. Research on these cemeteries—one in the heart of the ancient Greek world, the other two on its periphery—are dispelling scholarly notions of a “Dark Age” and are showing that this is a formative period that led directly to the creation of the ancient Greek city-state.

In addition to her research interests, ELLEN PEARLSTEIN (Associate Professor of Information Studies with joint appointment in the UCLA/Getty Master's Program in the Conservation of Archaeological and Ethnographic Materials) continues to promote collaborative conservation education. In 2008, Pearlstein received funding from the National Endowment for the Humanities and hosted a symposium entitled, “Storage Symposium: Preservation and Access to Archaeological Materials” The results of the symposium will be published electronically through the Cotsen Institute of Archaeology Press in their new digital publications series.

GREGSON SCHACHNER (Assistant Professor of Anthropology) is a Southwestern archaeologist currently working on three primary research projects: completing a book manuscript based upon his recently completed fieldwork in the El Morro Valley of New Mexico; continuing his examination of social developments during the Pueblo I period (A.D. 700–900); and establishing a long-term research project east of Petrified Forest National Park in Arizona. Schachner is also working with Tiffany Clark, a Research Associate of the Cotsen Institute, to organize and manage the extensive collections of materials from the Pajarito Archaeological Research Program, a major research project (1977–1981) directed by the late Professor James N. Hill.
DAVID SCOTT’s (Professor of Art History and Conservation of Archaeological and Ethnographic Materials) principal interests are the analysis of museum objects, the characterization of pigments, ancient metals and microstructure, the teaching of conservation, and the archaeometallurgy of pre-Hispanic Colombia, Ecuador and Peru. He is involved in a number of research projects, including recent data collection from museum objects at the San Diego Museum of Man.

MONICA SMITH (Professor of Anthropology), along with Dr. R.K. Mohanty, directs the excavation project at Sisupalgarh, India, an ancient city of the early centuries A.D. Smith’s research examines the role of cities for the ordinary person in the past, and how urbanism developed as centers of economic, social, ritual and political networks. She also sustains a long-term interest in the archaeology of food, the growth of ancient states and empires, and the way in which ordinary goods define and sustain trade networks in both the past and the present. Her most recent book, *A Prehistory of Ordinary People*, was published by the University of Arizona Press in 2010.

CHARLES (CHIP) STANISH (Professor of Anthropology and Director of the Cotsen Institute), his graduate students, and Peruvian colleagues have continued their excavations and mapping of a major settlement complex in the northern Titicaca Basin of Peru. This area, known as Táracu, housed a massive mound and pyramid complex from approximately 1400 B.C. to A.D. 900. Excavations revealed adobe pyramids that were constructed in the first millennium A.D. along with earlier complex architecture from the first millennium B.C. In 2010, Charles Stanish was elected to the National Academy of Sciences. Based on years of field research in the Titicaca Basin, Stanish just published a book for a wide audience in the Cotsen Institute’s World Heritage and Monument Series, under the title *Lake Titicaca: Legend, Myth, and Science*.

LOTHAR VON FALKENHAUSEN’s (Professor of Art History and Archaeology of East Asia and Associate Director of the Cotsen Institute) interest comprises Chinese archaeology in all its aspects, including connections with other parts of Eurasia. His publication, *Chinese Society in the Age of Confucius* (1000-250 B.C.): *The Archaeological Evidence*, won the 2009 Society for American Archaeology Book Award. Professor von Falkenhausen was recently inducted into the American Academy of Arts and Sciences.

WILLEKE WENDRICH (Professor of Egyptian Archaeology) is co-directing a UCLA excavation and survey project in Egypt that concentrates on the landscape around Lake Qarun in the Fayum Oasis, and specifically the development of agriculture. In cooperation with the Rijksuniversiteits Groningen (the Netherlands) and archaeobotanist/co-director René Cappers, the project concentrates on the two major periods in which agriculture was developed in this region: the Neolithic and the Greco-Roman periods. Wendrich is also Editor-in-Chief of the recently launched UCLA Encyclopedia of Egyptology online, a worldwide cooperation of Egyptologists, archaeologists, linguists, art historians, geologists and all other disciplines that are involved in research in Egypt. She also is the Faculty Director of the UCLA Digital Humanities Incubator Group and a member of the Cotsen Institute Digital Initiative Committee. In 2011, she assumed the position of Editorial Director and Chair of the Editorial Board of the Cotsen Institute of Archaeology Press.
HJ (Hadley Jensen): Could you tell me about your background and your personal interest in archaeology?

DB: I wouldn’t be much of a history buff if I couldn’t relate my interests to my background, so here goes: My father was in the U.S. Foreign Service, and our family lived and traveled in Europe when I was growing up. I attended an elementary school in Luxembourg established by the European Union (actually, a precursor of the EU) with separate sections in French, German, Dutch, and Italian. It was not that long after the end of World War II, and I was the only American in my class, so I was more aware of national differences and national histories than I would have been at an American school.

Later I developed my own mild case of what the historian William McNeill calls his “stubbornly sophomoric urge to understand things.” I think anyone subject to this urge is naturally drawn to historical explanations, and from there it’s a pretty straight path to archaeology, which is the only source of information about most of human history. Written records, when they survive, are sometimes composed long after the events they describe, and their authors often have agendas other than dispassionate scientific inquiry. Archaeology provides a way of checking the written record, as Lothar von Falkenhausen shows in his recent book on early China.

HJ: Gregory (Areshian) told me about your interest in comparative linguistics, especially as it relates to archaeology. Could you discuss how you became interested in this?

DB: Again, I think it probably traces back to elementary school and being intrigued by the differences and similarities in languages. My parents enrolled me in the French section. German was our foreign language, though I didn’t learn as much as I might have out of solidarity with my French and Belgian classmates, for whom it was a matter of family pride to do poorly in foreign languages. (Things must have changed in middle school, since most of them ended up speaking several languages fluently, but by then I’d moved on to American schools.) I regretted it later, as my parents told me I would, and I’ve dabbled in other languages since then.

Later I became interested in the question of how and why many languages of Europe, Western Asia, and India are related. The evolution of these different languages from a (hypothetical) common source happened long before the first written records, so it is up to archaeology to verify and date the evidence deduced by linguists from modern spoken languages and the earliest written sources. It turns out that the archaeological evidence is not unequivocal, and there is controversy about when and how the
process occurred: it’s hard to determine what language people speak by looking at their material environment. Some of the issues involve tracing the movements of people or uncovering other evidence of language dissemination. The contributions to the recent book by Hans Barnard and Willeke Wendrich on the archaeology of nomadism may offer some guidance here.

HJ: Gregory said you came to an Indo-European conference here?

DB: Yes, I was introduced to the Cotsen by my neighbor, Charlie Steinmetz, who’s a very avid amateur archaeologist, and once I saw the tremendous resources available, I was eager to get more involved. I met Gregory early on because he is one of the few archaeologists at the Cotsen Institute who has studied these Indo-European issues. There is a separate Indo-European Program at UCLA and they hold an annual conference. Most of the papers deal with linguistic issues that seem quite abstruse to nonspecialists (at least to this one), but in some years there have been talks that are accessible to the broader community, and I’ve attended a couple of those.

HJ: As a representative of the public/intellectual community, is there anything in particular you’d like to see in the development of the Institute?

DB: I read an interesting article by the mathematical physicist Freeman Dyson in which he categorizes mathematicians as either problem-solvers, whom he calls frogs, or broad theory-builders, whom he calls birds. Frogs and birds make equally important contributions. It’s a matter of approach.

I would never presume to compare professional archaeologists to such homely creatures, but I think it might be possible to classify archaeology aficionados in this way. Some of us (the frogs) really want to go out and dig, find something new, be the first to explore a site. Others (the birds) want the big picture: what does it all mean, how did it all start, are these similar things related or did they evolve independently?

In this landscape, I’m definitely a bird, interested in large processes and big generalizations. I do recognize that professional archaeologists and historians need to proceed with caution. One way to work from facts and the careful study of material evidence and still keep us birds happy is through comparative studies. As professional academic support for my suggestion, I enlist the article “Toward a Comparative History of European Societies” by the great French historian Marc Bloch, in which he promotes the comparative method in history (and also notes the success of comparative linguistics in the study of Indo-European languages.)

HJ: We’ve touched on this in a number of different ways, but can you tell me about your experience here and your impression of why it’s a unique place for scholarship and learning?

DB: One thing that strikes me is that there’s a great collegiality; the professors seem to work together and with their students on a very collaborative basis. And I think that the interest in communicating about the field to the public is unusual. Not every archaeology department is as interested in recruiting and being accessible to interested lay people as the Cotsen is. A lot of the credit for these developments goes to Institute Director Charles Stanish.

It’s been a lot of fun for my wife Kathleen and me: we’ve traveled with the friends we’ve made here to Armenia to visit Gregory’s site, to China, to the south of France to visit caves with Upper Paleolithic paintings. At UCLA you’re also close to many other departments and organizations on the cutting edge, and that makes the Cotsen a unique place to learn about archaeology.
C O N D U C T E D  B Y  H A D L E Y  J E N S E N ²

HJ (Hadley Jensen): You’re a professor of anthropological archaeology at Harvard, focusing specifically on the emergence and development of complex societies in Neolithic and Bronze Age China. Can you tell me more about your research interests and how your experience at UCLA led you to this?

RF: I’ve been working for the last decade mostly in the Yangzi River Basin, trying to understand how that part of East Asia was a significant area for developing complexity during the Late Neolithic and Bronze Age and specifically focusing on the development of economic systems, and how economy and religion, ritual, and other aspects of society were interconnected. I’ve been doing this through a number of different field projects, the first of which was the project that I focused on for my dissertation at UCLA. It was an excavation of a very large, significant site called Zhongba in the middle of the Three Gorges region—an area that was flooded behind the big Three Gorges Dam that was built in the first decade of this century. I worked there with another one of my UCLA classmates, Pochan Chen, who’s now a faculty member at National Taiwan University in the Anthropology Department there. He’s actually at Harvard this year as a visiting fellow, so we’re working on both wrapping up some of the long-term writing projects associated with our dissertations, but also on some new work we’ve been conducting together more

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Rowan Flad with augering crew in Chengdu Plain during the 2008-2009 season.
recently, some of which has been in collaboration with other UCLA grads as well. So my work at UCLA has profoundly directed my research for the last decade because of the connection between the research questions I was interested in for my dissertation work and the collaborating institutions that I’ve been working with ever since. There are a lot of ways in which, both structurally and intellectually, my UCLA experience was fundamentally important to what I’m doing these days.

HJ: I know a close collaborator of yours is Lothar Von Falkenhausen, professor of art history at UCLA and associate director of the Cotsen Institute. How did his influence your interest in Chinese archaeology? Who was your major inspiration during your time at UCLA?

RF: Lothar has had a tremendous influence on the way in which I’ve gone about doing what I’m doing. And he’s of course solidified and enriched my interest in Chinese archaeology. He certainly helped me understand what aspects of what I was initially interested in were possible and would be worthwhile contributions to the field as a whole. He clearly played the most important role in identifying a project that both Pochan and I could do substantive work on in a way that would contribute to the field more generally. That’s perhaps the most difficult thing to do in Chinese archaeology, and probably in archaeology in other parts of the world too—determine where one can gather appropriate data for researching specific questions in a way that is as ideal as possible. And it was very difficult, particularly in the 1990s, when it had only just become possible to do collaborative fieldwork in China, for non-Chinese archaeologists to navigate the process for establishing fieldwork. Lothar was one of the very few people who was able to do that during this formative stage. He enabled both Pochan and me to gain access to a very important site and to be able to do things in a way that was conducive to doing the sort of research we wanted to do. So in that way, Lothar had a really profound effect on the way that my research has developed.

He was not someone who dictated a research question, by any means. He made available an opportunity to work on a particular project and essentially let us figure out what it was about the project that was both interesting to us and more broadly interesting to anthropological archaeology. His mentorship had a very good balance between direction and letting us find our own way.

HJ: This leads me to another question. Have you always been interested in academia and teaching? Why are you doing this instead of something else?

RF: I don’t know that I’ve always consciously been interested in academia, but perhaps I have the temperament for it. My father is an academic—he was a geographer who taught at Vassar College for most of his career. My mother is an academically inclined non-academic, so there was that aspect of my background that I think affected me and made academia a logical field to consider. I also went to the University of Chicago as an undergrad, and that’s an institution that’s very special in the way the undergraduate curriculum is structured; it prepares you very well to be an academic. It’s the sort of institution where even as a freshman it’s necessary to engage in academic dialogue, and you do it all the time for the whole time you’re there. So I think that also played a role in preparing me for and making me interested in pursuing academia.

HJ: I was reading about your various research projects, which tackle a pretty wide range of topics, including salt production in ancient China, new survey strategies and the archaeology of landscape, human–animal interaction, and, more broadly, the development of complex societies during the second millennium. Can you give a brief summary of each of them?

RF: I should state that, although on the surface the various things that I’m doing seem rather disparate, they’re all connected in one of two ways. What I’m most interested in right now and moving forward in the next decade or so is, in various ways, investigating this crucial time in East Asian history that is one of the seminal periods in the emergence of complexity in China and East Asia generally, and that is the time period around 2000 B.C. (end of the third millennium and into the first millennium B.C.). There’s a lot going on in different parts of East Asia and China that all relate to the bigger picture of the way in which Chinese civilization, for lack of a better word, develops. This period has been most intensely investigated in the region of China called the central plains, the lower Yellow River Valley in particular, by scholars for almost a century, but it’s only recently, in the last few decades, that significant amounts of research specifically focused on this time period has brought more light to other regions of East Asia that were clearly in various degrees of contact with the central plains and with each other, and that very interaction that has been identified for quite some time as playing a significant role in the emergence of Chinese civilization more generally.

So what I’m particularly interested in doing is trying to further our understanding of that particular time period by looking at the various manifestations of complexity in different parts of China at that time. Part of my work in the Sichuan
Basin has been focused on that, by trying to understand the emergence of economic specialization, for example, in the case of Zhongba, but also changing patterns of settlement and site interrelationships, which is a main focus on another project that I’ve been mostly focused on for the last five years. That’s a project called the Chengdu Plain Archaeological Survey, which I’ve been helping direct along with Pochan Chen and Gwen Bennett, who’s another UCLA grad and is now at McGill University, as well as a number of institutions in East Asia (National Taiwan University and then a few Chinese institutions, including Peking University and the Chengdu City Institute of Archaeology). Several of us directors have been leading a project that is adding a completely new set of data to the archaeological understanding of the region around Chengdu, which is the capital of the Sichuan Province. The Chengdu Plain has become an area of intense archaeological interest since the 1980s, when a couple of pits full of elephant tusks and bronze heads and gold and jade and all sorts of other great goodies were found at a site called Sanxingdui. This site had been known for a long time, but only after the discovery of these pits was it really understood to be of a greater degree of importance to understanding emerging complexity in the second millennium B.C. than it had been previously. Although those components of that site were identified in the late 80s, and other finds throughout the plain, particularly in and around the city of Chengdu, have also come to light in the interim, most of our understanding of emerging complexity and diachronic change in this region has been based on these specific individual finds at a number of sites. There’s been very little effort placed on both integrating those sites into a larger kind of landscape and also understanding some aspects of the archaeological patterning of this time period, particularly the way in which settlements were patterned across the landscape and how that may have changed over time. So this is something, since it was not being investigated in any real fashion by our colleagues in China, we decided to work on in collaboration with them. Since 2005 we’ve led this survey project, which has involved both traditional surface survey techniques as well as systematic coring across a fairly large region. We’ve also done some geophysics and some geomorphologic work and are really trying to integrate these various approaches to the broader landscape and the pattern of settlements that we can bring together to understand this aspect of the archaeological pattern of the region. That’s another component of trying to understand this important time period in the Sichuan Basin.

Some of the other projects that I have on my plate are also involved in looking at this time period in other regions—in the northwest where I’ve done a little bit of pilot research at a site called Donghuishan looking at early wheat remains there. And the reason I’m interested in that is not so much because of the importance that those data have for understanding agricultural change in the area—although I find that question interesting—but rather because wheat and barley, both of which have been found at the site, are two markers of very long-distance interactions across Eurasia that are increasingly common in the second millennium B.C. across northern China. These remain broader patterns of long-distance interaction that I think play a significant role, particularly in the northwest of China, in these issues of emerging complexity. So that’s another way in which I’m trying to get at these broader questions through a specific data set that relates to this time period.

I said there were two main topics that excited me in terms of the research I’ve been doing. One is this issue of emerging complexity in the second millennium. The other has to do with human–animal interactions, and that has to do in part with my general interest in these questions, but I also have some training from UCLA, primarily with Tom Wake, in zooarchaeology. I employed this training to fairly useful purposes in my dissertation work by being able to incorporate animal bone analysis into our overall understanding of the changes in the organization of production at the salt production site. So, in my initial work, I basically employed it to that end, but I’ve been interested in
trying to engage with various aspects of human–animal interactions in China partly with the desire of trying to promote zooarchaeology research of various kinds. I’ve been working with Professor Yuan Jing, who’s a zooarchaeologist at the Chinese Academy of Social Sciences, Institute of Archaeology, to find ways to help promote the field by engaging in workshops and bringing people together in various ways and also publishing some of the material that’s been worked on in China and in various forums outside of China. I am also trying to think about the importance of some of the data that have been published previously in terms of understanding human–animal interactions in the context of ritual, for example, and the way in which we understand the spread of the use of animal domesticates across different parts of East Asia. So, it’s sort of a separate topic, although in certain ways it clearly overlaps with the former.

HJ: Have you found that there are a lot of other people doing this sort of work in China right now (on the larger question of emerging complexity?)

RF: I think that this general research topic is one that excites a lot of people—there’s currently a nationwide project on emerging civilization, called the Wenming Tanyuan Project. It’s a nationally funded project in China that involves a large number of institutions trying to understand more or less the same time period—the early Bronze Age and also a little earlier as well, and the patterns of activity that were important to emerging complexity. Now a lot of the effort of that project has been focused on the Central Plains, the area of primary importance in terms of the traditional origin of Chinese civilization. Although not exclusively focused there, the emphasis is clearly on the Central Plains, and so I think that my interests connect very closely to that and the excitement that a lot of Chinese archaeologists have for trying to understand that time period. But as someone who’s been educated in the anthropological archaeology tradition, what I’m also trying to help promote is an interest in really teasing apart the various aspects of complexity, the various ways in which societies were integrated, hierarchies were constructed and maintained, and institutions were developed. So my questions are framed in a slightly different way than perhaps some archaeologists in China frame theirs as they work on the same time period and some of the same data—but I think in very complementary fashion.

You mentioned the difficulty that one can face in doing work in China as a non-Chinese archaeologist. I think those difficulties are real, but they are the result of a fairly short time frame within which international collaborative research has been possible. I mentioned before that it’s only since the early 1990s that it’s been legally possible for Chinese archaeologists within China to collaborate with archaeologists outside of China in formal ways in order to investigate certain questions. So we’re now almost 20 years into this, but 20 years actually isn’t a very long time when it comes to disciplinary development. It’s only really in the last decade or so that there has been an increase in the number of international collaborations, and there are these periodic reshufflings that occur in the National Cultural Relics Bureau—which have the effect of complicating the procedures for getting permission and so forth.

Ultimately, I think (and I hope) the archaeological establishment in China will develop procedures that are transparent and obvious and not overly burdensome, that will promote this sort of international collaboration. I think that there’s a lot to be gained from other archaeological traditions, because they bring new perspectives and different techniques and different ideas about how similar data might be examined, or new data might be brought to light or different interpretations can come about. In my experience, most Chinese archaeologists who are growing up these days in the academic tradition in China are very eager to interact with the global archaeological community, but there’s a difference between eagerness for collaboration and formal permissions. So the bureaucratic aspect is always going to be something that is fraught with complexity.

HJ: Clearly you’ve collaborated with and coauthored publications with quite a few Chinese scholars and institutions. Do you think archaeology somehow bridges the cultural gap between American society and Chinese society?

