

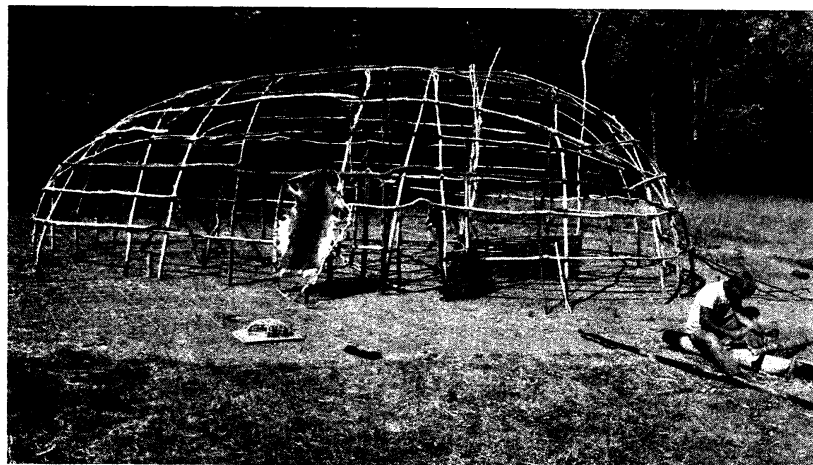
# MAMMOTH TRUMPET



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Center for the Study of Early Man

University of Maine at Orono  
495 College Ave. Orono, Maine 04473



Paleo-house near the end of phase one of reconstruction. Wattlework interior walls near entrance deflect cold from main rooms. A double back (north) wall, not shown in this photo, also serves as additional insulation against cold weather. Deerhides, as shown, will cover the entire house when complete. Note scale model in foreground.

## THE FLINT RUN PALEOINDIAN HOUSE RECONSTRUCTION

Near the South Fork of the Shenandoah River, a small creek called Flint Run traverses a flood plain on the northeast side of the river along outcrops of jasper. 10,000 years ago, Paleoindians built a house across the river from the creek. Articulate, intelligent and refined are some of the adjectives used by experimental reconstructive archaeologist Dr. Errett Callahan to describe the Paleoindians who built and occupied this house, which he planned and partially reconstructed last July.

Located in the Shenandoah Valley of Virginia, the Paleoindian base camp was found during 1970-71 by archaeologists led by Dr. William Gardner from Catholic University of America. Alerted to the probability of excellent dig sites by the presence of artifacts in local amateur collections and sponsored by a grant from the National Geographic Society, Gardner's team surveyed the Shenandoah Valley for prehistoric camp sites.

During excavation of the area called the Thunderbird site complex, a series of post molds were discovered. For hundreds of yards outside the post mold area, a full range of Paleo and Late Paleoindian fluted points in all stages of manufacture as well as a wide range of flake tools such as graters, spoke shaves, scrapers, and modified flakes, with all the associated debitage, provided ample evidence that the manufacture of Paleoindian tools had gone on there.

In addition to the general debitage outside the post mold area, a few pits were found inside the area. The pits were empty, and it was difficult to tell if they were contemporary with the house. In addition to the

usual erosion and wear and tear of time, the site had been partially plowed, which had destroyed several inches of overlying materials. Fortunately, the building had been situated part way up a hill, a position which inhibited plowing of the complete area and left some parts of the site relatively intact. Had it been located further down on the flood plain, plowing might have destroyed the whole site.

About a year ago, Dr. Gardner and his wife, Joan Walker, Director of the Thunderbird Museum and Archaeological Park, came up with the idea of trying to do a reconstruction of the house. Callahan became involved in the reconstruction project for several reasons: he has worked with Clovis flintknapping for more than half his life; he's experienced in reconstructive archaeology, and he's very familiar with the Shenandoah Valley area. "I wrote my master's thesis on Clovis tools from the Thunderbird site complex," he said. "I visited the site very early in the 1970s when they were excavating it, and I even slept down in the house area itself one night."

"They commissioned my company, Piltdown Productions, to make the same types of tools to use in the reconstruction that the original builders would have used. We didn't have much evidence of the tools used for felling trees of three or four inches, the diameter of the posts, but I've noticed that a Clovis point goes through five or six stages during its construction. There is a biface stage comparable to a handax, in addition to the large chunks of rock, cores, used in Australia to make wooden bowls."

"I've tried these bifaces or unhafted axes before: they will work to cut a four or five inch locust pole, but it's extremely tough on the hands. With the huge number of trees needed for the house reconstruction, we needed a hafting system. I followed the Old World model of hollowing out one end of an antler—deer, moose, elk, or caribou—and inserting a biface. I fitted

(Continued on page 5)

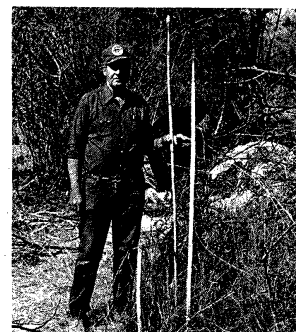
## ASSESSING ESKIMO AND INDIAN AFFINITIES: CLOSER THAN YOU THINK

"It's a story that goes back to an interest I've had ever since childhood," comments Emöke Szathmari, "having to do with where native Americans came from." She recalls reading James Fenimore Cooper novels in her native Hungarian and the interest that sparked in her as she was growing up. That interest flowered into a career in physical anthropology. Now at McMaster University in Hamilton, Ontario, Szathmari has been working for over a decade to analyze the genetic similarities and differences between Eskimos and subarctic Indian groups.

The relationships among these groups are a piece of the puzzle of how the Americas were peopled. "I'm interested in genetics as the tool to work with, mainly because one is much closer to the actual inherited material; the genetic traits that one works with are not subject to environmental distortion."

(Continued on page 7)

### George Frison:



George Frison displays his experimental elephant hunting weaponry: atlatl (left), and two shafts and foreshafts hafted with Clovis points. The righthand shaft proved too heavy to use. (Photo courtesy of George Frison)

## ELEPHANT HUNTING

Three weeks a year for the last two years, a man armed only with prehistoric weapons has been hunting elephants in Hwange National Park in Zimbabwe, Rhodesia. While hunters all around him are bringing them down with high-powered rifles, George Frison picks out one mortally wounded but still living elephant and dispatches it either with an atlatl and dart or a thrusting spear, presumed weapons of the Clovis hunters. The purpose of the research was to understand Paleoindian mammoth killing and butchering using the modern elephant as a model.

"What I wanted to do," Frison says, "was to get some firsthand experience with the efficiency of Clovis

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# C E N T E R N E W S

## NEW FEATURE FOR CURRENT RESEARCH IN THE PLEISTOCENE

Beginning with this volume, which will be out at the end of April, **CRP** will include a new Regional Focus section. This section is meant to provide additional coverage of a particular region and will have invited articles which are slightly longer than the usual articles.

Northeast Asia is the focus of this volume. Five articles, one from Japan and five from China, summarize key aspects of Pleistocene research currently being conducted there.

We have been delighted with the healthy number of subscriptions to **CRP**, and encourage you to urge your libraries to subscribe—it looks like we'll be around awhile.

**CRP** is meant to bridge the temporal gap between the initiation of new research and its ultimate publication upon completion. By subscribing, you can keep your finger on a number of pulses. Our turnaround time is only three months, which means you can find out what's happening in yours and other disciplines quickly and efficiently.

## SUGGESTED READINGS

### On Flint Run

**The Flint Run Paleo-Indian Complex: A Preliminary Report 1971-73 Seasons.** Occasional Publications #1. Catholic University of America, Washington DC.

Callahan, Errett 1981 **Pamunkey House Building: An Experimental Study of Late Woodland Construction Technology in the Powhatan Confederacy.** 1981 PhD dissertation through Catholic University of America, University microfilm #81-21269.

**The Saint Mary's LongHouse Experiment: The First Season.** 1985 Quarterly Bulletin of the Archaeology Society of Virginia 40(1):12-40.



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Callahan, Errett 1979 **The Basics of Biface Knapping in the Eastern Fluted Point Tradition: A Manual for Flintknappers and Lithic Analysts.** *Archaeology of Eastern North America* 7:1-180.

