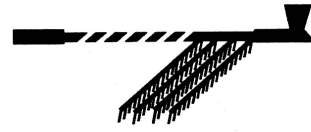


CALUMET



Newsletter of the Indian Peaks Chapter of the Colorado Archaeological Society
November, 2009

CALENDAR OF EVENTS

Presentation (lecture) meetings are held in the University of Colorado Museum, Dinosaur Room on the Second Thursday of most Months, at 7:00 PM. **The public is always welcome.**

Web Site: WWW.INDIANPEAKSARCHAEOLOGY.ORG

- November 4** PAAC - Perishable Materials (session 4 of 7)
November 5 IPCAS Executive Board Meeting, 7:30
November 9 AIA Meeting, CU Museum, Bob Hohlfelder (CU),
“Before The Fieldwork Begins: Archaeological Politics in the Eastern Mediterranean”
November 11 PAAC - Perishable Materials (session 5 of 7)
November 12 IPCAS Presentation Meeting, Neffra Mathews And Tom Noble, “Photogrammetry”. See Page 2
November 18 PAAC - Perishable Materials (session 6 of 7)
- December 1** Lowry Lab, see page 5
December 2 PAAC – Perishable Materials (last session)
December 3 IPCAS Executive Board Meeting, 7:30
December 3 AIA Meeting, CU Museum, Donald Preziosi (Oxford),
“Rethinking Minoan Palaces”
December 10 IPCAS Christmas Party, Details to be determined
December 15 Lowry Lab, see page 5
December 16 Lowry Lab, see page 5
December 18 Lowry Lab, see page 5
December 19 Lowry Lab, see page 5
December 21 Lowry Lab, see page 5
December 22 Lowry Lab, see page 5
- January 6-9** 2010 AIA/APA Joint Annual Meeting, Anaheim Marriott Hotel, Orange County, CA
January 7 IPCAS Executive Board Meeting, 7:30
January 14 IPCAS Presentation Meeting, Kevin Black, Topic: Lithic Sourcing
- February 4** IPCAS Executive Board Meeting, 7:30
February 11 IPCAS Presentation Meeting, Bob Rushforth, Topic: Aviation Archaeology
February 22 CU Lecture Series, CU Museum, Nejib ben Lazreg, “The Mosaic of the Wrestlers from Thapsus”
- March 4** IPCAS Executive Board Meeting, 7:30
March 10 CU Lecture Series, CU Museum, 7:00, Beth Dusinberre, “The Achaemenid Empire”
March 11 IPCAS Presentation Meeting, TBA
- April 1** IPCAS Executive Board Meeting, 7:30
April 8 IPCAS Presentation Meeting, Dr. Arthur Joyce, Topic: Rio Viejo Site, Oaxaca, Mexico
- May 6** IPCAS Executive Board Meeting, 7:30
May 13 IPCAS Presentation Meeting, TBA

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November Presentation

Photogrammetry is the art and science of obtaining precise mathematical measurements and three-dimensional (3D) data from two or more photographs. The Bureau of Land Management (BLM) has benefited from its in-house photogrammetric capabilities, support, and expertise for more than 20 years. This support includes creating unique and value-added digital datasets and serving as subject matter experts and contracting officer's representatives to obtain aerial photography and other types of 3D data. Traditionally, most people think of photogrammetry in the context of aerial photography. Photogrammetric techniques can be applied to virtually any source of imagery, whether it comes from 35-mm digital cameras or an earth-orbiting satellite. As long as the images are captured with stereoscopic overlap, one can derive accurate 3D data at a very wide range of scales.

The rapid evolution of digital cameras and increasing capabilities of computers and analytical software has dramatically expanded the variety of situations to which photogrammetry may be applied, while simultaneously decreasing the costs of acquisition, processing, and analysis. A variety of resource specialists (such as hydrologists, soil scientists, archaeologists, paleontologists, biologists, range conservationists, and engineers) can greatly benefit from 3D products derived from modern photogrammetric techniques. This is especially true in the field of ground-based or close-range photogrammetry. This document provides a general overview of photogrammetry, with separate sections focusing on traditional aerial photogrammetry and close-range photogrammetry. The appendices contain technical information on the equipment and suggested methods for capturing stereoscopic imagery. Their purpose is to assist field resource specialists in the successful completion of the imagery collection portion of a basic, close-range photogrammetry project.