RF: I think that, generally speaking, people who are connected to one another across cultures through a particular type of activity or an academic endeavor or a scientific orientation often will be able to talk with each other about things in ways that they wouldn’t otherwise because of their shared interests. I do think it’s the case that Chinese archaeologists and American archaeologists, or archaeologists from different parts of the world, because of the nature of their training in the discipline, start from different places and have different questions they want to ask. Having conversations about those differences—because there’s a common topic or interest—allows for conversations that might not otherwise take place. But it doesn’t mean that there aren’t still cultural differences that persist. I think the deeper the tradition of international communication, the easier it is to bridge gaps. I think that archaeology is, particularly in China, more of a historical discipline than a scientific one, and so, unlike certain very scientific disciplines like chemistry or physics that have longer traditions of shared research goals and normative practices that are very much cross-cultural and
international, there’s more of a cultural bias in terms of research orientation in history and archaeology than in those fields. And yet, there is, I think, still a great deal of similarity in terms of research interests that allows for cross-cultural communication.

So that’s one component of the issue that you’re talking about, but that’s specifically related to the archaeology community—the community of researchers. I think that when one’s talking about the broader public, there are some aspects of archaeology that facilitate cross-cultural communication. For example, the exposure of fascinating aspects of Chinese history to an American public makes China and the Chinese less mysterious, exotic, more understandable and more a part of a broader understanding of global history and so forth—that’s part of what historians and archaeologists and social scientists more generally are attempting to do with their scholarship. That doesn’t necessarily serve to bridge gaps between individuals, but rather to make other cultures more familiar and less foreign.

HJ: The only other thing I would ask is whether you think I’ve missed anything that you’d like our readers to know about? It can be specific to your work or to your experience at UCLA.

RF: Well, something we haven’t talked about much, which I think is worth mentioning because it’s important, particularly for the readership of Backdirt, is a little bit about how I interact with some of my colleagues who aren’t working in China who are classmates of mine from UCLA. One thing I was very fortunate to have when I was at UCLA was a cohort of classmates, both in my same year and the years more junior and senior to me, who I very much enjoyed interacting with and who I still get a lot out of. Particularly having gone through several stages of academia, one realizes how valuable it is and how important it is to have people who you can bounce ideas off of, who you can share papers drafts with, and who you can talk with at meetings and otherwise interact with on both a formal and an informal level. I think I was fortunate to have a fair number of people with whom I had that kind of relationship when I was at UCLA. The people I see at the SAA’s every year, for example, many of them are UCLA colleagues in one form or another. I interact quite regularly with several of my former classmates, including the ones who work in China, but also J. Cameron Monroe, who’s now at UC Santa Cruz, Liz Arkush, who’s now at Pittsburgh, and others. It’s great to have that network, and I think it’s one of the very important aspects of a graduate career—to develop networks of colleagues who can be supportive when and if you do move on to an academic position.

I know it’s a different entity these days, but when I was there, the “Friends of Archaeology” was a very active community of vocational archaeologists who were really vital to the way that the graduate students did their work. A volunteer—namely, Lady Harrington—joined me in the field, at her own expense, coming to China and helping me with some of my zooarchaeological analysis, and really was a great asset. I think most of the graduate students of my time had the great benefit of interacting with great people, both classmates and faculty and the broader community of archaeologically interested people around UCLA at the time. I was in the archaeology program at UCLA, but of course, the majority of archaeology graduate students in the year I started (as I think was generally the case) were in anthropology, including those I just mentioned, and yet there wasn’t any sort of divide between us. There were slightly different requirements we had to take, but it was a great asset to have the Cotsen Institute as a space within which we could all interact and feel like we were part of the same entity, even if there were disciplinary boundaries that separated us administratively. When one looks at this situation from a faculty perspective, I think it’s even more apparent, because it’s really impossible to escape, at most institutions, from a fair amount of confinement based on administrative boundaries even when you have a great deal in common with people who are working in the same discipline, but in a different department. So it’s very difficult to achieve that balance, and when I was at the Institute and in the Archaeology Interdepartmental Graduate Program, I think it was achieved reasonably well.
Our flight from Istanbul descended into the capital of Georgia, Tbilisi on a clear blue afternoon, cruised past the Stalin-era reception building to a new postmodern glass and steel terminal, and nestled up to one of its three jetways. The Airbus disgorged its 100 or so passengers in an orderly if feverish rush of guest workers, cousins, and at least two archaeological visitors ready to taste adventure in the Southern Caucasus and beyond.

Stepping out of the customs zone, we walked straight toward a sign, “Peter Gould,” suspended just below the broad, smiling face of our host, Gregory Areshian. Gregory led us off across the parking lot to a freshly washed green four-wheel drive vehicle of a design clearly inspired by old Land Rovers but manufactured in an obscure Eastern European factory. Gregory, his driver Tigran, and a young woman student newly arrived from the States had just made the journey north from Yerevan, Armenia, our ultimate destination that evening.

Gregory directed me to the front seat, wedging his bulk in back. More than once as the trip progressed, I had occasion to consider that the front right seat is known as the “death seat” in the United States, but at the time I just took it as a kindness intended to ensure that the best views were mine.

Gregory is the Assistant Director and Associate Researcher/Professor at the Cotsen Institute of Archaeology at UCLA and our host on a journey to inspect two sites in southern Armenia. After a distinguished academic career in the Soviet world—he was the second youngest man ever to win a Ph.D. from the Soviet Institute of Archaeology—Gregory joined other idealists in the Armenian government when the USSR crumbled. He served briefly as Vice Premier until he fell out with the rising economic mafias that ultimately engulfed several small former Soviet states. Eventually, they engineered his removal from the country. Gregory had now returned, years later, to excavate in his homeland on a U.S. passport.
Gregory’s plan was to head on the highway south and east toward the main border crossing between Georgia and Armenia, then proceed through picturesque mountains and valleys to Yerevan. Our trip began without incident. We headed out of the airport and down George W. Bush Street, past neglected Khrushchev-era housing blocks, the occasional retail front, and much ill-kept land: decrepit conditions that made the boulevard seem a fitting commemorative to “W.” As we left the confines of Tbilisi, the countryside became lush and green, mountainous, and spotted with impoverished but intriguing villages and signs of ancient occupations the earliest of which, in this region, date easily to the Paleolithic.

Curiosity was inevitable in such circumstances, and we began to pepper Gregory with questions about the economy, the ecology, the landscape, the politics, the language, the history, the Armenian alphabet—topics seeded by new and unexpected sights as they appeared through the increasingly bug-splatted windshield. Gregory is a formidable intellect with an encyclopedic knowledge of the Near East and its history. Thus, our questions unleashed a lecture on the history of the region, its people, and its culture delivered by a master teacher who retains a youthful enthusiasm for his subject.

However, Gregory became captivated with his subject and left the driving to Tigran, who was an expert at the wheel but a novice in negotiating southern Georgia’s geography. After over an hour of driving, Gregory was startled out of his lecture by a quick decision. He had familiarity with these roads—he had last driven them in the 1980s but little changes in these parts—and to turn back would add as much time to the trip as to go forward, so he elected to proceed. We would miss the mountains and intriguing villages and signs of ancient occupations the earliest of which, in this region, date easily to the Paleolithic.

At first, the venture proceeded smoothly through small Georgian villages along side open fields. Then we encountered our first pothole. Though not very deep, it presaged what was to come. Gradually, the road worsened. During the Soviet era, this had been a major thoroughfare that carried a daily commerce of cars, buses, and trucks between Yerevan and Tbilisi. But those were days when the Armenia/Georgia border was an imaginary line rather than a sequence of barbed-wire fences supervised by armed border patrols. With the fall of the Wall, border fences sprang up throughout the former USSR, and once-busy roads such as this one were all but abandoned. Maintenance for such roads, on either side of this remote border spot, came to a halt.

By 2010, a succession of harsh winters and blazing summers had worked over the asphalt. With each mile, the potholes were deeper and more frequent, the verge increasingly raw soil as the asphalt strip narrowed even as it became more perforated. Increasingly, the edge of the road disappeared into soil, bushes, and overhanging trees. For 20 or more miles as we edged ever more slowly toward Armenia, the population dwindled, the road disintegrated, and the forest loomed ever more gloriously but ominously in the waning hours of daylight.

As our rate of progress slowed, Gregory’s confidence ebbed. Borders have a tendency to close in these parts. On the border between Syria and Turkey at Kamishli, only 4 hours per day are allotted to admitting crossing traffic. We were going to hit this remote mountainous border post after 8 p.m. Guards could be asleep or at least at dinner. As we approached to within five miles of the border, Gregory warned us to prepare emotionally for rejection. It was possible there would be no one to grant us an Armenian entry visa at the border, leaving our only option a backtrack over the crumbling road in the pitch black of a Georgian mountain night—that is, assuming we were readmitted to Georgia. The prospect was grim.

When we reached the Georgian border post, a lone guard granted us access to the exit-stamp pavilion. There, while red-and-black-shirted inspectors gave the truck the once-over, we were ushered out of Georgia by a smiling officer who readily stamped our passports and handed us over to the Armenians. After all, it was our problem, not his, if the Armenians would not let us in. As we walked up the dirt road through no-man’s-land toward the forward Armenian post, the pounding question was: Would we find an officer willing to issue us a visa?

We nervously approached the converted shipping container that served as the border outpost. Out stepped three Armenian guards, surprised and skeptical at the arrival of four obviously misplaced travelers. There was no Visa Man. Gregory stepped forward and launched bravely into an explanation of where we were headed and why. He explained that we were a team of archaeologists and friends heading to inspect sites in the south. Archaeologists! One of the guards popped a question: Was Gregory associated with The Shoe? When he shyly conceded that, indeed, he was one of the discoverers of The Shoe, doors began to open for us. The Visa Man, who was already home and at dinner, was told to gulp down his food and head straight back to handle our paperwork.

A word about The Shoe. In the preceding season, the Institute of Archaeology and Ethnography of the National Academy of Sciences of Armenia digging together with Gregory’s team from the Cotsen Institute in ancient caves had unearthed what came to be recognized as the oldest complete leather shoe ever recovered—5,500 years old, made of hide
The wine itself was thin and sharp, a brownish color suggestive of clay but palatable if taken in broad drafts—which, as custom would have it, was the way wine is drunk on the border of Armenia. Toasting done, we were ready to go—but our passports were in the Commander’s hands, and one glass was clearly insufficient bonhomie for such an important occasion. The glasses were refilled. Our women friends attempted to demur, but the Commander informed us jocularly that our visas would be revoked if we did not finish the second glass. To ensure sufficient wine, a second soda bottle of home brew was handed in from outside the office. So it was down the hatch one more time, this one accompanied by bagel-shaped sweet breads that ultimately became our meal for the night. Not yet satisfied, our glasses were filled yet again, and the Commander produced a camera with which to record our final round of toasts. With one last draining of the glasses, we were ushered back into our truck and, as foggy darkness shrouded the mountains, we were admitted at last to Armenia.

The rest of the trip was as fast-paced as Tigran could make it. He had been driving for over ten hours by the time we entered his homeland, and we had three to four more hours before we made to Yerevan. For about five miles, the road on the Armenian side of the border equaled the Georgian in potholes and disintegrating tarmac. Once onto a good road, we surged forward at 100 to 110 km per hour, roaring up mountain roads and racing down the other side. The night was dark and the road steep, curving, and narrow. Traffic was surprisingly abundant and slower moving; passing on curves became the norm.

One by one, passengers drifted off until eventually all of the back seat slept. As the truck hurled through the night, I maintained a steady chatter with Tigran (or with myself, since we shared no language) just to ensure a measure of noise to keep our driver functional. At last, just after midnight, we flew over the last mountain pass and the lights of Yerevan and the Ararat Plain spread out before us, one-third of Armenia clustered in one large, dense valley. The effect was as startling as it was unexpected, like the first view of Los Angeles coming out of the mountains.

We reached our hotel and bade good night to Gregory. As we made our way to our room, grateful that rules had been stretched and meals interrupted to enable us to sleep at the Golden Tulip rather than on the roadside no-man’s land between Georgia and Armenia, one moral of the story became clear: archaeologists should always treat their students well—you never know when one of them may rescue a colleague and transform a potential disaster into a once-in-a-lifetime experience.
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TIBETAN SKY BURIALS

PHOTO ESSAY BY JILL SILTON

Sky burials are a Tibetan religious tradition, which is currently practiced in, among other places, the provinces of Sichuan and Qinghai in the People’s Republic of China. Here the grassland and the high rugged mountains clad with flowers in the spring are sparsely populated. Narrow roads often follow deep river gorges and climb zigzagging over mountains. Prayer flags in many different arrangements with specific denotations are frequent elements in the landscape.

The sky burial tradition is practiced to dispose of the corpses of commoners. It was first recorded in the “Book of the Dead,” a twelfth-century Buddhist treatise. However, it is believed to be a much older tradition.

1. This text is based solely on information obtained through my Tibetan guide/interpreter during my Tibetan travels in Sichuan and Qinghai 2006, 2008, 2009, and 2010.
2. Cotsen Institute of Archaeology at UCLA
3. The People’s Republic of China prohibited the use of sky burial during the Cultural Revolution in the 1960s; this ban lasted until the reforms of the 1980s.
4. Excluded are persons who died of infectious diseases or accidents, pregnant women, and children under 18.
When a person dies, the corpse is washed, put in a fetal position, wrapped in white cloth, and put in a corner of the domestic tent. For three days monks chant prayers in the tent. Then at dawn, the family brings the body to the sky burial place and stays through the dismemberment. At this location there is often a chorten (reliquary) and a small shrine for the lama, who will dissect the body. At these sites, prayer flags are commonly seen, some of which may be put there by the family of the deceased. A knotted cotton thread may be placed from the head of the deceased pointing uphill to guide the soul. Then, in order to attract vultures, the lama burns juniper branches and sounds a wind instrument. Once the bones are cleaned by the vultures, they are ground and mixed with *tsampa* (roasted barley flour) and yak butter. Both vultures and smaller birds are then able to consume what remains of the body.

The birds, commonly referred to as “sky dancers,” take flight, carrying the soul of the deceased to the heavens to await reincarnation. Offering the flesh and bones of the deceased as nourishment to the birds is in itself a sacred act. It is also of religious importance that birds, by feeding on the body, have no need to kill.

Although some elements of the sky burial ritual vary slightly, the importance of the soul reaching the heavens through the birds is a consistent feature.

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5. From to the Buddhist term *Dakini*, which stems from an ancient tale of a Tantric princess, who carried the souls of the dead to the sky.
Prayer flags above village
Lamas inside nomad tent praying over the deceased

Nomad tent

Sichuan site: foreground shows a dismemberment area
Sichuan site: close up of a dismemberment area with division for women and men

Qinghai site

Qinghai site:
the dismemberment platform

Sichuan site: close up of a stone at dismemberment area
Vulture found in the provinces of Sichuan and Qinghai

Qinghai site: birds circling above newly dismembered body
Chorten (reliquary). Cremation and burial in chortens is reserved for lamas.
Wine and Death:
THE 2010 EXCAVATIONS SEASON AT THE ARENI-1 CAVE COMPLEX, ARMENIA

BY GREGORY E. ARESHIAN¹, BORIS GASPARYAN², KRISTINE MARTIROSYAN-OLSHANSKY¹, LYSSA STAPLETON¹, AND DIANA ZARDARYAN²

The excavations by the Joint Project of the Institute of Archaeology and Ethnography of the National Academy of Sciences of Armenia, the Cotsen Institute of Archaeology at UCLA, and the University College Cork, Ireland (co-directors Boris Gasparyan, Gregory E. Areshian, and Ron Pinhasi), conducted in 2007–2010 at the Areni-1 cave complex in the middle part of the Arpa River Valley (Vayots Dzor Province, Armenia), have already generated major international interest among scholars, the mass media, and the general public. This is due to several factors, most notably the outstanding preservation of organic material belonging to the later phases (ca. 4200–3500 BCE) of the Chalcolithic which is nearly unprecedented in Near Eastern archaeology (Areshian et al. 2012; Barnard et al. 2011; Pinhasi et al. 2010). The most significant finds of 2007–2009 included the world’s oldest leather shoe known at present, the wine-pressing installation (excavations of which were completed in 2010), enigmatic clay structures inside the cave galleries, a number of copper artifacts, and a heterogeneous assemblage of pottery reflective of long-distance cultural interactions.

The long field season of 2010 started on June 20 and closed on September 9. Excavations were conducted in four areas currently designated as Trenches 1–4, with most efforts concentrated on Trench 2 (T2) and Trench 1 (T1) inside the galleries of the cave complex. We also carried out smaller-scale excavations in the Rock Shelter Area of the complex in front of the mouths of cave galleries designated Trench 3 (T3), and in Trench 4 (T4) on the slope of the talus slanting from the RockShelter Area toward the Arpa River bank.

The goal of the excavations in the newly opened T2 was to establish whether the so-called Central Gallery had, in the past, ended at the point where it ends today, before our excavations, or continues deeper and farther. Work in T1 continued exploration of the upper (first) Chalcolithic layer and was intended to complete the excavations of the Chalcolithic wine-pressing structure dated by 14C to ca. 4000 BCE. In T3, further stratigraphic investigations were carried out. Finally, more data was collected from the mostly Chalcolithic midden uncovered in T4. One of the most important conclusions from this season was that the stratigraphy of each of the trenches is drastically different from the others. As a result, future research should take two directions: (1) each stratigraphic unit of every trench must be individually correlated, both chronologically and contextually, one with another; (2) explanations of the stratigraphic differences must follow the establishment of such correlations.

TRENCH 2. The grid of T2, which consisted of 13 complete and 10 partial 1 x 1 m squares, was affixed above the present floor of the cave at the presumed end of the Central Gallery. To a depth of 1.85 m, the deposits in T2 consisted of slightly slanting layers of cultural fill of different colors (brown, light gray, and dark gray), disturbed by an intrusion dated to the sixth to eighth centuries CE by the finding of two silver Sassanian coins. Artifacts in the fill were infrequent, and its nature should be further investigated through micromorphological studies. At the depth of 1.85 m below the modern surface of the gallery, samples of pottery clearly identifiable with the early stage of the

¹. Cotsen Institute of Archaeology at UCLA
². Institute of Archaeology and Ethnography of the National Academy of Sciences of Armenia.
Kura-Arax assemblage were uncovered. They include a carinated shallow bowl with a red-burnished external surface and small handle under the rim, a large gray globular vessel with a prototypical semi-globular lug, and others. Further study of the stratigraphic and chronological position of these samples is especially important because it may clarify the process of formation of one of the geographically largest typological associations of artifacts of the Early Bronze Age (ca. 3300–2300 BCE) of the ancient Near East. The Kura-Arax samples found in T2 immediately overlaid an earlier Chalcolithic layer represented by painted black-on-red vessels characteristic of the uppermost Chalcolithic layer in T1 dated to 4100–3800 BCE (calibrated 14C). The chronological and cultural relationship between the Kura-Arax ceramic assemblage and the underlying Chalcolithic layer in T2 requires further investigation during upcoming fieldwork seasons. Three hypothetical research questions can possibly be answered: (1) Does the Kura-Arax ceramic assemblage appear within the upper Chalcolithic layer together with the painted black-on-red pottery? If not, (2) does the immediate stratigraphic superposition of the Kura-Arax assemblage reflect an uninterrupted chronological sequence? And, if not, (3) what is the probable time span of the break that may have existed between these two primary depositional contexts despite the fact that the upper stratigraphic unit with the Kura-Arax pottery immediately follows the lower with painted pottery? One of the most important findings made in T2 during the season was the presence of a narrow corridor continuing from the Central Gallery deep into the cliff and the discovery of a new passage branching westward from the same gallery. Both clearly indicate that our previous research had underestimated the size and complexity of the cave complex.