### On Milliron

Frison, George & Lawrence Todd 1985 **Colby Mammoth Site: Taphonomy and Archaeology of a Clovis Kill in Northern Wyoming.** University of New Mexico Press.

### On Atlatls

Laird, Roderick D. 1984 **How to Make and Use the Atlatl the Ancient Weapon of the Ice Age Hunters.** Atlatl Press, PO Box 703, Saratoga, WY 82331.

### On Mummies from Chile

Allison, Marvin J. 1985 **Chile's Ancient Mummies.** *Natural History*, Oct. 1985.

### On Eskimo-Indian Affinities

Szathmari, Emöke 1985 **Peopling of North America: Clues from Genetic Studies.** In R. Kirk and E. Szathmari (Eds.), **Out of Asia: Peopling of the Americas and the Pacific.** *Journal of Pacific History*, Canberra, Australia.

Szathmari, Emöke J.E., and Nancy S. Ossenberg 1978 **Are the Biological Differences between North American Indians and Eskimos Truly Profound?** *Current Anthropology* 19(4):673-701.

Laughlin, W.S. and A.B. Harper (Eds.) - 1979 **The First Americans: Origins, Affinities and Adaptations.** Gustav Fisher, New York.

### On Jean Auel's Novels

Soffer, Olga **The Upper Paleolithic of the Central Russian Plain.** (forthcoming from Academic Press).

Solecki, Ralph S. - 1971 **Shanidar.** Alfred A. Knopf, New York.

## CORRECTIONS

**Archaeology in Argentina** - We had incorrectly stated that the radiocarbon date of  $10,720 \pm 150$  was obtained from the level in which the Cerro La China fishtail projectile points were found. Nora Flegenheimer brings to our attention that the radiocarbon date comes from a charcoal sample (associated with lithic remains) from a site about 100 m away from the site in which the projectile points were found.

**Theriological Congress** - The word *lysosome* which we have defined as a type of blood protein should be *lysozyme*, a digestive enzyme.

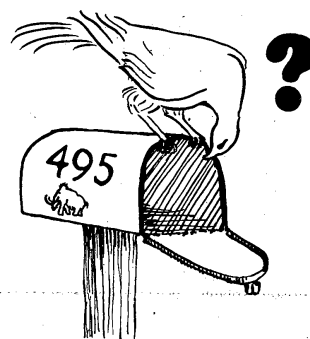
**International Council on Archaeology** - Richard H. Meadow informs us that our statement "Volumes constituting proceedings from the previous three conferences subtitled . . ." should be "Volumes from the London conference so far published are subtitled . . ." The Council would like to qualify their membership announcement to read: Corresponding membership in the International Council on Archaeozoology is available to anyone practicing or seriously interested in archaeozoological or closely related research for a voluntary contribution of US \$2.00 per annum, by writing to Dr. A.T. Clason, General Secretary ICAZ, Biologisch-Archaeologisch Instituut, Poststraat 6, 9712 ER Groningen, Groningen, The Netherlands. Please include your full address and particulars about your research interests, and please make checks payable to: R.U. Groningen, Groningen, The Netherlands, Postgiro 826171 (B.A.I. 771.00-7400). In return, you will receive a copy of the annual address list and newsletter.

## GOOD NEWS ON THE FUNDRAISING FRONT

Due to many, many small and several very large gifts from individuals and foundations, the Center is very close to meeting the Bingham Challenge! The Bingham Trustees had offered the Center \$500,000 for its endowment if we could match the amount. In addition, our success will mean an additional \$500,000 for the Institute for Quaternary Studies, of which the Center is a part.

Our endowment goal is 1.3 million dollars, which will enable us to continue our efforts to stimulate research and to do public outreach. If you are a contributing, sustaining, or patron member, you have already contributed to the endowment. But you can help us get over the top in meeting the Bingham Challenge simply by pledging your continued membership over several years, or increasing your membership level.

If you are interested in donating at a higher level, we would be happy to give you information on giving levels and forms of donor recognition. We look forward to hearing from you.



## GLOSSARY

**Atlatl** - a spear thrower. The atlatl is an implement which, attached to the end of a spear, serves to increase the length of a hunter's arm; and in turn, increase the speed, striking power, and accuracy of a thrown spear.



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## George Frison: ELEPHANT HUNTING



(Continued from page 1)

weapons and Clovis tools. I know that there have been several experiments—of course the famous Ginsberg experiment; and then there's the one we did here in Denver. And I think there's been three, four, five elephants, maybe, cut up.

"But the thing is that there's nothing that compares to a nice, warm animal if you're going to butcher. Once the thing sits around and gets cold, it's a different ball of wax when you start either skinning or processing or butchering or anything else. The same thing is true of an animal that you want to try to stick a spear in. It's a bit different from taking an animal that's cold, dead, stiff, lying on the ground, and taking one that's either newly dead or dying and be able to see what you can do with Clovis weaponry."

The occasion for Frison's foray was a massive culling of an ecologically excessive population of elephants at the Hwange National Park. Clem Coetzee and David Cummings, director and senior wildlife director respectively, found that instead of an ideal 18,000, they had 26–27,000 elephants overrunning the park. To spell out the job they were faced with: 8–9,000 elephants had to be slaughtered, a rather appallingly bloody task to contemplate. "Well, they had to do it," Frison explains, "because the elephants are the top of the food chain. When elephants get done with a piece of country there's absolutely nothing left." So, with the help of Gary Haynes, who, with Coetzee, has published research on what happens to elephant bones under natural conditions, and Drew Conybeare, a wildlife biologist who has done work on aging elephants, Frison managed to get permission to participate in the cull with his Clovis weapons.

Beyond the thrill of hunting as people did more than 10,000 years ago, the cull itself was a remarkable experience. Entire families were culled, the bigger the better, numbering from as few as 8–12 to as many as 73 individuals. Once the elephants were slaughtered, a horde of butchers swarmed over the carcasses, skinning them and taking the hide and ivory (proceeds going to support the park), cutting off the meat and hauling it back to camp, either for pet food or for human consumption.

"What we were dealing with was, I think, realistic in terms of what prehistoric peoples were looking for: they were looking for meat. And although you find males in Clovis kills, most of them I think were young animals, from nursery herds. Of course, all this is based on the assumption that African elephants behave somewhat as mammoths did, but I think it's a valid assumption. Looking at the frozen mammoths, we find out that the hide's about the same thickness; the animals are roughly the same size."

Frison had to joint the 6–7 foot shafts of his spears in order to take them with him on the regular commercial flight from the United States. There was no problem at the airport: Clovis points apparently do not show up very well on X-rays, thus sparing customs officers the burden of deciding whether Frison was a potential hijacker armed with prehistoric spears. The joint does, however, cut down slightly on the efficiency of the throwing, imparting a midair wobble that may help drive the shaft into the hide but which also helps to snap the joint.

Into a hole on the main shaft, Frison inserted various 18-inch foreshafts with Clovis points bound on with sinew, the sinew tarred over to help prevent expansion from the animal's moisture and heat. "I learned a lot very quickly about hafting, putting the points on the foreshafts. As usual, I started out mak-

Experimental weaponry (right) used by Frison included two Clovis points hafted onto wooden foreshafts with pitch and sinew. Both points shown need new pitch and sinew bindings. The upper point proved too large and the sinew wrapping too bulky to penetrate well, but the lower point penetrated deeply into the back and ribcage of an elephant (right) up to a dozen times with little or no damage to the point. (Photos courtesy of George Frison)

ing them entirely too big and too strong, and found out that if you have too big a wad of sinew to tie something on with, it simply won't let the point penetrate the animal." For effective penetration, point and shaft have to be lined up absolutely straight. Frison's spears, their Clovis points made by Bruce Bradley, are replicas of southwestern throwing sticks, a bit longer than the Eskimo equivalent. A spear has to be custom-made for the thrower, it should be noted: if you are, say, 5'6", you cannot pick up and expect to use successfully a spear made for George Frison's 6'2" frame and long arms.

