

MAMMOTH TRUMPET



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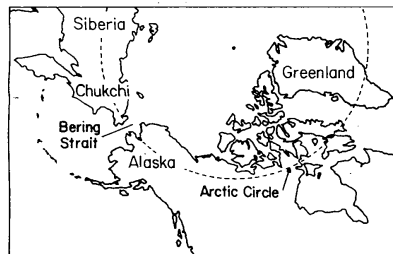
Center for the Study of Early Man Orono, Maine 04469

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RUSSIAN-AMERICAN TEAM LINKS ANCIENT POPULATION GENETICS

INTERVIEW WITH MICHAEL CRAWFORD

Some thousands of years ago, the distance between the Old World and the New was crossed by a migration from present-day Siberia to Alaska over a land bridge across the Bering Strait. For the last ten years, a Russian and an American scientist have been bridging the gap between East and West in their own manner. Michael Crawford, physical anthropologist from the University of Kansas, and Rem Israelevich Sukernik, an M.D. and human geneticist at the Academy of Sciences in Novosibirsk, Siberia, head of the



Laboratory of Human Adaptation, have been collaborating on studies measuring genetic similarities and differences between the contemporary native populations of Siberia and the Americas.

What can genetic studies of modern populations tell us about that original migration? In a recent interview Michael Crawford explained how, for one thing, the two scientists' discovery of numerous genetic similarities between Siberian and North American peoples completely corroborates the paleontological evidence of an original migration by a people from whom both modern groups are descended. That much, however, was not terribly surprising. More provocative was the genetic *difference* of the Central and South American Indians from the North American and Siberian indigenous peoples, because what that suggests is not just one but two waves of migration—the two, moreover, occurring necessarily far enough apart in time for considerable genetic differences to have developed.

This tentative hypothesis of two waves is contrary to some traditional archaeological interpretations of

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NEW DATES ON YUHA BURIAL

Since its discovery in 1971, the Yuha Burial has generated its fair share of controversy. Recovered by Morlin Childers of the Imperial Valley Museum, the remains come from the Yuha Desert, 30 miles south of El Centro, California. The bones were found beneath a cairn of boulders in a stratum of coarse-grained calcareous alluvium. They were partially covered with caliche, a limestone-like crust (pronounced ka leé chee).

Two samples were radiocarbon dated soon after discovery. A sample of caliche that had been scraped from the bones was dated to $21,500 \pm 1000$ years B.P. Radiocarbon and uranium series analysis of samples of caliche coating a cairn boulder produced dates of $22,125 \pm 400$ and $19,000 \pm 3,000$ years B.P. respectively. Amino acid racemization yielded a date of 23,000 $\pm 2,600$ on the skeleton itself.

In a recent article in *Nature* (vol. 308, pp. 446-7), new dates from the University of Arizona's tandem particle accelerator place the skeleton younger than 4,000 years. The sample, dated by Tom Stafford and colleagues at the Department of Geosciences, utilized fragments of bone of the hand, foot, rib, and un-

classified bone. All in all only 37.8 grams were used. A small amount was saved for future analysis.

Testing by tandem accelerator mass spectrometry was necessary because only a small amount of the skeleton remains; the rest was stolen from the Imperial Valley Museum in 1981. (See *Science* '83, volume 4, for a summary of events.) Fortunately a number of bone fragments were out on loan and a small amount survived the theft. These were dated separately producing very similar dates.

Several chemical fractions of the bone and also the caliche were tested. The date on total acid-insoluble organics of the bone was $3,850 \pm 250$ years B.P., and is considered the most reliable date. The caliche associated with the burial was also dated, yielding dates which range from 2,300 to almost 29,000 years ago. Apparently the caliche contained carbon from various sources of differing ages.

In a brief interview, Tom Stafford indicated that human intervention was probably responsible for the early dates from the boulder caliche. The boulders had apparently been moved from other contexts to the burial location.

The authors conclude the skeleton is of Holocene rather than Pleistocene age, despite some discrepancy between the dates of the acid-soluble organic fractions of different samples of bone. Although the date on this skeleton is not likely to reduce the controversy surrounding an early versus a more recent arrival of *Homo sapiens* in the New World, it certainly changes the shape of the argument. The ability to date such small amounts of bone promises exciting developments in our understanding of the Pleistocene.

Marcella Sorg



Mammoth bone core with associated flake. The core was produced on a mid-shaft segment of mammoth tibia. The proximal end (top of photo) is jagged resulting from platform preparation prior to removal of the longitudinal flake (re-attached, on right). (Photo courtesy of L. Adrien Hannus)

BONE TOOLS IN CLOVIS CONTEXT

L. Adrien Hannus, Archaeology Laboratory Augustana College, Sioux Falls, SD 57105

The Lange/Ferguson site in western South Dakota contains important evidence pertinent to the current "broken bone debate" in archaeology. First, it provides information about mammoth-butcher patterns and the use of bone tools. Second, bone tools and Clovis stone tools are found in direct association with each other.

The site was found preserved in sediments of a late Pleistocene pond or marsh in the White River Badlands of the Pine Ridge Indian reservation. In three seasons of field mapping and excavation from 1980 to 1982, the investigation of one locality within the site has been completed; two localities remain. The research at Lange/Ferguson is led by L. Adrien Hannus, Director of the Archaeology Laboratory at Augustana College in South Dakota. It has been funded by the South Dakota Office of Historical Preservation.

Remains of an adult mammoth with nearly all bones present were found in direct association with partial remains of a juvenile mammoth. Based on its dentition, the adult has been tentatively assigned to the species *Mammuthus jeffersonia*. Taphonomic analysis suggests that the mammoths apparently became mired in the mud, were butchered, and were

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C E N T E R N E W S

Volume 1, Now Available

PEOPLING OF THE AMERICAS: CURRENT RESEARCH

We have just launched an annual periodical which reports current research on the peopling of the Americas. Edited by Jim I. Mead, this serial is comprised of brief summaries submitted by researchers about their current work. These concise, state-of-the-art reports provide an overview of trends and developments in New World early human studies and allied disciplines, all in a single source.

Current Research is different than other journals. Its purpose is to bridge the gap between abstracts, which might be published in academy and society meeting proceedings, and those notes and short articles printed in regular peer-reviewed journals. Authors of **Current Research** articles are more free to expound about their ideas and research goals. Views of the authors are not necessarily those of the Center.

Contributions are divided into topics: archaeology, physical anthropology, lithic studies, taphonomy and bone modification, methods, paleoenvironments, and dissertations. Indices are provided for authors, locations and specific terms and concepts.

The success of this journal rests on the specialists who submit their reports of current research. If this is done, everyone interested in the study of the peopling of the New World and the paleoenvironmental reconstructions of the Western Hemisphere should be able to keep abreast of this fast-changing, interdisciplinary topic. Write to the Center for Instructions to Contributors.

THE ARTIST'S PERSPECTIVE

How did people survive amid the glaciers and megafauna of the Pleistocene? The mystery of the past is the magnet drawing us to it. The art incorporated in the banner head of the **Mammoth Trumpet** is one artist's response to this question.