Cheryl Damon Photo

Tom Noble prepares a site for the photogrammetric measurements and photographs.

Tom and Neffra Matthews participated in a Passport In Time (PIT) Project to record a large number of rock art panels.



Cheryl Damon Photo

Getting the photographs requires some ingenuity on occasions.



Tom Cree Photo

Cheryl is relaxing with a glass of wine and a footbath after a hard day in the field.

Cheryl said, "I'm so happy, if I were a dog, I'd wag my tail!"

Rome Was Built In A Day, With Hundreds Of Thousands Of Digital Photos

An Example of Photogrammetry

ScienceDaily, September 15, 2009

The ancient city of Rome was not built in a day. It took nearly a decade to build the Coliseum, and almost a century to construct St. Peter's Basilica. But now the city, including these landmarks, can be digitized in just a matter of hours. A new computer algorithm developed at the University of Washington uses hundreds of thousands of tourist photos to automatically reconstruct an entire city in about a day. The tool is the most recent in a series developed at the UW to harness the increasingly large digital photo collections available on photo-sharing Web sites. The digital Rome was built from 150,000 tourist photos tagged with the word "Rome" or "Roma" that were downloaded from the popular photo-sharing Web site, Flickr. Computers analyzed each image and in 21 hours combined them to create a 3-D digital model. With this model a viewer can fly around Rome's landmarks, from the Trevi Fountain to the Pantheon to the inside of the Sistine Chapel.

"How to match these massive collections of images to each other was a challenge," said Sameer Agarwal, a UW acting assistant professor of computer science and engineering and lead author of a paper being presented in October at the International Conference on Computer Vision in Kyoto, Japan. Until now, he said, "even if we had all the hardware we could get our hands on and then some, a reconstruction using this many photos would take forever."

Earlier versions of the UW photo-stitching technology are known as Photo Tourism. That technology was licensed in 2006 to Microsoft, which now offers it as a free tool called Photosynth. "With Photosynth and Photo Tourism, we basically reconstruct individual landmarks. Here we're trying to reconstruct entire cities," said co-author Noah Snavely, who developed Photo Tourism as his UW doctoral work and is now an assistant professor at Cornell University. Other co-authors of the new paper are Rick Szeliski of Microsoft Research, UW computer science professor Steve Seitz and UW graduate student Ian Simon.

In addition to Rome, the team recreated the Croatian coastal city of Dubrovnik, processing 60,000 images in less than 23 hours using a cluster of 350 computers, and Venice, Italy, processing 250,000 images in 65 hours using a cluster of 500 computers. Many historians see Venice as a candidate for digital preservation before water does more damage to the city, the researchers said.

Transitioning from landmarks to cities -- going from hundreds of photos to hundreds of thousands of photos -- is not trivial. Previous versions of the Photo Tourism software matched each photo to every other photo in the set. But as the number of photos increases the number of matches explodes, increasing with the square of the number of photos. A set of 250,000 images would take at least a year for 500 computers to process, Agarwal said. A million photos would take more than a decade. The newly developed code works more than a hundred times faster than the previous version. It first establishes likely matches and then concentrates on those parts. The code also uses parallel processing techniques, allowing it to run simultaneously on many computers, or even on remote servers connected through the Internet. The new, faster code makes it possible to tackle more ambitious projects.

"If a city reconstruction took several months, it would be just about building Rome," Seitz said. "But on a timeline of one day you can methodically start going through all the cities and start building models of them."

This technique could create online maps that offer viewers a virtual-reality experience. The software could build cities for video games automatically, instead of doing so by hand. It also might be used in architecture for digital preservation of cities, or integrated with online maps, Seitz said. In the near term, the "Rome in a Day" code could be used with Photo Tourism, Photosynth or other software designed to view the model output.

The research was supported by the National Science Foundation, the Office of Naval Research and its Spawar lab, Microsoft Research, and Google.