Those spears "worked pretty well," Frison summarizes, "and I was very impressed with how really lethal a weapon they can be." The projectile points break, but not all that often, unless they happen to hit a rib: one of his points has now penetrated twelve elephants with no damage and only a little dulling,

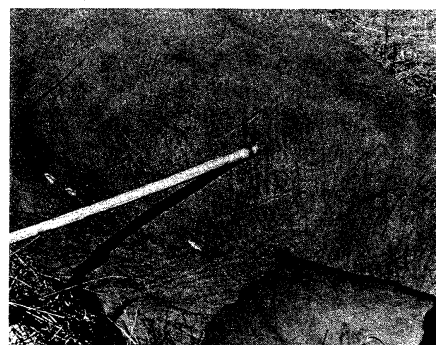
*I flaked a flint to a cutting edge,  
And shaped it with brutish craft;  
I broke a shank from the woodland dank  
And fitted it head and haft.  
Then I hid me close to the reedy tarn,  
Where the mammoth came to drink.  
Through the brawn and bone I drove the stone,  
And slew him on the brink.*

Author Unknown

which can be eliminated by resharping. A Pleistocene hunter did need to test his points *before* he took the risk of confronting an actual elephant, though. "I had one point that I thought would be the best I had, and it broke three times because of a flaw in the material." Frison recorded point breakage (along with weights of projectile points, thicknesses of hide, depths of penetration, weights and lengths of foreshafts etc.) and noted distinctive impact fractures. He has sent some of his used points to be studied under electron microscope for characteristic wear patterns, but has had no chance to look at the data yet.

How does one go about killing an elephant with a Clovis weapon? Answer: Carefully—very carefully. "You're not going to drop an animal in its tracks any way in the world, because to do that you've got to get into the brain . . . I think it's pure suicide to sit up there and try and stop an elephant that's coming at you." The two animals Frison killed had already been hit by rifle fire and had gone down on their knees, so that they were slightly easier to reach with a thrusting spear. Aiming a bit uphill takes the spear naturally into a point about two-thirds of the way down the side of the body. The heart being for all practical purposes inaccessible at the bottom of the rib cavity, the preferable target to go for is the lungs. If you miss those, you will hit the intestines, inflicting a wound that may be fatal—but perhaps hours, even days later.

You may also wound from a distance with a throwing spear—indeed, from a surprisingly long distance. Frison threw at his two elephants from 40–55 feet, and he considers that fairly close. With practice—a lot of practice, admittedly—he is sure he



could throw from 75 feet, perhaps even 100. Even at these distances there is no time to take a run to build up force behind your throw: elephants run fast. One stands still, and hurls with all the body English one can muster. Although the elephant's hide is tough and thick (up to 18–20 mm on the backs of the ones that Frison measured, down to as low as 5–6 mm. on the belly), the points cut through them without a great deal of difficulty.

"The first one I got, I actually put the shot clear over its back; it wasn't too good a throw because I pulled down too far with the atlatl. It hit the animal, but it just went right over . . . But the second time it was a perfect shot. The only thing is, I got it in the front shoulder instead of into the rib cage. But what I wanted to know anyhow was penetration, and this was just perfect . . . You can tell from the sound when it hits whether you've got a good shot or not."

Frison is sure that he could follow a family, pick out a stray on the edge of the herd, and in the course of a day get a lethal shot into the animal, despite the fact that the herds are constantly on the move while grazing.

Having killed an elephant, one is faced with the task of skinning, something Frison took a crack at last year with big biface reduction flakes often found in Clovis sites. The best material to cut the hide with is quartzite, definitely superior to chert, which dulls too quickly. The hide is taken off in plates: the butchers Frison watched divided it into 6–15 sections. Frison himself removed enough hide to be sure that in about a day he could have butchered the whole animal—less, of course, if a group effort had speeded the process.

Dismembering is relatively easy, because unlike a bison, an elephant has no heavy sinews. It's leg is, in Frison's unsurpassable analogy, "a couple of pieces of four-inch sewer pipe tied together with a big plastic bandage. You take that big joint capsule and you cut around it, and the joints simply fall apart." There are, interestingly, no knife marks left on the bone, such as those produced in the effort of hacking through bison sinews.

For the curious, an adult elephant yields about 950–1050 kg. of meat (2,000 steak dinners?), with most of the meat carried on the front quarter: Clovis sites have been found with only the front quarter cached. Choicest cut is right under the shoulder blade; the trunk is not exquisite, but it is edible. The local butchers took shoulder blade meat, heart, and onions and shiskebobbed them: Frison says it was delicious.

Last year, Frison went on his own; this year he was funded by the Leakey Foundation. He would like to go back next year to do some taphonomic work on kills of past years: the bones are simply abandoned, and there are now carcasses that are two or three years old, which carnivores for one reason or another do not seem to bother very much. And besides, for next year, they are talking about culling buffalo.

—Michael Dolzani

The above poem was sent to us by a member, Michael Chaplan, who came across it in a 1980 reprint by DBI Books of Northfield, Illinois of the 1927 Bannerman Catalogue of Military Goods.

## Jean Auel's Novel Slant on the Past

## THE DREAMING OF THE BONES

Can there be anyone out there who has not heard of *Earth's Children*, Jean Auel's epic of the Paleolithic, and its heroine Ayla, the Cro-Magnon woman raised by Neanderthals? If that title, which designates the entire projected six-volume sequence, is not familiar, surely at least *The Clan of the Cave Bear* rings a bell. As the first volume, and the tale of Ayla's upbringing, *Clan* made Jean Auel a best-selling writer; the second book, *The Valley of Horses*, made her famous, or something very like it.

As for the third volume, *The Mammoth Hunters*, whose first printing of 1,000,000 copies is at this very moment spread over bookstore shelves and display tables with what must be the most effective coverage since the Würm glacier, it has been the subject of reviews and feature articles in innumerable places. Some of the popular sources have even consulted the "experts": the Center for the Study of Early Man is not exactly accustomed to being solicited for comments by the likes of *U.S.A. Today* and *Vogue*.

Following humbly in the footsteps of these illustrious predecessors, the present article attempts to suggest in what ways *Earth's Children* might prove rewarding to those with a serious interest in our prehistoric ancestry, as well as to those who just love a good romantic adventure story. The better the writer, the more levels on which she can be read; and it is the multi-leveled quality of Auel's writing that enables it to function as an imaginative re-creation of archaeology and anthropology for the lay person—to show that the concerns of science are, on the deepest level, human concerns.

## Earth's Children and Jean Auel

It has been reported in various places, but the story behind the story is worth retelling. For one thing, the "true" events are sometimes as remarkable as the "fictional" ones; for another, the stories of Auel and Ayla in some ways parallel each other, intriguingly though indirectly. There are, of course, obvious differences; but each is foregrounded against the myth of the gifted woman trying to come to terms with her society without either rejecting it or being subjected to it. "I went to this special high school where I could learn how to be a stenographer and learn to be a secretary," Auel says. (Her last name, by the way, rhymes with "owl" or perhaps with "ah, well," which is probably her reaction to how many people get it wrong.) "I took shorthand because, in those days, that was studying for a career, the only kind of career that was really open to women. It bothered my mother because she didn't want me to be studying for a career of any kind. And she *hated* it when I read science fiction. She'd say, 'Throw that trash away.'"

Perhaps it is more than coincidence that the first piece of "that trash" to make a lasting impression on Auel, at the age of twelve, was Robert Heinlein's classic story *Universe*. Although *Universe* takes place in deep space, it is about a people's effort to remember its earthly roots, written by an author always deeply concerned with the theme of the gifted "misfit" (like Ayla), whom society so often tries blindly to reject. Auel is one of those writers in whom experience sinks deep and re-emerges transformed, sometimes much later. It is possible that seeds of both the "earth's children" and the "ugly duckling" themes were planted very early by a combination of reading and life experience, to blossom when, at the age of forty, never having written any fiction in her life, she sat down one night and began *The Clan of the Cave Bear*.

Auel had five children by the age of twenty-five (surely enough to satisfy anybody's mother). But after reading Betty Friedan's *The Feminine Mystique* she transferred into an enjoyable job designing electronic circuit boards, and then acquired an M.B.A., also doing a little technical writing and poetry, but never stories. "And I don't know what happened, but one night I conceived of this idea for a story that I thought might be a science fiction story, of a girl or a young woman who was living with people who were less advanced, less developed. And they were different; but

they thought *she* was different. I thought it would be an interesting twist from the old B-movies where the minute you put the blond white beauty on the desert island, or in the African tribe, or on the Indian plain, they bow down because she's a beautiful goddess. And I'm saying: Nuts! She's going to be *ugly* to them. Because beauty's in the eye of the beholder. But she was taking care of an old man with a crippled arm, and that's why they were letting her stay.