**TRENCH 3.** Excavations in T3 refined our understanding of the upper part of the stratigraphic sequence of the RockShelter Area in front of the cave galleries’ mouths. The identification of two layers of medieval structures has been confirmed. Dating to the late thirteenth and fourteenth centuries CE, the uppermost layer is represented by bread ovens (Armenian tonir) dug into the underlying layer which is dated to the period of the Islamic Caliphate’s domination of Armenia (late seventh to the first half of the ninth century CE). This layer, second from the top, is represented by the lowest portions of the walls of small dwellings built of river boulders, pebbles, and rock conglomerate and plastered with dirt containing chaff. The absence of remains belonging to the preceding Sassanian period (other than the aforementioned Sassanian coins, which may have continued to circulate during the first century of the Caliphate) underneath the lower medieval layer, and the gap in occupation between the two medieval layers—that is, during the High Middle Ages (tenth–thirteenth centuries CE)—may indicate that caves of the Arpa River Valley were used as hideouts by the local population during periods of wars, political instability, and economic destitution, and abandoned in times of political stability and economic prosperity. No definable cultural stratigraphic unit has been identified thus far between the lower medieval layer and the upper Chalcolithic layer. However, the presence of a few scattered potsherds typologically dated to the Early Iron Age (ca. eleventh–ninth centuries BCE) and to the beginning of the Middle Bronze Age (ca. 2000 BCE), together with animal dung deposits, suggest that the cave complex was most likely visited and used by herdsmen as a sheep shelter during those periods. Underlying the second medieval layer, three consecutive Chalcolithic layers have been identified. These are represented by packed clay floors with crushed vessels and other artifacts found in situ and cylindrical bins made of light-brown clay with traces of replastering. The bins become narrower toward their mouths. Multiple artifacts related to household and other production activities were found in the three Chalcolithic layers of T3. This assemblage includes the remains of hearths, grinding stones, animal bones, seeds, awls, looms, and even the remains of copper smelting and casting. The metallurgical assemblage consists of piles of raw ore (Figure 1), casting waste, a mold for casting ingots, and final products (knives) made of arsenical copper. The majority of stone implements found in T3 are of obsidian, although chert artifacts are also present in the assemblage. The coloration of obsidian may suggest that it originated from two groups of sources: P’ok’r Spitakasar (or Geghasar) and the Vorotan group, located at of 90 km and 95 km from Areni-1, respectively; hopefully, forthcoming analyses will identify the sources more precisely. Judging from the presence of fragmentary cores and flaking products, the production of chipped-stone tools took place in the rockshelter area, though a specific manufacturing area has not been identified thus far. High-quality flint deposits are easily accessible within a distance of 20 km or less from Areni-1, whereas obsidian does not occur in the Arpa River Valley. The predominance of obsidian in the Chalcolithic lithic assemblage at the site may reflect a traditional preference for, and experience in, manufacturing obsidian implements despite the obvious economic rationality.

![Figure. 1. Copper ore and crushing/grinding pebble pestle from the upper Chalcolithic layer (first half of the fourth millennium BCE).](image-url)
of using chert tools in this particular location. At the same time it suggests an intensive interregional network of commodities exchange. The most common stone tools are retouched blades, end scrapers, backed knives, burins, and chisels. Artifacts with bifacial processing include sickle inserts and arrowheads. One obsidian artifact was shaped by polishing of the edges and parts of the surface. As a whole, the assemblage of stone tools is characteristic of hunting, crop harvesting, and household activities related to secondary processing of products such as skins, bone, and wood. Artifacts related to spinning and weaving suggest that textiles, mats, and basketry were also produced in the Rock Shelter Area.

**TRENCH 1.** Excavations of T1 revealed a pattern that is entirely different from T3. Three goals were pursued in that trench in 2010: (1) exploration at the western end of the trench where a new opening in the wall of the gallery was uncovered during the previous season; (2) completion of the excavations of the wine-pressing structure in the second (from top) Chalcolithic layer; (3) further excavations of stratigraphic units identifiable as the first (uppermost) Chalcolithic layer (Figure 2.) Excavations of the opening at the western end of T1 uncovered a passage leading into a new cavity. In this passage a human mandible was found, as well as fragments of Chalcolithic pottery, a segment of a plastered floor, and traces of fire. The unexpected discovery of the front half of a goat was made deep into this corridor. The remains of the goat, including skin, desiccated flesh, and hair, were preserved due to a process of natural mummification that occurred in the extremely dry environment of the cave. Since the goat was found in the transitional stratigraphic unit between the desiccated dung layer dating to post-Chalcolithic periods of occupation (Bronze Age and medieval) and the first Chalcolithic cultural layer, the goat mummy must be dated by 14C.

Excavations of the “wine-pressing structure” discovered during the previous season in squares Q19/R19 of the second Chalcolithic layer (dated ca. 4000 BCE) of T1 were completed in 2010. This installation consists of a 1 m wide shallow clay tub (Locus 1) with raised edges made of packed clay slanting toward the mouth of a large jar (Locus 2) inserted into its lower end. This design suggests that a liquid originating on the platform was meant to flow into the jar, interpreted as a vat. The basin may well have been for the pressing of grapes on its surface, with the juice flowing into the mouth of the jar in the center of the installation, an interpretation endorsed by the discovery of desiccated grapes, pomace, grape seeds, and grape skins still attached to pedicels, and even of grape rachises (stems) and desiccated vines in close proximity (Areshian et al. 2012; Barnard et al. 2011). The identification of malvidin

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Figure. 2. Trench 1; general view of the upper Chalcolithic layer, ca 4000-3800 BCE.
(pigment responsible for the color of red wine) by means of biochemical analysis of residues on potsherds from Loci 1 and 2 strongly suggests the pressing of red grapes (Barnard et al. 2011). It is logical to assume that red grape juice had to stay for awhile in the vessels in order to leave any traces and residues, which is an indication that fermentation of grape juice into red wine most likely occurred. The jar/“vat” is a 62 cm high, dark gray vessel with an ovoid base. After completing the excavation inside the jar and taking out a part of its bottom for residue analysis, it became evident that the jar was broken and then restored with bitumen, placed into an admirably preserved net of knotted rope, and installed in a pit dug into the surface of the second Chalcolithic layer. After that, the pressing basin was built around the mouth of the “vat.” To our surprise, inside the “vat,” together with grape seeds, a single human tooth was found mixed with dried and carbonized organics. Some 15 cm below this, a human long bone was uncovered under a large rock slab (15 × 23 cm). Unfortunately, both the distal and proximal ends were broken, making a more specific identification difficult. The long bone was mixed with several fragments of rope and various dried and carbonized floral detritus. Several centimeters below this, a 5 cm long, thin copper sheet was found. The copper sheet was neatly cut from a larger artifact, possibly the wall of a drinking bowl or cup. The contents of the jar also included pieces of charcoal. The whole context suggests that wine pressing in the cave was not intended for regular consumption or, generally, for a variety of feasting ceremonies. Rather, it took place in connection with, and for the purpose of, rituals related to the deposition of human remains.

Excavations of other loci in the two upper Chalcolithic layers of T1 confirmed the connection between wine making in the cave and funerary and sacrificial rituals. A total of 11 loci (including the “vat” of the wine pressing structure) were excavated in T1 during the 2010 field season. Two of the eleven loci (Loci 2 and 69) belong to the second Chalcolithic layer (ca. 4200–4000 BCE), while the other nine belong to the first (uppermost) Chalcolithic layer (ca. 4000–3800 BCE) of T1. The loci can be subdivided into two groups: six fired vessels and five circular plastered structures. Both the ceramic vessels and plastered structures contained human and/or other organic remains. Within these loci, a variety of well-preserved artifacts were excavated, including basketry, wool and linen textiles, cordage, fragments of copper objects, and implements of wood and bone. In the first (uppermost) Chalcolithic layer, three loci were especially distinguished.

Locus 14 (in squares P17/18 and Q17/18) is a large plastered circular basin with a diameter of 1.5 m and a height exceeding 65 cm. The locus was excavated down to a flat plastered bottom, with the exception of a 20 cm wide section left along the southern part of the circular wall. The contents were primarily composed of a substantial quantity of potsherds, fragments of plaster, several small stone slabs, fragments of human and animal bones, charcoal, carbonized floral remains, a single semicircular copper object (broken bracelet?), and a single twig painted with blue pigment and partially burnt after painting (Figure 3). The function of this structure still remains unclear. It must also be noted that in several areas small round spots of orange pigment appear on the walls and base of the structure.

Locus 40 (in square L17) is a red-burnished vessel elaborately painted with black paint. The mouth of the vessel was sealed by placing the neck of another red-burnished vessel over the painted vessel’s rim and plastering the two together. A wooden peg was pushed into the plaster seal. The function or significance of these pegs found throughout the trench is yet unclear. The top half of the complete vessel is decorated with a row of vertical alternating lines and dots, while the ovoid base is decorated with the images of the sun, a body of water running around the lower body of the vessel, mountain goats, and snakes (Figure 4).

As of today, the pictorial composition on this vessel is the first of its kind found in the Caucasus and in the highlands of the Near East. Morphotypologically it belongs to the group of

Figure. 3. Trench 1; painted and subsequently burnt twig, upper Chalcolithic layer, ca 4000–3800 BCE.
black-on-red (BOR) Chalcolithic painted pottery well known in the area spanning from southwestern Turkmenistan to the central part of western Iran. The wealth of its decoration is matched by its contents. The vessel clearly served as—and most likely had been made with an initial intent to serve as—a funerary urn. It contained the remains of the right half of the body of an adult woman wrapped in reed mats and tied with cordage. Small pieces of the desiccated soft tissue were still attached to her skeleton. The cranium and the left half of the body were absent. There could be little doubt that the body was cut into parts and the skeleton carefully defleshed after death, before the soft tissues were allowed to naturally disintegrate. Thus, Locus 40 can be characterized as a dismembered primary burial which was part of rituals performed in the cave complex during the Chalcolithic. Other finds from within the urn include potsherds, organic detritus, charcoal, and pieces of plaster.

Locus 63 (in squares L17/M17) is a plastered clay cylindrical structure which yielded one of the most significant finds of the season: a well-preserved and complete primary burial of an infant with accompanying grave goods. The deposition of the infant's body was preceded by placement of several objects. The infant was buried atop an animal hide with the fur still intact; a ceramic bowl was placed upside down near her/his feet, and a cup carved from animal horn (Figure 5) was placed near the head. The torso was covered with a coiled bowl-shaped basket (Figure 6). Atop these a stone slab was placed, which was, in its turn, covered with large fragments of bicolored matting and potsherds. Above these were placed a few cremated bones of an adult, which were covered with more matting and potsherds. The care with which this infant was buried, together with the accompanying goods, make this burial stand out from others found in the cave. Its significance also lies in the phenomenal preservation (by natural mummification) of such fragile remains: a significant amount of soft tissue is still extant and hair is still attached to the scalp. Additionally, this concrete evidence of cremation of the deceased leads us to believe that the ash concentrations observed in other loci may also be the remains of cremations. This hypothesis is strengthened by the discovery of small fragments of human bones with traces of burning within those ash concentrations; however, micromorphological analyses will be necessary to confirm or reject this hypothesis.
The excavations season of 2010 substantially advanced our understanding of the Areni-1 cave complex and brings up a number of questions concerning social complexity and trajectories of transformation of Chalcolithic societies in the Near Eastern highlands. The virtual absence of evidence of household activities inside the galleries of the cave complex clearly indicates that those areas were not inhabited during the Chalcolithic. Rather, the inner space of caves was used as sacred area for complex rituals that included both primary and secondary depositions of dismembered and complete human remains. Wine played an important role in those rituals. The very substantial scale of ritual activities performed by a large community of people is confirmed by the discovery in several Chalcolithic layers both in T1 and T2 of multiple loci interpreted as remains of such activities. Judging from household remains found in the Rock Shelter Area (T3) outside of the mouths of the cave galleries, only a small group of Chalcolithic people actually lived there. This group may have guarded the sacred caves and serviced the performers of rituals who came from other locations. This hypothesis creates an enigmatic situation, because it assumes the presence of a substantial Chalcolithic population inhabiting the Arpa River Valley outside caves, despite the fact that, at present, Chalcolithic settlements are virtually unknown in that area. Discovering sites and patterns of Chalcolithic occupation in the valley will be an important goal for future explorations.

ACKNOWLEDGMENTS

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REFERENCES


Jaffa Cultural Heritage Project

PROGRESS REPORT FOR 2009 AND 2010

BY AARON A. BURKE

Established in 2007 under the co-direction of Aaron A. Burke (UCLA) and Martin Peilstöcker (Israel Antiquities Authority), the Jaffa Cultural Heritage Project (JCHP) continued its progress in 2009 and 2010 toward achieving the project’s four primary objectives: research, publication, conservation, and presentation of Jaffa’s archaeological heritage. As a cultural heritage project, the JCHP differs substantially from many archaeological projects, which adhere principally to the expeditionary model. Expeditionary projects are usually of short (and often uncertain) duration, with limited objectives and, oftentimes, a narrow temporal focus that is confined to specific period(s) of interest, irrespective of the potential advantage of a longer, diachronic or “deep time” perspective. This report addresses the project’s accomplishments in 2009 and 2010 within the framework of its four overarching objectives, with a view toward the goals of the 2011 to 2015 excavation seasons.

RESEARCH AND CONSERVATION. In 2009, excavations continued within the visitor’s center in Qedumim Square, after initial soundings in 2008. The excavations, under the supervision of George Pierce, were carried out by field staff Kyle Keimer, Krystal Lords, Brett Kaufman, Hillary Pietricola, and Heidi Dodgen, all UCLA graduate students. Professional monument conservators from Los Angeles, Leslie Friedman and Ben Marcus, undertook preliminary work to enable expansion and deepening of the excavations. A team of 18 field school participants from four countries made possible an extensive excavation within the enclosed space of the center. The goal of the excavations included (1) exploration of the cultural sequence in this area of the tell (mound), with a focus on pre-classical phases; (2) estimation of the potential for relating renewed excavations to the work undertaken by Jacob Kaplan between 1955 and 1974; and (3) assertion of the feasibility of cooperation between the various institutions participating. The excavation experience proved very successful in all three respects. The excavation area was deepened across most of the northern extent to the depth of the small probe conducted in 2008, vastly widening the exposure of the western rooms of a large complex dated to the Hellenistic period that dominates the area. A small and deep sounding in the center of the excavations revealed what appears to be an Achaemenid phase (ca. fifth–fourth centuries) of construction within the area. While the sounding was not large enough to permit an exposure of an architectural plan in this phase, this operation also unearthed Iron Age sherds (ca. 980–539 B.C.), suggesting that this part of the tell may have been occupied during the Iron Age. For safety reasons, it was not possible to continue deeper and, consequently, bedrock was not reached in this area. It remains possible, therefore, that Bronze Age layers still lay below the Iron Age remains. Despite this, the excavations revealed an impressive and unique limestone ashlar building preserved to a height of two stories, which is dated to the Hellenistic period on the basis of major phases of fill deposits and the structure’s architectural history. Unfortunately, owing to the fact that this structure was intentionally abandoned and then backfilled in the Early Roman period, no living floors dated to the Hellenistic phase were identified during the excavations. Subsequent conservation work by the Israel Antiquities Authority and the Old Jaffa Development Corporation in 2009 and 2010 have prepared the excavations for public viewing as part of a newly designed exhibit on Jaffa within the visitor’s center (Figure 1).
In 2011 the project will proceed toward one of its main objectives, the renewal of excavations within Jacob Kaplan’s main area, known as Area A, where a monumental gate facade of Ramesses II was unearthed in an early stage of Kaplan’s work, as well as extensive evidence of a Late Bronze Age Egyptian garrison kitchen. The sequence of Egyptian occupation identified previously spans nearly three centuries (ca. 1460–1150 B.C.), as demonstrated through a wide range of Egyptian New Kingdom ceramics. Historical sources from the period confirm that Jaffa during this period served as an Egyptian imperial outpost and port in Canaan, facilitating nearly annual Egyptian campaigns into Canaan and points north. The renewal of Area A excavations are principally focused on obtaining additional lines of data from the Late Bronze Age phases of the site, which can provide a new understanding of the archaeological context. To address questions of social interaction and ethnicity through material culture excavated in this area, we will seek to collect a wide array of faunal, floral, and residue samples that can contribute to our understanding of the diet of Jaffa’s inhabitants, which, on the basis of previously excavated ceramics, are anticipated to be predominantly Egyptian in orientation. This will not only illuminate aspects of food preparation and consumption among the Egyptian population (something that has not been possible in archaeological contexts in Egypt owing to limitations on the sampling of archaeological remains), but it will also reveal the degree to which the Egyptian garrison interacted socially with the local Canaanite population and the extent to which processes of acculturation and adaptation were at work among these populations.

**Publication.** Since August 2009 and during a hiatus of excavation in 2010, efforts by JCHP staff were principally dedicated to a continued effort to publish results from Jacob Kaplan’s excavations of the Bronze and Iron Age remains of Jaffa undertaken between 1955 and 1974. Work continued with funding from the Shelby White-Leon Levy Program for Archaeological Publications, and the preliminary results of these efforts have been published in the journal *Near Eastern Archaeology* (Burke and Lords 2010), providing the first in-depth analysis of any part of Kaplan’s early excavations. Additional results of the publication initiative appeared in 2011 in *The History and Archaeology of Jaffa 1*, the first volume of the Jaffa Cultural Heritage Project series (Burke and Mandell 2011; Keimer 2011; Peilstöcker and Burke 2011).
Publication Initiative, which has been ongoing since 2007, is approaching the final stages in the completion of the final reports addressing these excavations. In 2011, in addition to the inauguration of renewed excavation of the Egyptian fortress, the publication initiative will address Kaplan’s Area A excavations from 1970 to 1974, during which an oft-discussed temple known as the “Lion Temple” was excavated. Preliminary assessments now suggest that the temple had two phases of history during the Late Bronze Age, which may clarify why its precise date has been a contentious issue (Figure 2).

**PRESENTATION.** Beginning in the fall of 2009, the JCHP began using a NextEngine 3D desktop scanner to digitize the ceramics and artifacts uncovered. Funded by a UCLA Faculty Research Grant, the adoption of this technology was intended not only to increase the quantity and quality of data collected for artifacts in a way that made possible further study of artifacts outside of the field, but also to facilitate the inclusion of artifact scans in digital archives and 3D models. In 2010 protocols were established for creating publication-ready illustrations of ceramics in keeping with their traditional representation—namely, by means of profile drawings. This process should reduce costs associated with illustration in the long term, as nonspecialist participants are able to operate the scanner, while automated batch conversions of scanned sherds will enable the creation of profile drawings (Figure 3).

In addition to publications, one of the primary avenues for the dissemination of the project’s results is the project website, which was recently revamped and continues to broaden in scope. The website will permit the dissemination of a wide array of resources that can be accessed not only by researchers but also by laypersons interested in Jaffa’s cultural heritage. Resources, which will range from 3D digital scans to bibliographies and site guides, will be added regularly as new developments warrant.

Figure 2. The Lion Temple as seen during the 1972 excavations, photo from the Kaplan Archive.

Figure 3. Traditional profile drawing generated using 3D scanner.
In four years since its inception, the Jaffa Cultural Heritage Project has succeeded despite some significant challenges, not the least of which has been the declining economic environment since 2007. Its success is foremost the result of the project’s commitment to the analysis and publication of legacy excavation data, such as that of Jacob Kaplan’s excavations in Jaffa, which have provided an important guide for strategically approaching the continued exploration of Jaffa’s archaeological heritage. Additionally, the project has carefully sought to invest in new technologies such as 3D artifact scanning and an online database that help reduce reliance on technical specialists, but also increase efficiency by reducing total processing time for lab work with artifacts. In the year ahead, the project will continue to expand its efforts to incorporate the latest methods, as we seek a sustainable and responsible approach to the renewal of excavations in Area A in Jaffa.