The snowy arctic night crowned by the Aurora Borealis is the setting across which families of people and mammoth trek to their respective fates: people toward the east and ever greater, mammoth from the east to an opposite destiny.

It is unimportant whether the details are exact. The artist's goal was to capture the human response to the question, not necessarily to answer it. It is a dream, a memory, an echo of Pleistocene voices against the edifice of our modern society as we search for facts.

—Judith Cooper, artist for the **Mammoth Trumpet**

Corrections and Brief Comments

Mammoth Briefs: Eileen Johnson note should have read "initial exploration . . . revealed a possible pre-Clovis age occupation."

Conferences: S.A.A. "Paleoindians in Eastern North America" symposium participants should have included Esmée Webb (University of London) who provided an Old World overview and was a discussant.

Conferences: G.S.A. "Late Glacial Environments:" Eileen Johnson (Texas Tech) comments that Lange-Ferguson and Wasden are not the first known occurrence of mammoth bone breakage and flaking activities at Clovis-age sites, "These activities occur at Lubbock Lake (Texas) in a well-dated Clovis-age context (11,000 yr B.P.), first written up in 1976."

Lee Patterson, author of "Points of Sequence" is located at Tenneco Inc., P.O. Box 2511, Houston, TX 77001.

Luis Alberto Borrero, author of "Early Man in Patagonia" is located at the Instituto de Antropología, 25 de Mayo 217 - 1r. piso, 1002 Buenos Aires, Argentina.

Subscribe to the 1984 **Current Research** by sending \$5.00 to the Center and indicating it is for Volume 1. For orders outside the U.S., please add \$6.00 per volume ordered for postage and handling. The journal is 6" by 9", 112 pages, with a soft cover.

ESTABLISHING AN ENDOWMENT FUND

Building upon the successes of the past several years and looking forward to a future of new achievements, The Center for the Study of Early Man is pleased to announce the establishment of an effort to create an endowment fund. The purpose of the fund will be to guarantee the future of the Center by generating unrestricted income in perpetuity. Such income will be used to defray the costs of research, teaching, and public service activities.

Gifts to the fund will be matched up to \$500,000 by a private donor. In addition, a proposal has been submitted to the National Endowment for the Humanities Challenge Program requesting partial funding for the endowment. If these funds are awarded, donations may also be used as match for the NEH funds. All contributions are tax deductible. For additional information and brochure, write to Robson Bonnicksen, Director, at the Center. Gifts to the fund may be made payable to Center for the Study of Early Man Endowment Fund and sent to:

Center for the Study of Early Man
University of Maine at Orono
Orono, ME 04469

In the coming months, the Center, in cooperation with campus leadership, will be making personal calls throughout North America to request individual, corporate, and foundation support for the program. Ensuring the continuation of the Center's tradition of excellence in research, publication, teaching and public service is, in the view of University leaders, a goal worthy of support.

ANTICIPATING THE BONE CONFERENCE

Partial funding has been awarded by the National Science Foundation to the University of Maine at Orono for the First International Conference on Bone Modification, to be held in Carson City, Nevada, August 17-19. Organized by the Center for the Study of Early Man and hosted by the Nevada State Museum, the conference will bring together invited experts from many countries who will present more than 30 papers on topics concerned with discriminating bone modified by humans from that modified by other agencies.

Many presenters will be bringing original specimens with them, allowing comparison of subtle differences in morphological patterns. Patterns that may be diagnostic of specific processes are not always easily seen in published figures and photographs. Yet their interpretation is often the subject of rather spirited debate and is critical for demonstrating the presence of humans in early contexts. The conference will allow specialists to view examples of bones altered by such processes as carnivore chewing, trampling by animals, falling rocks, and people obtaining marrow and raw materials for tools.

The conference also features a panel discussion on the Peopling of the Americas and Public Policy. Representatives from professional organizations, funding agencies, and land management organizations will discuss the importance of the Americas' earliest cultural heritage and how to ensure its proper management through policy making and funding, as well as the limitations of these public efforts.

MAMMOTH TRUMPET STRIKES RESPONSIVE CHORD

When we published the first issue of the **Mammoth Trumpet** this spring, we were hoping for a modest response. But when subscriptions and letters began to pour in, we decided the paper had hit a responsive chord. We thank those of you who joined for your interest and your patience as we implement a system to handle the large volume.

With the support generated by the first issue, the **Mammoth Trumpet** will be published quarterly (instead of semi-annually). We are hoping to expand our readership further by offering the paper for newsstand sales in museums and park visitor centers. Of course, Center members will continue to receive the lowest subscription rates. We will depend heavily on word of mouth to help subscriptions grow, rather than expensive marketing and advertising.

Interest in the prehistoric past is expressed not only in professional research, but in literature and drama as well. In response to readers' suggestions, we have included a special summer supplement, with a review of the movie, **ICE MAN**. Also included here is a review of a guidebook to American archaeological sites and a short story on a very special museum exhibit, **Ancestors**. Let us know how you enjoy them.

The study of ancient humanity is necessarily a multi-disciplinary adventure. In this issue and those to come we are covering the work of population geneticists, vertebrate paleontologists, and even biochemists who have something to say about the Pleistocene. Response to this approach has been positive and we all hope to learn from each other in future issues.

Although it is our policy not to sell advertising space, we will occasionally mention books and other resources which we think might be of interest to our readers. Please send in any suggestions.

Finally, we want to thank those of you who have sent your comments and criticisms; it helps. Space is limited, but occasionally we also have room for contributed articles. Most of the material, however, will be invited according to the themes and needs of each issue.

A limited number of other professionals and members of the general public are welcome to attend. Contact Donald Tuohy, Nevada State Museum, Carson City, NV 89710 for details.



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TEAM LINKS ANCIENT POPULATION GENETICS (Continued from page 1)

a single migration some 12-15,000 years ago. In fact, it implies an earlier wave occurring perhaps 30-40,000 years in the past, of which the modern Middle and South American Indians are the descendants.

Crawford stressed that when they began working, he and Sukernik had not formed an opinion of their own about the matter. Indeed, the prehistoric implications of their project, though important from the beginning, were in fact secondary. The first object was an analysis of the population structure of circumpolar peoples. Crawford himself had originally been interested in studying how language acts as a barrier to gene flow between the Yupik and Inupik-speaking groups of Eskimos, particularly in light of the explosive spread of Inupik-speaking groups about 900 years ago throughout the Arctic from Alaska to Greenland. The rapidity of the dispersion ensured that, genetically, coastal Alaskan groups have remained so similar to the Greenland population that they can barely be distinguished.

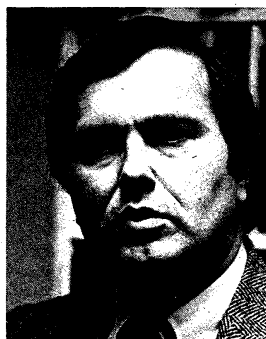
Crawford was introduced to Sukernik by a colleague from the University of Kansas during a visit to Moscow in 1973 or '74. On the other side of the Atlantic, the M.D. degree is commonly a preliminary requirement to a more specialized research degree. Consequently, most of the people in Europe working today in population genetics or physical anthropology are physicians, and so is Sukernik.