"This was my idea. I had no idea where it came from: I hadn't read anything about it. My husband said, 'It's eleven o'clock, come to bed,' but I said, 'Wait a minute, I want to see if I can do this.' So I sat up until the wee hours of the morning, and wrote about ten pages. And I discovered two things, one of which was that it was fun, really fun to try to create these scenes and people. The other was that I didn't have the faintest idea what I was writing. I didn't know if these people wore clothes, or, if so, what kind of



Ray and Jean M. Auel.

(Photo courtesy of Ann Bonnichsen)

clothes. How did they live, how did they look? Did they perspire?

"I thought I'd do a little research. So I went first of all to *Encyclopedia Britannica*, which I had at home. And of course the encyclopedia either has too much or not enough; and besides that, it was written more or less by professionals for professionals, so everything I was reading about early humans was 'pebble culture,' 'Aurignacian,' 'Mousterian'—all these words that didn't mean anything to me at the time. But I discovered that most scientists do believe that there was a time in our prehistory when two different kinds of humans were on earth simultaneously. And that headed me to the library."

Telling her teenage son that she would meet him in two hours, she went to the library and began pulling books off the shelves. When a very irate sixteen year-old stalked in, four hours later, to find his delinquent mother, the first thing she said was: "Oh good, you're here. You can take the other armload of books down for me." She took home perhaps fifty books, and simply started reading them, one after another for four weeks, taking notes as she went. "And while I was going through them, the story idea kept growing."

Once she started writing, she worked twelve, fourteen, sixteen hours a day, seven days a week. "By the time I got through, I had something like 400,000-450,000 words of a story that had broken into six parts. And then I went back and reread it. And I will tell you, it stank. It was awful. All my feeling, all my passion, all my desires—it wasn't on the page. So I then went to the library and got books on how to write fiction, and books on literature, to find out what makes good fiction."

Halfway through rewriting the first of the six books, she developed writer's block: "You've never even written a short story and now you're telling me you're going to write six books?" her husband said. But she broke through it, using the same method as most writers: a persistence that most people, who work only to make a living, find incredible, and sometimes even quite disturbing. Relatives seriously recommended to Auel's husband that he should consult professional help. "I was up all night; I was sleeping all day; I was avoiding my friends—this was neurotic behavior to them." Whether it was or not, it matches the behavior of many other writers, from Balzac to John Gardner.

"I'm a project person," Auel offers in partial explanation. "I think there are two kinds of people in the world: there are process people and project people. Process people make the good managers. They're the ones who can stand an ongoing thing." For me, it's always the completion of the project. I want to see something."

This does not explain the reason for such a project, with all its exhausting labor, in the first place. At first, there was no thought of making money, of becoming a professional writer, or even, apparently, of having an audience; if such desires developed, they were secondary. *Earth's Children* seems an authentic visitation, a dream that took possession of Auel at that crucial age, "midway in the journey of our life," and would not let her go until she gave birth to it, or exorcized it, whichever the metaphor should be. At any rate, from the moment of conception in January, 1977, it took a lengthy gestation for Auel to "see something"—to produce, through four complete drafts, a finished first volume, *The Clan of the Cave Bear*, in October 1978. From that point, Auel's prehistory is over; and the rest is history.

## Earth's Children and Science

Actual artifacts have a remarkable power to stimulate Auel's imagination. "Nearly—not quite but nearly—all the 'hard' items mentioned in *The Mammoth Hunters* are based on actual artifacts. There is speculation on usage. Sometimes the speculation is my own and sometimes my speculation is based upon someone else's." But the whole point of *Earth's Children*, at least for those with an interest in the actual facts of human prehistory, is that, plot aside, it is not invention or fantasy, but an imaginative reconstruction. In creating it, Auel disciplined herself to the same criteria of logic and evidence as any scientist, if somewhat more freely. When she talks to leading scientists, she says, it comes out that they are often full of very similar creative speculations, based on fact, but have to be extremely careful about publishing them. That is her great advantage as a fiction writer: "I can write about them."

In doing so, she has become a bridge between science in general, (and human prehistory in particular) and the public, something that most scientists would probably agree is badly needed, whatever their tastes in reading matter.

"Certainly I didn't intend it—yet I think there was probably an idea there, simply because my feeling was . . . why do they think everybody went around wearing little bikinis made out of raggedy furs when they had needles? Why didn't they suppose that people sewed clothing? All kinds of things like that kept popping up, and I would just be more surprised and more intrigued, and then almost a little angry. 'How come I don't know? Why isn't this accessible? I'm going to tell it all.' I didn't think of it specifically in terms of being an outreach person; what I thought of it was, 'Here's all this wonderful information.' And I hoped that since I was really starting with this newest information, that people would understand that I had done my homework. And what has happened is that the scientific community for the most part has." Indeed, most of the negative reactions to the informational side of the sequence have come not from scientists but from publishing and literary people. "They see my characters as too developed. 'They're an anachronism; they're supposed to be much more savage.' I think what happened is that they took their obligatory Anthropology 101 twenty years ago, from a textbook that was twenty years out of date."

Jean Auel is not a popularizer, at least not if that term implies oversimplifying the facts. Actually, her complaint is that most other versions of the Paleolithic, including many of the older scientific ones, have been oversimplified into clichés or outright falsehoods. In the next issue of the *Trumpet* Auel recounts part of her vision of those early humans.

—Michael Dolzani

# THE FLINT RUN PALEOINDIAN HOUSE RECONSTRUCTION

*"We would only be recycling an old myth if we looked at the earliest people as being crude or primitive in any way."*

(Continued from page 1)

the biface in tightly and then filled it in with a little pitch. It was a very efficient tool.

"An interesting point about the axe is that the head can now be removed from the handle and recycled into a completed Clovis point. We could go back and examine the edge of the resultant flakes and compare them with the condition of prehistoric flakes. We could then infer this type of use."

How did Callahan decide on the house form for the reconstruction? Records from the original excavation provided a map of post molds, some pits, occasional odd postholes which did not seem to fit any pattern, and stream rocks scattered all over beneath the house area. Some of the "extra" postholes, he explained, could have been from new building or rebuilding on the site; it's also possible the builders put up temporary posts so they could reach the higher levels to work on construction. Once the posts' usefulness was over, they could have been removed.

Callahan began with a floor plan from the original dig and then drew out a three-dimensional sketch on paper. "From the three-dimensional sketch, you can eliminate the impossibilities of how the posts in the holes were connected," he said, "but, of course, that leaves you with a wide range of possibilities." Narrowing of possibilities into probabilities can be done somewhat with ethnographic analogy, in this case using Eskimo examples. "For the most part, I tried to work the problem out on paper, and then I built a model to scale using sticks of a comparable size and diameter," Callahan explained.

Early summer saw Callahan's project move from an indoor scale model to the field. The museum provided a few full-time people and a number of volunteers from the community and the Catholic University Summer Field School for two weeks of work on the project. "We built the reconstruction on the museum grounds, across the river and about a mile from the original site, which is currently covered with a housing development," he explained. "The reconstruction was oriented exactly as the original — north and south as well as uphill and downhill. This is the most exciting part of such projects: maintaining the highest level of integrity possible, creating an exact archaeological duplicate down to the centimeter."

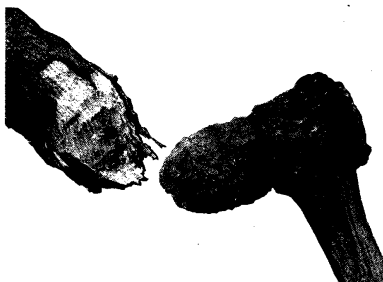
"Once the site was located, we removed the turf, gridded out the soil in one foot squares, and graded to the original elevation. The next step was to dig the postholes exactly as they had appeared at the original site. We used a mallet to drive in sharpened stakes the size of baseball bats to the depth of about 18 inches. Given the soil type and the stress that would be placed on the poles, 18 inches was the minimum depth I would dare use. Then we loosened the stakes and removed them, which left nice holes into which we dropped the poles."