REFERENCES

SCALORIA CAVE:
PROGRESS REPORT

BY ERNESTINE S. ELSTER

Scaloria Cave is on the edge of the Tavoliere Plain in southeast Italy, near the Adriatic Coast, and has both an upper and a lower chamber (Figure 1). It was discovered by chance in 1931 when workmen, preparing to install a water line from the city of Manfredonia to the remote villages of the Gargano peninsula, set off explosives, exposing a dark, unexpected crevasse. Eventually, the authorities were called in, and human remains were identified along with a scatter of bone and stone tools and pottery on the floor of the newly discovered chamber (Figure 2).

A short excavation followed and artifacts were removed to the local museum. As for the lower chamber, it was not discovered until decades later by young amateur cavers in search of adventure.

A pattern of short excavation season followed by closure was to repeat over decades, culminating in the UCLA-University of Genoa excavations in 1978–1980, co-directed by Marija Gimbutas (UCLA) and Santo Tine (University of Genoa), both

Figure 1. Plan of Scaloria Cave.

1. Cotsen Institute of Archaeology at UCLA.
now sadly deceased. However, in collaboration with an international group of scholars (U.S. [this author], Italy [E. Isetti and A. Traverso], Hungary [L. Bartosiewicz], and England [J. Robb and team]), a report of the Scaloria excavations is now being prepared for publication. This volume will include as much of the earlier unpublished data as is available: a history of discovery (1931), explorations over the years (1931–1980), and an evaluation of the significance of the cave to the Neolithic villagers of the Tavoliere Plain.

Among my collaborators, John Robb of Cambridge University has involved a number of scholars (Maryanne Tafuri, Rome, and Chris Knusel, Exeter) with special expertise in the study of ancient human skeletal remains and burial ritual, since the cave yielded evidence for almost three dozen burials (Figure 3). Robb submitted and received back from the Oxford Radiocarbon Unit 17 new radiocarbon dates that cluster between ca. 5500 and 5200 B.C., based on human bone collagen.

A tight pattern of dates such as these gives strong support to the use of the cave during the Early and Middle Neolithic periods of the southeast Tavoliere, with its hundreds of Neolithic hamlets incircled by ditches. Members of Robb’s team are examining ratios of carbon and nitrogen isotopes on femora along with strontium isotopes on dental enamel to investigate diet and mobility. The results of this research are eagerly awaited.

To highlight this report, I invite you to join John Robb as he entered the cave for the first time in the spring of 2010 and was led through the passages by one of the speleologists. This is taken from his e-mail:

. . . (the) cave probably had an ante-chamber which is now collapsed and under a big cone of detritus, and this would have been where most everyday activities were: keeping herds, cooking, etc. . . . [W]here there was light and air and access . . . the area where [the 1979] excavation trenches [were] . . . was just inside this antechamber . . . [which was] used for burial and was most likely the inner end of the daily activities zone. It is low, and in most places you cannot stand up fully. The floor is irregular and slopes
gently in some places, quite steeply in others. The soil is patchy. There are baby stalactites and bits of the ground are concreted. It feels dark, damp and airless but this might have been different when the original entrance was open.

From this loosely defined Upper Chamber the floor slopes steeply away in several directions; the Cave [developed] . . . by fracturing between limestone layers rather than by tunnel-like dissolutions. . . . It is not a series of clearly defined, smoothly bordered passages and rooms. The slope is quite steep in places (up to 60 degrees) and interrupted by stalactites, boulders, chutes, twisty bits, etc. And the ceiling is usually about a meter high so crawling is often necessary. The best way to think of getting around the cave is basically a lot like an ant crawling between two sheets of irregularly crumpled paper. You really have to know where you are going; there isn’t just one path. . . . You also lose a sense of connection to the outer world very quickly—visibility and audibility go down—maybe 30 meters bearing and around 10 meters straight line of sight. The last bit of path to the Lower Chamber involves quite a steep scramble . . . poorly defined and irregularly bounded.

There is an area where one can stand up and in one or two places the ceiling is quite high. All the whole pots have been removed, although in some cases the bases are still concreted in place. The so-called [lustral] “basin” is about 70 cm long by about 50 cm wide and is only a few cm deep; were it not filled with water it would actually be quite easy to miss (Figure 4).

The cave continues down below the water level so that the bottom part of it is flooded. The water level fluctuates according to how much it has been raining. The cavers we went with commented that the overall cave was a lot drier this time than it usually is (so we came out moderately muddy from crawling and rolling around instead of completely coated in slippery, clayey mud).

This means that parts of the lower end of the cave, where there are archaeological deposits, are occasionally actually under water.

What drew Neolithic visitors 7,500 years ago to crawl through the dark, dank passage leading to the Lower Chamber and then to use this space for some ritualized, mysterious activities? John Robb’s narrative clearly describes a chamber difficult to access, encrusted with stalactites and stalagmites, whose strangeness alone may have lured some of the local population to explore and use this space. Several of our collaborators are wrestling with this question, and, as the manuscripts arrive here at my desk at the Cotsen Institute, I see that we are rich with hypotheses. Look for a completed manuscript in 2012.

Figure 4. Lower Chamber with “lustral” basin in forefront.
Urkesh Further Back in Time

When we started excavations at Mozan, we had suggested that this might be the site of ancient Urkesh. We had also expected that it would date back to the second half of the third millennium BCE. And both assumptions proved correct. What we did not expect was that the settlement would go further back in time. Much earlier, in fact: to the Late Chalcolithic 3 (hereafter LC3) period (ca. 3500 BCE).

I have been able to fix the date on the basis of ceramics and glyptics that we began to discover three years ago. Then last year I decided that the concentration of this material just below the top of the monumental Temple Terrace of the third millennium warranted a larger excavation. And what emerged was the corner of a mud-brick building that is very much in the tradition of the large temple structures typical of southern Mesopotamian architecture. What was so surprising was its context—on the slope of the temple terrace, about 25 m above the surrounding plain. A small cache of cylinder seal impressions unearthed earlier indicates that some administrative mechanisms existed, not unlike, in my view, what we know from the largest nearby site with LC3 occupation, Tell Brak. At the same time, Late Chalcolithic Mozan had already developed production mechanisms in LC3 for mass-produced ceramics but, more importantly, had achieved sufficient wealth, skilled craftsmanship, and administrative organization to construct a mountain-like high terrace—the niched mud-brick building being, most likely, its temple.

In other words, an indigenous population was able to achieve this construction feat without having the need for southern stimulus. I am obviously eager to pursue the excavations. Archaeologically, this is very auspicious, because the mud-brick building lies directly below the modern surface and does not appear to be damaged. To find this out, we are eager to resume excavations, hopefully in the not too distant future.

Marilyn Kelly-Buccellati, Cotsen Institute of Archaeology at UCLA
The Vitor Valley of southern Perú is located about 40 km west of the colonial city of Arequipa, between Lake Titicaca and the coast of the Pacific Ocean. It has a long and continuous history of human occupation that extends from the pre-Hispanic Formative period through the Colonial period and into modern times. Vitor is known for its rich wine and pisco (grape brandy) production as well as its strategic location along key trade routes between highland communities and settlements along the coast of the Pacific Ocean. Vitor’s beautiful landscape is framed by volcanoes such as Misti and Chachani and dotted with hundreds of colonial wine and pisco bodegas (wineries).

The abundance of archaeological sites and ancient roads throughout the valley underscore the central importance of this area in the regional economy of the South Central Andes both in the past and present. Before the Vitor Archaeological Project (VAP) was conceived in 2008, virtually no major research projects had been initiated in this valley. As a consequence, the VAP represents the first multidisciplinary team to rigorously explore the long and rich history of this valley. VAP is a joint effort of the University of Chicago (M. C. Lozada), The Cotsen Institute of Archaeology (H. Barnard and W. Wendrich), and CIARQ (A. Cardona).

The site Millo 2 was the focus of our research in Vitor for the past three years. This extensive, multicomponent site was one of the largest Wari administrative and ritual centers in coastal southern Peru outside the heartland in Ayacucho. Wari represents a pre-Inka polity that dominated much of the western and eastern slopes in the Andes during the Middle Horizon (600–1000 CE). The results of our first three seasons of excavations at Millo suggest that there was direct highland Wari intervention at Vitor. In addition, based on our ceramic analysis, the presence of Tiwanaku, another competing Andean polity, raises the intriguing possibility that Wari ritual spaces such as Millo 2 were also revered and perhaps used by other competing groups. Our initial surveys also demonstrate a substantial pre- and post-Wari occupation of the valley, which continued until the arrival of the Spanish. During the period of societal transformation that occurred in response to the arrival of the Spanish, who initiated the production of wine and grape brandy, there was a noticeable reorganization of the indigenous settlement throughout the valley.

Ongoing multidisciplinary research by members of VAP in this unique archaeological context will help to pinpoint details regarding the continually changing political, social, and ideological landscapes of the Vitor Valley throughout its long history.

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AUGUSTO CARDONA, Centro de Investigaciones Arqueológicas de Arequipa
HANS BARNARD, Cotsen Institute of Archaeology and Department of Near Eastern Languages and Cultures, UCLA
WILLEKE WENDRICH, Department of Near Eastern Languages and Cultures and Cotsen Institute of Archaeology, UCLA
Faience Bead-Net Dresses in Old Kingdom Egypt

My current research has focused on an investigation of faience bead-net dresses that appear on walls and statues of Old Kingdom tombs. I also examined reconstructed bead-nets in the Boston Museum of Fine Arts and the Petrie Museum in London prior to 2010. These reconstructed examples came from burials at Giza and Qaw. Last year I began to analyze all of the data I previously collected in Egypt, various museums, and libraries to determine the meaning and relevance of this garment in the Old Kingdom funerary cult. It became clear that in order to do this, I would have to get further information on Predynastic and Early Dynastic antecedents to the Old Kingdom bead-net dress.

I will demonstrate that this bead-net garment did not suddenly appear in the late Fourth Dynasty, as is commonly believed, but was one of several manifestations of an Egyptian design that dates back to the beginnings of the Egyptian state. Initially associated with royalty, this design came to be more widely used in the Old Kingdom, particularly in the elite funerary cult. In this context the bead-net dress is associated with the tomb offering cult and the wish of tomb owners for abundant offerings in the afterlife.

SANDRA L. ORELLANA, Department of Anthropology, California State University, Dominguez Hills, and Cotsen Institute of Archaeology at UCLA


Giza, Western Cemetery, Tomb G 2342 = G 5520 (= Lepsius 28), looking northwest, January 16, 2004. Photograph by Peter Der Manuelian. Courtesy Peter Der Manuelian
Cultural Resource Management and Site Preservation in Uganda

Though my interests continue in West African and African diasporan archaeology, I recently spent much time promoting cultural conservation in Africa, particularly in Uganda. Following excavations in 2006–2007 at the Late Imperial Egyptian fort at Dufile in northern Uganda, originally built by Charles Gordon in 1874, plans have been drawn up, with the help of Max Farrar, who also worked on the Cotsen Institute projects in Albania and Syria, for a visitor’s center at Dufile which will provide museum services for northern Uganda as well as for South Sudan, which became an independent state in July 2011. It is hoped that the center will not only demonstrate the cultural history and ethnic diversity of the region, but will also serve as a focal point for community activities, including performance arts and craft activities. The nearest large town in South Sudan, Nimule, is less than five miles away from Dufile by canoe on the Nile. It is believed that working with the local communities on both sides of the frontier will promote pride in shared cultural origins that will be reflected in greater political harmony. The center will also highlight the work of oil exploration in the area and the potential for economic and cultural development. Dufile is being developed as a sustainable historical monument in a tourist circuit that includes other imperial field monuments—the forts in the north of Uganda at Patiko and Wadelai, which I excavated in the 1960s. Wadelai, which remained active well into the twentieth century, is being renovated with the generous help of the German government.

I also have been actively involved in a campaign, involving letter writing, newspaper articles, and legal procedures, to save East Africa’s first museum in Kampala, established in 1908, from developers who had bought the land hoping to build a 60-story trade tower. All over Africa, conservationists, with active archaeological collaboration, are fighting and cooperating with developers to save Africa’s dwindling cultural resources, which include rock art sites, shrines, bedrock mortars, earthworks, and museums that were built in the colonial period.

MERRICK POSNANSKY, Departments of History and Anthropology and Cotsen Institute of Archaeology, UCLA
Since 2008, archaeologists from UCLA have been working in the vicinity of Petrified Forest National Park in eastern Arizona investigating two periods of village formation that occurred circa A.D. 800 and 1300. In 2010, archaeologists from UCLA, the University of Redlands, and Petrified Forest National Park collaborated on the mapping and surface recording of two of these villages, Twin Butte, which represents the largest and earliest village in the region, and Black Axe, a small late-period village that has slipped through the cracks in the voluminous Southwest literature.

At both sites we made detailed total station maps that were aided by the use of a low-altitude balloon photography rig that rendered surface features much more visible and enabled the creation of three-dimensional models of what the sites might have looked like in the past. Twin Butte, which was occupied from roughly A.D. 600 to 800, contains over 20 small surface pueblos and probably at least double that number of subterranean pit structures that are no longer visible on the surface. Twin Butte was one of the subjects of Fred Wendorf’s doctoral dissertation work at Harvard University, and we will be working with those collections over the next year to obtain samples suitable for AMS radiocarbon dating to better delineate the site occupation span and total population.

Black Axe is a small village of approximately 80 rooms that probably housed roughly 100 people from A.D. 1275 to 1350. This site was used as a type site for defining the pottery series of the Petrified Forest by Museum of Northern Arizona archaeologists back in the early twentieth century, but its identity has been unknown until recently. Black Axe is the third, and by far the smallest, village from this time period documented by UCLA archaeologists in the Petrified Forest area over the last three years. We are currently investigating mobility practices in this late village cluster through archaeological survey and compositional analyses of pottery as part of a Wenner-Gren–funded project.

Gregson Schachner, UCLA Department of Anthropology and Cotsen Institute of Archaeology
Lab and Collections Work at Sisupalgarh

The ancient city of Sisupalgarh in eastern India is more than 2,000 years old and holds many tales in artifacts and architecture. For the past several years our international collaborative team from UCLA and Deccan College Post-Graduate and Research Institute (Pune, India) have been excavating there to learn how ordinary people lived in urban centers of the past.

What did they eat? Where did they live? Why was urban life attractive to them, when rural life would have been more peaceful and predictable?

The answers to these questions sound remarkably modern: ancient cities, like our urban centers today, had a wealth of opportunities that drew people in for an exciting, varied life. There was work in the market, in manufacturing, and in construction, and a lively social life in the crowded streets and passageways.

We even know from a nearby inscription that a local king paid for the reconstruction of the city’s massive walls after a storm, a good sign of civic leadership that also provided employment for inhabitants. The variety of artifacts in stone, metal, and especially in terracotta also show that city dwellers enjoyed shopping for trinkets and housewares, and that they often discarded items even when they were still usable—another similarity to the present day in which we discard or trade in items simply because they have fallen out of fashion.

Having completed five exciting excavation seasons, we are now in the phase of documenting, cataloging, and evaluating our finds in preparation for the comprehensive publication of the research. Archaeologists generally send each type of find to specialists and await reports, but one of our innovations in lab work is to assemble our student team from the fieldwork phase and bring them together again for this phase of analysis.

After cataloging the excavated material from Sisupalgarh, our team has been poring over Deccan College’s massive collection of comparative published material. The students are learning that the thrill of discovery isn’t limited to the “dirt” phase of archaeology: it also can be experienced in seeing the published photo of an object from a faraway site that looks exactly like one of our finds. Through these links and connections, we look forward to telling the story of Sisupalgarh not only as a place of vibrant urban activity, but as a city whose inhabitants were well connected to the vast economic and social networks of the ancient Indian subcontinent.

MONICA L. SMITH, Department of Anthropology and Cotsen Institute of Archaeology, UCLA
RABINDRA KUMAR MOHANTY, Deccan College Post-Graduate and Research Institute
New Research in Andean Archaeology

Charles (Chip) Stanish continued to analyze the materials from the Titicaca Basin. Along with several co-authors, he published several articles on the Tiwanaku occupation in the region, including work on trade routes and political geography. He also published two theoretical articles, one on the use of ritual geography in the Inca Empire and a second on the nature of markets in the prehispanic Andes. Stanish also published a book called *Lake Titicaca: Legend, Myth and Science* written for a general audience. This is the second book in the World Heritage and Monuments series of the Cotsen Institute of Archaeology Press.

Easter Island Excavation and Conservation Initiative

Rano Raraku is the quarry in which 95% of the 1,045 monolithic statues (moai) of Easter Island were carved. One of our research aims is to understand the statues in terms of regional territories and as a byproduct of habitual production, use, discard, and reuse behaviors. However, our excavations are also revealing tantalizing details of ritual behavior and the arts. Our excavations are directly linked, for the first time in the history of the island, to an innovative conservation program that provides learning opportunities for Rapa Nui students and hope for the future of statue preservation.

The Site

Rano Raraku is composed of consolidated tephra ash, or tuff. The volcanic crater is partially filled with a marshy, freshwater lake roughly 350 m in diameter and encircled by thick reeds covering today about 45% of the southern third of the lake’s surface. Modern studies of Late Quaternary sediments collected in core samples taken from the lake reveal a stratified pollen record from the last 30,000 years, suggesting that the island was once covered with dense forests of palm and other trees and shrubs. Forest disappearance in Rano Raraku is inferred to have been human induced, caused by intensive quarrying activity on the southeastern interior slopes.

Excavation

Our excavations are concentrated on two statues (RR-001-156 and RR-001-157), which were chosen because they are nearly unique on
Easter Island (Figure 1). They and only one other statue have complex petroglyphs carved on their backs, faces, and arms. The carvings are variants of a narrow range of elements and are arrayed in very interesting compositions. Most are well within the norm of Rapa Nui iconography, but some are very unusual. Many are crescent designs referred to as *vaka* (canoe); they also may be *rei miro* (gorget).

One of our most interesting finds during our second statue excavation was an egg-shaped mass (800 g) of concentrated, intensely pure red pigment (*kie’a*) tucked away under an overhang of bedrock (*papa*) carved with petroglyphs. Red pigment was an indispensable aspect of Rapa Nui ritual life, and remains today a valuable part of personal display during performance art. Along with a small basalt stone incised with a unique carving of a canoe (*vaka*) uncovered earlier during excavation of RR-001-157, this find gives us a tantalizing glimpse into the ritual concerns of artisans and others who frequented the Rano Raraku interior.

**EDUCATION**

We are providing seasonal, informal learning experiences for five to ten gifted Rapa Nui students in either archaeology or conservation, most of whom attend the Universidad Internacional SEK in Santiago. One of them was sufficiently inspired to conduct XRF analyses of a large sample of more than 700 stone tools (*toki*) we have excavated to date. Another is captivated by the petroglyphs on the backs of the statues and is now drawn to rock art analysis.

**CONSERVATION**

Our colleagues Christian Fischer (UCLA) and Monica Bahamondez, Director of the Centro Nacional de Conservación y Restauración in Santiago, have installed sophisticated monitoring equipment using above- and below-ground sensors to study the microclimate and weathering factors. The system will be in operation until March 2012 to cover an entire year and the environmental data are downloaded on a monthly basis by Táhira Edmunds and sent to C. Fischer.

In May 2011, both statues underwent protective treatment (Figure 2). Two water-repellent formulations were used to apply a protective treatment to the surfaces of both statues. One consisted of a solution of BS290 at a concentration of 15% (V/V) diluted with Aguarras Mineral. The other was Cave Clear-S, a ready-to-use solvent-based water repellent readily available in Chile. After some preliminary trials the different products were applied with a portable sprayer following a wet-on-wet application methodology until saturation of the surface was observed. The water-repellent solution at 15% was primarily used for the treatment of the exposed, and most weathered, parts of the statues. Once treated with the solution at 15%, the surface was sprayed with pure solvent in order to increase the penetration depth of the active product, followed by a final application of Cave Clear-S. On the excavated parts of the two statues, which are in much better condition, only Cave Clear-S was applied.