What really opened the door to collaboration was the fact that Crawford, as a Russian-Scottish immigrant from Shanghai, China, is one of the few physical anthropologists, if not the only one in the U.S., who is fluent in Russian. This not only dissolved the language barrier, it helped secure Crawford a National Science Foundation grant to work with Sukernik on the comparison of Siberian with Alaskan population genetics. In the course of several visits to Novosibirsk, he and Sukernik standardized the biochemical techniques to be used in what is still a continuing study.

The techniques are based upon the well-known principle that certain populations may share highly specific biochemical characteristics that act as what are called genetic markers. That is, they can be used as identifying patterns, rather in the manner of fingerprints, except that they help establish the common identity of an entire group of people. What Sukernik

Michael
Crawford

(Photo: Courtesy
Univ. of Kansas)



and Crawford brought to light for the first time was that the circumpolar peoples of the north share a spectrum of genetic markers among the blood serum proteins: in particular, certain gamma globulins and human leukocyte antigens. Comparing their results with data available on a wide range of blood serum traits, in the literature, they discovered further that these markers distinguish circumpolar from Central and South American native populations. That distinction in turn links up with others already discovered. For example, South American Indians lack at least one of the types of gamma globulin that occurs in high frequencies in the Arctic groups.

What might be hypothesized concerning prehistoric migrations from such data has been summarized by the two researchers in an article for the Soviet journal of nature *Priroda*, the first of its kind to be published by Russian-U.S. investigators. Archaeologists reconstructing how the original migration might have taken place sometimes fantasize—to exaggerate a little—a few Siberian big-game hunters saying to one another one day, "Let's see if we can go bag a mammoth in the New World," and then more or less blundering their way across Beringia. In place of an adventurous foray and accidental discovery, Crawford and Sukernik imagine a slow and inevitable process, the continuation into the New World of an expansion that began 30-40,000 years ago when a culture called the Duktai first entered Siberia.

Through fifty to sixty sites explored at present, archaeologists have traced how the Duktai spread across Siberia. The pace of expansion would have been related to both population fertility and their developing technology, enabling them to adapt to Arctic conditions. And it is reasonable, the writers propose in the *Priroda* article, to assume that this movement's momentum carried it naturally on into the New World. The two have published estimates of the number of people crossing Beringia that it would have required to produce the present North American Indian population of ten million; but Crawford makes clear that these are purely computer simulations based on a given rate of population increase, not anything directly resulting from their genetic data.

What the data do suggest is that, after an initial influx whose descendants may now be living in Central and South America, a second movement into the New World after the Wisconsin glacial period produced the North American native population groups as we now know them. The people who stopped short of crossing became the Siberian Eskimos and the predecessors of the Chukchi; and those members of Chukchi who had migrated into the New World became the North American Eskimos.

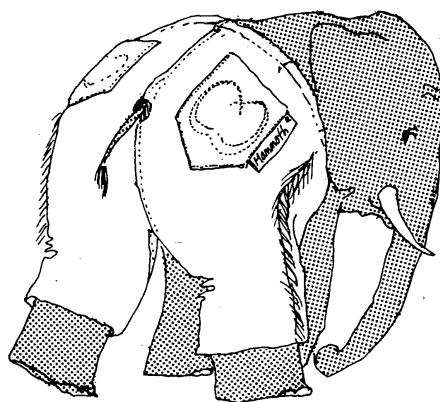
If more articles like the one in *Priroda* are to appear, if Russian-American collaboration in physical anthropology is to continue, it will require effort and encouragement on both continents. The Russians are in fact extremely interested in most kinds of biomedical research. Sukernik has been supported by both the Soviet Academy of Sciences and of Medical Sciences. The academician, Demitry Constantinovich Belyaev, who is head of the Cytology and Genetics Institute at Novosibirsk, has been particularly instrumental in promoting collaborative work, both with small-mammal and human populations. Crawford has been funded mostly by the National Science Foundation, with some support from his university and travel money from the U.S. Academy of Sciences.

Crawford has recently supported a resolution sponsored by William Pollitzer that was passed by the American Association of Physical Anthropologists in support of all possible collaborative programs with the Soviet Union. As he says, after all, studies of indigenous populations of Siberia and Alaska are virtually apolitical, and they provide invaluable contact and communication with Russian scientists.

When asked to compare the role of genetic studies with that of skeletal and archaeological data in answering the question of the peopling of the Americas, Crawford replied, "That's a tough one." On the one hand, we cannot interpret what happened in the past until we know something about the dynamics of the present: the blood genetics, demography and population structures of living groups and how they got to be as they are. For it is extremely difficult to extrapolate any genetic information from teeth or bones in themselves. On the other hand, contemporary genetic information could not be projected back into the past without solid archaeological evidence against which to check it. Both techniques are relevant; both are in fact essential.

Michael Dolzani

MAMMOTH GENES?



"I'M NOT SURE
THESE GENES FIT"

The article was carefully crafted as an April Fool's joke according to a representative of *Technology Review*. It is a complete hoax. But it raises important questions about our ability to recover genetic material from extinct animals.

In fact, research is proceeding along these lines at the University of California at Berkeley. Russell G. Higuchi and Allan C. Wilson have successfully extracted genetic material from a 100-year-old quagga (an extinct member of the horse genus) and from a 40,000-year-old frozen mammoth. The genetic material consists of very small amounts of DNA. The DNA from the mammoth is heavily contaminated by the DNA of recent bacteria. DNA from the quagga was cloned, but not that of the mammoth. In both cases only portions of the genetic material were extracted; the complete set of chromosomes was not retrieved, nor were whole cells.

Allan Wilson has agreed to be interviewed for the fall issue of the *Trumpet*. He will discuss his procedures and their current limitations. He will also outline the actions necessary to preserve genetic material in extinct animals when found frozen during excavation.

In the April issue of *Technology Review* (published at Massachusetts Institute of Technology) an article appeared which has caused quite a stir. Entitled "Retrobreeding the Woolly Mammoth," the article has received wide circulation in local papers around the country. It reports that a Russian scientist was able to recover ova from a young woolly mammoth that had been found frozen in Siberia. Supposedly the nuclei were implanted into cytoplasm from other cells in the mammoth's body and the cells were sent to a "James Creak" at M.I.T. for testing. The Russian scientist subsequently fertilized these ova with modern elephant sperm, implanted the embryos in modern elephants, and produced two elephant-mammoth hybrids.

PLEISTO-SCENES



A) Natural brown mammoth and B) Dark blue tundra migration hand silkscreened on high quality T-shirts. Adult shirts available in S, M, L, XL on natural white heavy weight 100% cotton. \$7.50 each. Children's shirts available in XS (2-4), S (6-8), M (10-12), L (14-16) on sand colored cotton/polyester blend. \$6.50 each.

Please include your name, mailing address and \$1.00 shipping and handling per shirt (\$2.00 outside U.S.) U.S. funds only. Maine residents add 5% sales tax to purchase price. Make checks payable to the Center for the Study of Early Man, University of Maine at Orono, Orono, ME 04469. Allow 6 weeks for delivery.

H.M. Wormington . . .