"At this point the site looked just like an archaeological excavation, and thus far we were going exactly by the archaeological evidence. Our next step was to bend and connect the poles, and this is where conjecture or speculation entered the picture. It turned out to be exciting because we discovered that the poles tied together into a tight, oval structure that left no poles unexplained and only called for the addition of about half a dozen poles on the east end of the house. There was no very tight symmetry, but the original builders may have come down on a rock in some spots and simply moved the posts over to easier ground," Callahan continued.

Once the poles were stuck in the ground, the arches were formed. Rather than just bending the poles together and getting on someone's shoulders to tie them, Callahan chose to work systematically. Opposing poles were taken out of the ground and laid down



Errett Callahan (Photo by Rene Fruchey)



Hop-hornbeam pole and the Clovis biface axe that felled it. Hafted in antler or wooden sockets with pitch, and sometimes wrapped with rawhide or sinew, the blades were easily interchangeable, but were found to be very durable and rarely broke. All axes and knives used during construction were made by Callahan and will become part of an exhibit at the Thunderbird Museum.

with their distal ends overlapping. Then rather loose ties were made in three places where the poles overlapped. The loosely tied poles were replaced in their holes so Callahan could stand back and view what adjustments should be made to get the arches in the best configuration. Once adjusted, they were permanently tied, and the arch could then be laid out on the ground and used as a template to tie other sets of poles. This added a systematic, rather than purely haphazard, step to the reconstruction.

The pitch of the roof was kept as low as possible because the original builders were living in the Ice Age, and while the area was not glaciated, it was cold. The poles were put under the maximum stress they could take without cracking, and this produced a low roof to help keep in heat.

"Once the side poles were all tied and we had our arches," Callahan said, "we took the poles on the ends and laid them down across the tops of the house, crisscrossing them all along the top. The horizontal poles of hickory, ash, or maple were tied all around the sides of the house except where we thought there would have been a doorway."

Visualizing a possible entrance in relationship with some of the interior postholes in the center of the house, one can see a kind of funnel hallway from the doorway into the middle of the house — its central room or rooms. This could have served as the place where a person would take off outdoor robes, knock the snow off them and hang them up before lifting a protective mat to enter the main living area.

In tying the horizontal poles around the outside of the house, Callahan was forced to use temporary fiber lashings which will be replaced with rawhide strips as acquired. "We continue to hold with the faunal orientation; it is highly probable that whitetail deer were especially abundant in this area during the Late Paleolithic. They appear to have been the pre-



Staked-out floorplan on a string grid clearly shows the oval outline of the house. Red cedar and black locust poles, foreground, have been stripped of bark and fire-hardened to prevent decay before being set into the earth. (All photos courtesy of Errett Callahan)

dominant animal at that time, rather than mammoth, mastodon, or caribou. While Callahan feels that grasses may have been used to insulate the house, he also feels that there were far too few trees of an adequate size to allow the use of bark as shingling. The original builders would most likely have used the materials in their environment to the maximum advantage.

Probably, the builders of the Flint Run house were not year-round residents, but it is likely they would have lived there during the coldest part of the winter. And the winters of that time were about 5°

(Continued on page 6)

Robert Verrey—

## PALEO HOUSE, PHASE II

The job of putting the flesh on the frame at Flint Run has fallen quite naturally to Robert Verrey, a Ph.D. candidate at Catholic University who has been working at Thunderbird museum for the past six years. Verrey worked with Errett Callahan in the construction of the frame, doing everything from generating hypotheses about probable relationships between posts to skinning the bark off trees with stone tools.

Verrey has been in contact with several hunting groups in the Washington D.C.-Northern Virginia area to try to round up the estimated 200 white-tailed deer skins that will be required to complete the roof. The skins will have to be scraped, to remove the fat, stretched and dried to be made ready. Once up, they will be overlaid like shingles to allow rainwater to roll off the intact deer hair. The skins will be cured by keeping smoky fires going in the house for about a week, a process meant to simulate the curing that would have taken place naturally when such skins hung over the continual small fires of the Paleoindians.

The 200 skins is more than the Indians probably needed, who would have used the larger caribou and perhaps (though not likely) mastodon hides. Still, even for the Indians, roofing the houses required much work for the approximately 8-20 people that might have lived in such houses. It was enough work that Verrey believes the Indians would have had to continue to keep their stockpile up by carrying the good skins from place to place as they wandered and replacing no more than 20-30 at one time.

Although interested in replicative archaeology, Verrey considers himself more of a digger, or excavation oriented archaeologist than his colleague Callahan. His nearly completed dissertation describes the manufacture of the tools used by the Indians at the Thunderbird site. Near the reconstructed Flint Run house, there is an area where a major amount of bifacial and unifacial toolmaking was done by different Indians over several generations. Verrey believes that some of the tools made there were meant for use on the site, some were meant for a single use and discarded, but many were "curated," meant to be carried away for use at places where there would not have been sufficient materials to manufacture such tools.

—Al Lindsay



## UPCOMING CONFERENCES

**April 23-26, 1986 SOCIETY FOR AMERICAN ARCHAEOLOGY 51st Annual Meeting, The Clarion Hotel, New Orleans, LA.**

For more information contact Annual Meeting Chair: Robert W. Neuman, Museum of Geoscience, Louisiana State University, Baton Rouge, LA 70803.

**May 19-24, 1986 INTERNATIONAL SYMPOSIUM OF ARCHAEOMETRY, Nuclear Research Centre, Athens, Greece.** Topics include: non-metals, dating of organic materials (e.g. radiocarbon and other cosmogenic nucleides, dendrochronology, amino acid dating), and dating of inorganic materials (e.g. thermoluminescence, ESR, fission track, uranium series, archaeomagnetism). Contact Dr. Yannis Maniatis, Archaeometry Symposium, NRC Demokritos, 153 10-GR Aghia Paraskevi, Attiki, Greece.

**May 19-21, 1986 GEOLOGICAL ASSOCIATION OF CANADA - MINERALOGICAL ASSOCIATION OF CANADA - CANADIAN GEOPHYSICAL Union Annual Meeting, Ottawa, Ontario, Canada.**

Contact Dr. J.A. Donaldson, Department of Geology, Carleton University, Ottawa, Ontario, Canada K1S 5B8.

**May 23-24, 1986 THE ETHICS OF COLLECTING CULTURAL PROPERTIES: WHOSE CULTURE? WHOSE PROPERTY?, Minneapolis Institute of Art Pillsbury Auditorium, Minneapolis, MN.**

For more information contact: Arts Resource and Information Center, 2400 Third Avenue, S., Minneapolis, MN 55404; 612/870-3131 or 800/338-ARTS.

**May 25-30, 1986 AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE Annual Meeting, Philadelphia, PA.**

For details contact AAAS Meeting Office, 1101 Vermont Avenue NW, Washington, DC 20005; 202/842-9530.

**May 31-June 1, 1986 7th ANNUAL MID-SOUTH ARCHAEOLOGICAL CONFERENCE, Natchez, MS.**

Topic area: The Paleoindian Period - Fluted Points to Dalton. For additional information contact Sam Brooks, Environmental Section, Vicksburg District Corps of Engineers, PO Box 60, Vicksburg, MS 39180; 601/634-5442.

**June 2-4, 1986 NINTH BIENNIAL AMQUA MEETING, University of Illinois, Champagne, IL.** Details to be announced.

**July 7-11, 1986 GEOCONGRESS '86, an International Earth Science Congress, Johannesburg, South Africa.** 21st Biennial Congress of the Geological Society of South Africa. Contact Symposium Secretariat, S.339, CSIR, PO Box 395, Pretoria 001, Republic of South Africa.

**July 18-20, 1986 ARCHAEOLOGY'S SIXTH ANNUAL ARCHAEO DOINGS, Camp Paleo, Saratoga, NY.** The sixth world open atlatl contest, flintknapping demonstrations, early man symposium. Atlatls and spears must be made out of materials available 2000 years ago, although use of today's super glues is acceptable. For more information write: Archaeology, Box 694, Saratoga, NY 12331.