On days with intermittent rain we were amazed to see how well the repellent did its job. Droplets quickly beaded up and didn’t penetrate the surfaces of either statue. We noted that the stone surfaces dried within a maximum of 10 minutes. These are subjective observations, of course, and a detailed assessment will be carried out in March/April 2012 during the last phase of conservation intervention that will follow our next excavation season.

**JO ANNE VAN TILBURG**, Cotsen Institute of Archaeology at UCLA

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**Figure 2:** Conservation treatment of RR-001-156 by CIOA’s Christian Fischer, May 2011.
METALLURGY AND ECOLOGICAL CHANGE IN THE ANCIENT NEAR EAST

BY BRETT KAUFMAN

One of the most substantial technological hallmarks of complex societies is the ability to smelt mineral ores and extract elemental metal. Gold, silver, iron, and copper can all be found as native metals and have been cold-worked or worked with minimal heat by humans since at least the eleventh millennium BCE (Craddock 1995; Roberts, Thornton, and Pigott 2009). Copper carbonates such as malachite and azurite were the first ores to be smelted in the sixth millennium BCE via the pyrotechnical harnessing of timber fuel in the form of charcoal (Figure 1). The earliest archaeological attestations of this advanced metallurgy come from across Anatolia, southeastern Iran, and the Balkans (Craddock 2000; Roberts, Thornton, and Pigott 2009). Advanced alloying processes were already in place in Anatolia due to the sheer abundance of polymetallic ore sources and metals such as nickel, antimony, arsenic, and tin which have left their signatures in some of the earliest complex copper alloys produced (Yener 2000). The dual occurrence of arsenic and copper in some ores led to the discovery of arsenical copper—the first bronze alloy. By the fourth millennium BCE, societies across the Near East began to demand this strong, corrosion-resistant alloy despite the great technical difficulties and possible health risks that production posed (Shalev and Northover 1987). Alongside pure copper, arsenical copper alloys persisted as the metallurgical technology of choice until the mid-third millennium, when the Sumerians of the Early Dynastic III period (ED III) adopted tin bronze technology (Moorey 1994), which was the intentional addition of tin to copper—a technology that had been known previously in Anatolia for at least 500 years and that required the smelting of two distinct ore types, followed by the co-melting of copper and tin.

In both the New and Old Worlds, humans first utilized pure copper, then arsenical copper, and finally tin bronze. Due to the nearly identical mechanical, aesthetic, and corrosion resistance properties shared by arsenical copper and tin bronze, anthropologically oriented archaeologists and students of the history of technology have long struggled to provide a convincing explanation for the increase in demand that ancient Near Eastern civilizations exhibited for tin bronzes. From a metallurgical point of view, compared with pure copper, the presence of arsenic or tin in a copper alloy provides enhanced...
properties such as strength, hardness, weldability, corrosion resistance, as well as improved aesthetics.

The application of pyrotechnological and thermodynamic principles to the study of the early usage of these metals has been hitherto lacking in research. Copper and tin ingots of near elemental purity, as well as ingots with mixed arsenic and copper, were traded across the Near East, and today we can calculate the amounts of fuel that would have been required to melt these metals. Ongoing research undertaken by the author shows that tin is nearly 6 times more fuel-efficient than pure copper. A further demonstration of fuel saving potential is provided when comparing common alloys of comparable mechanical properties. It is suggested that a tin bronze with 10% tin content is about 25% more fuel efficient than an arsenical copper with 3% arsenic content. In modern materials science applications, a 5% increase in efficiency is considered significant. It now appears that the only quantifiably appreciable difference between tin bronze and arsenical copper is the vastly different fuel-efficiency requirements. Indeed, whereas copper and arsenical copper require a closed furnace environment for production, it is well-known that tin can be melted in an ordinary fire (Rhead 1935).

In some parts of the New World such as the Andes, it is likely that humans chose this alloy progression not for fuel efficiency but for aesthetic purposes (Lechtman 1996). Arsenical coppers with an arsenic content above 8% look silvery, and tin bronzes look gold. Independently developed in both the eastern and western hemispheres, parallel sequences of a technological repertoire can be viewed as a lesson to archaeologists that similar cultural choices may not necessarily be dictated by the same underlying adaptive mechanisms.

Before proposing cultural and ecological causations for the adoption of various metal technologies, it is worthwhile to review briefly the chronological progression of the appearance of copper and its alloys throughout the Near East. This article does not only synthesize the metallurgical progressions and technological choices exhibited by ancient Near Eastern societies, but also poses questions that represent the current state of research being undertaken by archaeologists and archaeometallurgists.

**ANATOLIA**

It is fitting to begin this discussion in Anatolia, home to rich mineral resources in its vast mountain ranges such as the Taurus. These resources lent themselves to smelting experiments by humans from at least the sixth millennium BCE. These same mountain ranges were also rich in timber, marking Anatolia as a region incredibly well suited for metallurgical activity due to its abundance of fuel. The Uruk settlers who reached Hacinebi in the fourth millennium BCE found a culture that had already developed advanced metallurgical technology (Stein 1999). And archaeologists have recovered evidence for complex polymetallic alloys at sites such as Arslantepe from the end of the fourth millennium in the Early Bronze Age I (Palmieri et al. 2002), evidence that includes objects containing a mix of two or more metals such as silver, copper, arsenic, nickel, antimony, and iron. One of the most long-standing debates in the field of archaeometallurgy concerns where the tin came from. The sources of tin continue to elude archaeologists to this day (Franklin, Olin, and Wertime 1978). It is very likely that the earliest tin came from Anatolia, but those sources seem to have run out of available lodes bearing tin by the Old Assyrian period. Another region often considered by scholars is Afghanistan; and some scholars look as far as the British Isles at Cornwall (although this is a highly implausible source before the first millennium BCE) (Muhly 1985). By the Old Assyrian period (ca. 1900–1800 BCE), huge quantities of tin—about 100 tons in a 40- to 50-year period alone—were being shipped to the Anatolian karum of Kaniş alone (Larsen 1982). Unlike lead isotope analysis, which is our best current method for identifying the provenience of several metals except tin, tin isotopic research has not been developed due to a number of constraining factors that are unlikely to be resolved in the near future.

**IRAN**

Along with Anatolia, the Iranian plateau is another area where some of the earliest bronze metallurgy and technological experimentation is attested. The Iranian plateau is flanked on its west by the mineral-rich Zagros Mountains, and to its north by the Caucasus, a region well known for its wealth of copper, iron, and other ores. By 3600 BCE, people at the site of Tepe Hissar were using a crucible that required a high degree of pyrotechnic knowledge to produce (Thornton and Rehren 2009). By the late fourth/early third millennium BCE, arsenical iron (speiss) was being produced at the same site, perhaps indicating an attempt to create an arsenic-rich metal to be melted down later into a copper alloy (Roberts, Thornton, and Pigott 2009). This would represent the earliest attempt to co-smelt multiple metals. Tin bronze was adopted most thoroughly on the Iranian plateau in the early second millennium BCE, but some sites were already beginning to incorporate tin bronze in the third millennium (Frame 2010).

**MESOPOTAMIA**

Not only was Mesopotamia witness to the earliest fully developed urban civilization, writing, and irrigation agriculture, but the Sumerians of the EDIII period (ca. 2500 BCE) were the first to adopt tin bronze technology (Moorey 1994). This was likely due in large part to a lack of timber fuel, a by-product of both natural conditions and land-clearing activities intended to create pasturelands for faunal domesticates such as goat, sheep, and cattle. In tandem, this proliferation of faunal domesticates made huge quantities of dung fuel available. As mentioned above, tin can be melted in an ordinary fire, and it is likely that access to dung fuel helped spur the adoption of tin. As discussed above, tin bronze technology was invented
A
Basic copper carbonate of azurite pseudomorphing to malachite.

B
Dually occurring chalcopyrite (copper colored) and arsenopyrite (silver colored), on a quartz base. Copper, arsenic, and iron are the most prevalent metals.

C
Tin oxide ore of cassiterite, the source of tin in the Old World.

D
Realgar, or ‘arsenic ruby’ consisting of arsenic and sulfur, perched on a base of sphalerite, containing mostly zinc and iron.

E
Chalcopyrite and pyrite nodes, neighboring galena, all on a sphalerite base. This polymetallic ore therefore contains copper, iron, silver, lead, zinc, and sulfur.
in the mountainous areas to the north of Mesopotamia some half-millennium earlier, but the technology and tin resources were never in demand until the time of the Sumerians, which raises some interesting questions: Why tin? Why at different times across various regions was tin bronze in demand, hundreds of years after its invention? It is unfortunate that modern geopolitical circumstances preclude scientific excavations at present in Iraq, but it may be possible to clarify these questions via application of thermo-technological principles, combined with what we already know about the mechanical and aesthetic properties of copper and its alloys. The field of archaeology is currently witnessing a sea change in analytical capabilities, making it possible for research questions to be answered in the laboratory and not just in the field.

Under the Akkadian Empire (ca 2250–2100 BCE), perhaps the world’s first empire and with its famous early leaders such as Sargon and his grandson Naram-Sin, the production of tin bronze was halted in the Jezireh (northern Mesopotamia). Interestingly enough, tin bronze production continued in Sumer at Ur and was resumed by the Ur III dynasty (De Ryck, Adriaens, and Adams 2005). The Sumerians likely had continual access to the Persian Gulf in this period despite their Akkadian overlords. Does this mean they were receiving tin from what they called Meluhha—the Harappan of the Indus Valley—via sea trade? The best scholarship can do currently is to pose these questions, as the answers remain elusive.

The sphere of Sumerian influence extended from India to Anatolia. Just after the Sumerians of the ED III adopted tin bronze, so did the Harappans and the Anatolians (Kenoyer and Miller 1999; Lamberg-Karlovsky 1972). It is also likely that tin bronze was adopted at around the same time in the Khabur triangle and the Balikh, at sites such as Tell Brak, as well as at Mari, but we are still awaiting a comprehensive analysis of the metals that have been excavated from this region.

Figure 2. (A) This socketed spearhead from ~2000 B.C. contains 4.14% arsenic and 93.9% copper, placing it well within the ideal range of 2-6% arsenic for a functional weapon or tool. The dark streaks in the micrograph are iron sulfides leftover from production, and the white dots and streaks are lead leftover as impurities from the ore. (B) This bronze dagger dating to ~2300 – 2000 B.C. contains some of the earliest tin to be imported into the Levant. It is composed of 10.64% tin, making it a beautiful early example of a true tin bronze (tin content 10-14%). The faint branch-like streaks are dendrites, common to a tin and copper matrix. The white spots are impurities of lead, which comprises 2.62% of this alloy.
**EGYPT AND THE LEVANT**

The current state of research in earliest Egyptian metallurgy is unfortunately rather undeveloped. We now believe that the Egyptians were relatively late to adopt tin bronze, only at the beginning of the second millennium BCE (Maddin, Stech Wheeler, and Muhly 1977). This can be viewed as the third wave of tin bronze adoption, some 500 years after the Sumerians, Anatolians, and Harappans began to select this metal as their alloy of choice.

The southern Levant was also somewhat late to adopt tin bronze but did so before the Egyptians in what may be considered the second wave of adoption. Tin bronze begins to appear here in the Early Bronze Age IV (ca. 2300–2000 BCE). It is interesting to note that tin bronze occurs only in daggers during this period. Most of the metallurgical production evidence from this time comes from the northern Levant, whereas most of the alloy data comes from the southern Levant. Evidence of metallurgical activity can be found at sites such as Byblos, Tell Mardikh (Ebla), Ras Shamra (Ugarit), and Hama in the northern Levant (Philip 1989). By the beginning of the second millennium BCE, tin bronze is more heavily utilized (Branigan, McKerrell, and Tylecote 1976; Philip et al. 2003). Our knowledge of metallurgical progressions in the Levant has been hampered by a dearth of archeometallurgical studies from the many major excavations in Syria and Lebanon, and by a focus on metal antiquities of unknown provenience from Israel. Current work is being undertaken by the author that analyzes well-stratified metal artifacts from the southern Levant spanning the Early and Middle Bronze Ages which should help elucidate some of these resource and technological choices (Figure 2). This research shows that adoption of bronzes in the southern Levant led to a timber conservation of nearly 9% via tin augmentation alone in the Middle Bronze Age IIA-C.

No less important for answering why tin bronze became such a desired commodity is the issue of paleoenvironmental changes. Anthropogenic deforestation, combined with the severe Late Holocene climate episode of ca. 2200 BCE (Dalíes, Kukla, and Weiss 1997), provides an environmental context for analyzing technological choices made by humans. Individual humans and cultures have always had to adapt to ever-changing endemic processes, external pressures such as warfare and disease, as well as shifts in their environmental realities. Archaeology is uniquely suited to study human reactions to long-term environmental change, and one of the best ways to ascertain these reactions is by the collection and analysis of palynological evidence such as pollen cores and through other paleoethnobotanical methods. Considering that the exploitation of fuel resources—in the form of arboreal, herbaceous, or dung assets—dictates the amount of metal production that people could achieve, it is essential to reconstruct paleoenvironments in order to gauge the availability of vegetation, including fuel resources. For example, if a paleoethnobotanist can determine how much oak tree pollen fluctuated over time, then we can begin to grasp how much timber could have possibly been utilized by humans in the surrounding areas.

From the fourth to the second millennia BCE, forest stands were gradually diminished throughout southern Anatolia, northern Mesopotamia, and the northern Levant. This is mostly attributed to forest-clearing activities for purposes of metallurgical, ceramic, and plaster production (Miller 1985), although another substantial reason for the clearing of land was to make way for olive tree orchards (Baruch 1986). Humans then began to rely on dung fuel that was harvested from their sheep and goat flocks (Wilkinson 2003). Indeed, a greater availability of fuel sources spurred by this by-product of large-scale domestication (Algaze 2008) enabled humans to create more goods that demanded energy to produce. By the time of the greatest societal restructuring in the last three centuries of the third millennium BCE, the southern Levant had lost a third of its forest stands (Horowit 1974; Palumbo 1990). In addition and in tandem with deforestation, there is an abundance of evidence pointing to severe geomorphological shifts (Rosen 1986; Wilkinson 1999), a steep drop in precipitation levels (Faust and Ashkenazy 2009), and even the complete disappearance of bodies of water such as the Bet She’an lake in the mid-third millennium and the Qatna lake by the mid-second millennium (Horowit 1979; Valsecchi 2007). The combination of these anthropogenic and climatic effects culminated in what is known as the Late Holocene climatic episode. The volatile period immediately preceding these worsening conditions and fuel shortages was witness to the first large-scale spread of tin bronze.

Is it likely that Near Eastern elites would have consciously chosen to utilize tin bronze as an energy-saving mechanism? Conservatively estimating trade volumes from the Old Assyrian (ca. 1900 BCE) texts at karum Kaniš reveals that 100 tons of tin were shipped in a 40- to 50-year period to this one emporium alone (Larsen 1982). At Mari on the Middle Euphrates, 16 talents 10 minas (~490 kg) of tin were deposited in the palace treasury of King Zimri-Lim (eighth century BCE). A contemporary letter from the Mari archive documents the shipment of 10 talents (~300 kg) of tin from the capital to the royal family of Aleppo (Malamat 1971). Tin ingots dating to the Late Bronze Age and weighing roughly 100 kg were excavated in a maritime context off the coast of Haifa in modern-day Israel (Galili and Shmueli 1982; Hauptmann 2007). By the Neo-Assyrian era (early first millennium BCE), tribute shipments routinely included 100 talents (~3000 kg) of tin (Muhly 1973).

Further attestation of the concern with which Near Eastern Bronze Age elites considered their timber resources can be garnered from texts that allude to deforestation practices. These indications come from such contemporary works as the *Epic of Gilgamesh* (mid-third millennium), in which the hero journeys through the “Land of the cut-down ERIN-trees” (Hansman 1976), a region apparently known for its deforestation. This is particularly interesting, as the Sumerians of the ED III were the first humans to adopt and utilize tin bronze consistently.
The Hebrew Bible also contains references to Iron Age deforestation as well as to timber resource management:

“Open your doors, Lebanon, that the fire may devour your cedars. Wail, cypress tree, for the cedar has fallen, because the mighty are spoiled. Wail, oaks of Bashan, for the thick forest has come down.” (Zechariah 11:1–2)

“He cuts down cedars for himself, and takes pine and oak, and strengthens for himself the trees of the forest, and plants a fir tree and the rain nourishes it. And it will be for a man for fuel.” (Isaiah 44:14–15)

Considering the large quantities of tin listed in representative textual sources, harnessing the fuel-efficiency potential of tin would most certainly have been recognized as a highly effective forest management strategy by elite planners.

There is substantial paleoethnobotanical and archaeometallurgical evidence for various cultures of the time period and beyond managing their timber resources, such as at Wadi Feinan in the Early Bronze Age (ca. 2900–2350 BCE) (Engel and Frey 1996). Old Babylonian (ca. 1800 BCE) metallurgical crucible technology as excavated at Tell edh-Dhibai was likely designed in order to conserve charcoal fuel in this region of scarce vegetation (Davey 1988). There is convincing evidence for the early origins of debesa oak stand management that directly coincides with the earliest mining and smelting activities on the Iberian Peninsula during Phase II of the Copper Age Millaran cultures (ca. 2200–1600 BCE) (Stevenson and Harrison 1992). At Rio Tinto, the slag produced from the Iron Age through the end of Roman period would have required about 100 million tons of timber to produce. Spread over more than a millennium, this would translate to a sustainable amount of about one million tons a year (Craddock 1995). The entirety of timber resources on the island of Cyprus was repeatedly stripped and regenerated no less than 16 times to support metallurgical activity over three millennia (Constantinou 1982). Theophrastos praised fourth-century BCE Cypriot rulers for their forest management. The silting of harbors across the ancient Mediterranean is mostly attributed to erosion caused by heavy deforestation for fuel (Hughes and Thirtgood 1982). It is also quite possible that Punic metalworkers at Cartage (fourth century BCE) were concerned with fuel conservation as evidenced by clay-quartz heat-insulating layers in the iron forges (Docter et al. 2003). Ethnographic studies reveal that metalsmiths working in modern, preindustrial contexts are well aware of the calorific potential of different floral species (Babu 2003). The amount of time needed to regenerate tree stands indicates that this resource must be subjected to long-term planning and elite control if metallurgical activity is to flourish. For a preferable species like oak, regeneration of deforested stands could take around 50 years in the southern Levant (Gophna, Liphshitz, and Lev-Yadun 1987) and 50–80 years in Cyprus (Constantinou 1982), although coppicing and pollarding may reduce the temporal requirement. The Kefar Monash bronze tool and weapon hoard may represent archaeological evidence of four actual lumberjacks who left their gear in the site of an ancient oak forest (Mazar 1990).

Although it is unreasonable to suggest that any single reason is responsible for the success or collapse of a given culture, it may be suggested that a failure to adapt to shifting environmental realities is symptomatic of a general inability to incorporate technological and economic decision-making in light of natural resource constraints. What is clear is that there is no metallurgical production without timber charcoal fuel, leaving scholars with the task of first quantifying this relationship in terms of energy usage, and then qualifying the relationship based upon cultural processes and adaptive mechanisms. Different regions would have felt the impact of climatic or anthropogenic degradation of their surrounding forest stands to varying degrees, both in terms of erosion and fuel shortages. The model discussed above does not attempt to explain the reasons for tin adoption in every region, but two points should be clear: (1) the fuel efficiency of alloys should be considered at least as significant as the other properties usually associated with archaeometallurgical analysis, such as strength, hardness, and weldability, and (2) the Sumerians of the ED III and the Levantine cultures of the EB IV likely adopted tin bronze mainly for its fuel efficiency over copper and arsenical copper. It would also be beneficial to develop a field methodology that correlates forest stand availability through pollen cores and other paleoethnobotanical techniques with archaeometallurgical analysis of well-stratified alloys over time. Observing the interchanging relationships between timber management and metallurgical selection can provide informed research on the economic and cultural demands, choices, and social values of ancient cultures, from both technological and cultural ecological perspectives.