Still Leading the Way

by Michael Dolzani

There is at least one point of similarity between H.M. (Hannah Marie) Wormington and the ancient humanity she has devoted her life to studying: both were active in North America at an earlier date than some people would have believed possible.

The oldest inhabitants of North and South America, commonly called Paleoindians, entered the Western hemisphere at least as early as 10,000 years ago, and probably, Wormington believes, much earlier. Though far livelier than her years would suggest, Wormington began her own career in North America a very long time ago. Between her entry into Radcliffe-Harvard as only the second woman ever to be admitted in anthropology and April, 1983, when she became the first woman to receive the Distinguished Service Award of the Society for American Archaeology, has intervened almost fifty years of productivity.

Nor does that productivity show any sign of slowing. Forty-five years after her first book, *Ancient Man in North America*, 1939, she is at work on another, to be published next year by Academic Press. Although ten years' demanding effort has gone into it, her voice remains full of humor as she says:

"I'm really sick of it—I'm anxious to get rid of it. It's called *Ancient Hunters and Gatherers of North America*, and I already have 800 pages typed and it's still not complete."

As her description implies, the new book will be a summary of everything we know about humanity in North America in the period before roughly 6000 B.C. She has chosen that relatively recent cut-off point in order to take account of the fact that remains from the Paleoindian and the Middle Prehistoric or early Archaic period overlap and blend into each other. It is the cut-off point in the other direction, however, where continuing excavation is extending the Paleoindian Period further and further back into the Pleistocene Epoch, that is the more dramatic question.

The answer to such a mystery is always tentative. "But," Wormington says, "I do think that man has

I do think that man has been in this hemisphere longer than we can now prove.

been in this hemisphere longer than we can now prove." Early in the century it was assumed that no human being had set foot in North America until a few thousand years ago. But in 1926, one of the major discoveries of American archaeology was made near the town of Folsom, New Mexico, by a party of palaeontologists from what was to become the Denver Museum of Natural History. Human artifacts were found associated with bones of a type of fossil bison known to have been extinct for many thousands of years.

This was only the beginning of a succession of finds. At the Dent site in Colorado in 1932, the first evidence appeared that human beings had hunted mammoths in the New World. Beginning in the same period, the Clovis site in New Mexico yielded remains underlying, and therefore older than, the Folsom complex.

But Wormington thinks the story is unlikely to end there. "I'm sure that there's something well before Clovis. Before we have fluted points we have to have unfluted points." At the moment, she holds out greatest hope for a site at Valsequillo, Mexico. Results are yet unpublished, but Wormington herself has visited the site twice and is sure that the lower levels go back at least 25,000 years. Although her own field work is basically North American, she is keenly interested in South American excavations because, in her opinion, human beings could only have arrived there in one fashion: by working their way down from the north. There were definitely people inhabiting the tip of Patagonia 11,000 years ago, and as she puts it, "they



H.M. Wormington

(Photo: Steve Bicknell)

didn't just jet down there." They must have slowly migrated southward from much earlier habitations. She is critical, though, of some estimates dating human entry as early as 250,000 years ago.

When Wormington began in archaeology, radiocarbon dating did not yet exist, which meant that all age estimates were deductions. They depended entirely on accurate observation of the level of excavation in which a bone or tool was found embedded, and what other remains were associated with it in the same stratum. The technique is still vitally important. If an amateur collector is more of a Dr. Watson than a Sherlock Holmes, he or she may be tempted, in the excitement of making a find, to remove the bones or flints from their original association with each other and thereby confound all attempts at dating the material.

Despite this risk, Dr. Wormington has nothing but praise for avocational archaeologists, with whom she often collaborates. "I think we're terribly dependent on the amateurs, because they are the ones who so often find the sites. And the cooperation between the professional and avocational archaeologist is of tremendous importance, because someone who's out in the area and knows the country intimately can find sites that the archaeologist on survey is not likely to find.

"When I was doing my surveys of Alberta, Canada, nothing had been done up there; it was just a complete blank. And I found some remarkable collectors who had kept very careful records of the time when different point types eroded out during the great Dust Bowl era.

"One man named Russell Johnson, for example, every week would make careful records of when certain types eroded out, and whether they eroded out together. And way back in the 1930s, he realized that the Eden and Scottsbluff and Cody were all part of the same complex, something that the archaeologists did not figure out until many, many years later."

In Colorado, she points out, an amateur can actually take courses, participate in an actual excavation, and finally earn a certificate as a *para-archaeologist*, on the analogy of a paramedic.

Besides radiocarbon dating, a second innovation she has seen help change the field in her lifetime is the tremendous increase in interdisciplinary research and cooperation on-site. Wormington herself has something of a split degree because she availed herself of the opportunity to be trained by the great Pleistocene geologist Kirk Bryan (to whom *Ancient Man in North America* is co-dedicated).

She has enjoyed all her digs, from the time she spent her twenty-first birthday in 1935 excavating Palaeolithic sites in the Dordogne region under Dr.

Henri Martin. Arranging an exchange of French specimens for photographs of American tools led to a supposedly temporary job with the Denver Museum of Natural History that in fact became a 33-year association.

Back in America, she married, entered Harvard, and began conducting excavations, including a Folsom site near La Porte, Colorado in 1936 and a Fremont village site in Utah during the 1940's. The Fremont culture, which flourished in the Christian era to about 1050 A.D., became her second abiding interest, alongside the Paleoindian. By the time she actually received a Ph.D. degree in 1954, she had been publishing and doing fieldwork for nearly twenty years.

In the 1960's she worked on two Paleoindian sites in Colorado, the Frazier site with Agate Basin materials, and the Jurgens site (excavated with Joe Ben Wheat who published on the site) with Cody Complex materials. Both of these were bison-kill sites, with great masses of bones of extinct bison. Many of her workers were students, whom she could feed in the earlier days for fifty cents a day per person. Setting up what sometimes amounted to a field school involved ensur-

"I think we're terribly dependent on the amateurs, because they are the ones who so often find the sites."

ing an adequate supply of tents, cooking equipment and—so important in the American Southwest—water.

There was also the need for lectures on how to deal with snakes: how to use a tourniquet, how to cut and suck a snakebite. Wormington habitually ordered that a razor blade be taped into every belt in camp. She would also pick up bull snakes, which drive away rattlesnakes, from the side of the road at every opportunity, and bring them back to camp with her.

Where is the field of archaeology going? Wormington replies, "I think one of the important things is that it's become more truly a part of anthropology, with an emphasis on lifeways of ancient people. There was a time we had very little we could count on except typology. We knew something about the tools these ancient people made, but that was about all we knew.

"Now we do know something about their lifeways—whether they were organized in bands, whether they were hunting, whether they were gathering. Now we can even often discover what time of the year the hunts were taking place, and the size of the group that was living together. We're becoming much more truly anthropologists, with an emphasis on lifeways of people instead of just their material possessions."

The new book will reflect this broadened perspective. Although it includes a massive literature review, backed up in many cases by actual visits to the sites, the book is intended for the general public as well as for the specialist in archaeology, and there will be an introductory chapter for the lay person. The second chapter will go on to examine all claims for human antiquity before 10,000 years ago. The third chapter covers the early fluted-point horizon and the Clovis sites. The rest of the text will examine evidence on a regional basis, ranging from the Plains to the Far West to the Arctic.