**August 12-15, 1986 NORTH AMERICAN PALEONTOLOGICAL CONVENTION, Boulder, CO.**

Topics include: Mesozoic communities on land and sea, conceptual problems and analytical tools, community paleoecology and habitat systems, paleobiology of the major invertebrate taxa, golden age of dinosaurs, North American cave taphonomy, and taphonomy of open air sites. Contact Dr. Robert Bakker, Museum Annex, Hunter Building, Campus Box 315, University of Colorado, Boulder, CO 80309-0315.

**August 25-29, 1986 12th IAS SEDIMENTOLOGICAL CONGRESS, Canberra, Australia.**

For details contact Dr. K.A.W. Crook, Department of Geology, Australian National University, PO Box 5, Canberra, A.C.T. 2600.

**August 25-29, 1986 5th INTERNATIONAL CONFERENCE ON ARCHAEOZOOLOGY, Bordeaux, France.**

The conference is soliciting papers and ideas in the field of archaeozoology, defined as the "study of animal remains connected with the settlements of ancient human groups." Contact Dr. Peter Ducos, Conference ICAZ, C.R.E.P., St. André de Cruzières, France.

**September 1-7, 1986 UNION INTERNATIONALE DES SCIENCES PREHISTORIQUES ET PROTO-HISTORIQUES, Xth Congress, Southampton and London, England.**

For details contact Peter Ucko, Department of Archaeology, University of Southampton, England, SO9 5NH.

**October 16-19, 1986 SOCIAL SCIENCE HISTORY ASSOCIATION 11th Annual Meeting, St. Louis, MO.**

Contact Program Chair Richard Steckel, Department of Economics, Ohio State University, Columbus, OH 43210; 614/422-5008 or 6701; or Co-Chair D'Ann Campbell, Department of History, University of Indiana, Bloomington, IN 47405; 812/335-3849.

**October 20-24, 1986 MEXICAN ASSOCIATION OF BIOLOGICAL ANTHROPOLOGY Fourth Biennial Congress, Mexico City.**

For information write Asociación Mexicana de Antropología Biológica, c/o Instituto de Investigaciones Antropológicas, Ciudad Universitaria, Delegación Coyoacan, 04510 Mexico D.F., Mexico.

**November 7-9, 1986 19th ANNUAL CHACMOOL CONFERENCE, Calgary, Alberta, Canada.**

This year's theme: Diet and Subsistence: Current Archaeological Perspectives. For additional information write to: Programme Committee, Department of Archaeology, University of Calgary, Calgary, Alberta, Canada T2N 1N4.

**November 10-13, 1986 GEOLOGICAL SOCIETY OF AMERICA, Annual Meeting, San Antonio, Texas.**

Contact S.S. Breggs, Geological Society of America, PO Box 9140, 330 Penrose Place, Boulder, CO 80301.

**December 3-7, 1986 AMERICAN ANTHROPOLOGICAL ASSOCIATION 85th Annual Meeting, Franklin Plaza Hotel and Holiday Inn Center City, Philadelphia, PA.**

Deadline for all submissions is April 1, 1986; forms to be provided in January, 1986 AN. Program Editor to be announced.

**May 25-27, 1987 GEOLOGICAL ASSOCIATION OF CANADA - MINERALOGICAL ASSOCIATION OF CANADA Annual Meeting, Saskatoon, Saskatchewan, Canada.**

Contact W.O. Kupsch, Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 0W0.

**July 31-August 9, 1987 12th CONGRESS, INQUA, Ottawa, Ontario, Canada.**

Contact Dr. Alan V. Morgan, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

**August 21-23, 1988 THE CANQUA/7th YORK QUATERNARY SYMPOSIUM, Lethbridge, Alberta, Canada.**

The conference theme will be Paleoenvironmental Reconstruction of the Late Wisconsin Deglaciation and the Holocene. Contact Dr. R.W. Barendregt, Quaternary Symposium, Department of Geography, University of Lethbridge, 4401 University Drive, Lethbridge, Alberta, Canada T1K 3M4.

**GEOLOGICAL SOCIETY OF AMERICA MEETINGS**

1986 San Antonio, Texas (Nov. 10-13)

1987 Phoenix, Arizona (Oct. 26-29)

1988 Denver, Colorado (Oct. 31-Nov. 3)

For details: S.S. Breggs, Geological Society of America, P.O. Box 9140, Boulder, CO 80301.

## NEW REFERENCES AND RESOURCES

**Archaeological Inventory and Predictive Modeling in the Pacific Northwest**, edited by Richard Darsie, James Keyser and Steven Hackenberger. One of three volumes in USDA Forest Service Pacific Northwest Region's publication series, "Studies in Cultural Resource Management". For more information write to: James E. Keyser, Regional Archaeologist, USDA Forest Service, PNW Region, 319 SW Pine, P.O. Box 3623, Portland, OR 97208.

### FLINT RUIN *(Continued from page 5)*

colder and probably produced four feet more snow than is common today. The building may also have been used as a communal house, shared by different bands of Paleoindians at different times. According to Callahan, "This house was not just a quickly put up, nomadic type of structure. It's a substantial structure that shows a great degree of potential permanence and possible substantial habitation or multi-year use."

"Experiments have been done in Denmark," Callahan said, "where tipi type houses have been made with caribou hides, and they are so incredibly well insulated that even during winter blizzards in northern Denmark with the wind howling around outside, the smallest fire that they could possibly build made the house too hot. Two little blubber lamps kept the house at the proper temperature."

The deer hides that will be used to shingle the house today will probably not have as dense a coat as the ones from the Late Paleolithic, but the raw hides will repel moisture and act as any other kind of thatching. In addition, by smoking the house out every so often with small fires, the insect and rodent damage will be minimized, while a protective coat of creosote is added to the hides.

According to Callahan, "We would only be recycling an old myth if we looked at the earliest people as being crude or primitive in any way. People who could create the really fine fluted points they did were probably equally refined in other aspects of their technology. We now have clear examples of their work as systematic, articulate, and precise."

—Carole Bombard

**How to Collect North American Indian Artifacts**, by Robert F. Brand. For more information write to Robert F. Brand, 1029 Lake Lane, Pennsburg, PA 19873.

Holliday, Vance T. et al., Radiocarbon Ages from the Lubbock Lake Site: 1981-1984. *Plains Anthropologist*, 30(110):227-292.

Boldurian, Anthony T. et al. Fluting Devices in the Folsom Tradition: Patterning in Debitage Formation and Projectile Point Basal Configuration. *Plains Anthropologist*, 30(110):293-304.

**Emil Haury's Prehistory of the American Southwest**, edited by J. Jefferson Reid and David E. Doyel. A collection of previously published words by Haury from journals no longer available. 528 pages with 187 illustrations. Available in March. \$45.00 (US) to: University of Arizona Press, 1615 East Speedway, Tucson, AZ 85719.

**The Geoarchaeology of Whitewater Draw**, Anthropological Papers of the University of Arizona, No. 45, by Michael R. Waters. 96 pages with 44 illustrations. Available in March. \$14.95 (US) to: University of Arizona Press, 1615 E. Speedway, Tucson, AZ 85719.

**A Booklet of Archaeological Publications** from Eastern States Archaeological Federation. For more information write to: ESAF, Box 386, Bethlehem, CT 06751.

**Pitldown Productions** - Replication and Interpretation of Archaeological Materials. Send \$3.00 for their neat 48 page catalog to: Errett Callahan, Director, Pitldown Productions, 3412 Plymouth Place, Lynchburg, VA 24503.

**Tours** - Archaeology and the American Southwest Study Tour. June 28 - July 12, 1986. For more information write to the University of Bridgeport, Stamford Graduate Center, 6 Riverside Avenue, Riverside, CT 06878.

**Glaciation in Alaska - The Geologic Record**, edited by T.D. Hamilton, K.M. Reed and R.M. Thorson. A compilation of recent studies of late Tertiary and Quaternary glaciation in 10 regions of Alaska. \$18

(US) to: The Alaska Geological Society, Attn: Barbara Bascle, Box 101288, Anchorage, AK 99510.