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RADIOCARBON DATING: A BIBLIOGRAPHIC ESSAY

BY R. E. TAYLOR

From very early in the history of the $^{14}$C dating method, it was understood that efforts to provide an effective means of accessing the literature dealing with the method would be a challenging undertaking. Frederick Johnson (1904–1994), who assembled a bibliography published in the first issue of the journal Radiocarbon (Johnson 1959), was already well aware of this problem: even in his time, the method had been applied to a wide spectrum of scientific and humanities disciplines and topics. And yet Johnson could never have envisioned the international array of journals that would come to contain papers with information dealing with $^{14}$C method as both a dating and tracer isotope—including anthropology, archaeology, biochemistry, biology, the biomedical sciences, botany, chemistry, environmental science, forensic sciences, paleoanthropology, Quaternary geology and paleontology, geochemistry, geophysics, nuclear physics, paleoclimatology, and paleoceanography. Since English has been the principal vehicle of scientific publishing in the $^{14}$C research field, this discussion will focus on English-language publications.

The first published bibliography of $^{14}$C was assembled by Hilde Levi for references from 1946 to 1954 (Levi 1955) which was followed by listings for the years 1956 and 1957 (Levi 1957). The only annotated bibliography of $^{14}$C literature assembled by a professional librarian was prepared for sources published between 1946 and 1968 as, first, a pilot study (Polach 1980) and, then, as a book-length compendium (Polach 1988). This later work listed $^{14}$C literature in 14 categories. The categories included bibliographical works (Chapter 1), theoretical works (Chapter 2), techniques and instrumentation (Chapter 3), Conferences (Chapter 13), and Date Lists (Chapter 14). The remaining categories included separate listings of the fields of study to which $^{14}$C dating had been applied by 1968. This included general geology (Chapter 4), glacial geology (Chapter 5), ocean studies (Chapter 6), the Pleistocene (Chapter 7), and five geographical areas of archaeological applications including Africa (Chapter 8), America (Chapter 9), Asia (Chapter 10), Europe (Chapter 11), and Oceania (Chapter 12).

Any historically oriented bibliography of $^{14}$C dating would begin with Willard Libby’s Radiocarbon Dating volume, which summarized some of the initial technical developments and experiments that constituted the foundations on which the method was initially based for the period from 1946 to the mid-1950s. It also contained the first set of $^{14}$C “dates,” those produced by Libby’s laboratory at the University of Chicago. The volume appeared in two editions (Libby 1952, 1955), along with a paperback version (Libby 1965) and hard-cover reprint of the 2nd edition that includes an addendum noting revised values for the contemporary specific activity of natural $^{14}$C, revisions in the $^{14}$C half-life value, and initial considerations of the possibilities of systematic variations in $^{14}$C values before 4000 BP. This addendum notes that solid carbon decay counting had been made obsolete in the mid-1950s with the development of gas and liquid scintillation decay counting.

In addition to the comments of Libby (1967, 1970a, 1970b, 1973, 1979a, 1979b, 1982) relating his own views on the history of the method, other reflections and commentaries on various aspects of the history of the development of the technique at Chicago include those of Arnold (1992), Marloe (1980, 1999), de Messières (2001), Suess (1992), and Taylor (1985, 2000a, 2000b). Since the mid-1950s, each decade has witnessed the appearance of book-, chapter-, and journal-length papers summarizing the method and its applications as it was viewed when the various contributions appeared. Taken together, they collectively constitute an archive of historical overviews of the development of the method as of their publication date. The most comprehensive of these works (listed in chronological order) include Broecker and Kulp (1956), Polach and Golson (1966), Olsson (1968), Willis (1969), Ralph (1971), Tite (1972: 76–90), Michels (1973), Aitken (1974), Ralph and Michael (1974), Polach (1976), Ogden (1977), Taylor (1978),...
The use of $^{14}$C as a tracer isotope in carbon cycle and environmental studies has been reviewed by Cook et al. (2010). In addition to these items, there is, of course, a wide assortment of discussions of radiocarbon dating in various types of encyclopedias and other reference works.

For the first three decades of $^{14}$C dating studies, the primary bibliographic source for individual $^{14}$C age determinations were “date lists” prepared by the various radiocarbon laboratories. The custom of publishing $^{14}$C determinations in this form began with the University of Chicago laboratory (Arnold and Libby 1950, 1951). As each laboratory came online, an alphabetic code abbreviation was selected: for example, C (= University of Chicago), GRN (= Groningen), BLN (= Berlin), LE (= Leningrad/Saint Petersburg), QL (= Quaternary Isotope Laboratory, University of Washington), UCLA (= University of California, Los Angeles), UCR (= University of California, Riverside), GIF (= Gif sur Yvette (France), NZ (= New Zealand), U (= Uppsala (Sweden), A (= University of Arizona), and others. When alphabetic codes were prefixed to numerical values (e.g., C-530, QL-1320, UCLA-2340), they represented a unique laboratory code assigned to each sample. In some cases, multiple samples from the same site or context were assigned the same number but separate letter codes were added (e.g., QL-1320A, QL-1320B, QL-1320C, etc.).

With the development of AMS laboratories in the late 1970s, the same custom of assigning letter designations was continued: for example, OxA (= Oxford Radiocarbon Accelerator Unit, United Kingdom), CAMS (= Center for Accelerator Mass Spectrometry, University of California Lawrence Livermore National Laboratory, USA), and UCIAMS (= Keck Carbon Cycle Accelerator Mass Spectrometry Laboratory, University of California, Irvine). Where the same institution maintained both a decay counting and AMS facility, codes distinguishing the two laboratories were assigned. For example, while the decay counting laboratory in the Department of Geosciences at the University of Arizona used “A” as their code, whereas the AMS laboratory in the Department of Physics used “AA.”

Date lists have been published in a sequentially numbered series (e.g., University of Arizona Radiocarbon Dates I, University of Arizona Radiocarbon Dates II, etc.). The journal Radiocarbon periodically publishes a listing of laboratory codes (e.g., Radiocarbon 52, no. 4: 1701–1724 [2000]). Originally, laboratories were listed in separate sections by the nation in which they are located. With the advent of AMS laboratories, the decay and AMS laboratories were listed in separate sections.

The specialized journal devoted originally to the publication of $^{14}$C date lists began in 1959 as an annual publication, the Radiocarbon Supplement to the American Journal of Science. It was undertaken in large part because the editor of the journal Science had become concerned by the amount of space given over to the publication of $^{14}$C date lists in that journal in the late 1950s (Deevey 1984). By the third volume of this series (1961), the title was shortened to simply Radiocarbon. This journal expanded to two issues per year in 1958, three issues per year beginning in 1973, and, beginning in 2009, became a quarterly publication. Beginning with the Eleventh International Radiocarbon Conference held in Seattle, Washington in 1983, the proceedings of the International Radiocarbon Conferences have been published in Radiocarbon along with major policy statements reflecting international agreements dealing with the standard treatment of $^{14}$C values (e.g., Long 2000). Publication of the proceedings of the European-based Radiocarbon and Archaeology Conferences are now being published by Radiocarbon. The sixth in the series of these conferences, which began in 1981, was held in Paphos, Cyprus, in 2011.

In 1989, Radiocarbon became “an international journal of cosmogenic isotope research” and the number of laboratory date lists decreased, superseded by general research articles, technical notes, and a few book reviews. A number of both the pioneering and second-generation decay counting laboratories discontinued operations as their directors retired. But a much larger number of newer laboratories have been established and developed in all parts of the world, and AMS facilities have added to the total number. Because of this, although there has not been a net decrease in the number of laboratories undertaking $^{14}$C measurements, an increasing number have chosen not to prepare and publish their date lists. This is particularly true of certain commercial laboratories, which, from the very beginning of their operations, viewed the $^{14}$C age determinations that they produced as proprietary data—that is, the private property of the clients who paid for the analysis. The advent of AMS technology also increased dramatically the number of $^{14}$C analyses produced. The Oxford Radiocarbon Accelerator Unit, an AMS laboratory that focuses its attention on archaeological samples, continued the practice of publishing results of its AMS $^{14}$C analysis in a modified early Radiocarbon date list format. Beginning in 1984, these results have been published at least annually in the journal Archaeometry.

The advent and rapid expansion of the World Wide Web, the creation of websites containing information and materials relevant to $^{14}$C studies, and the development of various types of search engines have obviously dramatically expanded the resources now available for retrieving information dealing with the wide range of applications of $^{14}$C to various disciplines. Current and all back issues of Radiocarbon are available online at www.radiocarbon.org. That website also provides links to reliable sources of information about the technique. Entering “radiocarbon dating” as a query term in any search...
engine will, of course, pull up literally tens of thousands of hits. Regrettably, as is the case with any information obtained from a web-based resource, it can be difficult for a nonspecialist to evaluate the accuracy of most of the information these sites provide.

Sadly, a database that was originally designed to contain the entire corpus of \(^{14}\)C determinations was begun but not continued. This retrieval system for \(^{14}\)C dates was devised by the Radiocarbon Dates Association, Inc., utilizing edge-punched card files employing needle-sorting. Unfortunately, the time required to sort through large groups of cards became excessive as the number of individual dates dramatically increased in the 1970s and the system was discontinued. A very useful index for early \(^{14}\)C values associated with archaeological materials was assembled by Arthur J. Jelinek, who arranged dates published through 1961 on a geographical basis (Jelinek 1962). Despite the efforts of a number of investigators, no retrieval system was developed that would create and maintain a worldwide comprehensive database for \(^{14}\)C age determinations. Several types of \(^{14}\)C data retrieval approaches employing computer-based systems have been proposed, and some have been implemented for selected topics or regions (e.g., Taylor et al. 1968; Gulliksen 1983; Moffett and Webb 1983; Otlet and Walker 1983: 103), but no comprehensive system was ever supported and none currently exist. Several laboratories maintain publicly accessible Internet databases of the measurements carried out in their laboratory (e.g., Strydonck and Roock 2011). In the absence of a comprehensive worldwide database, specialized topical and regional compilations have been developed (e.g., Gajewski et al. 2011).

An important venue for the dissemination of research data in \(^{14}\)C studies has been periodic international radiocarbon conferences. The first formal gatherings were held in 1954, in Copenhagen for European scholars and in Andover, Massachusetts, for North American scientists. The first international radiocarbon conference was held in Cambridge, England, in the summer of 1955. Although prepared papers were presented at the third conference held in Andover in 1956, these papers were not published. The first formal publication of the papers presented at an international radiocarbon conference was begun with the Sixth International Conference held in 1965 at Washington State University in Pullman, Washington, USA (Chatters and Olson 1965). Since that time, the international radiocarbon conferences have been held on approximately a triennial basis. The Twenty-First International Conference will be held in Paris, France in 2012. A second series of meetings concerned initially to a large degree with \(^{14}\)C applications was inaugurated as a result of the introduction of accelerator mass spectrometry. The first AMS conference was held at the University of Rochester in the spring of 1978, and an approximately triennial schedule for these meetings has been maintained. The twelfth AMS conference was held in Wellington, New Zealand in 2011.

The development of the calibration and correlation of the \(^{14}\)C time scale has occupied the attention of a number of \(^{14}\)C research groups for more than four decades. The first paper to include data that addressed this issue was “Variations in Concentration of Radiocarbon with Time and Location on Earth” by the pioneering Dutch researcher Hessel de Vries (de Vries 1958; Willis 1998). Beginning in the late 1960s, the first major “calibration plot” was developed by Hans Suess (1909–1993) of the University of California, San Diego (La Jolla/Mt. Soledad) Laboratory, employing primarily a series of dendrochronologically-dated bristlecone pine samples produced by Wesley Ferguson of the University of Arizona Tree-Ring Laboratory (Suess 1970, 1978). Suess’ first paper on this topic appeared in the volume entitled Radiocarbon Variations and Absolute Chronology (Olson 1970), which included papers presented at a Nobel symposium, the first conference to consider the effects on archaeological chronology of the systematic age offsets in \(^{14}\)C time. By way of a historical footnote, Suess had a rare iron silicide mineral (FeSi), Suessite, named after him (Keil et al. 1982), although it would have seemed somewhat more appropriate to have named it after his grandfather, a noted Austrian geologist, Eduard Suess.


Results of the application of \(^{14}\)C dating in different disciplines have been periodically summarized. A volume commemorating four decades of radiocarbon studies, Radiocarbon After Four Decades: An Interdisciplinary Perspective (Taylor et al. 1992) reviewed the major contributions of \(^{14}\)C as a dating and tracer isotope in the period from its introduction to the early 1990s in archaeology, biomedical research, carbon cycle studies, earth sciences, environmental studies, hydrology, oceanography, and palynology. In 2000, a special issue of Radiocarbon in honor of Renee Kra, the managing editor of the journal for nearly three decades, contained a series of articles addressing the contribution of \(^{14}\)C in Old and New World
archaeology, geophysics, solar physics, and astrophysics, and in research on the carbon cycle in the oceans and terrestrial ground waters. In 2009, Radiocarbon celebrated 50 years of publication with a “Golden Anniversary edition” with a series of papers on applications, development, and historical perspectives including articles devoted to discussions of the impacts of $^{14}C$ on the conduct of both Old World (Kuzmin 2009) and New World (Taylor 2009) archaeology.

REFERENCES


A Letter from an Editor

HANS BARNARD

Any cursory survey of scientific journals such as Science or Nature reveals that the majority of scientific articles are nowadays frequently credited to more than one author. This phenomenon is also reflected in archaeological and anthropological research, where peer-reviewed, edited publications have become increasingly the norm. Apart from the consequences that this may have for the allocation of academic credit, it also requires a change in attitude from individual authors. Based on my personal experience as an author, coauthor, editor and reviewer, I would like to put forward some thoughts on the latter—which can be summarized into the three one-liners discussed in some detail below.

1. Everybody Needs an Editor

Writing any text is a lonely, tedious and sometimes painful task. Despite all the hard work and sense of satisfaction that is felt once a manuscript is created, however, nobody can expect this to be perfect as is. Sitting down for so many lonely hours and weighing all the alternatives narrows the mind of the author to an extent that it becomes impossible to see room for improvement. Accomplished authors are not so much those who do not need editing, but rather those who can read their own work with the eyes of a reader and can thus be their own editor. All others have to resort to an outsider to present frank comments in a way that cannot easily be ignored.

A special case of this is the peer-review process, now standard operating procedure in the sciences and increasingly common within the scholarly community. Peer-review is based on anonymous colleagues critically assessing submitted texts to provide the author(s) and the publisher with suggestions for improvement before publication. The system hinges on the honesty of the participants and its success is limited by three issues: the discretion of the reviewers, the possibility of rejecting important contributions, and the possibility of accepting accounts reporting on poor or fraudulent research. The article in which James Watson and Francis Crick first described the double-helix structure of DNA, for instance, was published without peer-review because the editor of Nature at the time—John Maddox—fearred that no referee would be able to keep information so self-evident confidential. More often, innovative ideas are rejected after peer-review, although most are eventually published if the author is sufficiently persistent. Most famously this happened to Paul Lauterbur,1 who was later awarded the Nobel Prize in Physiology or Medicine for the idea of using nuclear magnetic resonance to produce images (MRI); and to Stephen W. Hawking,2 whose idea of black hole radiation was not only theoretically sound, but recently experimentally proven. Both these articles were eventually published in Nature,3 but not without first being rejected for reasons that in retrospect seem shortsighted. On the other hand, almost thirty articles based on data fabricated by Jan Hendrik Schön were published between 1998 and 2001 in, among others, Science and Nature. These articles were later retracted,4 but the incident clearly illustrates the third and final of the weaknesses of the peer-review system listed above.

Despite these issues, experiments with “open peer-review” and “post-publication peer-review,” and the rise of online publications—still rather a free-for-all—the system of anonymous peer-review still seems the best of all the bad systems imaginable. The need for peer-review is obvious from the large number of unreliable, misinformed, biased, and (sometimes deliberately) misleading entries on the Internet, where there is far more chaff than wheat to be found, while the more reliable pages resemble peer-reviewed journal pages in a digital format. This quickly becomes evident after entering a query such as “pyramids aliens” into a search engine instead of visiting a trusted website like the UCLA Encyclopedia of Egyptology. Obviously the Internet is the quintessential embodiment of freedom of expression and the power of information, but at the hands of ignorant, unscrupulous, and malicious people it becomes an effective weapon of intellectual mass destruction. It is telling that even Wikipedia had to abandon its system of “crowd sourcing” in favor of a system reminiscent of peer-review. That the same applies to the printed media was demonstrated in 1996 through an “experiment” of Alan Sokal, professor of physics at New York University.7 He

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1. Cotsen Institute of Archaeology and Department of Near Eastern Languages and Cultures, UCLA.


managed to get an article “liberally salted with nonsense” published in the academic but, at the time, not peer-reviewed journal Social Text because, according to Sokal, it “sounded good and flattered the editors’ ideological preconceptions.” Around the same time Sokal revealed in the journal Lingua Franca that the article was “a pastiche of left-wing cant, fawning references, grandiose quotations, and outright nonsense.”

Nobody enjoys receiving critique on an article or chapter that has been months or even years in the making. Given that some reviewers, editors or collaborators can be more brusque than others, it remains crucial for authors not to respond to first instincts, but rather to think before taking any action. After the first rage subsides, the awareness will emerge that if this particular colleague, editor or reviewer had problems with certain paragraphs or statements, the same is likely true for other readers, possibly even most readers. This is the right starting point for taking the opinion of the first independent but knowledgeable reader seriously and for using it as an opportunity for improvement before the text is printed and can no longer be amended.

2. LESS IS MORE

This minimalist dictum was taken from the poem “Andrea del Sarto (Called ‘The Faultless Painter’)” by Robert Browning (1812–1889) and brought back into the public awareness by architect Ludwig Mies van der Rohe (1886–1969). Originally intended to apply to the visual arts and architecture, including the design of buildings, furniture and clothing, the adage was also adopted by authors such as Samuel Beckett, Charles Bukowski and Ernest Hemingway. It is most certainly relevant to scientific and scholarly writing where describing observations and expressing ideas needs to be both comprehensive and succinct. At a more basic level, the directive applies to commas, italics, quotation marks, footnotes or endnotes, abbreviations, jargon and words from another language. These should be used as sparingly as possible, only where necessary for understanding the text, and never to introduce ambiguity or to demonstrate the erudition of the author. When an editor or reviewer remarks on their excessive use, this should certainly be reconsidered and probably corrected.

3. KILL YOUR DARLINGS

Whether first said by F. Scott Fitzgerald, William Faulkner, Sir Arthur Quiller-Couch, or Mark Twain, this recommendation remains as valuable as it is difficult to observe. When an author has spent long hours finding a pun to use in the title or the most creative sentence ever to appear in print, it is grueling to learn that others do not understand or like the way that things are phrased and advise revision or even removal. In other words, they advise the author to kill her or his darling. This is obviously infuriating, but it again has to be realized that if the first independent reader had problems with this particular section, the same is probably true for most other readers. It is for this reason that this advice is repeated in all textbooks on journalism, creative writing, and filmmaking. Two specific issues that are at the root of many disputes between authors and editors need to be mentioned here. First is the obligation of the author to conform to the house style of the journal or publisher, especially concerning the format of bibliographical references. Second is the phrasing of the title, which should be the shortest summary of the text. It should thus not be a question; and if a colon is to be used, both the title and the subtitle should make immediate sense to all readers. Having a question, a pun or a quote in the title only makes it more difficult to gauge the contents and relevance of the text and does not benefit anyone.

In general, the whole text should be comprehensible for any informed and interested reader, even if she or he has no detailed knowledge of its background or significance. The best way to check for this is to hand the text to such readers, for instance graduate students, and take any resulting remarks, suggestions, and additions profoundly seriously. The author’s next step would be to privately request recognized specialists in the subject of the research to read and comment on the manuscript. If anything, this will prepare the author for possibly even more severe feedback in the form of the remarks by peer-reviewers or the editor. It must always be kept in mind that the assignment of the reviewers and the editor is to improve the product and to protect author(s) and publisher from settling on a mediocre publication.