Actual human remains are still extremely scarce, however. Certain discoveries of individual burials far from any other archaeological material have led Wormington reluctantly to the hunch that Paleoindians had a fear of the dead, like the Navajo. In that case, she concludes in slightly depressed tones, it will be sheer luck if we ever find skeletons.

Where, in any case, does she think we should be looking? "If I knew," she responds wryly, "I'd probably be out trying to dig it."

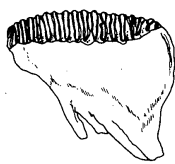
NEW WORLD MAMMOTHS IN A NUTSHELL

Larry D. Agenbroad, Department of Geology
Northern Arizona University, Flagstaff AZ 86011

Mammoth have been in the New World since approximately two million years ago. The oldest recorded radiometric date is 1.7 m.y. in deposits of the Welsch valley, Saskatchewan. Descendants of this early species of mammoth survived until approximately 11,000 years ago when they became extinct. They became somewhat smaller with modified dental characteristics, such as an increased number of enamel plates, thinner enamel, etc., during this interval.

Species identification of fossil proboscideans is primarily dependent on their dental characteristics (see diagram). *Mammot* (mastodon) teeth are cusped, whereas *Mammuthus* (mammoth) teeth have plates or envelopes of enamel whose centers are composed of dentine with cementum between and surrounding the plates. Mammoth species are differentiated by the number of plates per 100 mm length, the enamel thickness, length/width ratios of the teeth, etc. Age at death for an individual is determined by comparison of the mammoth teeth and a tooth eruption and wear sequence worked out for the African elephants.

Historically, the classification of mammoth in the New World has been and, unfortunately, remains confused (see table). Because of morphologic gradation



Mammoth tooth



Mastodon tooth

of dentition from more primitive to more progressive forms and because of overlapping stages in this progression, one species cannot be separated from another on the basis of dental traits alone. *Mammuthus primigenius* (the woolly mammoth), in particular, has been identified too uncritically.

In the early part of this century, it became popular to name new species of mammoth with the name of the financial benefactor, or other noteworthy person related to the research. The result was a proliferation of species names. This problem is illustrated in the work of Osborn who in 1942 lists sixteen species of Pleistocene mammoths in three distinct genera. More recently, all North American mammoth species have been included in the genus *Mammuthus*.

	Early Pleistocene (2.0-1.0 m.y.)	Middle Pleistocene (1.0-0.2 m.y.)	Late Pleistocene (0.2 m.y.-10,000)
Europe	<i>Mammuthus meridionalis</i>	<i>Mammuthus armeniacus</i>	<i>Mammuthus primigenius</i>
N. America	<i>Mammuthus meridionalis</i>	<i>Mammuthus imperator</i>	<i>Mammuthus columbi</i> <i>Mammuthus primigenius</i>

BONE TOOLS IN CLOVIS CONTEXT

(Continued from page 1)

buried by the mud almost immediately after being butchered. The bones show no signs of having been exposed to weathering or carnivore damage. In fact, the lower legs of the adult mammoth were essentially in anatomical position, still articulated, with the forelimbs deeply mired and both fore- and hindlimbs in a crouched position.

An examination of the skeleton of the adult reveals the probable pattern of butchering. Apparently, an incision was made along the back of the neck enabling removal of the hide to expose the musculature of the neck and front quarters. The head was then severed from neck between the fourth and fifth cervical vertebrae. Both shoulder blades were probably removed next and the left one was fashioned into two cleavers. These would have been heavy enough to chop through the back bones, allowing removal of the front quarters. The hind quarters were removed by cutting through the ilia near the hip joint.

One tibia of the juvenile mammoth was broken at the midshaft. Some of the resulting bone fragments were then utilized directly as tools (for example, knives, cleavers, or hammers). Flakes were removed from some cores one at a time or in overlapping series; they were removed from both the exterior (cortical) surface and the interior (medullary) surface.

One core (see photograph) is of particular interest; its matching flake was also found. Together, they provide direct evidence of the method of bone modification: first, a striking platform was prepared by knocking off small bits of bone at one end; then the flake was removed by striking the platform area.

In addition to the bone tools, one stone tool and a tertiary flake have also been found in direct association with the mammoth bones. The tertiary flake is suspected to have been detached from a stone cleaver during butchering. A second lithic artifact recovered at Lange/Ferguson is a complete basally-fluted point which is assigned to the Clovis complex.

Two radiocarbon dates have been obtained. The first, derived from organic material contained in the sediments sealing the bone bed, yielded an age of 10,670 ± 300 years B.P. This establishes a minimum age for the bone bed. The second, based on mammoth bone collagen, gave an age of 10,730 ± 530 years B.P.

Both dates are well within the parameters for Clovis affiliation.

Future work will begin next month on the second locality. Based on surface finds of lithic flakes, it is hoped that this area may be a preserved secondary-butcherer and tool-preparation site.

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A recent literature search has provided more than 1,500 locations for more than 3,100 individual New World mammoth since Hay's series of works in the 1920's. These data, with distribution maps for the species as identified in Maglio's taxonomy, are summarized in a chapter on New World mammoth distribution in Martin and Klein's new book *Quaternary Extinctions*. Among the conclusions from the analysis of the reported data are:

- New World mammoth are excluded from South America; presumably due to some environmental barrier associated with passage through the Isthmus of Panama. The most southerly reported occurrence is El Salvador.
- The majority of occurrences (57%) are in fluvial sediments (alluvium), with glacial deposits second (17%).
- The "heart" of mammoth range is in the Great Plains, from Texas to Minnesota, with the exception of *M. primigenius* which is predominant in Alaska, Canada and the Great Lakes region of the United States.
- After surviving four major glacial advances and the accompanying interglacials and expanding (geographically and biologically) in this interval, the mammoth became extinct, world-wide, at approximately 11,000 years ago.
- In the New World, the extinction of the mammoth is coincident with the first widespread, archaeologically visible cultural entity—the Clovis big game hunters. Whether people were the causative or just a contributing factor to the extinction is a subject of much debate.

NEW REFERENCES AND RESOURCES

Archaeology on Film, a comprehensive catalogue of archaeological film and video programs has been published recently by the Archaeological Institute of America. It is edited by Peter S. Allen and Carole Lazio and contains listings of more than 700 titles. Information included for each: producer/director, date, length, color/b&w, audience level, purchase/rental information, brief description. Price \$7.50 for AIA, AAA, and SAA members, \$10.00 all others. Write: Archaeological Institute of America, P.O. Box 1901, Kenmore Station, Boston, MA 02215. Include \$1.50 (bookrate) or \$2.50 (first class) postage and handling.

Flintknapping Digest is a new newsletter established to facilitate communication among flintknappers and interested people from other fields. For a subscription (\$4) or more information write: Ray Harwood, Flintknapping Digest, 17546 Haynes St., Van Nuys, CA 91406.