PAAC Lab Training at the OAHP's Lowry Facility

The dates for the resumption of PAAC lab training at our Lowry facility have been set. This winter, we will only be having lab days in December, as the first half of 2010 is reserved for the preparations and execution of OAHP's move to a new building. The seven dates in December 2009 are:

Tuesday, December 1
Tuesday, December 15
Wednesday, December 16
Friday, December 18
Saturday, December 19
Monday, December 21 and
Tuesday, December 22

Information about the lab can be found on our web site at:

<http://coloradohistory-oahp.org/programareas/paac/certreq/labcreditb.htm>, as follows:

Denver Lab Project

The Office of Archaeology and Historic Preservation (OAHP) has archaeological collections that have yet to be completely processed for permanent curation. PAAC volunteers may receive credit toward certification at either the Laboratory Trainee or Laboratory Technician level by helping the State Training Coordinator in the cataloguing and analysis of these materials.

The lab work is held at the Colorado Historical Society's Museum Support Center in east Denver (MSCD), 8:30 am-4:30 pm. Prospective volunteers should contact the State Training Coordinator to participate. All supervised hours spent with specific materials in the collections apply toward the 40 hours of lab time required for certification. While the collection includes a variety of prehistoric and historical materials, a large majority is lithic (flaked stone and ground stone artifacts).

Prerequisite Courses:

No prior experience is required in most instances. However, lab space and equipment for volunteers is limited, so if too many PAAC participants wish to volunteer on a scheduled lab day, preference will be given to those volunteers who have already earned the Lab Trainee certificate and are working toward the Lab Technician certificate, and others who have completed one or more of the following courses:

[Introduction to Archaeology, CAS & PAAC](#)

[Introduction to Laboratory Techniques](#)

[Prehistoric Lithics Description and Analysis](#)

Requirements:

Prospective volunteers must complete the [PAAC Candidate Application Form](#) (PDF) if not already on file with me, and should be prepared to participate on a minimum of two days. Volunteers interested in participating in the lab project should contact me **by November 17**. Later expressions of interest may be accommodated on a space-available basis. A packet of information with additional details, including a location map, will be sent to all participants. Thanks!

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The Fall of the Maya: "They Did it to Themselves"

October 6, 2009: For 1200 years, the Maya dominated Central America. At their peak around 900 A.D., Maya cities teemed with more than 2,000 people per square mile -- comparable to modern Los Angeles County. Even in rural areas the Maya numbered 200 to 400 people per square mile. But suddenly, all was quiet. And the profound silence testified to one of the greatest demographic disasters in human prehistory -- the demise of the once vibrant Maya society. What happened? Some NASA-funded researchers think they have a pretty good idea. "They did it to themselves," says veteran archeologist Tom Sever.

"The Maya are often depicted as people who lived in complete harmony with their environment,' says PhD student Robert Griffin. "But like many other cultures before and after them, they ended up deforesting and destroying their landscape in efforts to eke out a living in hard times." A major drought occurred about the time the Maya began to disappear. And at the time of their collapse, the Maya had cut down most of the trees across large swaths of the land to clear fields for growing corn to feed their burgeoning population. They also cut trees for firewood and for making building materials.

"They had to burn 20 trees to heat the limestone for making just 1 square meter of the lime plaster they used to build their tremendous temples, reservoirs, and monuments," explains Sever. He and his team used computer simulations to reconstruct how the deforestation could have played a role in worsening the drought. They isolated the effects of deforestation using a pair of proven computer climate models: the PSU/NCAR mesoscale atmospheric circulation model, known as MM5, and the Community Climate System Model, or CCSM. "We modeled the worst and best case scenarios: 100 percent deforestation in the Maya area and no deforestation," says Sever. "The results were eye opening. Loss of all the trees caused a 3-5 degree rise in temperature and a 20-30 percent decrease in rainfall."

The results are telling, but more research is needed to completely explain the mechanisms of Mayan decline. Archeological records reveal that while some Maya city-states did fall during drought periods, some survived and even thrived. "We believe that drought was realized differently in different areas," explains Griffin. "We propose that increases in temperature and decreases in rainfall brought on by localized deforestation caused serious enough problems to push some but not all city-states over the edge." The Maya deforested through the use of slash-and-burn agriculture -- a method still used in their old stomping grounds today, so the researchers understand how it works.

"We know that for every 1 to 3 years you farm a piece of land, you need to let it lay fallow for 15 years to recover. In that time, trees and vegetation can grow back there while you slash and burn another area to plant in." But what if you don't let the land lay fallow long enough to replenish itself? And what if you clear more and more fields to meet growing demands for food? "We believe that's what happened," says Griffin. "The Maya stripped large areas of their landscape bare by over-farming."