TIMES OF TURMOIL ENCOURAGE an intense reflection on the ultimate validity of our fieldwork in foreign lands. Identified as we become with the people, committed as we are to recover their territorial past, engaged as we still remain in the more esoteric dimensions of our research, the question of relevance emerges with urgency.

Such is the case, today, with regard to our fieldwork in Syria. We are identified, we are committed, we are engaged—we definitely have come to feel foreign no more, because of our attitude, because of their openness. Our heart is very much in Mozan while our mind dwells on Urkesh. Our heart is in the streets of Syria today, even while our mind seeks to define something as seemingly remote as Late Chalcolithic 3 pottery.

“Seemingly” remote? How could such abstractions not be remote when people are dying in the streets? But they do, strongly, matter, because the whole effort ultimately evokes and nurtures the sense of dignity that sustains us humans when everything else collapses around us.

As archaeologists, we serve as purveyors of a past in which the present sinks roots that are all the deeper when the sense of identity is under attack. We come to feel that in some unexpected way, the Syrians of today can also lean on the Syrians of yesteryear whom we help bring back to light.

We have, unwittingly, prepared for this. We have prepared as we have been striving to conserve the fragile mud-brick walls of four and more millennia ago, as we have been endowing this remote past with faces and names, as we have been showing how the delicate disentangling of ruins from the grip of the earth is laden with meaning.

We have prepared because, in doing this, the people affected—we who dig, and they who live the results—have become jointly empowered with the richness of memory. And this memory is the treasure to be defended.

Thus it is that we feel confident that, having become the guardians of memory, the Syrians of Mozan will protect the Syrians of Urkesh. Thus it is that the Syrians of yesteryear can in turn lean on the Syrians of today.

Communication is the start of preservation. Alongside conservation, alongside interpretation. Communication conceived as education. An education that educates us as much as “them,” as we all learn, together, that to attribute meaning is to affirm relevance.

1. Founding Director of the Cotsen Institute of Archaeology at UCLA, Departments of Near Eastern Languages and Cultures and of History, UCLA.
On February 19, 2011, students, faculty, and the general public gathered at the Lenart Auditorium of the Fowler Building at UCLA for a day-long conference to learn about and discuss some of the latest research in archaeology. The first UCLA Archaeology Graduate Student Conference created an opportunity to address current research conducted by UCLA graduate students relating to archaeological methods, theory, and fieldwork from sites all over the world.

John Papadopoulos, Professor and Chair of the Archaeology Graduate Interdepartmental Program, opened the day, followed by a series of student lectures and presentations organized by theme—Historical Environments, Shifting Populations, and Materiality and Value. Three students spoke to each theme and represented a wide range of time periods, regions, and topics in archaeological research.

Lana Martin discussed paleoenvironmental instability and plant resource availability on Santa Cruz Island. She was followed by Brett Kaufman, who spoke about metallurgical responses to deforestation in the Early and Middle Bronze Age southern Levant. Ryan Roberts talked about Levantine archaeoseismology, Eric Fries discussed his survey project at a rural Mayan site in Belize, and Karl La Favre spoke about hunter-gatherers in the Lake Titicaca Basin, Peru. Katherine Brunson focused on animal use and exploitation as it relates to social complexity in Late Neolithic China, and Krystal V. L. Pierce’s research on the Egyptian pottery assemblage from Jaffa (Israel) exhibited how the continued production of pottery abroad contributed to the sustainability of Egyptian cultural identity there.

Lastly, Joseph (Seppi) Lehner discussed innovations in technology and political economy during the Anatolian Iron Age, especially how metal technology served as a proxy for economic and political behavior, while Ben Shepard spoke about the political economic implications of shifting burial practices in the Middle Holocene, examining several sites of the Cis-Baikal area in Siberia. In the afternoon, a poster session was presented.

It was an exciting day of interesting lectures, presentations, and discussions, which serve as a testament to the depth, diversity, and intellectual curiosity of the body of graduate students at the Cotsen Institute. Furthermore, it displayed the unique collaborative and interdisciplinary nature of the interdepartmental graduate program, which includes students from anthropology, archaeology, classics, Near Eastern languages and cultures, and art history.

HADLEY JENSEN, Editorial Assistant, Backdirt

A Year of Friday Seminars

This past year, the Friday Seminars of the Cotsen Institute of Archaeology provided an opportunity for archaeology graduate students to invite guest scholars from other institutions to address select themes in archaeological research.

The 2010–2011 academic year began with different presentations concerning archaeological food studies on a global scale. Our own Thomas Wake (Director of the Zooarchaeology Lab at the Cotsen Institute) opened the series with a comparison of subsistence strategies on the Pacific and Atlantic coasts of Panamá. The dynamic relationship between modes of food consumption and sociopolitical development was a recurrent theme, particularly in the discussion by Gail Wagner (Professor of Anthropology, University of South Carolina) on plant domestication and importation in the New England colonial context. Cultural and ethnic identity in food production and consumption also emerged as a theme, as Heather Lapham (Associate Scientist, Center for Archaeological Investigations at Southern Illinois University Carbondale) demonstrated food choices among Spanish soldiers at sixteenth-century Fort San Juan in western North Carolina. Synthesizing faunal and floral evidence
is often necessary in order to identify divergent subsistence strategies. This was evident in the analysis by Amber VanDerwarker (Associate Professor of Anthropology, UC Santa Barbara) of institutional decision-making processes driving intensified maize production in Mesoamerica and in the presentation by Richard Redding's (curator of the Zooarchaeology Lab, University of Michigan) of the provisioning challenges faced by Egyptian Old Kingdom workmen in Giza. The fall quarter series exemplified the wide breadth of topics increasingly being considered in archaeological food studies.

During the winter quarter, guest speakers brought the series close to home with reports of current investigations in coastal southern California archaeology. Island ecosystems, in particular, have emerged as a prominent aspect of archaeological research in California prehistory. Matthew Des Lauriers (Professor of Anthropology, CSU Northridge) presented an overview of the maritime hunter-gatherer economy on Isla Cedros, located off the coast of Baja California. Continuing this theme, Wendy Teeter (Curator of Archaeology, UCLA Fowler Museum) lectured on preserving prehistoric heritage and potential watershed analysis on Catalina Island. Moving farther north to San Nicolas Island, René Vellanoweth (Professor of Anthropology, CSU Los Angeles) shared numerous highlights of recent fieldwork, including the exciting discovery of ritual domestic dog burials. Departing from the chosen region but still addressing the theme of coastal resources, special guest Susan deFrance (Associate Professor, University of Florida) discussed the role of human–animal interactions in the Inca settlement of southern Peru. Although fieldwork abroad dominates the ongoing research of UCLA scholars, the winter quarter emphasized the breadth and intensity of local archaeology.

The final, spring quarter sequence of Friday Seminars featured presentations of innovations in field methods, a timely series as archaeologists prepared to depart for summer fieldwork. It began with a unique hands-on experience, as graduate students constructed a hand-pump flotation device designed by Chantel White (Boston University doctoral candidate) and China Sheldon (Professor, Framingham State College). Sheldon and White's lecture on the development and application of the device was accompanied by a demonstration in the Fowler courtyard, which made a repeat appearance at the 2011 open house. Archaeology is not removed from the growing trend toward paperless and digitally streamlined data collection. Nicholas Tripcevich (Staff Research Associate at the Archaeological Research Facility, UC Berkeley) shared his system of managing mobile GIS and digital note-taking with handheld devices in the field. Finally, for those going where few have gone before, Joshua Wright (Fellow in the Introduction to Humanities program at Stanford) outlined his research team's method of using nested survey design to reach a productive compromise between spatial coverage and recovery density. The spring quarter speakers provided critical feedback to Cotsen researchers, several of whom will be using these methods in their upcoming field projects.

This year-long series of Friday afternoon lectures brought together local researchers and out-of-area visitors to engage in active theoretical and methodological discussion with the archaeological community at UCLA. Look for the exciting series of Friday Seminars we have planned for next year, including talks on environmental archaeology, ethics, and identity.

**LANA MARTIN**, Department of Anthropology, UCLA

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**The UCLA Keck Digital Cultural Mapping Program student project showcase**

The UCLA Keck Digital Cultural Mapping Program: http://www.keckdcmp.ucla.edu/ (in its third and final year) aims to incorporate digital mapping concepts in UCLA's curriculum, providing Humanities and Social Science students training in the emerging technologies
that will shape the future of scholarship. This spring, ten of the best undergraduate and graduate student projects produced in courses associated with the “Keck” program were showcased in a digital poster session at the Faculty Club. Awards were presented for the top three projects, with first prize going to Guowei Zhang, who used GIS, Google Earth and 3D modeling to investigate the impact of the Guggenheim Museum in Bilbao on the economy and culture of the city. Second place went to Patrick Tran and Andy Trang, who used the online mapping platform Hypercities to build a narrative following the lives of two Holocaust survivors. Kevin Lloyd’s project, which won third prize, used 3D modeling to recreate early phases of the Roman Circus Maximus. Also showcased were the projects of Cotsen graduate student Anke Hein (presented by Jack Davey), on her work using GIS to map graves in Sichuan, Southwest China, as well as a collaborative GIS mapping project on the necropolis of Sakkara, Egypt, as part of a class taught by Keck program coordinator Elaine Sullivan.

The showcase was a great success, highlighting how geospatial technologies are quickly becoming adopted in the study of the modern and ancient world. A number of Cotsen faculty, including Willeke Wendrich (the Keck program director), Hans Barnard, Diane Favro, and Min Li have participated in the Keck program, incorporating innovative mapping technologies and concepts to their classes.

WILLEKE WENDRICH, Department of Near Eastern Languages and Cultures and Cotsen Institute of Archaeology, UCLA

Wepwaut in Westwood: “Opening the Way” for budding Egyptologists at UCLA

T his spring, Professor Willeke Wendrich hosted her annual “Wepwaut in Westwood” event, offering UCLA undergraduate students studying Egyptology the opportunity to present their course research projects to the public. The presentations focused on the ancient necropolis of Sakkara, the burial ground of elites and kings from the earliest moments in Egyptian statehood through the early Christian period. Eight undergraduates reported on the latest research at this famous burial ground, covering topics such as the Early Dynastic form of the cemetery, the New Kingdom tomb of Horemheb, and the animal necropolis. Egyptologist and postdoctoral scholar Elaine Sullivan anchored the morning session, lecturing on how GIS and 3D modeling are being used at UCLA to investigate visibility between Sakkara and neighboring sites.

In the afternoon UCLA graduate students offered updates on their own research in Egypt and the Levant. Krystal Pierce discussed her work as part of the Jaffa Cultural Heritage Project in modern Israel. Emily Cole presented a paper on ostraca written in a mix of the Greek and Demotic languages found at the Egyptian site of Narmouthis. Anne Austin and Bethany Simpson, members of the UCLA/RUG/UoA expedition to the Fayum, demonstrated how 3D scanners are being utilized to record the Greco-Roman town of Karanis with accuracy and speed never before possible.

HADLEY JENSEN, Editorial Assistant, Backdirt
Archaeologists at the Beach

In the spring of 2011 the seminar on ceramic analysis was offered again to graduate students in the Archaeology Program, but also to a select group of undergraduate students who had shown a demonstrable interest in the subject. During this seminar, ceramic vessels are discussed and drawn, but also broken, reassembled, and even made from scratch. In the morning of April 13, all students spent an hour to form a vessel out of commercially procured clay. These were subsequently dried until leather-hard and bone-dry until the morning of May 7. That day the Ceramic Research Group organized one of their regular pit-firings on Dockweiler Beach, just west of the Los Angeles International Airport.

Just after 9 am, a fire was built out of scrap wood from building sites in one of the concrete rings placed on the beach for that purpose. This was allowed to burn until only glowing embers remained. Around 9:30, these were covered with a layer of sherds of broken flowerpots. On top of these the students placed the unfired vessels, after which everything was covered with another layer of potsherds. Thus the vessels were protected from the direct influence of the fire. On top of this, a large amount of fresh firewood was placed which quickly caught fire and burned from about 9:45 until 11:00. With the help of tongs, the vessels were then placed on the rim of the ring to cool down and be checked and admired by all. Measurements made on earlier occasions have shown that the temperature inside such a set-up can reach 850–900°C (1550–1650°F) for as long a half an hour. More important than these observations and the rather crude vessels, however, is the experience. Seeing the complete process through once ensures that it will never be forgotten—an important asset for beginning archaeologists who will be confronted with ancient potsherds for the rest of their professional lives.

HANS BARNARD, Cotsen Institute of Archaeology and Department of Near Eastern Languages and Cultures, UCLA

2011 Open House

Over the last 14 years of holding an annual open house, a tradition has been born at the Cotsen Institute of Archaeology, one that draws the young and the old, many simply curious about archaeology, some who are planning a future as professional archaeologists, and some who just follow the billboards advertising our event. Faculty from around southern California’s colleges and universities bring their undergraduate students. Charles Steinmetz organized the visit of inner-city high school students to our Institute, creating an opportunity for them to experience a university campus. They all have one thing in common—they promise to come back next year and to bring family and friends.

This year we had 14 laboratories open. We also held virtual reality demonstrations; a demonstration by our graduate students using a hand-pump flotation device to separate small pieces of bone, shell, and plants; a public lecture; a display of Cotsen Institute Publications; and guided tours of the Fowler Museum exhibits.
The laboratories that opened their doors were Anatolian, Ceramic Analysis, Channel Islands, Conservation, East Asian, Egyptian, Mediterranean, Moche Archive, Old Stone Age, Rock Art Archive, South Asian, Southwest, and Zooarchaeology.

The featured lecture by Dr. Alexei Vranich focused on a fascinating experiment to test the feasibility that reed boats were used to transport multi-ton stones across Lake Titicaca from volcanic quarries to the megalithic city of Tiwanaku, Bolivia.

If you missed the open house of 2011, look for the announcement on our web page: www.ioa.ucla.edu, at the beginning of May 2012.

HELLE GIREY, Cotsen Institute of Archaeology at UCLA

The Lake Titicaca reed boat experiment. Archaeologists test the feasibility that reed boats were used to transport multi-ton stones across Lake Titicaca from volcanic quarries to the megalithic city of Tiwanaku, Bolivia. Photo by Alexei Vranich.

Participants in CIOA Open House 2011.

Friends of Archaeology Dinner Lectures for 2011-2012

Open to members of the Cotsen Institute of Archaeology support group – Friends of Archaeology (FOA). For information regarding joining FOA, please visit: http://www.ioa.ucla.edu/support/foa

NOVEMBER 1, 2011 “How Human Societies Became Complex: A Perspective from Near Eastern Caves”

Dr. Gregory Areshian
Assistant Director of Cotsen Institute of Archaeology, Associate Researcher, and Visiting Professor, UCLA

JANUARY 31, 2012 “Death and Sacrifice at midnight Terror Cave”

Professor James Brady
California State University Los Angeles

MAY 1, 2012 “Toil and trouble: UCLA’s field work in the cauldron of post-revolution Egypt”

Professor Willeke Wendrich
Department of Near Eastern Languages and Cultures and Cotsen Institute of Archaeology, UCLA
Archaeology 2.0: New Approaches to Communication and Collaboration, by Eric Kansa, Sarah Witcher Kansa, and Ethan Watrall, represents the first hybrid print and digital publication of the Cotsen Institute of Archaeology Press and is the first title in the new Cotsen Digital Archaeology Series. This book is currently available in print and also as an open-access downloadable PDF through eScholarship, a platform that provides a suite of open-access, scholarly publishing services (visit http://escholarship.org/uc/cioa).

The book asks the questions, “How is the Web transforming the professional practice of archaeology? And as archaeologists accustomed to dealing with ‘deep time,’ how can we best understand the possibilities and limitations of the Web in meeting the specialized needs of professionals in this field?” With contributions from a range of experts in archaeology and technology, this volume is organized around four key topics that illuminate how the revolution in communications technology reverberates across the discipline: approaches to information retrieval and information access; practical and theoretical concerns inherent in design choices for archaeology’s computing infrastructure; collaboration through the development of new technologies that connect field-based researchers and specialists within an international archaeological community; and scholarly communications issues, with an emphasis on concerns over sustainability and preservation imperatives. This book not only describes practices that attempt to mitigate some of the problems associated with the Web, such as information overload and disinformation, it also presents compelling case studies of actual digital projects—many of which are rich in structured data and multimedia content or focused on generating content from the field “in real time,” and all of which demonstrate how the Web can and is being used to transform archaeological communications into forms that are more open, inclusive, and participatory. Above all, this volume aims to share these experiences to provide useful guidance for other researchers interested in applying technology to archaeology.
THE LLOYD COTSEN STUDY COLLECTION OF CHINESE BRONZE MIRRORS: VOLUME I: CATALOGUE; VOLUME II: STUDIES (box set)
Lothar von Falkenhausen (Editor, Volumes I and II) and Suzanne Cahill (Author, Volume I)
Publication Date: November 2011
Series: Monumenta Archaeologica 25
Price: $450, two-volume box set (hardcover)

The Lloyd Cotsen Study Collection of Chinese Bronze Mirrors is a co-publication of the Cotsen Occasional Press and the Cotsen Institute of Archaeology Press. Volume I, The Lloyd Cotsen Study Collection of Chinese Bronze Mirrors: Catalogue, includes an engaging foreword by Lloyd Cotsen, an overview of major Chinese dynasties and periods, and a brief history of Chinese bronze mirrors by Suzanne Cahill. This volume presents a detailed catalogue of the extensive Cotsen Collection through high-quality images and illustrations of the mirrors in their approximate chronological sequence. Volume II, a set of eleven scholarly essays, goes further to investigate these mirrors as a study collection. Guided by the conviction that this particular constellation of mirrors may lead to substantive insights that cannot easily be obtained otherwise, the leading scholars who contributed to this volume used the materials in Volume I as a point of departure for explorations of topics of their own choice. The resulting diversity of the chapters is notable—with coverage ranging from a discussion of Han mirror inscriptions as modular texts to an analysis of mirrors inlaid with mother of pearl—and the findings are as novel and stimulating as they are preliminary.

AN INVESTIGATION INTO EARLY DESERT PASTORALISM: EXCAVATIONS AT THE CAMEL SITE, NEGEV
ISBN: 978-1-931745-84-0 (paperback), 978-1-931745-83-3 (hardcover)
Publication Date: September 2011
Series: Cotsen Institute of Archaeology Monograph 69
Price: $69.95 hardcover; $39.95 paperback

This book focuses on two primary purposes, one theoretical/methodological and the other the publication of original data. It comprises a case study of excavations at an early (ca. 2800 B.C.) pastoral site in the Negev. Rosen places the site within the context of the beginnings of multiresource nomadism and provides a broad overview and analysis of a seasonal encampment. He demonstrates the feasibility of an archaeology of early mobile pastoralism and also discusses the anthropological and methodological challenges surrounding this subject. The archaeological assemblages discussed in this book constitute the first detailed examination of this early desert culture and include materials previously unreported for the region and period.
Lake Titicaca and the vast region surrounding this deep body of water contain mysteries that we are just beginning to unravel. The area surrounding the world’s highest navigable lake was home to some of the greatest civilizations in the ancient world. These civilizations were created by the ancestors of the Aymara and Quechua peoples who continue to live and work in Peru and Bolivia along the shores of this legendary body of water. Charles Stanish’s Lake Titicaca: Legend, Myth, and Science provides a state-of-the-art description and explanation of the great cultures that developed in this land, from the first migrants ten millennia ago to the people who thrive there today. Stanish uncovers the world of myth and legend that has grown up around this mysterious place, including the lost continent of Mu, the land of Paititi, El Dorado, and the many mystic ruins of Titicaca. This book also provides the results of a century of scientific research that narrate an even more insightful tale than the legends and myths combined.