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SUMMER SUPPLEMENT

Two New World Specimens Included in 'Ancestors' Exhibit



Human skull from Cerro Sota, Chile. (Courtesy American Museum of Natural History)

In April the American Museum of Natural History in New York City opened a remarkable temporary exhibit of original fossils important for human evolution. Entitled *Ancestors: Four Million Years of Humanity*, the exhibit will run from April 13 through September 9, 1984. At a cost of about \$500,000 and

with the cooperation of 25 institutions around the world who lent specimens, this exhibit offers a once in a lifetime opportunity to see an important array of specimens.

Prior to the exhibit opening, four days were set aside for anthropologists and paleontologists to view and compare the fossils, and to discuss their observations with their colleagues. Although measurements were not permitted, handling of the specimens was allowed, and some people used magnifying glasses to look at finer details. Discussion and interaction among scientists was intense and fruitful.

Along with almost 50 important human and pre-human fossils from around the world, two New World skulls are on display. The Cerro Sota skull, from the tip of Chile, was found by American Museum archaeologist Junius Bird and has been dated to about 11,000 years ago. The Rancho La Brea skull, contributed by the Natural History Museum of Los Angeles County, is also on display. All of the specimens were hand carried by curators to the exhibit site; none have been damaged. Richard Leakey finally decided not to include the materials from the Kenya National Museum, however, due to the risk involved to these irreplaceable specimens. Casts were substituted for these fossils.

Over 100,000 people visited the exhibit the first month, and the volume is expected to continue through-

out the summer. Public response has been very favorable. If you visit the exhibit, be sure to allow adequate time for viewing. The specimens are displayed in general 'evolutionary' order, so it is best to understand the layout before moving through the exhibit. Since there is quite a bit of information to digest, it may be helpful to plan on going through the exhibit twice: once to get a general overview, and a second time to absorb the details.

The exhibit is supported by an indemnity from the Federal Council on the Arts and Humanities. Funding has been provided by the New York State Council on the Arts, Wenner-Gren Foundation for Anthropological Research, National Science Foundation, and the L.S.B. Leakey Foundation. The American Museum of Natural History is located at Central Park West at 79th Street, New York. Phone 212-873-1300.

Marcella Sorg

America's Ancient Treasures

(3rd revised and enlarged edition). Franklin Folsom and Mary Elting Folsom. University of New Mexico Press, Albuquerque. 1983. xxviii + 420 pp., illus., glossary, bibliog., index. \$14.95 (paper).

Review by Alice M. Tratebas

America's Ancient Treasures is a guide to archaeological sites and museums in the United States and Canada. Directions are given only to archaeological sites which have been prepared for public view and are protected. The museums listed were selected for their prehistoric, rather than historic or ethnographic, displays. Listings may be brief, but more often they describe the background and significance of an exhibit or site. For the Calico Mountains site, as an example, the listing gives the history of the investigations and discusses the two sides of the controversy concerning whether the artifacts are natural or man-made and their possible 200,000 year age. The treatment is balanced and informed.

In an interview, Franklin and Mary Folsom indicated they began visiting archaeological sites and museums years ago. By the time they wrote the first edition of the guide, they had seen nearly all the places described. Before finishing the third edition, they sent state and provincial archaeologists the listings for their area, as a check for mistakes or museums that might be left out. The letters received in response suggested additional listings for the guide.

Both authors have had an interest in archaeology since childhood. To this long term interest, the Folsoms add a background in professional writing that contributes a clarity to the book often lacking in archaeological writing.

Organization of the guide is by state or province within geographic regions. The index is useful for locating specific sites or general topics, such as Paleo-Indian sites and exhibits or petroglyphs. A glossary, a list of suggested readings, and the addresses of archaeological societies and state or provincial archaeologists offer further aid.

The guide is profusely illustrated with photographs and line drawings in the upper half of the page to match the listings below. Short articles cover topics such as specific sites or cultures, archaeological techniques (such as tree-ring dating, stratigraphy), artifact types (atlantis, pebble tools), and a variety of other topics (prehistoric astrology, the Ginsberg experiments, domesticated plants, dwarf mammoths, the problems of pot hunting). Each geographic section begins with a longer article on the lifeways and culture history of the area. The book thus serves as an introduction to American and Canadian prehistory.

The Folsoms regret that the enlarged third edition has become so bulky it is not as handy for travelers as earlier editions. Although it has outgrown the glove box, the book should be carried along on every trip. Both professional archaeologists and lay people will find this book a valuable guide to informative sights along the route or at their destination.

Iceman: Thinking of the Lost World

ICEMAN was produced by Norman Jewison, directed by Fred Schepisi, Cinematographer Ian Baker, Script writers Chip Proser and John Drimmer.

Review by Michael Dolzani

I went to see *Iceman* basically expecting good solid entertainment, a science fiction adventure story about a Neanderthal who returns to life after being thawed out of glacial ice in the Canadian north. I was pleasantly surprised because it is also a very intelligent, well-researched, and capably-scripted film that attempts to explore the nature of our fascination with the prehistoric.

Mind you, it is also as rousing a tale as anyone could want for munching popcorn by on a Saturday afternoon. In fact, one of the first things the film makes evident is that the initial root of our fascination with "cave men" is a magical and childlike sense of wonder. (At the showing I attended, two children, perhaps four and six years old, ran up the aisle afterward ecstatically shouting words in Neanderthal language). Scientific interest may be built on top of this, but that comes later. First is a sense of mystery and excitement about what Arthur Conan Doyle called the Lost World.

What does this Lost World, from which the Neanderthal Charlie emerges, symbolize for us? Why does it arouse such wistful emotions? Well, when Randall Jarrell writes a poem called "Thinking of the Lost World," it turns out to be about the lost world of childhood, that place of innocence and wonder that has somehow disappeared into the distant past. Jarrell connects his Lost World with the prehistoric; but behind these myths in our culture is the even more comprehensive one of a lost paradisaal Garden.

Adult mentality may find such associations far-fetched, but evidently Charlie himself does not. As Shepherd, the film's idealistic young anthropologist, is informed by an elder from another lost world, that of the Canadian Inuit culture, Charlie may have been forced out of his paradisaal homeland by the coming of the glacier or scarcity of food. When he was frozen, he might have been on a "dream walk" trying to offer himself as a sacrifice to his bird-spirit in order to save his people: the film begins and ends with an Inuit poem about self-sacrificial death and resurrection.

We do not know a great deal about either the psychological or the cultural traits of Neanderthal people, which means that the film creators' choices have been largely on the basis of the message they are trying to convey. So we are not surprised that on the

one hand, Charlie has many of the characteristics we envy so much in children (and animals): the spontaneity, the lively curiosity, the innocence of un-self-conscious relation to his instincts. His responses are, in all senses, "natural." Next to him, most of the research team that revives him seem "frozen"—upright, emotionally "cold" in their responses.

One of the reasons this (PG-rated) film is good to take your children to is that it works so hard to reverse the stereotype of the "savage" that Western civilization tends to project on primitive people, modern or prehistoric: hence the deliberate parallel with the Inuit. (Producer Norman Jewison is Canadian, and *Iceman* is full of Canadian cultural mythology).