**Preserving Field Records: A Manual.** A guide to procedures and products that will ensure the survival of important records. \$6.95 (US) to: The University Museum, Publications Division, 33rd and Spruce Streets, Philadelphia, PA 19104.

**Mastodon Bearing Springs and Late Quaternary Geochronology of the Lower Pomme De Terre Valley, Missouri.** GSA Special Paper 204, by C. Vance Haynes, Jr. An illustrated, 8 1/2" x 11" paperback with 42 pages plus oversized insert. \$10 (US) to: GSA Publication Sales, Department XXX, P.O. Box 9140, Boulder, CO 80301.

**On Track of Ice Age Mammals**, by Antony J. Sutcliffe, London, British Museum (Natural History).

**Animals and Archaeology: Husbandry in Europe**, edited by J. Clutton-Brock and C. Grigson. Archaeological Reports International Series 227, 1984. Oxford.

**The Human Skeleton**, by Pat Shipman and Alan Walker. A comprehensive view of the human skeleton from molecular and cellular bone biology up to functional gross anatomy. Divided into three parts: the nature of bone; the function of bones; and interpreting bones. 84 line drawings and 62 photographs. \$30 (US) to: Harvard University Press, 76 Garden Street, Cambridge, MA 02138.

**Effective Practices in Indian Education** from the Northwest Regional Educational Laboratory. A 211-page teachers' guide to techniques and ideas to help teachers of Indian children become more effective in their instruction and classroom management.

**Geology and Society**, by Donald R. Coates. Topics include: mineral, water, and energy resources, earthquakes, floods, landslides, volcanic activity, soil destruction, geoengineering, environmental management and law. 406 pages. \$22.50 (paper) or \$49.50 (cloth) US funds to: Chapman and Hall, 29 West 35th Street, New York, NY 10001.

**Ancient Man Information Exchange**, edited by Stephen A. Porcelli. Subscription by membership in Tekawika Institute of Ancient Man, 1812 Warren Drive, Woodbridge, VA 22191. \$8.00

# ASSESSING ESKIMO AND INDIAN AFFINITIES: CLOSER THAN YOU THINK

(Continued from page 1)

Similarities in genes between populations usually occur as a result of common ancestry; differences occur when populations are separated from each other for periods of time, preventing the exchange of genes. Thus the amount of difference between two groups is an indirect measure of the amount of time that has passed since they shared a common ancestor.

The genetic differences between populations can be described in a number of ways. One can look at one gene at a time, say a gene for a particular blood type, and measure its frequency (the percentage of people who have it) in one population compared to another population. Sometimes a particular gene will be present in one population, but absent in another. More often, the gene will be present in both groups, but at different frequencies.

Szathmari prefers to analyze this type of genetic information using a multivariate approach, which allows the examination of many gene frequencies at once. For example, one protein found in blood is serum albumin; but there are variant forms of serum albumin found in human populations. If there are two possible variants for serum albumin found in a population, then there are two gene frequencies to be calculated for that population, and those two frequencies added together will sum to 1.00 (100%). Sometimes there are more than two variants of a gene, and usually populations are tested for a number of gene types (for example, several blood types and many kinds of serum proteins).

"You can end up with literally 50 or 60 different genes for which you have gene frequencies for any two or more populations. To make some sort of meaningful statement from these numerous tables of gene frequencies, geneticists developed statistical methods to reduce all of this information into one statistic, one number. This number will make use of all the information and tell us the genetic difference between two populations. The values will range from 0 to 1. If you are comparing three populations, you calculate three sets of genetic differences, one between populations a and b, one between b and c, and one between a and c. Then you can rank these distances either from the highest to the lowest or vice versa; the smaller the distance, the greater the genetic similarity.

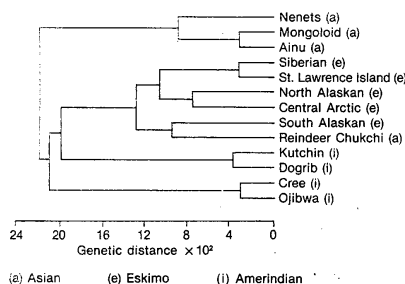
"Then there are other methods that allow you to use those genetic distances. Imagine what you would have if you were looking at 18 different populations, two by two—you would get a horribly large matrix of genetic distances. So these other methods are ways to reduce the matrices into two-dimensional images of the distances between pairs of populations, tree-like diagrams we call 'dendrograms.'" (see accompanying figure)

Szathmari has applied this multivariate technique to gene frequencies from North American Eskimo and subarctic Indians (the Athapaskan language family, including most tribes located west of Hudson Bay but excluding Haida and Tlingit; and the Algonkian language family, including tribes east of Hudson Bay). Her analysis has produced some surprises. She finds that Eskimos are more similar to Athapaskans than Athapaskans are to Algonkians.

This view contrasts from that of many physical anthropologists who have looked at native American affinities using a univariate approach, comparing skeletal and dental morphology or single gene frequencies. They have described Eskimos as very different, particularly in terms of skeletal and dental morphology, from Indians, and much more similar to the so-called "Classic Mongoloids" of Asia.

Szathmari's research indicates that, despite their overall morphological differences, Eskimos and Indians are quite similar genetically. She comments that "natural selection acts much more strongly on externally visible features, and therefore can bring about in evolutionary time much more change in external features, than in the internal traits such as red cell antigens (blood types) or serum (blood) proteins." Hence, she says, many evolutionary biologists believe that genes may be a much better (i.e., more conservative) indicator of genetic relationship than are discrete morphological features.

What can the genetics of modern populations tell us about the peopling of the Americas? Hypotheses



This dendrogram shows genetic similarities among Asian and American subarctic populations, using Nei's standard distance,  $D$ , obtained for 14 genetic systems. The length of the horizontal branches needed to connect any two groups indicates the amount of genetic distance between them. (Figure adapted from Szathmari 1985 - see Suggested Readings).

can be generated from archaeological evidence, and these can be tested with genetic data. The differences between Athapaskans and Algonkians indicate they have diverged to some degree. One explanation Szathmari offers, based on the dating of the Meadowcroft Rock Shelter in what is now Pennsylvania, is that the ancestral Algonkians may have been south of the Wisconsin glacier before 20,000 years ago, isolated from the ancestral Athapaskans by the coalescence of the Laurentide and Cordilleran Ice Sheets. Ancestral Athapaskans, on the other hand, may have been northwest of the ice, where they may have either experienced more contact with much later-arriving Eskimo groups or else simply did not differentiate as much from the ancestral Asian stock that also gave rise to Eskimos.

Because both Indians and Eskimos are derived from a common northeast Asian stock, differences between them are relatively subtle. Szathmari believes these differences are primarily due to the accumulation of so-called "neutral" mutations rather than natural selection. Because subarctic Athapaskans and Algonkians now occupy a similar environment, the

selective pressures are likely to have been similar, not different. Hence their differences are primarily due to long-term build up of tiny mutations coupled with genetic isolation.

There is a need for much more research. A persistent problem has been the availability of comparable data on many groups. In her most recent article in *Out of Asia* (see Suggested Readings), for example, she uses 14 genetic systems; yet the optimal number of systems for within-species comparisons is 30 or more. She comments, "Although a terrific amount of blood has been collected across the arctic and subarctic, the same array of genes have not been tested in every population."

An additional difficulty is the need to "pool" the data. The population sizes for subarctic groups are quite small, and the data from different villages and different tribes must be combined in some way in order to construct hypotheses about the peopling of an entire hemisphere. Szathmari has used linguistic categories to pool her data, reasoning that "a native speaker of a North American Indian language is likely to have learned it from biological relatives." But, she notes, linguistic categories are not universally agreed-upon; further, there is a danger that these terms might not be used carefully by all researchers. For example, she does not use the term "Na-Dene" (a language 'phylum' which includes the 'families' Athapaskan, and the language isolates Tlingit and Haida) to describe data which do not include the latter two (Northwest Coast) language groups; and she feels that term has been used indiscriminately by others.