The History and Archaeology of Jaffa I, edited by Martin Peilstöcker and Aaron A. Burke, lays the groundwork for the Jaffa Cultural Heritage Project (JCHP), a research initiative established in 2007 as a joint research endeavor of the Israel Antiquities Authority and the Cotsen Institute of Archaeology at UCLA. The first part of the book presents the historical, economic, and legal context for the JCHP’s development, while outlining its objectives and the unique opportunities that Jaffa offers researchers. The history of Jaffa and its region, and the major episodes of cultural change that affected the site and region, are explored through a series of articles in Part II, including an illustrated discussion of historical maps of Jaffa from the nineteenth and early twentieth centuries. Recent archaeological discoveries from Jaffa are included in Part III, while Part IV provides a first glimpse of the JCHP’s efforts to publish the Jacob Kaplan and Haya Ritter-Kaplan legacy from Jaffa. Together the twenty-five contributions to this work constitute the first major book-length publication to address the archaeology of Jaffa since excavations were initiated at the site some 56 years ago.
INFORMATION AND ITS ROLE IN HUNTER-GATHERER BANDS
Robert Whallon, William A. Lovis, and Robert K. Hitchcock (Editors)
Publication Date: February 2011
Series: Ideas, Debates, and Perspectives 5
Price: $95 hardcover, $65 paperback

Robert Whallon, William A. Lovis, and Robert K. Hitchcock's Information and Its Role in Hunter-Gatherer Bands explores the question of how information, broadly conceived, is acquired, stored, circulated, and utilized in small-scale hunter-gatherer societies, or bands. This volume brings together a group of leading scholars from multiple disciplines, including archaeology, ethnography, linguistics, and evolutionary ecology. Each of these specialties deals with the question of information in different ways and with different sets of data given different weight. The fundamental goal of the volume is to bridge disciplines and subdisciplines, open a discussion, and see if some common ground—either theoretical perspectives, general principles, or methodologies—can be developed upon which future research concerning the creation and transmission of information in hunter-gatherer societies can be built.

INCA RITUALS AND SACRED MOUNTAINS: A STUDY OF THE WORLD’S HIGHEST ARCHAEOLOGICAL SITES
Johan Reinhard and Maria Constanza Ceruti
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Publication Date: December 2010
Series: Cotsen Institute of Archaeology Monograph 67
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The Incas performed some of the most dramatic ceremonies known to us from ancient times. Groups of people walked hundreds of miles across arid and mountainous terrain to perform rituals on mountains over 20,000 feet high. The most important offerings made during these pilgrimages involved human sacrifices (capacochas). Although Spanish chroniclers wrote about these offerings and state-sponsored Inca processions, their accounts were based on second-hand sources, and the only direct evidence of the capacocha sacrifices comes to us from archaeological excavations.

In Inca Rituals and Sacred Mountains: A Study of the World’s Highest Archaeological Sites, Johan Reinhard and Maria Constanza Ceruti describe the results of research undertaken on Mount Llullaillaco (6,739 m/22,109 feet), which comprises the world’s highest archaeological site. The types of ruins and artifact assemblages recovered are described and analyzed. By comparing the archaeological evidence with the chroniclers’ accounts and findings from other mountaintop sites, common patterns are outlined; at the same time, previously little-known elements contribute to our understanding of key aspects of Inca religion. This study illustrates the importance of archaeological sites being placed within the broader context of physical and sacred features of the natural landscape.
prehistoric societies in this area of the Andes. an unparalleled opportunity to examine theoretical issues survey of the Andahuaylas region—a project that represented From 2001 to 2004, Brian Bauer conducted an archaeological and subsequent defeat by the Inca had not been investigated. and the cultural processes that led to their rapid development until recently the Chanka heartland remained unexplored. A defining moment in the history of South America, as the Inca forces and became the most powerful people in the Andes. Many scholars believe that the defeat of the Chanka represents Then continued to expand and establish the largest empire of the Americas. Despite its critical position in South American history, until recently the Chanka heartland remained unexplored and the cultural processes that led to their rapid development and subsequent defeat by the Inca had not been investigated. From 2001 to 2004, Brian Bauer conducted an archaeological survey of the Andahuaylas region—a project that represented an unparalleled opportunity to examine theoretical issues concerning the history and cultural development of late-prehistoric societies in this area of the Andes. The Chanka: Archaeological Research in Andahuaylas (Apurímac), Peru, the culmination of this project, includes an archaeological analysis of the development of the Chanka and examines their ultimate defeat by the Inca.
2012 Titles

EXPLORING METHODS OF FAUNAL ANALYSIS: INSIGHTS FROM CALIFORNIA ARCHAEOLOGY
Michael Glassow and Terry Joslin (Editors)
How does the practice of archaeology benefit from faunal analysis? Michael Glassow and Terry Joslin’s Exploring Methods of Faunal Analysis: Insights from California Archaeology addresses this question. Contributors to this volume demonstrate how faunal remains can be used to elucidate subsistence, settlement, technological systems, economic exchange, social organization, adaptation to variability in resource availability and distribution, and the impacts of historic land use. The sheer prevalence of faunal remains in California archaeological sites means that most archaeologists working in the state inevitably must give these resources their close attention—and yet methodological challenges remain. The chapters in this thoughtfully edited volume tackle these challenges, providing strategies for identifying and mitigating sampling bias and recommending quantitative techniques borrowed from a variety of disciplines. The volume also presents examples that illustrate the use of faunal data to test hypotheses derived from microeconomic theory, the applicability of bone and shell chemistry to faunal analysis, and the relevance of faunal data to addressing issues in biology.

CHOTUNA AND CHORNANCAP: EXCAVATING AN ANCIENT PERUVIAN LEGEND
Christopher Donnan
Christopher Donnan’s Chotuna and Chornancap: Excavating an Ancient Peruvian Legend, explores one of the most intriguing oral histories passed down among ancient Peruvians: the legend of Naymlap, the founder of a dynasty that ruled the Lambayeque Valley of northern Peru centuries before European contact. Naymlap is said to have built his palace at a place that many now consider to be the archaeological sites of Chotuna and Chornancap. In an effort to test the validity of the Naymlap legend, Donnan directed extensive archaeological excavations at Chotuna and Chornancap, completing plans of the monumental architecture, mapping and excavating most of the major structures, and developing a chronology for the sites. This book presents the results of these excavations and demonstrates the extent to which the archaeological evidence correlates with the sequence of events described in the Naymlap legend.

CRUCIBLE OF PUEBLOS: THE EARLY PUEBLO PERIOD IN THE NORTHERN SOUTHWEST
Richard Wilshusen, Gregson Schachner, and James R. Allison (Editors)
Archaeologists are increasingly recognizing the early Pueblo period as a major social and demographic transition in Southwest history. In Crucible of Pueblos: The Early Pueblo Period in the Northern Southwest, Richard Wilshusen, Gregson Schachner, and James Allison present the first comprehensive summary of population growth and migration, the materialization of early villages, cultural diversity, relations of social power, and the emergence of early great houses during the early Pueblo period. Six chapters address these developments in the major regions of the northern Southwest, and four synthetic chapters then examine early Pueblo material culture to explore social identity, power, and gender from a variety of perspectives. Taken as a whole, this thoughtfully edited volume compares the rise of villages during the early Pueblo period to similar processes in other parts of the Southwest and examines how the study of the early Pueblo period contributes to an anthropological understanding of Southwest history and early farming societies throughout the world.

ROCK ART AT LITTLE LAKE: AN ANCIENT CROSSROADS IN THE CALIFORNIA DESERT
Jo Anne Van Tilburg, Gordon E. Hull, and John C. Bretney (Editors)
Rock Art at Little Lake: An Ancient Crossroads in the California Desert presents the UCLA Rock Art Archive team’s examination of the petroglyphs and pictographs at Little Lake in Rose Valley, California, through field recording; the digital capture of rock art imagery; the analysis of that imagery; conclusions from this analysis; and presentation of the surrounding environment and historical context. This book represents the culmination of ten years of seasonal field surveys in the area and aims to promote a connective web of associations that will break down existing barriers between rock art research and the rest of archaeology. Section One, “Vistas,” establishes a sense of place for the reader, while the “Visionaries” section that follows delves into the heart of the research. Through
the use of reconnaissance and intensive survey techniques, museum studies, formal and stylistic analysis, salvage ethnography, and a research paradigm centered on the landscape, the Little Lake research team demonstrates how to build a framework for analysis that thoroughly establishes the intricacies of cultural and material context. The contributions in this volume carefully examine the discrete technical and symbolic aspects of Little Lake Ranch rock art: chronology, scratched pattern distribution, the desert bighorn sheep and atlatl motifs, and painted rock art. The third section of the volume, “Vernacular,” includes vivid sketches of the area’s local history and the circumstances leading to the high quality of rock art preservation. In addition, a discussion of the material culture, such as the production and use of pottery and basketry, enhances the understanding of the context in which the rock art was envisioned. Finally, an informative summary of the UCLA Rock Art Archive’s field, lab, and archival methods are provided, along with a field guide of rock art motifs chosen to give the reader a sampling of the individual elements considered within this study.

THE HISTORY OF THE PEOPLES OF THE EASTERN DESERT
Hans Barnard and Kim Duistermaat (Editors)
The last fifty years have seen extensive research of ancient ports on the Red Sea coast of Egypt, the mines and quarries in the region, and the road systems connecting these to the Nile Valley. What has been missing is a systematic study of the peoples of the Eastern Desert in whose territories these activities took place. Hans Barnard and Kim Duistermaat’s The History of the Peoples of the Eastern Desert aims to fill this gap, clearly demonstrating that despite a harsh environment and scholarly neglect, the native inhabitants of the Eastern Desert have their own culture and history. Divided into two parts—the first covering the Holocene until Alexander the Great, and the second the last two and a half millennia—this volume brings together the leading authorities on the area and its peoples to provide an overview of the history of the Eastern Desert that is unparalleled in its comprehensiveness. The extensive range of topics addressed includes, among others, specific historical periods, natural resources, nomadic survival strategies, ancient textual data, and the interaction between Christian hermits and their neighbors. Each chapter summarizes, evaluates, and discusses the historical significance of relevant archaeological and written sources, providing readers with an essential starting point for future research on the Eastern Desert.
The latest Cotsen Advanced Seminar was held on the campus of UCLA in November 2009. Entitled “The Construction of Value in the Ancient World,” the project was conceived by Gary Urton (Professor of Anthropology, Harvard University) and John Papadopoulos (Chairman, Archaeology Interdepartmental Graduate Program and Professor of Classics, UCLA). The seminar brought together 25 leading scholars working in various parts of the world (anthropologists, archaeologists, art historians, economic historians, historians, linguists, philologists, sociologists), including four MacArthur Fellows.

The collection of papers from this seminar will be published in the Cotsen Advanced Seminar Series in 2012. The starting point for the volume is the basic premise that the concept of value is a social construct and is thus defined by the cultural context in which it is created. The questions we raise are not new, and they have been asked often: How was value created, defined, and expressed in any given ancient or modern society? How can students of the past understand the value that might have been accorded to materials, objects, people, places, patterns of action, and so on, by those who produced or used the things that compose the human material record? How was value articulated (e.g., how many of these in exchange for how many of those, or why this word and not another)? What do we know about how objects were valued in the past, whether, for example, in the pre-industrial market or pre-market economies of the Mediterranean, or the “non-market” contexts of Oceania and the Pre-Columbian Andean societies? Why were certain materials (among so many others, gold, silver, feathers, shells, cattle, grain) valued by people in many different parts of the world over other materials? What qualities of physical substances—for instance, translucence, scarcity, durability, age—were at the heart of how cultures determined, negotiated, and on occasion sanctioned value? How were different quantities or numbers of objects, or their negotiated position(s) within ordinal sequences, related to judgments of value?

The volume is loosely based on four overarching but closely interrelated themes, which served as foci for discussion: place value, body value, object value, and what we have termed number value. These are not conceived as monolithic, distinct categories, nor are they static; rather, they are interrelated and often collapse into one another. Running through the papers are issues of memory, nostalgia, identity, biography, ideology, style, symbolism, and exchange. The concept of value lies at the intersection of individual and collective tastes, desires, sentiments, and attitudes that inform the ways people select, or give priority to, one thing over another. Scholars from Aristotle to Marx and beyond have been fascinated by the question of what constitutes value. With this soon-to-be published volume, we hope to make a small contribution to this inquiry—at the beginning of the twenty-first century!

1. Archaeology Interdepartmental Graduate Program, Cotsen Institute of Archaeology, and Department of Classics, UCLA
2. Department of Anthropology, Harvard University.
In Memoriam

Virginia Fields
(1952–2011)

Virginia Fields, noted scholar of early Mesoamerican art and archaeology, passed away unexpectedly from complications of diabetes. In 1989 she joined Los Angeles County Museum of Art and was the first curator of Pre-Columbian art. Twenty-two years later, she was senior curator of art of the ancient Americas at LACMA, with many noted exhibitions to her credit.

Among her exhibitions of art and culture of ancient Mesoamerica were “Mexico: Splendors of Thirty Centuries,” “Olmec: Colossal Masterworks of Ancient Mexico,” “Lords of Creation: The Origins of Sacred Maya Kinship,” “The Road to Aztlan: Art from a Mythic Homeland,” and opening in April 2012, “Children of the Plumed Serpent: The Legacy of Quetzalcoatl in Ancient Mexico.”

Virginia was born Virginia Mary Monk in 1952 in Manchester, Connecticut, to a large Irish Catholic family. She married the photographer and filmmaker David Miller.

Virginia received her M.A. from San Francisco State. While there, she attended a Maya hieroglyphic writing workshop at University of Texas at Austin and met with well-known Maya scholar and epigrapher Linda Schele. She received her Ph.D. from University of Texas at Austin in 1989 and was influenced by Linda Schele and the growing understanding of hieroglyphic writing and art.

Virginia’s interest in museum studies grew from an interest in culture and systems of visual communications. She was instrumental in the future planning of a digital resource center for the study of ancient America. The work of setting up an exhibition is rarely understood by the public, but Virginia was successfully formulating ideas, obtaining funding and permissions to borrow artworks from other institutions and governments, transporting the objects, and finally setting up the exhibition. She was described by Joanne Pillsbury, director of Pre-Columbian studies at Dumbarton Oaks, a research institute of Harvard University in Washington, D.C., as a soft-spoken person with “herculean energy and powers of persuasion.”

Under Virginia’s tenure, LACMA’s holdings of ancient American art grew from about 700 pieces to more than 3,000 objects. Among these is a rare collection of Colombian ceramics, and other valuable acquisitions.

Los Angeles has lost a strong voice that powerfully articulated the importance of the ancient American cultures to the people of the United States. The Cotsen Institute of Archaeology has lost an academic affiliate and a true friend of its support group, Friends of Archaeology. Virginia was always willing to arrange for private tours of her exhibitions to the Friends, acting as the personal tour guide and sharing her passion for everything Mesoamerican.

HELLE GIREY, Cotsen Institute of Archaeology at UCLA
2010–2011 RECIPIENTS OF GRANTS AND FELLOWSHIPS FROM THE INSTITUTE’S FOUNDATIONS

Faculty and Researchers

FUNDING FOR FIELDWORK

AARON A. BURKE, Associate Professor of Archaeology of the Levant and Israel, received a grant to continue the excavations of the Jaffa Cultural Heritage Project (Israel) that explores the archaeological remains of the Egyptian imperial domination of the New Kingdom in Canaan (i.e. Late Bronze Age ca 1530-1200 BCE) in collaboration with the Israel Antiquities Authority (IAA).

R. E. TAYLOR, Visiting Professor and HANS BARNARD, Assistant Researcher and Adjunct Assistant Professor, received a grant for an important project concerning the date of first human occupation of the Americas. The research will either refute and reinterpret the radiocarbon dates obtained for the site of Monte Verde, Chile, or may confirm those.

MONICA L. SMITH, Professor of Anthropology, was awarded a seed grant for the initiation of a new field project in eastern India.

MIN LI, Assistant Professor of East Asian Archaeology, received funding from the Institute to complete the last season of a reconnaissance of one of the most important archaeological locations of Ancient China, the city Lu in the Wen-Si River basin.

WILLEKE WENDRICH, Professor of Egyptian Archaeology, received a grant as partial support for the project “The Neolithic Foundations of Predynastic Lower Egypt: Climate Change and Geological Opportunism in the Fayum.”

THOMAS WAKE, Senior Museum Scientist, received a grant allowing him to participate the 11th quadrennial meeting of the International Council for Zoarchaeology, in Paris. He organized and chaired a symposium entitled “Advances in Neotropical Zooarchaeology.”

ALEXEI VRANICH, Visiting Lecturer in Andean Archaeology, received funding to continue research in Cuzco, Peru, focused on mapping and digitally documenting archaeological remains in the modern environment of a World Heritage City.

FUNDING FOR RESEARCH LABORATORIES

HANS BARNARD, Assistant Adjunct Professor and Assistant Researcher received funding to continue his biochemical laboratory studies of residues remaining on surfaces of archaeological artifacts.

THOMAS WAKE, Senior Museum Scientist, received funds for the research “Proyecto Arqueologico Sitio Drago in Boca del Drago and Panama City, Panama.”

COTSEN INTERDISCIPLINARY RESEARCH FUNDING

BRIAN DAMIATA, Visiting Lecturer in Anthropology and Cotsen Fellow, received funding to support the Field Geophysics lab course in 2011 winter quarter.

ALEXEI VRANICH, Visiting Lecturer, received funding to carry out interdisciplinary research in Peru with participation of undergraduate and graduate students.
Graduate Students

RECIPIENTS OF THE 2011 COTSEN GRADUATE FELLOWSHIPS

Evan Anders Carlson
Claire Aliki Collins
Chelsey Quinne Fleming
Sonali Gupta-Agarwal
Christine Leigh Johnston
Kanika Kalra
Karl Jeffrey LaFavre
Susanna Lam
Joseph William Lehner (Seppi)
Benjamin Nigra
Kristine Olshansky
Hillary Pietricola
Catherine Elizabeth Pratt

ADDITIONAL GRADUATE STUDENT FUNDING

Bethany Simpson, Archaeology, Travel to Egypt to work on the UCLA/RUG Fayum Project & Research at the University of Michigan
Sonali Gupta-Agarwal, Archaeology, Travel to Egypt to work on the Berenike Field Project
Lana Martin, Anthropology, Travel to Panama to work on the Proyecto Arqueologico Sitio Drago Project
Kuei-Chin Lin, Archaeology, Presentation at the SAA Annual Meeting 2011
Anke Hein, Archaeology, Presentation at the SAA Annual Meeting 2011
Angela Susak, NELC Ph.D., Research at University of Michigan Collections

Research Programs at other Institutions

Co-Funded by the Cotsen Institute of Archaeology

School for Advanced Research (Santa Fe, New Mexico), Summer Scholar Program
Department of Anthropology, University of California at Los Angeles, “Behavior, Evolution, and Culture” Program.

Undergraduate Students

Cotsen Undergraduate Research Fellowships (CURF) were awarded to students representing traditionally underrepresented groups in the archaeological profession, allowing those students to participate in archaeological fieldwork.

RECIPIENTS OF THE 2011 COTSEN UNDERGRADUATE RESEARCH FELLOWSHIPS:

Cole A. Walters, University of Maryland, Baltimore
Ha Beom (Harrison) Kim, University of Oregon

RECIPIENTS OF ADDITIONAL SCHOLARSHIPS FOR UCLA STUDENTS:

Sandy Enriquez and Frania Mendoza, both from UCLA Department of Anthropology, received scholarships that allowed them to participate in fieldwork in Peru.

Undergraduate Students
SPECIAL THANKS
Donors and Funders of Projects
July 2010-June 2011

The Cotsen Institute of Archaeology at UCLA expresses its deepest gratitude to Lloyd and Margit Cotsen for their commitment to the creation of knowledge and continuous support of the faculty, researchers, students, and other affiliates of the Institute.

Our special thanks go also to the following supporters:

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Cover Photo: Mouths of the cave galleries, Areni Cave Complex, Armenia
Photo: Gregory E. Areshian
THE WORLD’S OLDEST: DISCOVERIES IN ARMENIA