Not only is Charlie better-looking, when you think about it, than most of the research team, his facial features have been subtly spiritualized: occasionally, he looks like a Christ-figure with bad teeth. The latter seem to be a token symbol of his primitiveness, as does the fact that his language is very guttural. There is a fair trade here, though. Where Charlie has trouble with labial stops, like the "p" in Shepherd's name, Shepherd has trouble with Neanderthal vowels: "Charlie" is only a rather undignified distortion of Charlie's actual name in his own language. Moreover, one character remarks drily that their "specimen" has a better vocabulary than one of the team's macho males. He is also less of a "brute"—slender of build, fully-erect, and probably less hairy than many in the film's audience.

The point is that it is perfectly possible that Neanderthal people not only had all the physical prerequisites for being human, but perhaps retained some cultural virtues we lost in our "fall" into civilization. Whether or not he is deluded about what he takes to be the bird-spirit in his final religious experience, Charlie possesses a living mythology that enables him to face death with joy and heroism. Contrasted with this are the values of a sterile, dehumanizing technological civilization that wants to use him for cryogenic research, so that rich people might someday be able to run away from death—by freezing themselves.

How one reacts to all this will depend on one's attitude toward the old question of nature versus culture. The movie's idea of a quest for spiritual transfiguration of ourselves and nature that might bring back a paradisaal state may be too nostalgic and sentimental to be convincing. But what *Iceman* tells us is that that childlike dream, in some form or another, may be finally the thing that makes us human.

CONFERENCES

Canadian Archaeological Association

The Canadian Archaeological Association's 17th Annual Meeting was held in Victoria, British Columbia, April 18-21, 1984. Two symposia were presented on Paleoindian research.

"New Paleoindian Sites of the Rocky Mountains and Peace River Region"

Chairperson Knut R. Fladmark (Simon Fraser University)

- Daryl Fedje and James M. White (Parks Canada). The Vermilion Lake Site: An Early Postglacial Record from the Northern Rocky Mountains.

- K. R. Fladmark, J. D. Driver, J. M. White and D. Alexander (Simon Fraser University, Simon Fraser University, Parks Canada, Simon Fraser University). Environment and Stratigraphy of the Charlie Lake Cave Site.
- Diana Alexander (Simon Fraser University). Analysis of the Lithic Materials from Charlie Lake Cave.
- James M. White (Parks Canada). Pollen Analysis of the Charlie Lake Cave Site.
- K. R. Fladmark (Simon Fraser University). The Paleoindian Component at Charlie Lake Cave.
- Jonathan C. Driver (Simon Fraser University). Preliminary Report on Early Post-Glacial Fauna from Charlie Lake Cave.

"The Peopling of the Americas"

Chairperson: Richard Shutler, Jr. (Simon Fraser University)

- Richard Shutler, Jr. (Simon Fraser University). The Development of Paleo-Indian Studies in the New World.
- Richard E. Moran (National Museum of Man). The Pleistocene Archaeology of Beringia.
- Barney Reeves (University of Calgary). Early Man in the Americas: Who, When and Why.
- Roy L. Carlson (Simon Fraser University). The Later Prehistory of the Americas.
- Richard S. MacNeish (Boston University) • Discussant.

87th Annual Meeting of the Texas Academy of Sciences

Held on the campus of the University of Texas at San Antonio on March 16, 1984, the conference featured a symposium entitled *Paleo-Indian Archaeology in Texas*:

Chairs: Thomas R. Hester (Univ. of Texas at San Antonio) and Harry J. Shafer (Texas A&M)

- Joel Gunn (Univ. of Texas at San Antonio). Late Pleistocene and Early Holocene Climate and Early Man in Southcentral United States.
- D. Gentry Steele, David L. Carlson and Anthony G. Commuzzie (Texas A & M). The Duewall-Newberry Site: Probable Evidence of Man/Mammoth Interaction in Central Texas.
- Ken Brown (Univ. of Texas at San Antonio). Early Occupations at Berger Bluff.
- Frank A. Weir (State Dept. of Highways and Public Transportation). The Wilson-Leonard Site: A Late Paleo-Indian Village in Central Texas.
- Thomas R. Hester (Univ. of Texas at San Antonio). The Plainview Occupation at the St. Mary's Hall Site, South Central Texas.
- Elton R. Prewitt (Prewitt and Assoc., Inc.). Paleoindian Archaeology: San Gabriel River Drainage, Texas.
- L. W. Patterson and Joe D. Hudgins (Houston Archeological Society). Paleoindian Manifestations in Wharton County, Texas.
- Eileen Johnson (Texas Tech). Lubbock Lake: Recent Discoveries.
- Harry J. Shafer (Texas A & M). Early Holocene Occupations at Hinds Cave, Texas.
- Thomas C. Kelly (Univ. of Texas at San Antonio). Texas Paleo-Indian Point Typologies.

UPCOMING . . .

Aug. 4-14, 1984 27th INTERNATIONAL GEOLOGICAL CONGRESS, Moscow, USSR.

Quaternary Geology & Geomorphology Section, Quaternary Chronostratigraphy of Eurasia subsection will feature papers on prehistoric humans and traces of their activity as stratigraphic elements.

Aug. 13-15, 1984 AMQUA 8th Biennial Meeting. University of Colorado, Boulder, Co.

Theme is "Seasonal Climatic Responses in the Quaternary;" focus areas are Equatorial Africa/India, Southwest USA & Mexico, Mid-continent USA & Canada, and Alaska-British Columbia-Northwest USA. Contact P. W. Birkeland, Dept. of Geological Sciences, Univ. of Colorado, Boulder, CO 80907.

Aug. 17-19, 1984 1st INTERNATIONAL BONE MODIFICATION CONFERENCE. Ormsby House, Carson City, NV.

Invited papers and workshops on discrimination of human from other agencies of bone modification. Contact Donald R. Tuohy, Nevada State Museum, Capitol City Complex, Carson City, NV 89701.

Sept. 1-7, 1986 UNION INTERNATIONALE DES SCIENCES PREHISTORIQUES ET PROTOHISTORIQUES. XIth Congress, Southampton and London, England.

Contact Peter Ucko, Dept. of Archaeology, Univ. of Southampton, Southampton SO9 5NH, England.

Oct. 1-3, 1984 TER-QUA '83 Institute for Tertiary-Quaternary Studies, 3rd Annual Symposium and Field Trip, Univ. of Texas-Dallas.

Topics include: Marine-continental correlations, climatic change, paleosols and soils, vertebrate stratigraphy, Pleistocene nomenclature, isotopic dating, Plio-Pleistocene boundary. Contact Lee Smith, Dept. of Geology, Texas Christian University, Fort Worth, TX 76129 or Wakefield Dort, Dept. of Geology, Univ. of Kansas, Lawrence, KS 66045.

Nov. 10-12, 1984 17th ANNUAL CHACMOOL CONFERENCE, Univ. of Calgary, Alberta.

Sponsored by the Univ. of Calgary Archaeological Association. An interdisciplinary conference entitled: "Man and the Mid-Holocene Climatic Optimum." Contact Chacmool Programme Committee, Dept. of Archaeology, Univ. of Calgary, Alberta T2N 1N4 Canada.

Sept. 18-23, 1984 4th ANNUAL MIDDLE-ATLANTIC KNAP-IN. Thunderbird Paleo-Indian site south of Front Royal, Virginia.