Not only did drought make it difficult to grow enough food, it also would have been harder for the Maya to store enough water to survive the dry season. "The cities tried to keep an 18-month supply of water in their reservoirs," says Sever. "For example, in Tikal there was a system of reservoirs that held millions of gallons of water. Without sufficient rain, the reservoirs ran dry." Thirst and famine don't do much for keeping a populace happy. The rest, as the saying goes, is history. "In some of the Maya city-states, mass graves have been found containing groups of skeletons with jade inlays in their teeth -- something they reserved for Maya elites -- perhaps in this case murdered aristocracy," he speculates. No single factor brings a civilization to its knees, but the deforestation that helped bring on drought could easily have exacerbated other problems such as civil unrest, war, starvation and disease.

Many of these insights are a result of space-based imaging, notes Sever. "By interpreting infrared satellite data, we've located hundreds of old and abandoned cities not previously known to exist. The Maya used lime plaster as foundations to build their great cities filled with ornate temples, observatories, and pyramids. Over hundreds of years, the lime seeped into the soil. As a result, the vegetation around the ruins looks distinctive in infrared to this day." "Space technology is revolutionizing archeology," he concludes. "We're using it to learn about the plight of ancients in order to avoid a similar fate today."

What The Romans Learned From Greek Mathematics

ScienceDaily, March 4, 2009

Greek mathematics is considered one of the great intellectual achievements of antiquity. It has been decisive to the academic and cultural development of Western civilization. The three Roman authors Varro, Cicero and Vitruvius were all, in their own way, influenced by Greek knowledge and transferred it to Roman literature. In his dissertation, Erik Bohlin, at the University of Gothenburg, Sweden, studied the traces of Greek influence on these authors with regard to the mathematical branch of geometry. Most people have heard of the great Greeks Euclid and Archimedes. And who is not familiar with Pythagoras' theorem? When Rome usurped political power around the Mediterranean, the Romans came into close contact with Greek culture, its literature and science.

According to some sources, the Roman author Varro is supposed to have written a book on the subject of geometry. This book has not been preserved however. In Erik Bohlin's view, after critical examination of the collective historic evidence, very little can be established with reasonable probability about its contents. Earlier research has attempted to claim, for example, that Varro's book was used by later Roman authors as a source of geometric teaching matter. This assertion does not stand up to critical examination, however, and must be seen as a more or less unfounded hypothesis according to Bohlin.

Cicero's rhetorical and philosophical writings contain many passages that deal with or touch on the subject of geometry. Geometry and geometric knowledge are fundamental in Vitruvius' *De architectura* (On architecture). There are many passages in which geometry is applied practically or which assume that the reader is familiar with it. The dissertation comments on and interprets a selection of significant passages from both these authors.

For Vitruvius, the practical use of geometry does of course come first: geometric designs are required in architecture, not least, to achieve exact drawings. In general, the scientific view of the Romans was strongly influenced by limiting utilitarianism: only knowledge with immediate practical use was worth cultivating. According to the author of the dissertation, this picture ought to be nuanced, however, especially with regard to the authors Cicero and Vitruvius who essentially had an open and appreciative attitude to the Greek advances in mathematics and studies of geometry – even if practical use came first. Bohlin finds a clearly expressed ideological dimension to the significance of geometry in both Cicero and Vitruvius. Geometry is regarded as an integrated part of civilization and refined human culture. As such, an inherent cultural value, which is thereby also universal, is attached to geometry.

For Cicero and, in particular, for Vitruvius, this ideological dimension was not independent of practical use, but both aspects were seen as linked. "With this perspective, the actual differences between that which is Roman and that which is Greek can be toned down, and in this we find a motivation for Cicero's and Vitruvius's more open attitude to geometry and Greek knowledge in general," says Bohlin.

Buried Coins May Hold Key To Solving Mystery Of Ancient Roman Population

ScienceDaily, Oct. 6, 2009

Using a mathematical model to predict population trends based on ancient coin hoards, a UConn biologist and a Stanford University historian have concluded that the population of ancient Rome was smaller than sometimes suggested. Although the first century BC in Italy has been extensively studied, and much is known about the great figures of the era, including Cicero, Caesar, Virgil, and Horace, some basic facts – such as the approximate population size of the late Roman Republic – remain the subject of intense debate.