Although Szathmari asserts that Athapaskan-Eskimo genetic differences are less and Athapaskan-Algonkian differences more than expected, and although she believes these suggest a particular scenario for the peopling of the Americas, she is cautious. "When I put qualifications on the data, people are very unhappy. They want answers, definite answers. They don't want anything hedged 'round with scientific caution. And I believe that, because of the spotty nature of the data, one has to hedge. But I'm convinced that this closeness between Eskimos and certain North American Indian groups is not an artifact, but reflects a genetic reality which has to be interpreted with the archaeological data that are available."

—M. Sarg

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## MAMMOTH BRIEFS

The world's oldest man-made mummy has turned up in the Atacama Desert of Chile. **Marvin Allison**, a paleopathologist at the University of Tarapaca has spent the past 8 years carbon dating more than 1500 natural and man-made mummies. The ages of these mummies range from 3,800-7,800 years. Surprisingly, only the oldest mummies were man-made; the more recent ones were naturally formed, raising interesting questions about the cultural changes that took place over those 4000 years. These Chilean mummies are better preserved than the more famous Egyptian ones and some of them predate the Egyptian mummies by more than 2500 years.

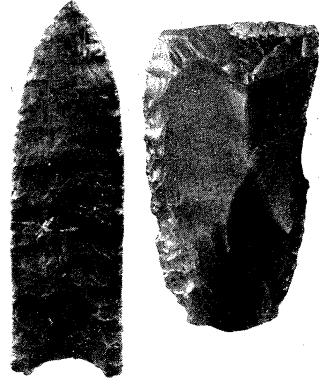
**Peter Costello**, a literary historian from Dublin, Ireland, writing in the November 1985 issue of *Antiquity*, claims to have unearthed the identity of the perpetrator of the Piltdown Hoax. According to Costello, the evidence points to **Samuel Woodhead**, the principal of an agricultural college and friend of the man who discovered the remains, **Charles Dawson**. The Piltdown Man, once thought to be the "missing link" between apes and man, turned out to be the skull of a modern man and the jaw of an orangutan. Costello believes the skull came from Piltdown Commons, which had been used as a mass grave during the plague of 1348-49. Dawson gave the skull to Woodhead so that he could harden it with potassium dichromate. Woodhead also had access to a geological and zoological collection from Borneo, whence the orangutan jaw probably came.

**Robert S. Carr**, Dade County Archaeologist, is heading a dig at a sinkhole in southern Florida that has turned out to be a rare and exciting find of human remains in direct association with extinct animals. This association with Ice Age animals suggest that humans occupied the site at least 10,000 years ago. The site contains the remains of over 50 species of animals including mammoths, lions, giant ground sloths, bison, forest peccary and short-faced bears. In addition, charred rocks and animal remains indicate the presence of a hearth. It is believed that this area, now less than 1 mile from Biscayne Bay, was once a cool, dry, savannah, miles away from the Atlantic Ocean. The radio carbon dates from the site are being eagerly awaited.

**Huang Wanpo** (Institute of Vertebrate Paleontology and Paleoanthropology, Beijing, China) reports that remains of *Gigantopithecus* were found along with the remains of other mammals in a karst cave, Wushan County, Sichuan Province, in October, 1985. The cave is located 800 meters above sea level from the Sanxia, Changjiang River. Although many other *Gigantopithecus* fossils have been found in China, this locality is the most northern of the sites. *Gigantopithecus* is a giant ape with as yet uncertain links to human ancestors. The dating of the Sanxia fossils is tentatively placed at the Early Pleistocene on the basis of faunal similarities with the more southerly Liucheng *Gigantopithecus* cave. These include *Ailuropoda microta* (panda), *Hyaena licente* (hyena), *Machairodontinae* (sabertooth cat), *Chaliostriidae* (chalicotheres), *Mastodon* (mastodon), *Tapirus cf. peii* (tapir), and *Equus cf. yunnanensis* (horse). It is hoped that the study of these new mammal fauna will help with the understanding of the geological development of the Changjiang River and the formation of the Sanxia (Yangtze River) Gorges.

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## The Milliron Site: A POINT IN CLOVIS TIME



The Milliron site, atop a butte in southeastern Montana (left), and some of the artifacts recovered there (right) which suggest a previously unknown, non-fluted toolmaking tradition. (Photo courtesy of George Frison)

A simple description of the Milliron site makes it sound pretty ordinary. A single-component site located atop a heavily-eroded butte in southeastern Montana, it probably represents a small bison kill: there is evidence of a certain amount of bone breakage in the remains, which consist of about four animals. Yet it is at least possible that the dating of this relatively simple site will lead to some reinterpretation of the prevailing theory of prehistoric cultural development for the American High Plains.

George Frison, chairman of the Department of Anthropology at the University of Wyoming and recent past president of the Society of American Archaeologists, has worked on the Milliron site for the past two summers, funded by the Bureau of Land Management (on one of whose surveys the site was first discovered) with matching funds from the University of Wyoming. He explains that the single accelerator date on charcoal from the site places it in the late Clovis period, 11,340 ± 120 years. However, Milliron cannot be a Clovis site: Clovis points are fluted and the points found with the bones at Milliron are unfluted.

Frison emphasizes that Milliron's antiquity is by no means unquestionably established as yet: if the charcoal came from a tree that was already quite old when the wood was burned, the dating is to that extent inaccurate. He wants to get five or six additional dates before coming to any conclusions. Nevertheless, if Milliron *does* turn out to be contemporaneous with late Clovis, the consequence is fairly momentous; for it puts the current theory of a single, straight-line development from Clovis to Folsom cultures somewhat into question.

Far from resisting such a conclusion, many archaeologists may think it a consummation devoutly to be wished; for a number of them are already dissatisfied with the direct Clovis-to-Folsom model, including Frison himself. "It doesn't bother me," he says. "I see no reason why we couldn't have had something contemporaneous with Clovis but that was a little different variant. I never did like to bring Folsom out of Clovis.

Most of the other technologists I know don't either; they just don't like it."

The big question is, if we discard what might be called the fundamentalist notion of Folsom drawn out of Clovis culture like Eve drawn out of Adam's rib, what developmental model is to replace it? Simply inserting the Milliron culture in the middle of the sequence, as a transitional phase between Clovis and Folsom, does not seem to work. At any rate, Frison personally does not like to think of starting out with Clovis, then evolving to a non-fluting technology, then reverting to a fluted-point culture with Folsom. In the end, Milliron may function not to splice together a gap in the present model, but to blow the whole question wide open. After all, if one previously unknown culture has been discovered, it means that there may have been others. In that case, the whole picture of North American prehistoric origins and influences may need to be rethought, or even simply shelved until more evidence is uncovered.

Milliron-type sites, it appears, have had a history of looking unobtrusive. Twenty years ago, the Irwins, a team working on the Hell Gap Site, found a pre-Folsom component which they called the Goshen complex, and in it discovered projectile points remarkably similar to the eleven that Frison has collected from Milliron. But most people dismissed the Goshen points as Plainview (which they do strongly resemble). In their *Plains Anthropologist* article in 1973, the Irwins felt that the Goshen complex should be identified as a separate cultural complex, and dated somewhere between Clovis and Folsom. But, for two decades, no other convincing evidence was found of the Goshen Complex until Milliron turned up out of nowhere.

Frison's site is about 2 meters deep, covered with alluvial material, with good sedimentation. Bison tarsals and metatarsals, as well as one set of cervicals, remain articulated, and carpals and metacarpals, if not articulated, were at least still found together, suggesting that the animals had not been moved too far from the actual place of the kill. Frison has been helped by Jerry Clark and Dave Fraley of the Montana Bureau of Land Management; taphonomy is being done by Lawrence Todd of the University of Denver; geology by John Albanese; and Beth Volk and Marty Griffith of the Montana Bureau of Land Management have provided soil analysis. This team has so far examined 85 square meters of the approximately 2000 square-meter top of the butte, and will be returning to the site next spring. Frison insists on waiting for more dates before he writes up their findings. In the meantime, though, *Mammoth Trumpet* readers might enjoy reading the book that Frison *does* have forthcoming from the University of New Mexico Press in 1986. Co-authored with Lawrence Todd, it is titled *Colby Mammoth site; Taphonomy and Archaeology of a Clovis Kill in Northern Wyoming* (approx. 228 pp.). Perhaps it may help take the edge off the suspense of awaiting further developments from Milliron.

—Michael Dolzani

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