Focus of workshop is problems of change from Paleo-Indian biface technology to Early Archaic technology. Contact Michael Johnson, 2842 Franklin Walk, Falls Church, VA 22042.

Sept. 26-28, 1984 SYMPOSIUM ON VIRGINIA QUATERNARY. Charlottesville, Virginia.

Sponsored by the Virginia Division of Mineral Resources on the occasion of its 150th anniversary. Invited speakers discuss ancient plant and vertebrate communities, megafaunal extinctions, archaeology, upland geomorphology, and Quaternary zoogeography. Poster paper contributions requested; titles by August 1. Contact S. O. Bird, Virginia Division of Mineral Resources, P.O. Box 3667, Charlottesville, VA 22903.

Jul. 21, 1984 4th ANNUAL WORLD OPEN ATLAS CONTEST AND FLINTKNAPPING DEMONSTRATIONS, Saratoga, Wyoming.

Camp Paleo is from July 20-22, a gathering of professional and avocational archaeologists which takes place every year. For information about next year write to Archaeology, Box 703, Saratoga, WY 82331.

Nov. 2-4, 1984 51st ANNUAL MEETING OF THE EASTERN STATES ARCHAEOLOGICAL FEDERATION, Holiday Inn, Annapolis, MD.

Topics include: colonial Maryland archaeology, aboriginal coastal communities, Late Woodland, ethnoarchaeology. Contact Ronald Thomas, Box 676, Newark, DE 19711.

Nov. 15-17, 1984 NEW WORLD CONFERENCE ON RESCUE ARCHAEOLOGY, Dallas Hilton Inn, Dallas, TX.

Seminars and panel discussions with invited speakers from North and South America will discuss needs, problems, and possible solutions for resolving cultural preservation conflicts in the design and construction of major public works. Contact Fred Wendorf, Dept. of Anthropology, Southern Methodist Univ., Dallas, TX 75275.

Oct. 4-6, 1984 GREAT BASIN ANTHROPOLOGICAL CONFERENCE, 19th biennial meeting, Owyhee Plaza Hotel, Boise, ID.

Contact Max G. Pavese, Dept. of Sociology-Anthropology, Boise State Univ., Boise, ID 83725.

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 - Comparison of artifacts produced by Callahan and Bonnichsen
 - Conclusion
- Cognitive Archaeology: Using Experimental Analogues for the Analysis of Prehistoric Artifacts
 - Introduction
 - A case study: The Clovis problem
- Conclusion

References

- Appendix I: Data for the Callahan Experiment
 Appendix II: Data for the Bonnichsen Experiment
 Appendix III: Supplemental Information on Data Collection and Analysis
 Appendix IV: Plates of Attributes Used in Coding Experimental Artifacts
 Appendix V: Plates of Experimental Artifacts
 Appendix VI: Principles of Force Mechanics Associated with Flake Scar Morphology

FORTHCOMING TITLES

- NEW EVIDENCE FOR THE PLEISTOCENE PEOPLING OF THE AMERICAS
 Contributions in English, Spanish and Portuguese with extensive English abstracts
 Alan L. Bryan (Ed.)
- ARCHAEOLOGICAL SEDIMENTS IN CONTEXT
 Julie K. Stein and William R. Farrand (Eds.)
- ENVIRONMENT AND EXTINCTIONS: MAN IN LATE GLACIAL NORTH AMERICA
 Jim I. Mead and David Meltzer (Eds.)
- ANIMAL REMAINS FROM ARCHAEOLOGICAL SITES
 D. Gentry Steele and B. Miles Gilbert (Eds.)

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Center for the Study of Early Man, University of Maine at Orono, Orono, ME 04469

MAMMOTH BRIEFS

Robert Thorson (University of Alaska Museum) announces the formation of the Alaska Quaternary Center and development of a new Quaternary Studies program at the University of Alaska. The Quaternary Center was established in 1983 to help coordinate Quaternary research and instruction. They are working to provide visiting professor and visiting scientist programs, promote opportunities for Quaternary research, and serve as a clearinghouse for events and findings of interest to scientists throughout the world. Research specialties at the University of Alaska include glaciology, volcanology, archaeology, paleocology, and other aspects of arctic and subarctic environmental processes.

John Fagan (Portland District Corps of Engineers, Oregon) and **Melvin Aikens** (University of Oregon) have received National Science Foundation funding for field work at the Dietz Clovis site, discovered by Dewey Dietz of Redmond, Oregon. With over 60 Clovis artifacts, the site is one of the largest in the West. Since the site is confined to the surface, investigators are attempting to relate it to lake shore features in order to address the question of whether Clovis hunters were adapted to lake shore environments. Geological dating of valley sediments is needed to help date the site. A private foundation has been established to fund the laboratory analysis and integrate the archaeological, geological, and paleo-environmental data.

C. Vance Haynes (University of Arizona) and **Dennis Stanford** (Paleoindian Program, Smithsonian) will continue work at Blackwater Draw this summer. Funding is provided by a National Geographic Society grant. Field work was conducted last summer as well. This season they plan to extend excavation in the Paleoindian levels and to investigate the levels below Clovis known to contain bone remains. Blackwater Draw is located at Portales, New Mexico, and is a key stratigraphic site for Paleoindian research.

Larry Agenbroad (Northern Arizona University) and **Norm Tessman** (Sharlot Hall Museum) have unearthed remains of four mammoths in the Prescott Valley and St. Johns area of Arizona; these remains were exposed by flooding last September. The mammoths found in Prescott Valley are Columbian mammoth, generally dated from 16,000 to 11,000 years ago. The St. Johns discovery also involved **Charles Hoffman** and **B. Miles Gilbert** (both of Northern Arizona University). The St. Johns mammoth is judged to be about 100,000 years old and may be an Imperial mammoth, not found previously in Arizona. Further work is being done to date the remains and assign specific species designations.

SUGGESTED READINGS

On Siberian-Alaskan Population Genetics

Crawford, Michael H. and Victoria B. Enciso. 1983. Population structure of circumpolar groups of Siberia, Alaska, Canada, and Greenland. In *Current Developments in Anthropological Genetics. Vol. 2. Ecology and Population Structure*, edited by M.H. Crawford and J.H. Mielke. New York: Plenum Press.

Szathmari, E.J.E., and N.S. Ossenberg. 1978. Are the biological differences between North American Indians and Eskimos truly profound? *Current Anthropology* 19(4): 673-701.

On Mammoths in a Nutshell

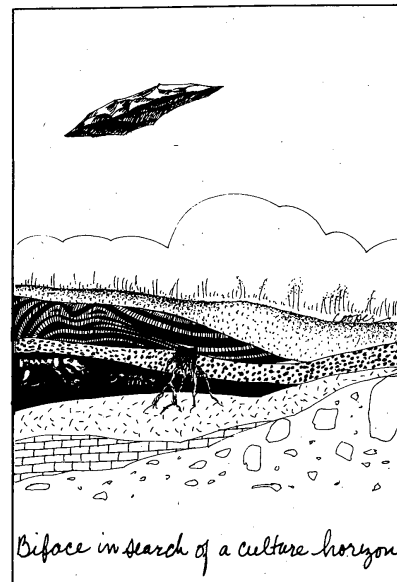
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