Depending on who historians believe was counted in the early Imperial censuses (adult males or the entire citizenry including women and children), the Italian population either declined or more than doubled during the first century BC. The ultimate answer is important. If the high count is correct, much of Roman history as it currently stands would have to be re-written and it would have enormous implications for the popular view of the economic scope and social structure of ancient Rome.

In an article published online on Oct. 5 in the *Proceedings of the National Academy of Sciences*, University of Connecticut theoretical biologist Peter Turchin and Stanford University ancient historian Walter Scheidel attempt to answer the population question by focusing on the region's prevalence of coin hoards, the bundles of treasure that people buried to protect their savings during times of great violence and political strife. According to Turchin and Scheidel, the temporal distribution of unrecovered coin hoards is an excellent proxy for the intensity of internal warfare and unrest, and therefore a key indicator of population demographics. "Hoards are an excellent indicator of internal turmoil," says Turchin. "This is a general phenomenon, not just in Rome. So little catastrophes happening to small people, in accumulation, can give us a very good idea of what happened at the macro-level to the whole society."

Applying a blend of quantitative and empirical testing normally found in the natural sciences rather than relying on traditional historiographical methods of reading and interpreting ancient sources, Turchin and Scheidel developed a simple mathematical model that used coin hoards to project population dynamics before and after 100 BC. Their conclusion? The model predicts declining population after 100 BC and suggests the vigorous population growth scenario of the "high count" is highly implausible. "This may seem like an arcane dispute, but it isn't really, because the difference is so large – 200 percent," says Scheidel, a professor of humanities and expert on Roman history. "This model is much more consistent with the low count. I'm not sure that by itself it has absolutely proven it, but it certainly provides additional evidence for the low-count hypothesis."

Turchin's and Scheidel's model was developed using census data of the period before 100 BC, when Roman population history is relatively uncontroversial. The model's trajectory successfully captured major demographic trends during that period, including the short-lived population increase before the Second Punic War, demographic contraction during the war, and sustained population growth in the second century BC. They then tested the model using coin hoard data after 100 BC, and found that the trajectory mirrored the numbers postulated by adherents of the low-count theory. "Judging by the number of hoards found during the first century BC, this period was as calamitous as the war with Hannibal," Turchin says. "Actually it was even worse, because there was not just one, but two large clumps of hoards. It is very difficult to imagine how a population could grow during a period of such violence, and the model provides a precise quantitative statement of this."

Turchin and Scheidel are both strong advocates for greater collaboration between scholars of the humanities and scientists. "The results in this article indicate that a formal approach combining modeling with data analysis can compensate for the scarcity of reliable statistics from pre-modern societies," says Turchin, a professor of ecology and evolutionary biology in the College of Liberal Arts / Sciences. He has coined a term for such collaborations – "Cliodynamics" – and has devoted a website (<http://cliodynamics.info/>) to the new science. "I'm very much in favor of such collaborations," Scheidel says. "Most humanists don't do that, but they should be doing it. I don't expect humanists to be scientists, they can't be. But that doesn't mean scientists can't be more involved."

Experts Find Rare Crusader-Era Murals in Syria

By Albert Aji and Bassem Mroue, The Associated Press

DAMASCUS, Syria Archaeologists have discovered two Crusader-era murals depicting heaven and hell in a medieval church near Syria's coast - a rare find that could reveal new information about the Christian knights who battled Muslims for control of the Holy Land hundreds of years ago. Experts are now renovating the 12th century paintings, which were discovered last year by a joint Syrian-Hungarian team excavating an old Crusader fortress on a hilltop near the Mediterranean Sea in the western province of Tartous.

The discovery was announced Saturday by Bassem Jamous, Syria's director general of antiquities and museums, who told the state-run Al-Thawra newspaper that the paintings could provide information about the traditions and beliefs of the Crusaders. The murals, which measure about 8 feet (2.5 meters) high and 11.5 feet (3.5 meters) wide, were hanging on either side of the altar of a 12th century chapel inside the al-Marqab Citadel and had accumulated thick layers of dust and dirt, archaeologists said.

The panel depicting hell shows people being tortured inside a wheel covered with knives and others being hanged and burned, said Marwan Hassan, head of the Department of Antiquities in Tartous. The one portraying heaven

includes saints surrounded by light colors. Hassan said the Crusader murals are important because they are the first ones found in the Middle East depicting heaven and hell. Authorities have restricted access to the paintings while archaeologists finish work. "Crusaders did not stay in one place for a long time, and so it is very rare to find such paintings left behind by them," Michel Makdisi, head of excavations at Syria's Directorate General of Antiquities, told The Associated Press. Pope Urban II ordered the First Crusade in 1095 to establish Christian control of the Holy Land.

Mini-Coliseum unearthed near Rome

By Ariel David, The Associated Press

ROME - A team of British archaeologists working in ancient Rome's seaport has unearthed the remains of a "mini-Coliseum" - a smaller version of the monumental arena built in the center of the imperial capital. The foundations of the tiny amphitheater, dated to the early third century, were discovered outside Ostia, a once bustling port town about 15 miles southwest of Rome through which much of the riches and goods destined for the city flowed. The find underscores how ancient arenas came in different sizes and were used for a variety of purposes, not just the public gladiatorial bouts and gory animal shows for which the Coliseum is famous, lead archaeologist Simon Keay said Thursday.

"There are a lot of amphitheaters in the Roman world, and people assume they were all used for animal and gladiatorial combat," Keay said. "But they could be used for other things," such as a private theater or for administrative purposes. The discovery was particularly surprising because this was the only amphitheater in Ostia and it was rare to find one so close to a harbor.

The "mini-Coliseum" was located inside a palace built 100 years earlier by the Emperor Trajan. The administrative complex housed the "procurator," the official in charge of the harbor, but also may have hosted emperors as they left or returned from sea voyages, Keay said. Experts are still puzzling over the purpose of the amphitheater, said Keay, a professor of archaeology at the University of Southampton and at the British School at Rome, which worked jointly on the dig. "It's a very enigmatic building. It's not meant to be seen from miles around; it's very discreet," he said in a telephone interview. "We are not entirely sure of what went on in the amphitheater."

Unlike the Coliseum, which was used for public spectacles, the Ostia venue likely had a private use. The procurator may have used it for shows to entertain his guests or as a place to address his staff, a team of British archaeologists working a smaller version of the monumental are Keay said. It may have also served as a training ground for the local "vigiles" - ancient Rome's firefighters, he said. The arena, measuring 138 feet by 125 feet, was uncovered in August at the end of a three-year digging campaign in the area of the "portus," the sea harbor built in imperial times near Ostia's older fluvial port on the Tiber.

Further study is needed to determine the arena's height and capacity, but Keay speculated the structure could hold up to 2,000 people. By comparison, the Coliseum, built in the first century, could seat about 50,000 spectators.

Aside from the foundations, not much is left of Ostia's amphitheater because it was demolished during the Byzantine period to build fortifications. Experts have determined the structure was made of bricks, mortar and wood. It was partially ringed by columns, and archaeologists have uncovered remains of rich marble decorations and the head of a statue possibly depicting Ulysses - the wandering Greek hero wellliked by sailors.

Keay said he plans to continue the dig if money can be raised and Ostia's archaeological office renews its collaboration with the team.

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CODE OF ETHICS

As a member of the Colorado Archaeological Society, I pledge:
 To uphold state and federal antiquities laws. To support policies and educational programs designed to protect our cultural heritage and our state's antiquities. To encourage protection and discourage exploitation of archaeological resources. To encourage the study and recording of Colorado's archaeology and cultural history. To take an active part by participating in field and laboratory work for the purpose of developing new and significant information about the past. To respect the property rights of landowners. To assist whenever possible in locating, mapping and recording archaeological sites within Colorado, using State Site Survey forms. To respect the dignity of peoples whose cultural histories and spiritual practices are the subject of any investigation. To support only scientifically conducted activities and never participate in conduct involving dishonesty, deceit or misrepresentation about archaeological matters. To report vandalism. To remember that cultural resources are non-renewable and do not belong to you or me, but are ours to respect, to study and to enjoy.

Signature: _____ Signature: _____

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 of the Colorado Archaeological Society
 P.O. Box 18301
 Boulder, CO 80308-1301